

GRADE 5 ART

First edition

8 units

32 lessons

A video for every lesson

FIRST EDITION

COURSE GUIDE

Grade 5 Art is a full year of art instruction for ten- and eleven-year-olds. Over 32 weeks the student learns to draw what is really in front of him by sighting, measuring and seeing negative space; to draw the human figure, face, hands and animals in proportion; to paint a color wheel and control the value, intensity and temperature of color; to model form with light and shadow; to understand the materials of painting, from earth pigments and lapis lazuli to egg tempera and lightfastness; to build space with one-point, two-point and atmospheric perspective; to design a picture with balance, emphasis, movement, unity and variety; and finally to study Giotto, Fra Angelico, Raphael and the Gothic cathedrals.

Every lesson follows the same pattern: **look, learn, make**. The student looks carefully at one great work of art in a picture study, learns a clear idea about how pictures are made, and then makes something with his own hands, in the studio project and in a sketchbook. The picture study and the project always serve the same idea, so the student sees how a master solved the problem before he tries it himself.

The course is written in the classical Christian tradition. We look for what is true, good and beautiful, we learn from the old masters, and we treat careful making as a way of honoring the Creator who made us in His image. Our motto is *Fabricando fit faber*: by making, one becomes a maker.

Each lesson links one short teaching video (and often a backup) from art teachers and working artists such as John Muir Laws, Circle Line Art School, The Virtual Instructor, In the Studio with Dianne Mize, Winged Canvas, Mr. Otter Art Studio and How2DrawAnimals. Art-history and material videos come mostly from museums such as the National Gallery of Art, the Rijksmuseum, The Met and Smarthistory. Every video was chosen to teach that lesson's idea and was checked frame by frame for wholesome content, including every artwork shown on screen, but channels change, so please preview when you can. Many creators mention their own websites, courses or

supply lists at the end; you can stop the video there. If a video is ever removed, use the backup or search the lesson title with the channel name.

Start with Lesson 1.1 →

WHO IT IS FOR

Students about 10 to 11 years old (fifth grade) who can read independently and hold a pencil with control. No earlier art training is required, though students who completed Grade 4 Art will recognize the strands and go deeper. Parents need no art background: every lesson explains the idea in plain words and lists each step.

HOW TO USE THIS COURSE

1. **Weekly rhythm.** Do one lesson a week in two sessions of about 45 minutes.
Session 1: warm-up, video, core ideas and picture study. Session 2: studio project and sketchbook. At the end of each unit add a third session for the unit review and the portfolio piece. Eight units of four lessons make 32 weeks.
2. **Read the core ideas together.** A fifth grader can read them alone, but talk them over afterward. Ask him to explain the key terms in his own words. The key terms are real art vocabulary that he will use for years.
3. **Picture study.** Show the artwork as large as you can (a laptop or TV is better than a phone). Let the student look quietly for two full minutes. Then put the picture away and ask him to tell back everything he saw. Bring the picture back and work through the “Look for” items and the questions. There are no wrong first answers; the aim is careful looking.
4. **Videos.** The lesson tells you when to watch. Most are best watched once straight through and then again with pauses while the student works. Preview when you can.
5. **Studio project.** Gather the materials before the session. Follow the steps in order and read the tips. At the end, the student reads the “Check” statements and says honestly which ones he met. Date and keep every project.
6. **Sketchbook habit.** The sketchbook exercises are short (10 to 15 minutes). Do at least one each week, and more if the student enjoys them. A sketchbook is for practice, not for perfect pages; never tear pages out.

7. **Unit review and portfolio.** Each unit ends with a short review (50 points) that can be done orally or in writing, and a portfolio piece that brings the unit's skills together. Use the rubric to talk about the work. Keep the portfolio pieces in a large folder; they make a fine family art show at the end of the year.

SCOPE AND SEQUENCE

UNIT 1 • WEEKS 1–4

Observational Drawing

Drawing what you see: sighting and measuring with a pencil, drawing negative space, setting up and drawing a still life, and keeping a nature journal.

- 1.1 Sighting and Measuring
- 1.2 Negative Space
- 1.3 Drawing a Still Life
- 1.4 Nature Journaling

UNIT 3 • WEEKS 9–12

Color Theory

A painted twelve-part color wheel, the value of each color, dulling colors with their complements, and warm and cool color in landscape.

- 3.1 A Painted Color Wheel
- 3.2 The Value of Colors
- 3.3 Intensity and Complements
- 3.4 Color Temperature in Landscape

UNIT 2 • WEEKS 5–8

Form and Proportion

The proportions of the clothed human figure, the face, the hands and animals, learned by measuring in units such as “heads.”

- 2.1 The Clothed Figure in Proportion
- 2.2 The Face
- 2.3 Hands
- 2.4 Animals

UNIT 4 • WEEKS 13–16

Light and Shadow

How light models form: the core shadow and terminator, reflected light, the shapes of cast shadows, and how Vermeer painted daylight.

- 4.1 Core Shadow and the Terminator
- 4.2 Reflected Light
- 4.3 Cast Shadow Shapes
- 4.4 Light in Vermeer

UNIT 5 • WEEKS 17–20

Material Science: Where Color Comes From

Material science: earth pigments, ultramarine from lapis lazuli, egg tempera, and why some colors fade (lightfastness).

- 5.1 Earth Pigments
- 5.2 Ultramarine from Lapis Lazuli
- 5.3 Egg Tempera
- 5.4 Why Paint Fades: Lightfastness

UNIT 7 • WEEKS 25–28

Composition and Design

The principles of design: balance, emphasis, movement, and unity with variety, planned through thumbnail sketches.

- 7.1 Balance
- 7.2 Emphasis
- 7.3 Movement
- 7.4 Unity, Variety and Thumbnails

UNIT 6 • WEEKS 21–24

Perspective

Linear and atmospheric perspective: one-point review, boxes in two-point perspective, drawing buildings, and showing distance with air and color.

- 6.1 One-Point Perspective Review
- 6.2 Boxes in Two-Point Perspective
- 6.3 Drawing Buildings
- 6.4 Atmospheric Perspective

UNIT 8 • WEEKS 29–32

Sacred Art and the Renaissance

Sacred art and the Renaissance: Giotto, Fra Angelico, Raphael, and the Gothic cathedrals with their stained glass.

- 8.1 Giotto and the Fresco
- 8.2 Fra Angelico
- 8.3 Raphael
- 8.4 Gothic Cathedrals and Stained Glass

WEEKLY PACING CALENDAR

WEEK	PLAN
1	- Session 1: Lesson 1.1 Sighting and Measuring: warm-up, video, teaching and picture study - Session 2: Lesson 1.1 studio project and sketchbook practice <i>Two sessions a week is the usual rhythm. Younger children can split a long session in two; older students can do both sessions in one sitting.</i>
2	- Session 1: Lesson 1.2 Negative Space: warm-up, video, teaching and picture study - Session 2: Lesson 1.2 studio project and sketchbook practice
3	- Session 1: Lesson 1.3 Drawing a Still Life: warm-up, video, teaching and picture study - Session 2: Lesson 1.3 studio project and sketchbook practice

WEEK	PLAN
4	• Session 1: Lesson 1.4 Nature Journaling: warm-up, video, teaching and picture study • Session 2: Lesson 1.4 studio project and sketchbook practice • Session 3: Unit 1 review and portfolio piece
5	• Session 1: Lesson 2.1 The Clothed Figure in Proportion: warm-up, video, teaching and picture study • Session 2: Lesson 2.1 studio project and sketchbook practice
6	• Session 1: Lesson 2.2 The Face: warm-up, video, teaching and picture study • Session 2: Lesson 2.2 studio project and sketchbook practice
7	• Session 1: Lesson 2.3 Hands: warm-up, video, teaching and picture study • Session 2: Lesson 2.3 studio project and sketchbook practice
8	• Session 1: Lesson 2.4 Animals: warm-up, video, teaching and picture study • Session 2: Lesson 2.4 studio project and sketchbook practice • Session 3: Unit 2 review and portfolio piece
9	• Session 1: Lesson 3.1 A Painted Color Wheel: warm-up, video, teaching and picture study • Session 2: Lesson 3.1 studio project and sketchbook practice
10	• Session 1: Lesson 3.2 The Value of Colors: warm-up, video, teaching and picture study • Session 2: Lesson 3.2 studio project and sketchbook practice
11	• Session 1: Lesson 3.3 Intensity and Complements: warm-up, video, teaching and picture study • Session 2: Lesson 3.3 studio project and sketchbook practice
12	• Session 1: Lesson 3.4 Color Temperature in Landscape: warm-up, video, teaching and picture study • Session 2: Lesson 3.4 studio project and sketchbook practice • Session 3: Unit 3 review and portfolio piece
13	• Session 1: Lesson 4.1 Core Shadow and the Terminator: warm-up, video, teaching and picture study • Session 2: Lesson 4.1 studio project and sketchbook practice

WEEK	PLAN
14	• Session 1: Lesson 4.2 Reflected Light: warm-up, video, teaching and picture study • Session 2: Lesson 4.2 studio project and sketchbook practice
15	• Session 1: Lesson 4.3 Cast Shadow Shapes: warm-up, video, teaching and picture study • Session 2: Lesson 4.3 studio project and sketchbook practice
16	• Session 1: Lesson 4.4 Light in Vermeer: warm-up, video, teaching and picture study • Session 2: Lesson 4.4 studio project and sketchbook practice • Session 3: Unit 4 review and portfolio piece
17	• Session 1: Lesson 5.1 Earth Pigments: warm-up, video, teaching and picture study • Session 2: Lesson 5.1 studio project and sketchbook practice
18	• Session 1: Lesson 5.2 Ultramarine from Lapis Lazuli: warm-up, video, teaching and picture study • Session 2: Lesson 5.2 studio project and sketchbook practice
19	• Session 1: Lesson 5.3 Egg Tempera: warm-up, video, teaching and picture study • Session 2: Lesson 5.3 studio project and sketchbook practice
20	• Session 1: Lesson 5.4 Why Paint Fades: Lightfastness: warm-up, video, teaching and picture study • Session 2: Lesson 5.4 studio project and sketchbook practice • Session 3: Unit 5 review and portfolio piece
21	• Session 1: Lesson 6.1 One-Point Perspective Review: warm-up, video, teaching and picture study • Session 2: Lesson 6.1 studio project and sketchbook practice
22	• Session 1: Lesson 6.2 Boxes in Two-Point Perspective: warm-up, video, teaching and picture study • Session 2: Lesson 6.2 studio project and sketchbook practice
23	• Session 1: Lesson 6.3 Drawing Buildings: warm-up, video, teaching and picture study • Session 2: Lesson 6.3 studio project and sketchbook practice
24	• Session 1: Lesson 6.4 Atmospheric Perspective: warm-up, video, teaching and picture study

WEEK	PLAN
	- Session 2: Lesson 6.4 studio project and sketchbook practice - Session 3: Unit 6 review and portfolio piece
25	- Session 1: Lesson 7.1 Balance: warm-up, video, teaching and picture study - Session 2: Lesson 7.1 studio project and sketchbook practice
26	- Session 1: Lesson 7.2 Emphasis: warm-up, video, teaching and picture study - Session 2: Lesson 7.2 studio project and sketchbook practice
27	- Session 1: Lesson 7.3 Movement: warm-up, video, teaching and picture study - Session 2: Lesson 7.3 studio project and sketchbook practice
28	- Session 1: Lesson 7.4 Unity, Variety and Thumbnails: warm-up, video, teaching and picture study - Session 2: Lesson 7.4 studio project and sketchbook practice - Session 3: Unit 7 review and portfolio piece
29	- Session 1: Lesson 8.1 Giotto and the Fresco: warm-up, video, teaching and picture study - Session 2: Lesson 8.1 studio project and sketchbook practice
30	- Session 1: Lesson 8.2 Fra Angelico: warm-up, video, teaching and picture study - Session 2: Lesson 8.2 studio project and sketchbook practice
31	- Session 1: Lesson 8.3 Raphael: warm-up, video, teaching and picture study - Session 2: Lesson 8.3 studio project and sketchbook practice
32	- Session 1: Lesson 8.4 Gothic Cathedrals and Stained Glass: warm-up, video, teaching and picture study - Session 2: Lesson 8.4 studio project and sketchbook practice - Session 3: Unit 8 review and portfolio piece <i>Last week. Hold a family art show: hang the best piece from each unit and let the student tell guests about one of them.</i>

MATERIALS

Sketchbook (9×12 in, mixed-media paper, at least 60 sheets)

For warm-ups and sketchbook practice all year. Mixed-media paper takes pencil, marker and light watercolor.

Drawing pencils: HB, 2B, 4B and 6B

HB for light layout lines, the B pencils for shading. Unit 5 explains why B pencils are darker.

Kneaded eraser and a white plastic eraser

The kneaded eraser lifts graphite gently and can be shaped to a point for highlights.

Pencil sharpener, ruler (12 in) and a few paper clips or bulldog clips

The ruler is for perspective lessons; clips hold paper to a board.

Drawing paper (pad of 9×12 or 11×14 in, 70 lb or heavier)

For studio projects.

Watercolor paper (pad of 9×12 in, 140 lb / 300 gsm, cold press)

Heavier paper does not buckle as much when wet. Cotton paper is a treat but not required.

Tempera or acrylic paint in primary colors plus white and black

Best: a warm and a cool of each primary (for example, cadmium-type red and a magenta or crimson; lemon yellow and a warm yellow; ultramarine blue and a phthalo or cyan blue). Student-grade is fine.

Watercolor pan set (12 colors or more)

For nature journaling, landscapes and color studies.

Brushes: a round size 8, a round size 4, a flat ½ in

Synthetic brushes are fine. Rinse them and reshape the tips after use.

Colored pencils (24 colors) and oil pastels (24 colors)

Colored pencils for detail and layering; oil pastels for bold color studies.

Palette (a white plastic plate or a palette with wells), water jars, paper towels

A white palette lets you see colors truly.

Black fine-line marker (waterproof)

For ink lines in the nature journal and design studies.

For Unit 5: a few eggs, powdered earth pigments or soft chalk pastels in earth colors, a small jar with a lid, a craft stick

Used to make egg tempera and earth-color paint at the kitchen table. Inexpensive dry pigments (ochre, sienna, umber) are sold in art stores; brown, yellow-ochre and rust chalk pastels crushed into powder also work.

A desk lamp and a few white objects (eggs, a ball, a mug, a box)

For the light and shadow lessons.

A viewfinder (a 3×4 in window cut in a piece of cardstock)

Helps the student choose and frame a subject. Make one in Lesson 1.3.

A large folder or portfolio

Keeps finished projects flat and safe for the year-end art show.

GRADING

Grade the work by effort, care and growth in the skills each lesson teaches, not by talent. Use the self-check statements in each project and the rubrics on the portfolio pieces as your guide.

PART	%
Studio projects	40
Sketchbook practice	20
Unit reviews	15
Portfolio pieces	25

Scale: A 90–100, B 80–89, C 70–79, D 60–69, below 60 needs more practice before moving on.

- For a studio project, give full marks when the student followed every step with care and met the check statements, even if the result is not yet polished.
- Sketchbook practice is graded on completion and honest effort. Count the exercises done each week.
- Unit reviews are worth 50 points each. They may be given orally; write down the student's answers.
- Portfolio pieces are scored with the rubric: for each criterion give 5 (clearly shown), 3 (partly shown) or 1 (not yet shown), then convert to a percentage.
- Write one sentence of specific praise and one sentence of next-step advice on every portfolio piece. Specific words (“your cast shadow is sharp near the cup and soft farther away”) teach more than general praise.

A NOTE TO PARENTS

You do not need to be an artist to teach this course. You need to be a good companion in looking. Sit beside your student during the picture study, wonder aloud, and ask, “What do you see that makes you say that?” Your interest is the best encouragement he can have.

Fifth graders often become self-critical about their drawings. Remind your student that drawing is a skill learned by practice, like reading or arithmetic, and that the old masters also filled sketchbooks with studies. Praise patience, careful looking and good craftsmanship. Skill will follow, and by the end of the year you will both be surprised at how far he has come.

UNIT 1

OBSERVATIONAL DRAWING

This unit teaches the most important skill in drawing: seeing what is really there. Most people draw from the pictures stored in their heads, which is why so many drawings of a mug or a tree look alike. An artist trains his eyes to notice the true sizes, angles and shapes of things in front of him.

You will learn to measure with your pencil (called sighting), to draw the empty spaces around an object (negative space), to arrange and draw a still life, and to keep a nature journal the way scientists and artists have done for centuries. By the end of the unit your drawings will look more like the real thing because you will have looked more carefully.

PREREQUISITES

- Can hold a pencil lightly and draw light and dark lines
- Knows the basic shapes (circle, oval, rectangle, triangle)
- Has a sketchbook and drawing pencils (HB, 2B, 4B)

MASTERY CHECKLIST

- ☐ I can measure the height and width of an object with my pencil at arm's length.
- ☐ I can compare sizes using one part as a unit of measure.
- ☐ I can draw the negative spaces around an object to find its shape.
- ☐ I can set up a still life with overlapping objects and draw it from life.
- ☐ I can make a nature journal page with words, pictures and numbers.

LESSONS IN THIS UNIT

1.1 Sighting and Measuring

2 sessions of 45 minutes

1.2 Negative Space

2 sessions of 45 minutes

1.3 Drawing a Still Life

2 sessions of 45 minutes

1.4 Nature Journaling

2 sessions of 45 minutes

UNIT 1 REVIEW

Answer each question in a sentence or two, or by drawing when asked. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What is observational drawing, and how is it different from drawing from memory?

2. (5 pts)

Describe how to sight the height of an object with your pencil.

3. (5 pts)

Why must your elbow stay locked when you sight?

4. (5 pts)

What is a unit of measure? Give an example.

5. (5 pts)

Explain positive space and negative space.

6. (5 pts)

Why does drawing negative space help you draw more accurately?

7. (5 pts)

Name three things to think about when you set up a still life.

8. (5 pts)

What does a viewfinder help you do?

9. (5 pts)

Name the three tools a nature journal page uses, with one example of each.

10. (5 pts)

Name one of this unit's picture studies and tell one thing the artist observed carefully.

ANSWER KEY

1. Observational drawing is drawing something real that is in front of you. Drawing from memory uses the simple symbols stored in your head, so it is less accurate.
2. Hold the pencil straight up at arm's length with the elbow locked, close one eye, line up the tip with the top of the object, and slide your thumb to the bottom.
3. So the pencil is always the same distance from your eye; otherwise every measurement changes.
4. One part you measure first and use to compare everything else, such as the height of a mug ("the bottle is 2½ mugs tall").
5. Positive space is the subject itself; negative space is the empty space around and between its parts.
6. You have no memory symbol for the gaps, so you must look at their true shapes, and they are simpler shapes that are easier to see correctly. They also help you check your drawing.
7. Any three: use different heights and shapes, overlap some objects, use an odd number of objects, light from one side, a plain background, choose the view with a viewfinder.
8. Choose and frame your composition: what goes in the picture and where it sits.
9. Pictures (a large drawing and a detail study), words (labels and "I notice, I wonder" sentences), numbers (measurements, counts, temperature).
10. For example: Dürer's *Great Piece of Turf* shows each blade of grass and dandelion leaf; Sánchez Cotán measured the sizes of the vegetables; Hiroshige designed the sky shapes between the branches.

PORTFOLIO PIECE: A STILL LIFE DRAWN FROM LIFE

Set up a new still life of four or five objects, including at least one natural object (a pinecone, a gourd, a leafy branch or fruit). Light it from one side. Draw it on 11×14 in paper with pencil, using sighting to measure proportions and negative shapes to check your drawing. Leave your light sighting marks visible in one corner to show your process, and add simple shading for the light and shadow sides.

LOOK FOR	WHAT IT MEANS
Proportion	The sizes of the objects compare correctly with one another, checked by sighting.
Negative space	The gaps between and around the objects match the real setup.
Composition	Objects overlap, vary in height, and the group fills the page without crowding an edge.
Line and shading	Guidelines are light, final lines are clear, and each object has a light side and a shadow side.
Care and patience	The drawing shows careful, unhurried looking from start to finish.

1.1 SIGHTING AND MEASURING

OBJECTIVES

- Measure the height and width of an object by sighting with a pencil at arm's length.
- Choose a unit of measure and use it to compare the sizes of several objects.
- Find the angle of an edge by comparing it with a vertical or horizontal pencil.

Warm-up. Look at a coffee mug for one minute. Hide it, and draw it from memory in your sketchbook. Then bring it back and draw it again while looking. Put the two drawings side by side. Which one is closer to the real mug? Write one thing you noticed only when you were looking.

WATCH

How To Draw With Sighting

Drawsh Studio • 8:09

<https://www.youtube.com/watch?v=2sK4O5Zdhcs>

WHEN TO WATCH

After the core ideas. Watch once, then watch the first half again with a pencil in your hand and copy the arm position.

BACKUP VIDEO

Drawing with Simple Sighting Technique

Chris Triner • 8:44

https://www.youtube.com/watch?v=Otv_l_qkML4

Use if the main video is unavailable, or as a second explanation before the studio project.

KEY TERMS

observational drawing

Drawing from something real that is in front of you, not from memory or imagination.

sighting

Measuring sizes and angles by holding your pencil at arm's length and lining it up with what you see.

proportion

How the sizes of things compare to each other, such as “the bottle is twice as tall as the cup.”

unit of measure

One part you measure first and then use to measure everything else, like the height of a mug.

plumb line

A straight up-and-down (vertical) line you sight to check which parts of a subject line up with each other.

CORE IDEAS

When you draw from memory, your brain hands you a **symbol**: a simple, flat picture of a mug or a tree that it has stored away. Symbols are useful for writing, but they make drawings look stiff and alike. **Observational drawing** means drawing what is actually in front of you. To do that, you have to slow down and check sizes, angles and shapes with your eyes, not with your memory.

Artists check sizes by **sighting**. Hold your pencil straight up and down at arm’s length, with your elbow locked so the pencil is always the same distance from your eye. Close one eye. Line the tip of the pencil up with the top of the object and slide your thumb down the pencil until it lines up with the bottom. The piece of pencil above your thumb is the object’s height *as you see it*. Turn the pencil sideways, keeping your thumb in place, to compare that height with the width.

Sighting works by comparing, so first choose a **unit of measure**, usually a small, clear part such as the height of a mug. Then ask, “How many mugs tall is the bottle? How many mugs wide is the bowl?” You might find the bottle is 2½ mugs tall. These comparisons are called **proportions**. If your drawing keeps the same proportions as the real objects, it will look right at any size.

Sighting also finds **angles**. Hold your pencil perfectly vertical (up and down) or horizontal (side to side) next to a slanted edge, such as the rim of a bowl or the side of a roof. Ask, “Is this edge closer to flat or closer to standing up?” You can also tilt the pencil to match the edge, then carefully bring the pencil down to your paper without changing its tilt.

A **plumb line** is an imaginary vertical line. Hold your pencil straight up and slide it across the scene: which parts line up? Maybe the handle of the mug is directly above

the corner of the book. Level lines (horizontal) work the same way. These checks catch mistakes before they are drawn dark.

Measure lightly and often, especially at the beginning. Make small tick marks for tops and bottoms, block in simple boxes, then draw the true shapes inside.

Measuring is a way of checking your eye, not a cage. As you practice, your eye will grow more accurate and you will need to measure less.

PICTURE STUDY



Quince, Cabbage, Melon and Cucumber, Juan Sánchez Cotán, about 1602 · Oil on canvas · San Diego Museum of Art, San Diego

Image: [Wikimedia Commons](#), public domain

Juan Sánchez Cotán was a Spanish painter who, soon after making this picture, left his studio to become a lay brother in a monastery, where he kept painting for the rest of his life. He painted ordinary vegetables with such patient, exact looking that they seem close enough to touch. Every size and every edge here was checked against the real thing.

Look closely

- Find the dark window opening. Its straight edges make a frame, like the rectangle you will draw around your own still life.
- Compare sizes. How many quinces wide is the cabbage? Is the melon wider or narrower than the cabbage?
- Trace with your finger the curve the objects make, from the quince at the top left down to the cucumber at the bottom right.
- Look at the cucumber and the melon slice. They stick out past the edge of the ledge toward you. How does the painter show that?

Talk about it

1. Why do you think the painter hung the quince and cabbage on strings instead of setting everything on the ledge?

2. Which object looks most real to you? What did the painter do to make it look that way?
3. This painting shows very plain foods. Why might a painter think plain things are worth such careful attention?

STUDIO PROJECT

Three Objects, Measured

You will draw three kitchen objects of different heights from life, using sighting to get their proportions right. The aim is not a fancy picture but an accurate one: if someone set your drawing beside the real objects, the sizes would match.

You will need

- Drawing paper (9×12 in)
- HB and 2B pencils
- Kneaded eraser
- Three objects of different heights, such as a mug, a tall bottle and a short jar or can
- A table and a chair you can sit in without moving

Steps

1. Set the three objects in a row on a table, with a little space between them. Sit about 6 to 8 feet away. Mark the legs of your chair with tape so you can sit in the same place next session; if you move, every measurement changes.
2. Choose your unit of measure: the height of the mug. Sight it with your pencil (arm straight, elbow locked, one eye closed). Remember the length on your pencil.
3. Measure the height of the bottle in mugs, then the jar. Measure the width of each object in mugs too. Write the results in the corner of your paper, for example “bottle = 2½ mugs tall, ½ mug wide.”
4. Decide how tall the mug will be on your paper (about 2 inches works well). With the HB pencil, make light tick marks for the top and bottom of each object, using your measurements to space them.
5. Use plumb lines and level lines: hold your pencil straight up and sideways to see where the objects line up. Is the top of the jar level with the middle of the mug? Mark it.
6. Block in each object as a light box, then draw the real shapes inside the boxes: the oval of the mug’s rim, the curve of the bottle’s shoulder, the

handle.

7. Check angles. Hold your pencil level and compare it with the bottom curves of the objects and the edge of the table.
8. When the shapes are right, go over the final lines with the 2B pencil, pressing harder where an edge is in shadow. Erase the boxes and tick marks with the kneaded eraser.

Tips

- If your arm gets tired, rest it between measurements, but always lock the elbow when you measure.
- Ovals at the top of a mug or jar are flatter when they are near your eye level and rounder when they are lower. Look carefully at each one.
- Measure, draw a little, then measure again. Short loops of checking work better than measuring everything at once.

Check your work

- ☐ The heights of my three objects compare the same way on my paper as in real life.
- ☐ I used plumb lines or level lines to check where objects line up.
- ☐ My guidelines are light, and my final lines are darker and clean.

SKETCHBOOK PRACTICE

1. Sight a door in your house. How many of its widths tall is it? Draw the door with its handle and hinges in the right places.
2. Draw your own shoe from the side. Use the height of the heel as your unit of measure.
3. Draw a chair. Before you draw, find two plumb lines (parts of the chair that line up vertically) and mark them lightly.

From history. In 1525 Albrecht Dürer published a book called *Instruction in Measurement*, with woodcuts showing artists using grids, strings and frames to measure exactly what they saw. Renaissance artists believed that careful measuring was part of honest seeing. Your pencil is a simpler version of the same tool.

COMMON MISTAKES

- Bending the elbow while sighting. The pencil must stay the same distance from your eye, so lock your arm every time.

- Moving your chair or leaning between measurements, which makes every size change.
- Pressing hard from the start. Early lines are guesses to be checked, so keep them light.
- Measuring once and then never checking again. Return to your unit of measure often.

Make it a game • Guess How Many Mugs. Pick a mug as your unit of measure. Sight a lamp, a book and a chair at arm's length with your pencil, and each of you writes down how many mugs tall each one is. Check with string or a ruler. Closest guess scores a point. First to five wins.

Scripture. “Who hath measured the waters in the hollow of his hand, and meted out heaven with the span” (Isaiah 40:12, KJV)

God made the world with perfect measure and proportion. When we measure carefully to draw it truly, we are paying attention to the order He built into creation.

1.2 NEGATIVE SPACE

OBJECTIVES

- Tell the difference between positive space and negative space.
- Draw an object by drawing the shapes of the spaces around and between its parts.
- Use negative shapes to check the accuracy of a drawing.

Warm-up. Hold your hand up with your fingers spread against a plain wall. Instead of drawing your fingers, draw only the shapes of the wall you can see between them. Then look: did your hand appear?

WATCH

Draw Tip Tuesday - How To: Negative Spaces

Koosje Koene | Draw Tip Tuesday · 5:18

<https://www.youtube.com/watch?v=ZJJOBWbvHRs>

WHEN TO WATCH

After the core ideas and before the studio project. Pause when she first fills in a negative shape and point to it.

BACKUP VIDEO

Intro to Positive & Negative Space

Sauer's Virtual Art Room · 3:34

https://www.youtube.com/watch?v=z9TT5f_l6Zw

A short explanation of the two kinds of space; good before the picture study.

KEY TERMS

positive space

The space taken up by the subject itself, such as the chair or the branch.

negative shape

One closed piece of negative space, such as the gap between two chair legs.

negative space

The empty space around and between the parts of the subject.

silhouette

The outline shape of something filled in with one flat dark color, like a shadow puppet.

CORE IDEAS

Everything you look at has two kinds of space. **Positive space** is the thing itself: the chair, the plant, the bicycle. **Negative space** is everything else: the air around it and the gaps between its parts. In a picture, both kinds of space have shapes, and both are equally real on the paper.

Why draw the empty spaces? Because your brain does not have a stored symbol for “the gap between a chair leg and its crossbar.” When you draw that gap, you cannot fall back on memory. You have to look. Negative shapes are often simple, flat shapes such as triangles and odd rectangles, and they are easier to see truly than the object itself.

To draw negative space, pick one gap and look only at its shape. How tall is it compared with its width? Are its corners square or slanted? Draw that shape. Then draw the shape next to it, which shares an edge with the first. Little by little the shapes fit together like puzzle pieces, and the object appears in the middle, made by its surroundings.

Negative space is also the best way to **check** a drawing. If a gap in your drawing is wider or taller than the gap you see, something is off. Artists squint at the subject and the drawing and compare the negative shapes; mistakes jump out right away.

Good artists also design the negative space. In a well-made picture the spaces around the subject are interesting shapes, not leftovers. Japanese printmakers were masters at this: a single branch can divide the sky into beautiful pieces.

PICTURE STUDY



Plum Park in Kameido, Utagawa Hiroshige, 1857 · Woodblock print, ink and color on paper · Many copies were printed; this impression is in the Rijksmuseum, Amsterdam

Image: [Wikimedia Commons](#), public domain

Hiroshige made this print as part of a series called *One Hundred Famous Views of Edo* (old Tokyo). He placed a huge, dark plum branch right in front of us, so close that it is cut off by the edges of the picture. The branch divides the glowing sky into strong shapes. Vincent van Gogh admired this print so much that he copied it in oil paint.

Look closely

- Look at the dark trunk and branches. This is the positive space. Now look only at the sky between the branches. Count how many separate negative shapes you can find.
- Find the biggest negative shape and the smallest one. Are they all different sizes?
- Notice the band of red at the top and the pale band near the horizon. How do these flat colors make the dark branch stand out?
- Find the tiny people behind the fence. How does their small size make the near branch feel huge?

Talk about it

1. If you painted the sky shapes all one color and the branch white, would you still recognize a tree? Why?
2. Why do you think Hiroshige let the branch run off the edges of the print?
3. Which part of the picture did your eye go to first? What led it there?

STUDIO PROJECT

A Chair Drawn from the Spaces

Chairs are hard to draw from memory because of all their legs and rungs. You will draw a real chair only by drawing the negative spaces between and around its parts. Then you will fill in the negative space with dark pencil so the chair shines out as a light shape.

You will need

- Drawing paper (9×12 in)
- HB and 4B pencils (or a black marker for filling)
- Kneaded eraser
- A wooden kitchen chair or any chair with open legs and rungs
- Optional: a sheet of colored paper to set behind the chair

Steps

1. Set the chair a few feet away, turned at a slight angle so you can see three or four legs. Sit where you can see the whole chair without moving your head much.
2. Lightly draw a rectangle on your paper for the whole chair. Use sighting: how many seat-widths tall is the chair? Make the rectangle match.
3. Choose one easy negative shape, such as the gap under the seat between two front legs. Look at it as if it were a flat piece of paper. Draw its outline lightly in the right place inside your rectangle.
4. Move to the shape next door, which shares an edge with the first. Draw it. Keep going, one gap at a time: between the rungs, between the back slats, between the legs and the edge of your rectangle.
5. Never draw the chair directly. If you catch yourself drawing “a leg,” stop and look at the space beside the leg instead.
6. After all the gaps are drawn, step back. Compare your negative shapes with the real ones. Fix any shape that is too wide or too narrow.
7. Fill every negative shape with dark, even tone using the 4B pencil (or a marker). Keep your strokes going the same direction so the dark is smooth.

8. Leave the chair itself white. Erase any stray lines on the chair with the kneaded eraser. Your chair now appears as a light silhouette made by the dark spaces.

Tips

- Squinting helps: it blurs details and makes the shapes of the gaps easier to see.
- If a space is not closed (it runs off to the edge), let the edge of your rectangle close it.
- A plant with big leaves, a bicycle wheel, or a stool make good second subjects if you enjoy this.

Check your work

- ☐ I drew the spaces, not the chair, from start to finish.
- ☐ My negative shapes match the real gaps in size and angle.
- ☐ The negative space is filled evenly, and the chair stands out as a clean light shape.

SKETCHBOOK PRACTICE

1. Draw a houseplant or a leafy branch in a jar by drawing only the spaces between the leaves. Fill the spaces with colored pencil.
2. Look at a tree against the sky. Draw five negative shapes you see between its branches.
3. Cut a simple shape (a cup or a bird) from black paper. Glue it on white paper and notice how the white around it also became a shape.

From history. Japanese woodblock prints like Hiroshige's were carved on several blocks of cherry wood, one for each color, and printed by hand. When they reached Europe in the 1800s, painters such as Monet and Van Gogh were amazed by their bold flat shapes and daring use of empty space, and their own pictures changed because of it.

COMMON MISTAKES

- Switching back to drawing the object. Keep your eyes on the empty shapes.
- Making all the negative shapes the same size. Real gaps vary; look at each one fresh.

- Filling the dark areas with scribbles that leave white specks. Use steady, even strokes.

Make it a game · Draw Only the Spaces. Set a chair where both of you can see it. Draw only the negative shapes between the legs and rungs, never the chair's own outline. Your parent guesses the moment the chair appears. Then swap. How few shapes did it take before someone shouted, 'Chair!'?

1.3 DRAWING A STILL LIFE

OBJECTIVES

- Arrange a still life with overlapping objects of different heights, shapes and textures.
- Use a viewfinder to choose a composition.
- Draw the still life from life, using sighting and negative space to check proportions.

Warm-up. Make a viewfinder: cut a 3×4 inch rectangle out of the middle of a piece of cardstock. Hold it up and look through it at your room. Find three different “pictures” by moving it closer and farther. Make a quick thumbnail sketch of your favorite.

WATCH

Draw a Still Life: From Line Drawing to Shading

Circle Line Art School · 5:59

<https://www.youtube.com/watch?v=tpFBpo17ORA>

WHEN TO WATCH

Watch how the drawing starts with simple shapes, center lines and ellipses, and how overlaps are checked before shading.

BACKUP VIDEO

How To Set Up a Still Life, and Light It

Classical Art at Home, Homeschool Curriculum · 5:47

<https://www.youtube.com/watch?v=gc09xbNIDrc>

Before setting up your still life in Session 2; shows how to arrange and light the objects.

KEY TERMS

still life

A picture of objects that do not move, such as fruit, dishes, books or flowers, arranged by the artist.

overlap

When one object is in front of another and hides part of it. Overlapping makes a picture look deep.

viewfinder

A small window cut in card that you look through to choose what to put in your picture.

composition

The arrangement of all the parts of a picture.

CORE IDEAS

A **still life** is a picture of objects that stay still: fruit, bowls, jugs, books, flowers. Artists have painted still lifes for hundreds of years because the objects wait patiently while you study them. A still life is the best place to practice everything you learned about sighting and negative space.

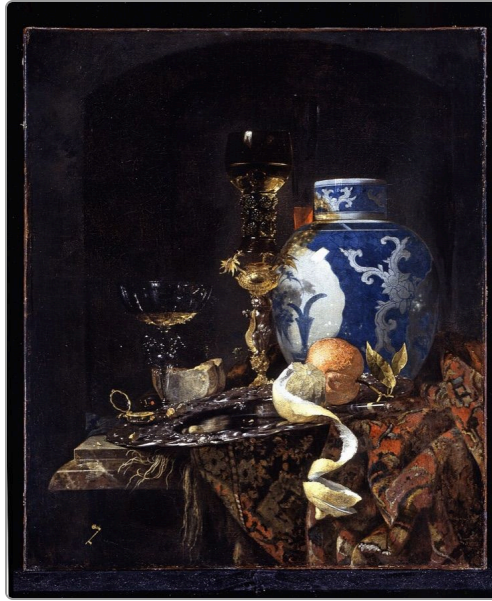
Setting up a still life is part of the art. Choose three to five objects that are different from each other: one tall, one round, one low; one shiny, one soft, one rough. Odd numbers (three or five) usually look more natural than pairs. Place some objects so that they **overlap**, with one partly in front of another. Overlapping ties the group together and makes the picture look deep.

Light matters too. Put a lamp or a window on one side so the light comes mainly from one direction. Then each object will have a lit side and a shadow side, and each will cast a shadow on the table. A plain cloth or a sheet of paper behind the objects keeps the background quiet.

Before drawing, look through a **viewfinder**. Move it until the group fills most of the window, with a little space around it. Avoid placing the group exactly in the middle or squeezing it against an edge. This choice is your **composition**.

Draw from big to small. First lightly block in the whole group as one shape. Then sight each object's height and width and draw it as a simple shape. Check the negative shapes between objects. Only after everything is placed correctly do you add details and shading.

PICTURE STUDY



Still Life with a Chinese Porcelain Jar, Willem Kalf, 1669 · Oil on canvas · Indianapolis Museum of Art, Indianapolis

Image: [Wikimedia Commons](#), public domain

Willem Kalf was a Dutch painter who specialized in still lifes of beautiful, costly objects: Chinese porcelain, Venetian glass, silver and fruit from faraway lands. He arranged each object with great care so that shapes, colors and textures play against one another. Look closely at how he overlaps and groups his objects.

Look closely

- Find the tallest object, the roundest object and the lowest object. Kalf chose objects of different heights on purpose.
- Find three places where one object overlaps another.
- Look at the lemon peel hanging down over the edge of the table. What does it add to the picture?
- Notice the dark background. How does it make the objects glow?

Talk about it

1. How many different textures (shiny, soft, smooth, bumpy) can you find? How did Kalf show each one?
2. Why do you think the objects are grouped close together instead of spread out in a line?

3. If you were setting up a still life to show what your family cares about, what objects would you choose?

STUDIO PROJECT

My Kitchen Still Life

You will set up, light and draw your own still life of three to five objects. Use everything from this unit: the viewfinder to compose, sighting to measure, and negative space to check. Then add simple shading to show the light.

You will need

- Drawing paper (11×14 in or 9×12 in)
- HB, 2B and 4B pencils
- Kneaded eraser
- Viewfinder from the warm-up
- Three to five objects (for example, a jug, an apple, a lemon, a bowl, a book)
- A plain cloth or a sheet of paper for the background
- A desk lamp

Steps

1. Choose your objects: one tall, one round, one low, and if you like, one with an interesting texture. Place them on the cloth so that at least two overlap. Try several arrangements.
2. Put the lamp on one side, slightly above the objects, and turn off other lights if you can. Check that each object has a light side and a shadow side.
3. Look through your viewfinder and choose the composition. Draw a small thumbnail (2×3 in) in your sketchbook to plan where the group sits on the page.
4. On your drawing paper, lightly draw the outer shape of the whole group with the HB pencil. Make it fill most of the page.
5. Pick a unit of measure (the height of the apple works well). Sight and mark the height and width of each object. Block each one in as a simple shape: ovals, circles, rectangles.
6. Check the negative shapes between the objects and between the objects and the table edge. Adjust anything that is off.

7. Refine each contour: the spout of the jug, the dimple of the apple, the thickness of the bowl's rim. Erase guidelines you no longer need.
8. With the 2B pencil, lightly shade the shadow side of each object. Use the 4B for the darkest shadows on the table, right where each object touches it.
9. Leave the brightest spots white. Step back, squint, and compare your drawing with the setup. Darken anything that looks too pale.

Tips

- Draw what you see, not what you know. The far side of a bowl is hidden; do not draw it.
- Keep the lamp in the same place for both sessions, or take a phone photo of the setup so you can rebuild it.
- If the drawing is getting crowded, draw fewer objects bigger rather than more objects smaller.

Check your work

- ☐ At least two of my objects overlap, and they are different heights.
- ☐ My objects are in proportion to one another, checked by sighting.
- ☐ Each object has a light side and a shadow side that agree with my lamp.

SKETCHBOOK PRACTICE

1. Draw a single piece of fruit three times: from above, from the side, and cut in half.
2. Set up two objects and draw them first apart, then overlapping. Which drawing looks deeper?
3. Draw five thumbnail compositions of the same still life by moving your viewfinder. Circle the best one.

From history. Still life became a favorite kind of painting in the Netherlands in the 1600s. Dutch painters such as Willem Kalf, Pieter Claesz and Willem Claesz Heda painted tables of food, glass and silver so precisely that people said they could almost taste the fruit. Many of these pictures were also quiet reminders to be thankful for daily bread.

COMMON MISTAKES

- Lining objects up in a row like soldiers. Overlap them and vary their heights.

- Drawing the objects too small in the middle of the page with lots of empty paper. Let the group fill the page.
- Drawing the rim of a bowl or cup as a flat line. Rims are ovals.

Make it a game · What Moved?. Build a still life of three overlapping objects of different heights. Look through your paper viewfinder for twenty seconds, then turn around. Your parent changes one thing: moves, swaps or removes it. Turn back and name exactly what changed and which object now overlaps which. Switch roles and make it trickier.

1.4 NATURE JOURNALING

OBJECTIVES

- Observe a plant or small creature closely and record it with words, pictures and numbers.
- Draw a natural subject large, with a close-up detail drawing.
- Ask questions and write observations the way a naturalist does.

Warm-up. Go outside or to a window and set a timer for three minutes. Write a list of everything you notice: colors, sounds, movements, smells. Try to reach at least fifteen things.

WATCH

Nature Journaling w/ Rosalie Haizlett | Ranger Rick Kids

Ranger Rick · 2:17

<https://www.youtube.com/watch?v=-kVmzeeK0ZM>

WHEN TO WATCH

Before you go outside. Listen for what a naturalist notices and writes down, then try it yourself.

BACKUP VIDEO

The Nature Journal Connection, Episode 1: Introduction to Nature Journaling

John Muir Laws · 12:28

<https://www.youtube.com/watch?v=0Fb65ZOjBDA>

A longer introduction to nature journaling from John Muir Laws, a well-known naturalist and teacher.

KEY TERMS

nature journal

A sketchbook where you record what you observe in nature with drawings, writing and measurements.

naturalist

A person who studies plants, animals and the natural world by careful observation.

detail study

A small, close-up drawing of one part of a subject, such as the edge of a leaf or the eye of a bird.

annotation

A short note written next to a drawing to explain or label it.

CORE IDEAS

A **nature journal** is a record of what you see in God’s creation, made with drawings, words and numbers. For centuries, artists and scientists kept journals like this. A drawing slows you down, and while you draw you notice far more than you would by just glancing.

A good journal page uses three tools. **Pictures:** a large drawing of your subject, plus a **detail study** of one part up close (the veins of a leaf, the seed in a pod). **Words:** notes and labels, called **annotations**, and full sentences beginning “I notice...,” “I wonder...,” and “It reminds me of...” **Numbers:** measurements, counts and the time and temperature.

Begin every page with the date, the place, the time and the weather. These facts turn a drawing into a record you can compare next week, next season or next year.

Use everything you have learned. Sight the proportions of a leaf (how many widths long is it?). Look at the negative spaces between petals. Draw lightly first, then darken. Add color with colored pencil or watercolor, matching the real color as closely as you can by testing it on the edge of the page.

You do not need to finish everything. A journal page can hold one careful drawing and many quick sketches. What matters is honest observation. If you are not sure about something, write a question. Questions are the beginning of learning.

PICTURE STUDY



Great Piece of Turf, Albrecht Dürer, 1503 · Watercolor and gouache on paper · Albertina, Vienna

Image: [Wikimedia Commons](#), public domain

Albrecht Dürer, the great German artist, dug up a piece of an ordinary meadow and painted it as carefully as if it were a king. Nobody before him had painted weeds and grasses with such loving attention. It is really a page from an artist's nature study, made more than five hundred years ago.

Look closely

- Find the dandelion leaves and flower heads. How many can you count?
- Look at the bottom of the picture. How does Dürer show the dark, wet soil and roots?
- Notice that the background is empty. Why might he have left it plain?
- Follow one blade of grass from the bottom to its tip. Does it overlap other blades?

Talk about it

1. Why would a famous artist spend days painting weeds?
2. What would you have to do to paint a patch of grass this carefully?
3. What is one small, ordinary thing near your home that deserves this kind of looking?

STUDIO PROJECT

A Naturalist's Journal Page

You will make one full nature journal page about a single plant (or a leaf, flower, pinecone, feather or shell). Like Dürer, you will look longer than you ever have before at something small and ordinary.

You will need

- Sketchbook or a sheet of mixed-media paper
- HB and 2B pencils
- Colored pencils or a watercolor pan set and a small brush
- Black fine-line marker (waterproof)
- A ruler
- A natural subject: a weed, a flower, a leaf, a pinecone, a feather or a shell
- Optional: a magnifying glass

Steps

1. Choose a subject outdoors or bring one to your table. Write the date, place, time and weather in the top corner of your page.
2. Look for one full minute before drawing. Turn the subject and find the most interesting view.
3. Draw the subject large, filling about half the page. Sight its proportions: how many widths long is the leaf? How many petals are there? Draw lightly with the HB pencil.
4. Add a detail study in a small box or circle beside the main drawing: one part drawn much larger, such as the edge of a leaf or the center of a flower. Use the magnifying glass if you have one.
5. Measure the real subject with your ruler and write the measurements next to your drawing. Count something (petals, veins, seeds) and write the number.
6. Add color. Test each color on the edge of the page first and compare it with the real subject. Real greens are rarely the green straight from the box; mix or layer them.

7. Go over the most important lines with the fine-line marker if you like, and write labels with little arrows pointing to the parts.
8. Write at least two sentences each for “I notice...,” “I wonder...,” and “It reminds me of...”

Tips

- Write in small, neat letters and leave space around your drawings. A page with breathing room is easier to read.
- If your subject will wilt, draw the shape first and add color quickly, or take a photo for color reference.
- Your wonder questions do not need answers. Some of the best ones cannot be answered quickly.

Check your work

- ☐ My page has a large drawing and at least one detail study.
- ☐ I wrote the date, place, weather, measurements and at least one count.
- ☐ I wrote “I notice, I wonder, it reminds me of” sentences.

SKETCHBOOK PRACTICE

1. Choose one tree near your home and start a page about it. Return to it once a month this year and add a new drawing each time.
2. Draw a bird you see from a window in quick 30-second sketches. Birds move, so draw several fast ones instead of one slow one.
3. Collect five different leaves and draw them in a row. Write one difference you see between each pair.

From history. Before photography, naturalists relied on drawings to record new plants and animals. Maria Sibylla Merian, a German artist of the late 1600s, sailed to South America to draw insects and the plants they eat, and John James Audubon spent years painting every bird he could find in America. Their careful drawings are still valued by scientists today.

COMMON MISTAKES

- Drawing the subject too small. Make it big enough to show detail.
- Coloring with a single flat green. Look for yellows, blues and browns in the green.
- Forgetting words and numbers. A nature journal page is more than a drawing.

Make it a game • Sixty-Second Naturalist. Take one leaf or flower outside. Set a timer for sixty seconds and record as many true observations as you can: a word, a number such as a count of petals or veins, or a tiny labeled picture. Each observation is a point. Pick a new subject and try to beat your score.

Scripture. “Consider the lilies of the field, how they grow” (Matthew 6:28, KJV)

Jesus told His followers to look closely at the flowers. Nature journaling is a way of obeying that word: we consider, slowly and carefully, the things God has made.

UNIT 1

OBSERVATIONAL DRAWING

This unit teaches the most important skill in drawing: seeing what is really there. Most people draw from the pictures stored in their heads, which is why so many drawings of a mug or a tree look alike. An artist trains his eyes to notice the true sizes, angles and shapes of things in front of him.

You will learn to measure with your pencil (called sighting), to draw the empty spaces around an object (negative space), to arrange and draw a still life, and to keep a nature journal the way scientists and artists have done for centuries. By the end of the unit your drawings will look more like the real thing because you will have looked more carefully.

PREREQUISITES

- Can hold a pencil lightly and draw light and dark lines
- Knows the basic shapes (circle, oval, rectangle, triangle)
- Has a sketchbook and drawing pencils (HB, 2B, 4B)

MASTERY CHECKLIST

- ☐ I can measure the height and width of an object with my pencil at arm's length.
- ☐ I can compare sizes using one part as a unit of measure.
- ☐ I can draw the negative spaces around an object to find its shape.
- ☐ I can set up a still life with overlapping objects and draw it from life.
- ☐ I can make a nature journal page with words, pictures and numbers.

LESSONS IN THIS UNIT

1.1 Sighting and Measuring

2 sessions of 45 minutes

1.2 Negative Space

2 sessions of 45 minutes

1.3 Drawing a Still Life

2 sessions of 45 minutes

1.4 Nature Journaling

2 sessions of 45 minutes

UNIT 1 REVIEW

Answer each question in a sentence or two, or by drawing when asked. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What is observational drawing, and how is it different from drawing from memory?

2. (5 pts)

Describe how to sight the height of an object with your pencil.

3. (5 pts)

Why must your elbow stay locked when you sight?

4. (5 pts)

What is a unit of measure? Give an example.

5. (5 pts)

Explain positive space and negative space.

6. (5 pts)

Why does drawing negative space help you draw more accurately?

7. (5 pts)

Name three things to think about when you set up a still life.

8. (5 pts)

What does a viewfinder help you do?

9. (5 pts)

Name the three tools a nature journal page uses, with one example of each.

10. (5 pts)

Name one of this unit's picture studies and tell one thing the artist observed carefully.

ANSWER KEY

1. Observational drawing is drawing something real that is in front of you. Drawing from memory uses the simple symbols stored in your head, so it is less accurate.
2. Hold the pencil straight up at arm's length with the elbow locked, close one eye, line up the tip with the top of the object, and slide your thumb to the bottom.
3. So the pencil is always the same distance from your eye; otherwise every measurement changes.
4. One part you measure first and use to compare everything else, such as the height of a mug ("the bottle is 2½ mugs tall").
5. Positive space is the subject itself; negative space is the empty space around and between its parts.
6. You have no memory symbol for the gaps, so you must look at their true shapes, and they are simpler shapes that are easier to see correctly. They also help you check your drawing.
7. Any three: use different heights and shapes, overlap some objects, use an odd number of objects, light from one side, a plain background, choose the view with a viewfinder.
8. Choose and frame your composition: what goes in the picture and where it sits.
9. Pictures (a large drawing and a detail study), words (labels and "I notice, I wonder" sentences), numbers (measurements, counts, temperature).
10. For example: Dürer's *Great Piece of Turf* shows each blade of grass and dandelion leaf; Sánchez Cotán measured the sizes of the vegetables; Hiroshige designed the sky shapes between the branches.

PORTFOLIO PIECE: A STILL LIFE DRAWN FROM LIFE

Set up a new still life of four or five objects, including at least one natural object (a pinecone, a gourd, a leafy branch or fruit). Light it from one side. Draw it on 11×14 in paper with pencil, using sighting to measure proportions and negative shapes to check your drawing. Leave your light sighting marks visible in one corner to show your process, and add simple shading for the light and shadow sides.

LOOK FOR	WHAT IT MEANS
Proportion	The sizes of the objects compare correctly with one another, checked by sighting.
Negative space	The gaps between and around the objects match the real setup.
Composition	Objects overlap, vary in height, and the group fills the page without crowding an edge.
Line and shading	Guidelines are light, final lines are clear, and each object has a light side and a shadow side.
Care and patience	The drawing shows careful, unhurried looking from start to finish.

UNIT 2

FORM AND PROPORTION

People and animals are the hardest subjects to draw, and the most rewarding. The secret is proportion: knowing how the parts of a body compare in size. Artists for thousands of years have used simple measuring rules, like “an adult is about seven and a half heads tall,” to start their drawings well, and then checked the rules against what they saw.

In this unit you will learn the proportions of the clothed human figure, the face, the hands and a horse. You will build each one from simple forms (ovals, cylinders, boxes) before adding details. The masters you will study, from Millet to Vermeer to Dürer to Stubbs, all began with this same careful measuring.

PREREQUISITES

- Can sight and measure with a pencil (Lesson 1.1)
- Can draw light guidelines and erase them cleanly
- Knows the basic forms: sphere, cylinder, cube, cone

MASTERY CHECKLIST

- ☐ I can draw a standing figure about 7½ heads tall with the waist, hips and knees in the right places.
- ☐ I can place the eyes halfway down the head and find the nose and mouth with guidelines.
- ☐ I can draw a hand from simple shapes with fingers in the right lengths.
- ☐ I can draw an animal from simple shapes, using one part to measure the rest.
- ☐ I can explain why artists check proportion rules against real life.

LESSONS IN THIS UNIT

2.1 The Clothed Figure in Proportion

2 sessions of 45 minutes

2.2 The Face

2 sessions of 45 minutes

2.3 Hands

2 sessions of 45 minutes

2.4 Animals

2 sessions of 45 minutes

UNIT 2 REVIEW

Answer each question in a sentence or two, or by drawing when asked. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

About how many heads tall is a grown man or woman? About how many heads tall is a child your age?

2. (5 pts)

Where is the halfway point of a standing adult's body?

3. (5 pts)

With the arms hanging down, where are the elbows and the wrists?

4. (5 pts)

Where do the eyes go on the head?

5. (5 pts)

How wide is the space between the eyes? Where do the ears go?

6. (5 pts)

What is a three-quarter view? Name the painting in this unit that shows one.

7. (5 pts)

How long is the middle finger compared with the palm? Which finger is shortest?

8. (5 pts)

What is foreshortening?

9. (5 pts)

Name the simple forms you would use to start drawing a horse.

10. (5 pts)

Why did George Stubbs study horse anatomy for so long before painting *Whistlejacket*?

ANSWER KEY

1. About $7\frac{1}{2}$ heads for an adult; about 6 heads for a ten- or eleven-year-old.
2. At the hips (about 4 heads down).
3. The elbows are at the waist; the wrists are at the hips.
4. Halfway down the head, from the top of the head to the chin.
5. About one eye-width. The ears run from the eyebrow line to the bottom of the nose.
6. A view of the face turned partly to one side; Vermeer's *Girl with a Pearl Earring*.
7. About as long as the palm. The little finger is the shortest.
8. When a form points toward you and looks shorter than its real length.
9. Circles or ovals for the chest and hindquarters, a wedge for the head, a cylinder for the neck, and lines with joint dots for the legs.
10. So he would understand how a horse is built, its bones, joints and muscles, and could paint it accurately and alive.

PORTFOLIO PIECE: A PERSON AT WORK

Draw a full clothed figure of a family member doing an ordinary task, such as reading, cooking, gardening or carrying a basket, like Millet's farmers. Measure the figure in heads, show at least one hand clearly, and place the features of the face with guidelines. If an animal is part of daily life (a dog at the reader's feet, a cat on a chair), add it built from simple forms.

LOOK FOR	WHAT IT MEANS
Figure proportion	The figure is measured in heads, with hips near the middle and arms reaching mid-thigh.
Face	The eyes are halfway down the head and the features are placed with guidelines.
Hands	At least one hand is drawn from simple shapes with fingers of correct lengths.
Clothing and form	Clothes drape over the body with folds at the joints, and shading shows round forms.
Observation	The drawing was made from a real model and shows particular details of that person.

2.1 THE CLOTHED FIGURE IN PROPORTION

OBJECTIVES

- Use the head as a unit of measure to draw a standing figure about 7½ heads tall.
- Place the shoulders, waist, hips, knees and elbows correctly.
- Draw a clothed figure from simple forms, then add clothing that follows the body.

Warm-up. Stand in front of a mirror (or have a family member stand still). Touch the top of your head, your chin, your shoulders, your waist and your knees, saying each name. Then draw a stick figure in your sketchbook with dots for each of those places.

WATCH

Figure proportions - DRAWING ESSENTIALS

Mr. Otter Art Studio • 4:42

https://www.youtube.com/watch?v=kKGC_js35x0

WHEN TO WATCH

After the core ideas. Pause at each head division and mark the same lines on a strip of paper.

BACKUP VIDEO

How to Draw Basic Human Proportions | The Easiest Way to Draw the Human Body

That Art Teacher • 6:14

<https://www.youtube.com/watch?v=SoMPFmDk1Ww>

Before the studio project. Draw along with her using a ruler.

KEY TERMS

figure

In art, a drawing or painting of a human body.

canon of proportion

A set of rules for how big each part of the body is compared with the others, often measured in heads.

landmarks

Points on the body that are easy to find and measure, such as the chin, shoulders, waist, knees and elbows.

gesture

The overall pose and movement of a figure, often drawn as a quick flowing line first.

CORE IDEAS

Artists measure the human **figure in heads**: the height of the head from the top to the chin. A grown man or woman is about **7½ heads tall**. (Children have bigger heads compared with their bodies: a child your age is about 6 heads tall, and a baby only about 4.) A rule like this is called a **canon of proportion**.

Use these **landmarks** for a standing adult: the chin is at 1 head; the chest (the line of the armpits) is at about 2 heads; the navel and the elbows at about 3; the place where the legs join the hips, with the wrists beside it, at about 3¾, which is halfway down the whole body; the knees at about 5½; the feet at 7½. The shoulders are about 2 heads wide on a man and a little narrower on a woman.

The arms are longer than most beginners think. With the arms hanging down, the elbows are at the waist and the fingertips reach the middle of the thigh. The legs make up about half the body's height. Most beginner drawings have legs that are too short and arms that end at the hips.

Build the figure in layers. First draw a **gesture** line that shows the pose. Then draw simple forms: an oval for the head, a box shape for the chest, a smaller box for the hips, cylinders for the arms and legs, and wedge shapes for the feet. Only after the forms are right do you add clothing.

Clothing follows the body. Folds gather at the elbows, the waist and the knees, where the body bends, and fabric hangs straight down from the shoulders and hips because of gravity. Draw the body first, lightly, and let the clothes drape over it.

The rules are a starting point, not the end. Real people are tall and short, broad and slender. After you set up the proportions, look at your real model and adjust. The rules help you begin; your eyes help you finish.

PICTURE STUDY



The Angelus, Jean-François Millet, 1857–1859 · Oil on canvas · Musée d'Orsay, Paris

Image: [Wikimedia Commons](#), public domain

Millet grew up on a farm in France and painted the farm families he knew. Here a man and woman stop digging potatoes when the church bell rings at evening for the Angelus, a time of prayer. Millet gave the two figures strong, simple, solid shapes, like statues standing in the field.

Look closely

- Measure the woman with your eyes. How many of her heads tall is she? (Use her head as the unit.)
- Find her waist and her hands. Where are her elbows compared with her waist?
- Look at the folds in her skirt and apron. Do they hang straight down or curve? Where does the fabric gather?
- Find the small church steeple on the horizon. How does it connect to what the two people are doing?

Talk about it

1. Why do you think Millet made the figures so simple, without much detail on their faces?
2. How does the light of the setting sun change the mood of the painting?

3. What does this painting teach about work and prayer?

STUDIO PROJECT

A Standing Figure in Seven and a Half Heads

You will draw a full standing figure of a grown man or woman, clothed in everyday or work clothes like Millet's farmers, measured carefully in heads. First you build a proportion chart; then you draw the body as simple forms; then you dress it.

You will need

- Drawing paper (9×12 in or taller)
- HB and 2B pencils
- Kneaded eraser
- Ruler
- Colored pencils (optional)
- A family member willing to pose for 5 minutes, or a photo of a standing adult in ordinary clothing

Steps

1. Hold the paper tall. With the ruler, draw a light vertical line down the middle, 7½ inches long. Mark every inch with a short horizontal tick and number them 1 to 7, with 7½ at the bottom. Each inch is one head.
2. Draw an oval head in the top inch. Mark the landmarks: chin at 1, chest at 2, waist and elbows at 3, the bottom of the hips and the wrists at 3¾ (the halfway point), knees at about 5½, feet at 7½.
3. Draw the shoulders about 2 heads wide at a little below the chin. Draw a box-like shape for the chest from the shoulders to the waist, and a smaller box for the hips.
4. Add the arms as cylinders: the upper arm from shoulder to elbow (at the waist), the forearm from elbow to wrist (at the hips), and the hand reaching to mid-thigh.
5. Add the legs as tapering cylinders from the hips to the knees and from the knees to the ankles. Add wedge-shaped feet.

6. Look at your model or photo. Adjust the forms to match: a slight tilt of the shoulders, the weight on one leg, the head turned.
7. Now dress the figure. Draw the outline of shirt, coat, skirt or trousers over the forms, a little outside the body. Add folds at the elbows, waist and knees.
8. Erase the guidelines and the hidden parts of the forms. Darken the final contour and add a little shading on one side. Color the clothing if you like.

Tips

- Make your first forms very light; you will draw clothes over them.
- If the figure looks stiff, tilt the shoulders and hips in opposite directions. That is how people really stand when they rest their weight on one leg.
- Check the arms: elbows at the waist, wrists at the hips.

Check your work

- ☐ My figure is about 7½ heads tall, and the hips are near the halfway point.
- ☐ The elbows are near the waist, and the fingertips reach the middle of the thigh.
- ☐ The clothing drapes over the body, with folds where the body bends.

SKETCHBOOK PRACTICE

1. Draw three one-minute gesture sketches of a family member doing chores: sweeping, reaching up, carrying something.
2. Draw a figure of a child your age (about 6 heads tall) next to an adult (7½ heads). Notice how the head size changes the look.
3. Draw a coat or shirt hanging on a hook. Notice where the folds fall.

From history. The ancient Greeks wrote rules for the proportions of the body, and Renaissance artists such as Leonardo da Vinci and Albrecht Dürer measured many people to test those rules. Dürer filled a whole book, *Four Books on Human Proportion* (1528), with measured drawings of tall, short, broad and slender people, because he saw that God did not make everyone the same.

COMMON MISTAKES

- Legs too short. The hips are halfway down the body.
- Arms too short. The wrists reach the hips, not the waist.
- Head too big. Measure it: an adult is about 7½ heads tall.

- Drawing clothes as flat outlines. Clothing wraps around round forms and folds where the body bends.

Make it a game • Landmark Freeze. Your parent calls out a landmark: shoulders, elbows, waist, hips or knees. Freeze with your hand on that spot on your own body and say about how many head-lengths down from the top it falls. Wrong guess, parent gets the point. Ten calls, then check your answers against your figure drawing.

2.2 THE FACE

OBJECTIVES

- Place the eyes, nose, mouth and ears on a face using proportion guidelines.
- Draw a face from the front and in a three-quarter view.
- Observe how a master painter shaped a face with light.

Warm-up. Look in a mirror. Put a finger at the corner of your eye and another on the top of your ear. Are they level? Now check the bottom of your nose and the bottom of your ear. Write down what you discover.

WATCH

How to Draw Facial Proportions

Jescia Hopper • 12:26

<https://www.youtube.com/watch?v=1kHzAh9sCH4>

WHEN TO WATCH

Draw along on scrap paper, pausing after each guideline, then do the portrait from life.

BACKUP VIDEO

How To Draw A Self Portrait: For Kids!

Books And Brushes FOR KIDS! • 10:26

<https://www.youtube.com/watch?v=IRp3sBQ-NFU>

A slower, step-by-step version of the same proportions.

KEY TERMS

portrait

A picture of a particular person, usually showing the face.

features

The parts of the face: eyes, eyebrows, nose, mouth and ears.

guideline

A light line drawn to help place features, erased or covered later.

three-quarter view

A view of the face turned partly to one side, between straight-on and full profile.

CORE IDEAS

The head is shaped more like an egg than a circle: wider at the top and narrower at the chin. Start a front-view face with an egg-shaped oval. Draw a light vertical **guideline** down the middle so the two sides match.

Here is the biggest surprise: **the eyes are halfway down the head**, not near the top. Most beginners draw them too high because the forehead is covered by hair. Draw a horizontal guideline exactly halfway from the top of the head to the chin. The eyes sit on it.

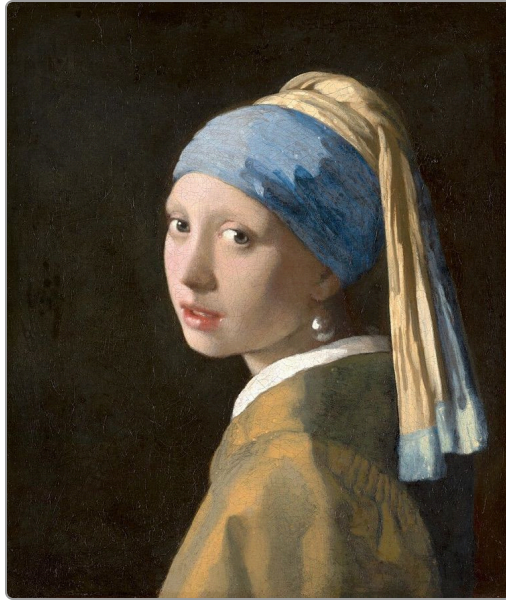
The face is about five eyes wide: one eye's width between the eyes, one eye on each side, and one more eye's width from each eye to the edge of the head. The bottom of the nose is about halfway between the eye line and the chin. The mouth is about one-third of the way from the nose to the chin. The corners of the mouth line up below the centers of the eyes.

The ears sit between the eyebrow line and the bottom of the nose, on the sides of the head. The neck is wide: it starts just below the ears, not as a thin stick under the chin.

When the head turns into a **three-quarter view**, the center line curves around the egg toward the side the face is turned. The far eye gets narrower, and the nose pushes out past the far cheek. The guidelines still go across at the same heights; they just wrap around the form.

These proportions are the average. Every face is different, and a **portrait** captures the differences: a longer nose, wider-set eyes, a rounder chin. Use the guidelines to start, then look carefully at your sitter to find what makes that face his own.

PICTURE STUDY



Girl with a Pearl Earring, Johannes Vermeer, about 1665 · Oil on canvas · Mauritshuis, The Hague

Image: [Wikimedia Commons](#), public domain

This is not a portrait of a particular person but a study of a face, called a *tronie* in Dutch. Vermeer painted a girl turning toward us as if we had just spoken her name. It is one of the best-loved faces in all of art, and it is a perfect example of a three-quarter view.

Look closely

- Find the eyes. Are they in the top half of the head, or near the middle? (Remember the turban covers the top of her head.)
- Look at the far eye and the far cheek. How does Vermeer show that the face is turned?
- Find the brightest spots: the pearl, the eyes, the lips. How many small highlights can you see?
- Notice that there are almost no hard outlines. Where does the face meet the dark background?

Talk about it

1. What do you think she is about to say or do? What in the painting makes you think so?
2. Why might Vermeer have used such a plain dark background?

3. How is this face different from the simple faces in cartoons?

STUDIO PROJECT

A Portrait from Life

You will draw a portrait of a family member, or a self-portrait from a mirror, using the proportion guidelines. Start with a front view; if you finish early, try a three-quarter view like Vermeer's.

You will need

- Drawing paper (9×12 in)
- HB, 2B and 4B pencils
- Kneaded eraser
- A mirror (for a self-portrait) or a patient sitter
- Ruler (optional)

Steps

1. Seat your sitter (or yourself in a mirror) near a window so the light falls from one side. Look for one full minute.
2. Draw a large egg shape, about 6 inches tall, in the upper part of the paper. Draw a light vertical center line.
3. Draw a horizontal eye line exactly halfway down. Divide it into five equal eye-widths and draw the two eyes in the second and fourth spaces as almond shapes.
4. Mark the bottom of the nose halfway between the eye line and the chin. Draw the nostrils and the bottom of the nose as small curves, not a big outline.
5. Mark the mouth line one-third of the way from the nose to the chin. Line up the corners of the mouth below the centers of the eyes.
6. Place the ears between the eyebrow line and the nose line. Draw the neck starting just under the ears.
7. Now look closely at your sitter and adjust. Are the eyes closer or farther apart? Is the face longer or rounder? Draw the hairline and the hair as big shapes first, then a few strands.

8. Shade gently: darken the eye sockets, under the nose, under the lower lip, under the chin and the side of the face away from the window. Leave the forehead and cheek nearest the light lightest.
9. Erase the guidelines and add the pupils and a tiny white highlight in each eye.

Tips

- Draw the eyebrows as soft groups of short strokes, not a single dark line.
- Teeth usually look best not drawn at all; a soft line between the lips is enough.
- If your sitter gets tired, let them rest every five minutes and mark their position with tape.

Check your work

- ☐ The eyes are halfway down the head and about one eye-width apart.
- ☐ The nose and mouth sit at the right heights, and the ears line up between the brows and the nose.
- ☐ My portrait shows something particular about my sitter's face.

SKETCHBOOK PRACTICE

1. Draw ten eyes from life or from paintings in this course: open, half-closed, looking left and right.
2. Draw your own face in profile using two mirrors, or draw a family member's profile.
3. Draw five quick heads turned in different directions, wrapping the center and eye lines around each egg.

From history. Vermeer painted only about 35 paintings that we know of in his whole life, working slowly and carefully in his home in Delft, in the Netherlands. *Girl with a Pearl Earring* was sold at an auction in 1881 for very little money, and the buyer gave it to the Mauritshuis museum, where it is now one of the treasures of the collection.

COMMON MISTAKES

- Placing the eyes too high. They are halfway down the head.
- Drawing a thin neck. The neck is nearly as wide as the jaw.

- Outlining the nose with a long dark line. Show the nose with shading at the bottom and sides.
- Ears too small. They run from the eyebrows to the bottom of the nose.

Make it a game · Face Facts, Face Fib. Tell three statements about where features sit on a face. Two must be true and one must be a tall tale, such as the ears sitting on top of the head. Your parent guesses the fib and says where that feature really goes. Take turns, and keep a score for each caught fib.

2.3 HANDS

OBJECTIVES

- Describe the proportions of the hand: palm and fingers, finger lengths, and the thumb.
- Draw a hand by building it from simple shapes.
- Draw your own hand from observation in two different poses.

Warm-up. Place your left hand flat on the paper and look at it, not at the paper, while you slowly draw its outline with your right hand (a blind contour). Don't peek! Then compare. Which parts surprised you?

WATCH

How to Draw Hands | starting with just 3 simple shapes

Anne Lourayne · 10:34

<https://www.youtube.com/watch?v=dMiO2umgE78>

WHEN TO WATCH

After the core ideas. Watch the first five minutes, pause, and practice the three shapes before continuing.

KEY TERMS

palm

The flat inside of the hand between the wrist and the fingers; about as long as the middle finger.

knuckles

The joints of the fingers. The big knuckles at the top of the hand form a gentle curve, not a straight line.

mitten shape

A simple shape for blocking in the hand before drawing separate fingers.

foreshortening

When a form points toward you and looks shorter than its real length.

CORE IDEAS

Hands are hard to draw because they have so many parts and can make so many shapes. The answer is to simplify. First draw the **palm** as a slightly tapered box, then the fingers as a group in a **mitten shape**, then the thumb as its own wedge. Only after those are right do you split the mitten into fingers.

Know the proportions. The palm is roughly square, and the middle finger is about as long as the palm. The fingers are different lengths: the middle finger is longest, the ring and index fingers are a little shorter, and the little finger is the shortest, reaching about the top joint of the ring finger. The **knuckles** make a curve across the hand, not a straight line.

Each finger has three sections, and each section is a bit shorter than the one before. The creases on the palm side do not line up exactly with the knuckles on the back; the fingers look shorter from the palm side because the palm comes up to meet them.

The thumb is different. It grows from the side of the palm near the wrist, has only two sections you can see, plus a fleshy pad at its base, and it swings around to face the other fingers. Draw it as a wedge attached to the side, not as a sixth finger lined up with the others.

When a finger or a whole hand points toward you, it looks shorter than it really is. This is called **foreshortening**. Trust what you see, not what you know: draw the short shape you actually see, with overlapping sections.

PICTURE STUDY



Praying Hands, Albrecht Dürer, 1508 · Brush and ink with white highlights on blue-prepared paper ·
Albertina, Vienna

Image: [Wikimedia Commons](#), public domain

Dürer made this drawing as a study for the hands of an apostle in an altarpiece. The painting was later destroyed in a fire, but the drawing survived and became one of the most famous drawings in the world. Notice how Dürer used dark lines for shadow and white for light on blue paper.

Look closely

- Find the knuckles. Do they make a straight line or a curve?
- Compare the length of the fingers with the length of the palm.
- Find the thumbs. How are they different in shape and direction from the fingers?
- Look for the white lines. Where did Dürer put the light?

Talk about it

1. Why do you think Dürer drew the veins and wrinkles so carefully?
2. What do these hands tell you about the person they belong to?
3. Why might a drawing of hands alone, without a face, still feel so powerful?

STUDIO PROJECT

Studies of My Own Hand

Like Dürer, you will make a page of hand studies. Your model is always with you: your own non-drawing hand. You will draw it in three poses, building each from simple shapes and then adding shading.

You will need

- Drawing paper (9×12 in), or toned tan or gray paper if you have it
- HB and 2B pencils
- A white colored pencil (for toned paper)
- Kneaded eraser
- A desk lamp

Steps

1. Set the lamp on the side of your drawing hand so the light falls across your posing hand.
2. Pose 1: hold your hand flat, palm down, fingers together. Draw the palm as a tapered box and the fingers as one mitten shape. Add the thumb as a wedge from the side.
3. Check proportions: is the mitten (the fingers) about as long as the palm? Then divide the mitten into four fingers of different lengths. Draw the curve of the knuckles.
4. Pose 2: turn your hand on its side as if shaking hands. Block in the shapes again. Notice how the fingers overlap each other now.
5. Pose 3: hold something, such as a pencil, a cup or an apple. Start with the object, then wrap the mitten shape around it.
6. Refine each drawing: draw the finger sections, the creases at the joints and the fingernails (they curve around the fingertips).
7. Shade the side away from the light, the spaces between the fingers, and the shadow the hand casts on the object or table.
8. If you used toned paper, add white highlights on the knuckles and the tops of the fingers, as Dürer did.

Tips

- Rest your posing hand on the table so it stays still.
- Draw large: each hand should be about the size of your real hand.
- When it gets hard, squint and draw the big shape of the hand first again.

Check your work

- ☐ I drew three different hand poses, each started from simple shapes.
- ☐ My fingers are different lengths and as long as the palm.
- ☐ My thumb comes from the side of the palm, not the end.

SKETCHBOOK PRACTICE

1. Draw a family member's hands while they read, knit or eat. Draw quickly and fill a page.
2. Draw your hand making five different shapes: a fist, pointing, waving, holding a cup, resting.
3. Find the hands in three paintings in this course. Sketch one pair of hands from a painting.

From history. Dürer drew the *Praying Hands* on paper he had painted blue himself, then used a fine brush with black ink for shadows and white paint for light. This method, drawing on a middle-toned paper and adding both dark and light, was a favorite of Renaissance artists because it shows form so quickly.

COMMON MISTAKES

- Fingers all the same length, like a comb.
- Fingers too short compared with the palm.
- A thumb that sticks out from the end of the palm like a sixth finger.
- Knuckles in a straight row instead of a curve.

Make it a game • Hand Charades. Your parent strikes a hand pose behind a book, then reveals it for five seconds. Describe it aloud in simple shapes: mitten shape, palm, three finger parts, thumb. Then draw it in sixty seconds. Both of you check your drawing against a real hand. One point for each correct part.

Scripture. “establish thou the work of our hands upon us; yea, the work of our hands establish thou it” (Psalms 90:17, KJV)

Hands pray and hands work. Moses asked God to bless the work of human hands, and we can ask the same for the work our hands make in art.

2.4 ANIMALS

OBJECTIVES

- Break an animal into simple forms: ovals for the chest and hips, cylinders for the neck and legs.
- Use the head or the body length as a unit to measure an animal's proportions.
- Draw a horse or another four-legged animal with correctly placed joints.

Warm-up. Find a photo of a horse, dog or cat standing sideways. In one minute, draw it using only circles and ovals. In the next minute, connect the shapes with lines for the neck and legs.

WATCH

How to Draw a Horse

[How2DrawAnimals](#) · 14:19

<https://www.youtube.com/watch?v=MYrPZeLleqA>

WHEN TO WATCH

During the studio project. Watch the guideline stage first (about the first five minutes), then pause and draw along.

BACKUP VIDEO

How to draw HORSES step by step [METHOD]

[Art Pro](#) · 7:27

<https://www.youtube.com/watch?v=ajPVuGTVySI>

Shows a simple measuring scheme for horses in several poses; good for the sketchbook exercises.

KEY TERMS

anatomy

The study of the structure of a body: its bones, muscles and joints.

joint

A place where a limb bends, such as the knee, hock or elbow.

barrel

The large, rounded chest and belly of a horse or other four-legged animal.

hock

The joint halfway down a horse's back leg that bends backward, like a human heel lifted high.

CORE IDEAS

Every animal can be built from simple forms. For a horse, start with two circles: one for the chest and one for the hindquarters. Connect them into the long **barrel** of the body. Add a smaller circle or wedge for the head and a thick, tapering cylinder for the neck. Then add the legs as lines with dots for the **joints**.

Measure an animal with a unit, just as you measure people in heads. For a horse, the body from the front of the chest to the back of the rump is about $2\frac{1}{2}$ head-lengths long, and the height at the top of the shoulders is about the same as that body length, so a standing horse fits nicely into a square. The depth of the body, from the top of the shoulders to the bottom of the chest, is about the same as the length of the front leg from the chest to the ground.

Animal legs bend differently from ours. A horse's front "knee" is really its wrist, and the **hock** on the back leg is really its heel, lifted high. That is why the back leg seems to bend backward. Mark the joints before you draw the leg shapes, and keep the lower legs thin and the hooves slanting forward.

Learn some **anatomy** by looking. Under the skin of a horse you can see the shoulder blade, the big muscles of the hindquarters and the long neck muscles. You do not have to know their names, but notice their bumps and hollows, and shade them to show form.

Animals move, so draw quickly from life when you can: a sleeping cat, a dog at rest, birds at a feeder. Use photos for long, careful drawings, but always look for the simple shapes first.

PICTURE STUDY



Whistlejacket, George Stubbs, about 1762 · Oil on canvas · National Gallery, London

Image: [Wikimedia Commons](#), public domain

George Stubbs spent eighteen months studying the anatomy of horses, measuring and drawing every part, before he painted them. *Whistlejacket* was a famous racehorse, and Stubbs painted him life-size, rearing up against an empty background, so that nothing distracts us from the horse's shape, muscles and spirit.

Look closely

- Find the two big rounded forms of the body: the chest and the hindquarters.
- Find the joints on the back legs. Which way do they bend?
- Look for the muscles and veins under the shiny coat. Where are the brightest highlights?
- Notice the plain background. Why might Stubbs have left out a landscape?

Talk about it

1. How does the pose make the horse look strong and lively?
2. What would you need to know to paint a horse this accurately?
3. Why is it good for an artist to study how a creature is made inside before drawing its outside?

STUDIO PROJECT

A Horse Built from Forms

You will draw a standing horse (or, if you prefer, a dog, cat or cow) from a photograph, building it from circles and cylinders and measuring it in head-lengths. Then you will shade it to show the round forms of the body.

You will need

- Drawing paper (9×12 in, used sideways)
- HB, 2B and 4B pencils
- Kneaded eraser
- A clear side-view photo of a standing horse or other four-legged animal (from a book, a calendar or a family photo)

Steps

1. Look at the photo and find the simple shapes: chest circle, hindquarters circle, head wedge, neck cylinder, legs.
2. Measure the head length on the photo with your pencil. How many head-lengths long is the body? How many tall is the horse at the shoulder? Write the numbers down.
3. Lightly draw the chest circle and the hindquarters circle on your paper, spaced to match. Connect them with lines for the back and belly.
4. Add the neck as a thick tapering shape rising from the chest, and the head as a wedge at the end. Check that the head length matches your measurement.
5. Draw each leg as a line first, with a dot at every joint: elbow, knee, fetlock (ankle) on the front legs; stifle, hock, fetlock on the back legs. Check that the back leg bends the right way at the hock.
6. Thicken the legs around the lines: thick at the top, thin below the knee and hock. Add hooves that slant forward.
7. Refine the outline: the curve of the back, the arch of the neck, the ears, eye, nostril, mane and tail.
8. Shade to show form: darker under the belly, behind the front legs, under the neck and on the side away from the light. Leave highlights on the rounded

top of the hindquarters and shoulder.

Tips

- Horses' legs are thinner than most people draw them, and their heads are bigger.
- Draw the far legs a little lighter than the near legs to help them look farther away.
- Draw the mane and tail with long flowing strokes in the direction the hair grows.

Check your work

- ☐ My animal's body, head and legs are in proportion, measured from the photo.
- ☐ The joints are in the right places, and the back legs bend the right way.
- ☐ My shading makes the body look round, not flat.

SKETCHBOOK PRACTICE

1. Draw a pet or a neighbor's animal from life in quick two-minute sketches. Draw only the big shapes.
2. Draw the same animal in three poses: standing, lying down, and turning its head.
3. Copy one animal from a master painting (Dürer's *Young Hare* or one of Audubon's birds) to study how the artist drew fur or feathers.

From history. To learn horse anatomy, George Stubbs worked in a farmhouse in Lincolnshire for over a year, carefully studying and drawing horses layer by layer. His book *The Anatomy of the Horse* (1766) was so accurate that it was still used by animal doctors a hundred years later.

COMMON MISTAKES

- Making the legs too thick and the head too small.
- Bending the back legs forward like a person's knees.
- Starting with the outline and the details instead of the big forms.

Make it a game • Guess My Animal. Secretly choose an animal. Draw it using only ovals for the chest and hips and cylinders for the neck and legs, no details. Your parent has three guesses. Then switch. Bonus point for naming where the joints and the hock would go before you add them.

Scripture. “But ask now the beasts, and they shall teach thee; and the fowls of the air, and they shall tell thee” (Job 12:7, KJV)

God’s creatures can teach us about His wisdom and design. When we study an animal closely enough to draw it well, we learn some of what they have to teach.

UNIT 2

FORM AND PROPORTION

People and animals are the hardest subjects to draw, and the most rewarding. The secret is proportion: knowing how the parts of a body compare in size. Artists for thousands of years have used simple measuring rules, like “an adult is about seven and a half heads tall,” to start their drawings well, and then checked the rules against what they saw.

In this unit you will learn the proportions of the clothed human figure, the face, the hands and a horse. You will build each one from simple forms (ovals, cylinders, boxes) before adding details. The masters you will study, from Millet to Vermeer to Dürer to Stubbs, all began with this same careful measuring.

PREREQUISITES

- Can sight and measure with a pencil (Lesson 1.1)
- Can draw light guidelines and erase them cleanly
- Knows the basic forms: sphere, cylinder, cube, cone

MASTERY CHECKLIST

- ☐ I can draw a standing figure about 7½ heads tall with the waist, hips and knees in the right places.
- ☐ I can place the eyes halfway down the head and find the nose and mouth with guidelines.
- ☐ I can draw a hand from simple shapes with fingers in the right lengths.
- ☐ I can draw an animal from simple shapes, using one part to measure the rest.
- ☐ I can explain why artists check proportion rules against real life.

LESSONS IN THIS UNIT

2.1 The Clothed Figure in Proportion

2 sessions of 45 minutes

2.2 The Face

2 sessions of 45 minutes

2.3 Hands

2 sessions of 45 minutes

2.4 Animals

2 sessions of 45 minutes

UNIT 2 REVIEW

Answer each question in a sentence or two, or by drawing when asked. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

About how many heads tall is a grown man or woman? About how many heads tall is a child your age?

2. (5 pts)

Where is the halfway point of a standing adult's body?

3. (5 pts)

With the arms hanging down, where are the elbows and the wrists?

4. (5 pts)

Where do the eyes go on the head?

5. (5 pts)

How wide is the space between the eyes? Where do the ears go?

6. (5 pts)

What is a three-quarter view? Name the painting in this unit that shows one.

7. (5 pts)

How long is the middle finger compared with the palm? Which finger is shortest?

8. (5 pts)

What is foreshortening?

9. (5 pts)

Name the simple forms you would use to start drawing a horse.

10. (5 pts)

Why did George Stubbs study horse anatomy for so long before painting *Whistlejacket*?

ANSWER KEY

1. About 7½ heads for an adult; about 6 heads for a ten- or eleven-year-old.
2. At the hips (about 4 heads down).
3. The elbows are at the waist; the wrists are at the hips.
4. Halfway down the head, from the top of the head to the chin.
5. About one eye-width. The ears run from the eyebrow line to the bottom of the nose.
6. A view of the face turned partly to one side; Vermeer's *Girl with a Pearl Earring*.
7. About as long as the palm. The little finger is the shortest.
8. When a form points toward you and looks shorter than its real length.
9. Circles or ovals for the chest and hindquarters, a wedge for the head, a cylinder for the neck, and lines with joint dots for the legs.
10. So he would understand how a horse is built, its bones, joints and muscles, and could paint it accurately and alive.

PORTFOLIO PIECE: A PERSON AT WORK

Draw a full clothed figure of a family member doing an ordinary task, such as reading, cooking, gardening or carrying a basket, like Millet's farmers. Measure the figure in heads, show at least one hand clearly, and place the features of the face with guidelines. If an animal is part of daily life (a dog at the reader's feet, a cat on a chair), add it built from simple forms.

LOOK FOR	WHAT IT MEANS
Figure proportion	The figure is measured in heads, with hips near the middle and arms reaching mid-thigh.
Face	The eyes are halfway down the head and the features are placed with guidelines.
Hands	At least one hand is drawn from simple shapes with fingers of correct lengths.
Clothing and form	Clothes drape over the body with folds at the joints, and shading shows round forms.
Observation	The drawing was made from a real model and shows particular details of that person.

UNIT 3

COLOR THEORY

Color is one of the great joys of God’s world, and one of the hardest things in art to control. In this unit you will stop using paint straight from the tube and start mixing colors on purpose. You will paint your own twelve-part color wheel, discover that every color has a value (how light or dark it is), learn to make a color brighter or duller with its complement, and see how warm and cool colors make a landscape glow with light and fall back into distance.

Each idea is tied to a painter who used it on purpose: Seurat, who studied the science of color; Monet, who painted the sun on a misty morning; Van Gogh, who set yellow against blue; and Frederic Church, who painted the burning colors of a sunset in the American wilderness.

PREREQUISITES

- Knows the primary colors (red, yellow, blue) and the secondary colors (orange, green, violet)
- Can make a value scale from light to dark in pencil
- Has tempera or acrylic paint in the primaries plus white and black, and watercolors

MASTERY CHECKLIST

- ☐ I can paint a twelve-part color wheel with primary, secondary and tertiary colors.
- ☐ I can tell which of two colors is lighter or darker in value, even when the hues are different.
- ☐ I can make a color duller (less intense) by mixing in a little of its complement.
- ☐ I can use warm colors to bring things forward and cool colors to push them back in a landscape.
- ☐ I can explain hue, value, intensity and temperature in my own words.

LESSONS IN THIS UNIT

3.1 A Painted Color Wheel

2 sessions of 45 minutes

3.2 The Value of Colors

2 sessions of 45 minutes

3.3 Intensity and Complements

2 sessions of 45 minutes

UNIT 3 REVIEW

Answer each question in a sentence or two. You may point to your color wheel to help. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

Name the three primary colors and the three secondary colors in painting.

2. (5 pts)

What is a tertiary color? Give two examples.

3. (5 pts)

Explain the difference between hue and value.

4. (5 pts)

Which pure hue is lightest in value, and which is darkest?

5. (5 pts)

What is a tint, and what is a shade?

6. (5 pts)

Name the complement of each: red, blue, yellow.

7. (5 pts)

How can you make a color less intense without black?

8. (5 pts)

What happens when complements are placed side by side instead of mixed?

9. (5 pts)

Why do distant hills look cooler and paler?

10. (5 pts)

What is special about the value of the sun in Monet's *Impression, Sunrise*?

ANSWER KEY

1. Primaries: red, yellow, blue. Secondaries: orange, green, violet.
2. A mix of a primary and the secondary next to it, such as red-orange and blue-green.
3. Hue is the color family (red, blue); value is how light or dark the color is.
4. Yellow is lightest; violet is darkest.
5. A tint is a color with white added (lighter); a shade is a color with black or a dark color added (darker).
6. Red-green, blue-orange, yellow-violet.
7. Mix in a small amount of its complement.
8. They make each other look brighter and more intense.
9. The air between you and the hills scatters blue light, so far things look bluer, paler and softer.
10. It is almost the same value as the sky around it; it stands out by hue (orange against blue-gray), so it seems to shimmer.

PORTFOLIO PIECE: A LANDSCAPE IN PLANNED COLOR

Paint a landscape from a place you know (your yard, a park, a field at evening). Before painting, plan your colors in a small swatch strip: choose a temperature (mostly warm or mostly cool), mix your neutrals from complements, and save your most intense color for one focal spot. Show warm light and cool shadows, and make the distance cooler and paler than the foreground.

LOOK FOR	WHAT IT MEANS
Color mixing	Colors are mixed from primaries and complements, not used straight from the tube; colors are clean, not muddy.
Value	Light and dark values are clear, and the picture still reads when squinting.
Intensity	Most colors are quieter, and the most intense color is saved for one important spot.
Temperature and depth	Warm light and cool shadows are used, and distant parts are cooler and paler.

3.1 A PAINTED COLOR WHEEL

OBJECTIVES

- Mix secondary and tertiary colors from three primaries.
- Paint an accurate twelve-part color wheel.
- Explain why paint mixing does not always give the colors you expect.

Warm-up. Take your box of colored pencils or crayons. Arrange them in a circle on the table, going around the rainbow: red, orange, yellow, green, blue, violet, and back to red. Where do the in-between colors (like yellow-green) fit?

WATCH

How to Paint an Accurate COLOUR WHEEL (Step by Step)

Winged Canvas • 6:54

<https://www.youtube.com/watch?v=V3GZjp95v0s>

WHEN TO WATCH

Before the studio project. Watch once, then keep it open and pause as you mix each color.

Note: The instructor uses gouache; tempera or acrylic works the same way. The end of the video advertises the channel's online classes.

BACKUP VIDEO

How to Paint a Color Wheel by Mixing Primary Colors

Mr. Henderson's Art Class • 13:04

<https://www.youtube.com/watch?v=jip2liOedi4>

A slower classroom version with tempera paint, covering the six-color wheel; use it if the main video moves too fast.

KEY TERMS

hue

The name of a color family, such as red, yellow-green or blue-violet.

primary colors

Red, yellow and blue: the three colors that cannot be mixed from other paint colors.

secondary colors

Orange, green and violet: each made by mixing two primaries.

tertiary colors

The six colors between a primary and a secondary, such as red-orange or blue-green, named with the primary first.

color wheel

A circle of hues arranged in rainbow order, showing how colors are related and how they mix.

CORE IDEAS

A **color wheel** is a map of color. It arranges the **hues** in a circle, in the same order as the rainbow, so you can see at a glance which colors are neighbors and which are opposites. Painters have used color wheels since Isaac Newton first bent the ends of the rainbow into a circle in 1704.

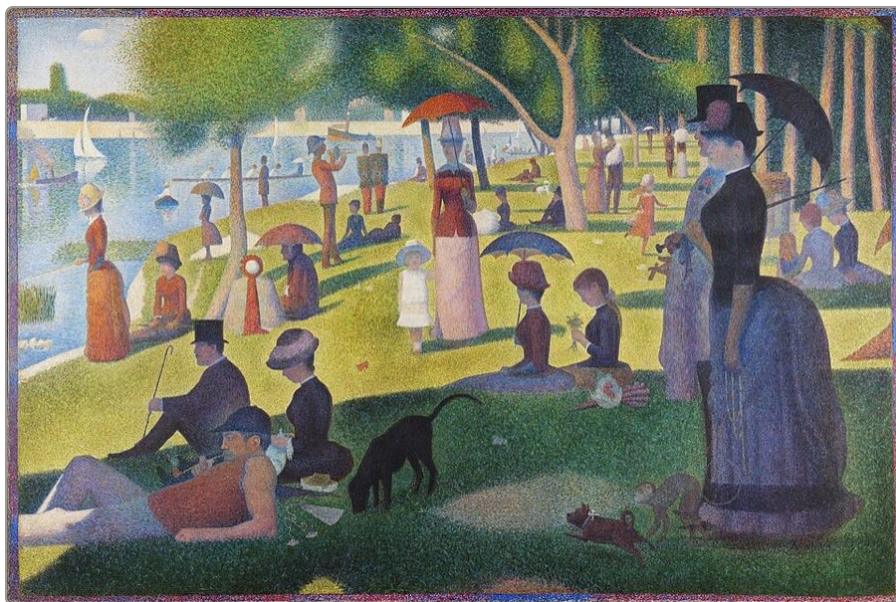
The three **primary colors** in painting are red, yellow and blue. Mixing two primaries makes a **secondary color**: red + yellow = orange; yellow + blue = green; blue + red = violet. Mixing a primary with the secondary next to it makes a **tertiary color**: red-orange, yellow-orange, yellow-green, blue-green, blue-violet and red-violet. Together they make twelve hues.

Mixing is not equal parts. Yellow is weak and blue and red are strong, so to make green, start with yellow and add tiny touches of blue. Always add the darker or stronger color to the lighter one, a little at a time. It takes a lot of yellow to fix a green that has too much blue.

Why do some mixtures turn out dull? Real paints are made of real **pigments**, and no red or blue pigment is perfectly pure. A warm red (leaning toward orange) and a warm blue (leaning toward green) make a muddy violet, because together they contain a little of all three primaries. For a clean violet, choose a cool red (like crimson or magenta) and a blue that leans toward violet (like ultramarine). For a clean green, choose a yellow and a blue that both lean toward green (lemon yellow and a cyan or phthalo blue). You will learn more about pigments in Unit 5.

Keep your colors clean: use a clean brush for each new mixture, rinse well, and blot the brush on a paper towel. Change your rinse water when it turns cloudy.

PICTURE STUDY



A Sunday Afternoon on the Island of La Grande Jatte, Georges Seurat, 1884–1886 · Oil on canvas · Art Institute of Chicago

Image: [Wikimedia Commons](#), public domain

Georges Seurat studied the science of color from books by the chemist Michel-Eugène Chevreul and others. For two years he worked on this huge painting of Parisians enjoying a Sunday by the river, painting it with tiny dots of pure color set side by side. He believed that dots of different hues would mix in our eyes and glow more brightly than paint mixed on a palette.

Look closely

- Look closely at the grass. Can you find dots of yellow, blue and even orange in the green?
- Find the shady parts and the sunny parts of the grass. How are the colors of the dots different?
- Find each of the six main colors of the color wheel somewhere in the picture.
- Look at the border Seurat painted around the edge. What colors did he use?

Talk about it

1. Why do you think Seurat chose to paint with dots instead of mixed colors?
2. If you stand back from the painting, what happens to the dots?
3. How does the painting make you feel about a quiet Sunday afternoon?

STUDIO PROJECT

My Twelve-Part Color Wheel

You will paint a twelve-part color wheel using only red, yellow and blue paint. It will become a reference you can use all year. Take your time: every color should be clearly different from its neighbors and as clean as you can make it.

You will need

- Heavy paper or cardstock (9×12 in)
- A round object to trace (a plate about 8 in across) and a small cup or bottle cap
- Pencil and ruler
- Tempera or acrylic paint: red, yellow, blue (if you have them, a warm and cool of each)
- Round brush size 4 or 6
- Palette or white plate, water jars, paper towels

Steps

1. Trace the large plate to make a circle. Use the ruler to divide it into 12 equal slices, like a clock: draw lines through the center from 12 to 6, 1 to 7, 2 to 8, 3 to 9, 4 to 10 and 5 to 11. (Or trace 12 small circles around the big circle using a bottle cap.)
2. Label lightly in pencil, going around: yellow at 12, yellow-orange at 1, orange at 2, red-orange at 3, red at 4, red-violet at 5, violet at 6, blue-violet at 7, blue at 8, blue-green at 9, green at 10, yellow-green at 11.
3. Paint the three primaries in their slices: yellow at 12, red at 4, blue at 8. Rinse your brush well between colors.
4. Mix orange: start with a puddle of yellow and add red a tiny bit at a time until it looks halfway between. Paint it at 2.
5. Mix green (yellow plus a little blue) for 10 and violet (red plus blue) for 6. If your violet is muddy, try a cooler red or add a touch more blue.
6. Mix the tertiaries: for yellow-orange, add a little yellow to some of your orange; for red-orange, add a little red to orange. Do the same between each

primary and secondary.

7. Look at the whole wheel. Does each step look like an even step? Repaint any slice that jumps too far.
8. When dry, write the names neatly. On the back, write which mixtures were hardest and why.

Tips

- Mix more paint than you think you need; it is hard to mix exactly the same color twice.
- Light to dark: always add the darker color to the lighter one in small amounts.
- If the paint is too thick and streaky, add one drop of water.

Check your work

- ☐ My wheel has all twelve hues in the right order.
- ☐ Each color is a clear step between its neighbors.
- ☐ My colors are clean, not muddy or streaky.

SKETCHBOOK PRACTICE

1. Choose one secondary color, green, and mix five different greens from different yellows and blues (or with colored pencils by layering). Label each mixture.
2. Make a dot painting of one apple or orange in the style of Seurat, using cotton swabs and only pure colors.
3. Find twelve objects at home that match the twelve hues of your wheel. Draw and color a small picture of each.

From history. Isaac Newton discovered in 1666 that a glass prism splits white sunlight into a band of colors, and he arranged those colors in a circle in his book *Opticks* (1704). Later, in the 1800s, the French chemist Michel-Eugène Chevreul studied how colors look different depending on what is next to them. Painters like Seurat read his books and used his ideas in their paintings.

COMMON MISTAKES

- Adding yellow to blue instead of blue to yellow, and using up all the yellow trying to fix it.
- Using a dirty brush, which turns colors gray or brown.

- Making tertiary colors that look the same as the secondary. Each step should be visibly different.

Make it a game • Twelve in Order. Write the twelve colors of the wheel on small slips of paper and shuffle them. Set a timer and lay them out in a circle in the correct order. For each secondary or tertiary color, say which colors you would mix to make it. Beat your own time on the next round.

Scripture. “I do set my bow in the cloud, and it shall be for a token of a covenant between me and the earth.” (Genesis 9:13, KJV)

The rainbow is God’s own color wheel, set in the sky as a sign of His promise. Every color you mix this year comes from the light He made.

3.2 THE VALUE OF COLORS

OBJECTIVES

- Explain that every color has a value, separate from its hue.
- Compare the values of different hues and arrange them from light to dark.
- Make tints and shades of one color, and match a color's value with a gray.

Warm-up. Take a photo of your painted color wheel and look at it in black and white on a phone or computer (most photo editors have a black-and-white filter). Which hue is lightest? Which is darkest? Were you surprised?

WATCH

Quick Tip 127 - Judging Color Value

In the Studio Art Instruction • 8:52

<https://www.youtube.com/watch?v=2fiAp5MkRuE>

WHEN TO WATCH

After the warm-up and the core ideas. Pause each time she compares two colors and guess which is darker before she tells you.

KEY TERMS

value

How light or dark a color is, no matter what hue it is.

tint

A color made lighter by adding white (or, in watercolor, more water).

shade

A color made darker by adding black or a darker color.

grayscale

A picture or scale made only of grays, from white to black, showing values without hue.

CORE IDEAS

Every color has two different qualities that are easy to mix up. Its **hue** is its color family: red, blue, green. Its **value** is how light or dark it is. A light blue and a dark blue have the same hue but different values. A yellow and a violet have different hues, and very different values too.

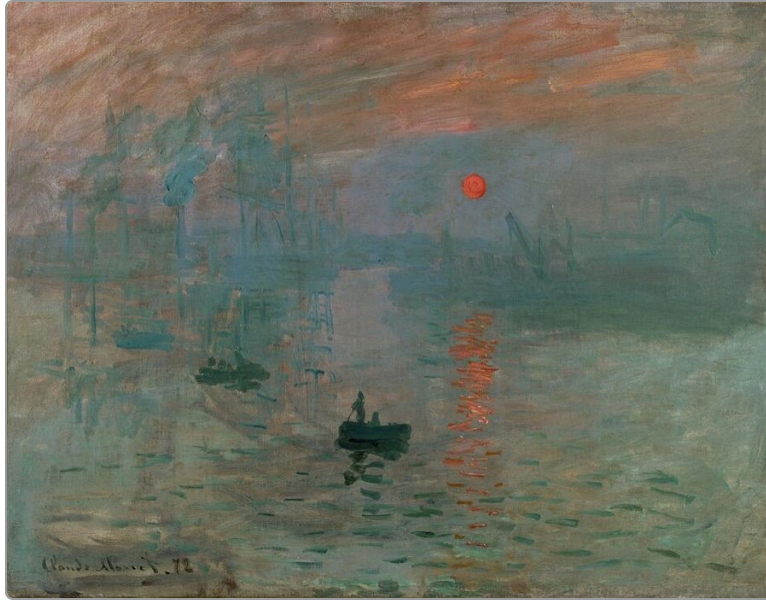
Pure hues are not all the same value. Yellow is naturally the lightest, then orange and yellow-green, then red and green, then blue, and violet is darkest. If you photograph your color wheel in **grayscale**, the yellow side turns light gray and the violet side turns nearly black.

You can change a color's value. Adding white makes a **tint** (pink is a tint of red). Adding black or a dark color makes a **shade** (maroon is a shade of red). In watercolor, adding more water makes a lighter tint because more of the white paper shows through.

Value matters more than hue for making a picture read clearly. If two shapes next to each other have the same value, they melt together even if their hues are very different. Artists squint at their subjects because squinting hides hue and shows value. A good painting usually looks good in black and white too.

Sometimes painters use equal values on purpose. When two very different hues have exactly the same value, the edge between them seems to shimmer. Monet did this with his orange sun and gray-blue sky, so the sun seems to glow and flicker in the mist.

PICTURE STUDY



Impression, Sunrise, Claude Monet, 1872 · Oil on canvas · Musée Marmottan Monet, Paris

Image: [Wikimedia Commons](#), public domain

Monet painted this view of the harbor of Le Havre, France, early one morning from his hotel window. When it was shown in 1874, a critic made fun of its title and called Monet and his friends “Impressionists.” The name stuck. Scientists who study vision have measured this painting and found something surprising about the sun: in a black-and-white photo, it almost disappears.

Look closely

- Find the brightest-looking thing in the picture. Now squint. Does the sun look lighter than the sky, or about the same?
- Find the darkest shapes. What are they?
- Look at the orange streaks on the water. How many can you count?
- Notice how few details there are. Which shapes are clear and which fade into the mist?

Talk about it

1. If the sun is the same value as the sky, why does it still stand out so strongly? (Think about hue.)
2. Why might Monet have painted a misty morning instead of a clear one?
3. What time of day would you like to paint, and what colors would it need?

STUDIO PROJECT

Color and Value Matching Chart

You will make a chart that shows each main hue beside a gray of the same value, and a tint-and-shade strip for one color. This will train your eye to see value inside color, one of the most useful skills a painter can have.

You will need

- Heavy paper or cardstock (9×12 in)
- Tempera or acrylic paint: red, yellow, blue, white, black
- Round brushes
- Palette, water, paper towels
- Ruler and pencil
- Your color wheel from Lesson 3.1

Steps

1. Use the ruler to draw two rows of six 1½-inch squares at the top of your paper. Label the top row: yellow, orange, red, violet, blue, green.
2. Paint each square in the top row with that hue (mix the secondaries as you did on the color wheel).
3. In the bottom row, under each color, paint a gray you mix from white and black that you think matches the value of the color above it. Squint as you compare.
4. Check your matches: take a black-and-white photo, or squint hard. If a gray looks lighter or darker than its color, repaint it.
5. Below the chart, draw a strip of seven squares. Choose one hue (blue works well). Paint the pure hue in the middle square.
6. To the left, make three tints, adding more white each time. To the right, make three shades, adding a little black (or a dark complementary color) each time.
7. Label the strip “tints” on the left and “shades” on the right.
8. Write a sentence at the bottom: which hue was hardest to match with a gray, and why?

Tips

- Mix the grays on a white plate in small amounts: begin with white and add tiny touches of black.
- Paint drying can change its value slightly. Compare after the paint is dry.
- If you don't have a phone, look at your chart through a piece of red cellophane to reduce the hues.

Check your work

- ☐ Each gray matches its color's value when I squint or look in black and white.
- ☐ My tint and shade strip moves in even steps from light to dark.
- ☐ I can explain why yellow needed a much lighter gray than violet.

SKETCHBOOK PRACTICE

1. Draw a simple landscape twice in colored pencil: once with light colors in the sky and dark on the ground, once the other way around. Which reads more clearly?
2. Make a value scale in five steps using only one colored pencil, pressing harder for darker values.
3. Copy the sun and water from *Impression, Sunrise* with oil pastel, trying to keep the sun the same value as the sky.

From history. The word "Impressionism" began as an insult. In 1874 a group of young painters, including Monet, Renoir and Pissarro, held their own exhibition in Paris because the official art show rejected their work. A critic named Louis Leroy mocked Monet's *Impression, Sunrise*, saying it was only an "impression," not a finished picture. The painters liked the word and kept it.

COMMON MISTAKES

- Thinking bright means light. A bright red can be quite dark in value.
- Adding black to yellow and expecting dark yellow; you will get olive green. Darken yellow with a little brown or violet instead.
- Comparing colors without squinting. Squinting helps you see value.

Make it a game • Light to Dark Lineup. Collect ten colored household items. Squint at them and line them up from lightest to darkest by value, not by hue. Your parent checks by squinting too and may swap two items. Then pick one color and tell why a red can be lighter than a blue. Fewer swaps scores higher.

3.3 INTENSITY AND COMPLEMENTS

OBJECTIVES

- Identify complementary pairs on the color wheel.
- Make a color less intense (duller) by mixing in its complement.
- Use bright and dull colors together to make the bright ones stand out.

Warm-up. Stare at a bright red square of paper for 30 seconds without moving your eyes, then quickly look at a white wall. What color do you see? Try it with a green or blue square too.

WATCH

The Power of SATURATION in Colour (Painting Exercise)

Winged Canvas • 7:50

<https://www.youtube.com/watch?v=FGjXR2lcIVo>

WHEN TO WATCH

After the core ideas. Watch how mixing in the complement makes a color less intense.

Note: The end of the video advertises the channel's online classes.

BACKUP VIDEO

Painting an Intensity Scale with Complimentary Colors

Judy's Art Company • 7:13

<https://www.youtube.com/watch?v=blgRu1SDjck>

A step-by-step demonstration of painting an intensity scale with complementary colors.

KEY TERMS

intensity

How bright and pure a color is, or how dull and grayed it is. Also called saturation or chroma.

complementary colors

Two colors directly opposite each other on the color wheel, such as red and green, blue and orange, or yellow and violet.

neutral

A color with almost no hue, such as gray, brown, beige or near-black, often made by mixing complements.

afterimage

The faint complementary color you see after staring at a strong color.

CORE IDEAS

Colors have a third quality besides hue and value: **intensity**. A high-intensity color is pure and bright, like a fire engine red. A low-intensity color is grayed and quiet, like a brick red or the red of an old barn. Most colors in nature are not fully intense; that is why paintings made only of bright tube colors look harsh.

Complementary colors sit opposite each other on the color wheel: red and green, orange and blue, yellow and violet (and the tertiary pairs, such as red-orange and blue-green). Each complement contains what the other is missing. Together they hold all three primaries.

To lower a color's intensity without changing its value much, mix in a little of its complement. A touch of green makes red into brick red; a bit more makes a rich brown; equal amounts make a **neutral** gray-brown. This is how painters mix beautiful browns, grays and earthy greens that look natural.

When complements are placed side by side instead of mixed, they do the opposite: they make each other look brighter. Red looks redder next to green. Your eye produces an **afterimage** of the complement, which strengthens the neighbor. Painters use this to make an important part of a picture glow.

A good rule: keep most of the picture lower in intensity and save the most intense colors for the place you want people to look. A small spot of pure color surrounded by quiet, grayed colors will shine like a jewel.

PICTURE STUDY



Café Terrace at Night, Vincent van Gogh, 1888 · Oil on canvas · Kröller-Müller Museum, Otterlo, Netherlands

Image: [Wikimedia Commons](#), public domain

Van Gogh painted this street in the town of Arles at night, standing outside with his easel. In a letter to his sister he wrote that it was a night painting without any black, made only of beautiful blue, violet and green. He placed the glowing yellow and orange of the lamplit café against the deep blue-violet of the sky, so each makes the other stronger.

Look closely

- Find the yellow awning and the deep blue sky. Where on the color wheel are they?
- Look at the stars. What colors did Van Gogh use for them?
- Find the cobblestones. Are they as bright as the awning, or duller? Where do they look orange and where blue?
- Look for any pure black. Is there any?

Talk about it

1. How does Van Gogh make night look dark without using black?
2. Why does the café look so warm and inviting?
3. If the sky were gray instead of blue, how would the yellow look?

STUDIO PROJECT

Intensity Scales and a Glowing Lamp

First you will paint two intensity scales, mixing complements step by step. Then you will paint a small night scene, an evening window or a street lamp, where a few spots of pure, intense color glow against quieter, duller colors around them.

You will need

- Heavy paper or watercolor paper (two 9×12 in sheets)
- Tempera or acrylic paint: red, yellow, blue, white
- Round and flat brushes
- Palette, water, paper towels
- Pencil and ruler

Steps

1. On the first sheet, draw two rows of five squares. Paint the first square of the top row pure orange and the last square pure blue.
2. In the second square, paint orange with a small touch of blue. In the fourth square, paint blue with a small touch of orange. In the middle square, mix about equal amounts until you get a neutral gray-brown.
3. Repeat in the second row with red and green (or yellow and violet). Label both scales “intensity scale.”
4. On the second sheet, lightly sketch a simple night scene: a house with a lit window, or a lamp post on a street, with a sky above.
5. Paint the sky with blue mixed with a little orange so it is deep and dull, not bright. Add a little white near the horizon.
6. Paint the house, street and trees in dull, grayed colors mixed with complements: blue-grays, browns and dark greens.
7. Last, paint the lamp or window with your purest, most intense yellow and orange. Add a few touches of orange light on the ground below it.
8. Step back. Does the light glow? If not, dull the colors around it a little more.

Tips

- Add the complement in very small amounts. A little goes a long way.
- Keep a clean brush for your intense colors so they are not muddled.
- Use no black at all, like Van Gogh: darken with complements instead.

Check your work

- ☐ My intensity scales move in even steps from bright to neutral.
- ☐ Most of my night scene is low in intensity.
- ☐ The light is the most intense color and seems to glow.

SKETCHBOOK PRACTICE

1. Look around your house and find five neutral colors (on a floor, a wall, a wooden table). Write down which complements you think could mix them.
2. Draw an orange on a blue cloth with oil pastels, and an orange on a brown cloth. Which orange looks brighter?
3. Make a small study of a leaf in colored pencil, layering a little red over the green to dull the shadow side.

From history. Van Gogh wrote hundreds of letters to his brother Theo and his sister Wil, and many describe his color ideas in detail. While in Arles in 1888 he painted almost one painting a day, often outdoors, using complementary pairs again and again: yellow and violet, orange and blue, red and green.

COMMON MISTAKES

- Adding black to dull a color. Black makes a color darker and often dirtier; a complement keeps it alive.
- Adding too much complement at once and jumping straight to mud.
- Using intense colors everywhere so nothing stands out.

Make it a game • Complement Match-Up. Make twelve cards, each with a color of the wheel. Turn them face down. Take turns flipping two and keeping them if they are complements, such as red and green. Whoever makes a match must also say what happens when you mix them: a duller color. Most pairs wins.

3.4 COLOR TEMPERATURE IN LANDSCAPE

OBJECTIVES

- Sort colors into warm and cool and recognize warmer and cooler versions of the same hue.
- Explain how warm colors seem to come forward and cool colors seem to recede.
- Paint a landscape using warm light and cool shadow and distance.

Warm-up. Look out a window or step outside. Find the warmest color you can see and the coolest color. Then look at the farthest thing you can see (hills, trees, buildings). Is it warmer or cooler than the things nearby?

WATCH

WARM COOL COLOR LANDSCAPE ART LESSON

Art Land · 6:57

<https://www.youtube.com/watch?v=SLz9iSFeWWM>

WHEN TO WATCH

Before the studio project. Watch how warm and cool colors are kept in separate parts of the picture.

BACKUP VIDEO

Are You Using Color Temperature in Your Paintings?

Malcolm Dewey · 5:24

<https://www.youtube.com/watch?v=m0uLP58AAJ8>

For a deeper explanation after the picture study; a landscape painter explains warm light and cool shadows.

KEY TERMS

color temperature

Whether a color feels warm (like fire and sun) or cool (like water, ice and shade).

warm colors

Reds, oranges and yellows, and colors that lean toward them.

cool colors

Blues, greens and violets, and colors that lean toward them.

recede

To seem to move back, away from the viewer.

CORE IDEAS

Colors have a **temperature**. **Warm colors** (reds, oranges, yellows) remind us of fire and sunlight. **Cool colors** (blues, greens, violets) remind us of water, ice, shade and sky. You can see the warm half and the cool half on your color wheel.

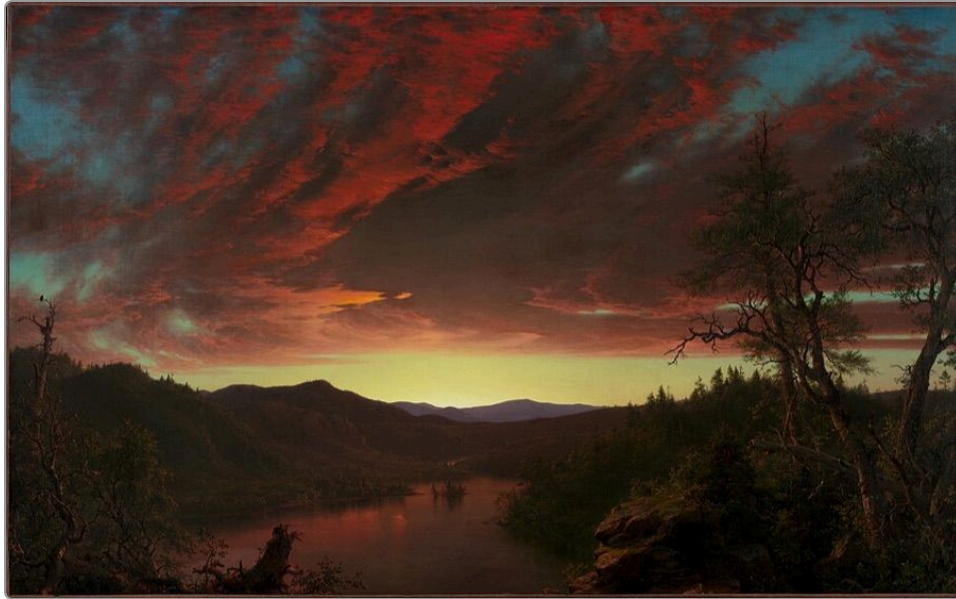
Temperature is also relative. There are warm and cool versions of every hue. A lemon yellow is cooler than a golden yellow; a crimson is cooler than an orange-red; a green with more yellow is warmer than a blue-green. Comparing two reds and asking, “Which one leans toward blue?” is how painters choose colors precisely.

Warm colors seem to come toward you, and cool colors seem to **recede**, or move back. In a landscape, the air between you and faraway hills scatters blue light, so distant things look cooler, bluer and paler. Painters use this: warm, strong colors in the foreground and cool, soft colors in the distance make a picture look deep.

On a sunny day, sunlight is warm, and shadows are lit by the blue sky, so they are cool. That is a simple rule that makes outdoor paintings glow: **warm light, cool shadow**. At sunset, the light becomes very warm (orange and red), and the shadowed land turns deep blue and violet.

Temperature also creates mood. A picture made mostly of warm colors feels cheerful, lively or hot; one made mostly of cool colors feels calm, quiet or cold. The most beautiful pictures often use mostly one temperature with a few touches of the other for contrast.

PICTURE STUDY



Twilight in the Wilderness, Frederic Edwin Church, 1860 · Oil on canvas · Cleveland Museum of Art, Cleveland

Image: [Wikimedia Commons](#), public domain

Frederic Church was a painter of the Hudson River School, a group of American artists who painted the wilderness as a sign of God's glory. He saw sunsets like this one in the forests of Maine. The sky burns with warm reds and oranges while the land below has already gone cool and dark.

Look closely

- Find the warmest part of the sky. Where is the sun?
- Look at the land and the river. Are their colors warm or cool?
- Find the most distant mountain. How is its color different from the trees in the foreground?
- Look at the river. What colors are reflected in it?

Talk about it

1. How does the painting make you feel? Which colors cause that feeling?
2. Why do you think the land is so much cooler and darker than the sky?
3. Many people in Church's day saw his landscapes as praise to the Creator. What in this painting might lead someone to think of God?

STUDIO PROJECT

Sunset over the Hills

You will paint a landscape at sunset or early evening using color temperature: a warm, glowing sky, and cool hills that get paler and bluer as they go back into the distance. Watercolor works beautifully for this, but tempera or acrylic is fine.

You will need

- Watercolor paper (9×12 in, 140 lb)
- Watercolors (or tempera)
- Round brushes size 4 and 8 and a flat brush
- Pencil
- Water, paper towels, masking tape

Steps

1. Tape the paper to a board on all four sides. Lightly draw a horizon line about one-third up from the bottom, and the shapes of three or four layers of hills, each lower and closer than the one behind.
2. Paint the sky first with warm colors: yellow near the horizon, then orange, then red-orange higher up, letting them blend while wet. Near the top, add a little cool violet or blue.
3. Let the sky dry completely.
4. Paint the farthest hill layer with a pale, cool blue-violet (mostly water, a little pigment). Let it dry.
5. Paint the next hill layer slightly darker and a little less blue, perhaps blue-green. Let it dry.
6. Paint the nearer layers darker and warmer: deep greens, dark green-blues and, in the very front, a little warm brown or dark red in the grass.
7. Add a few dark tree or fence shapes in the foreground against the sky. Add a touch of warm sky color on the tops of the nearest hills where the last light hits them.
8. When dry, remove the tape slowly. Look: do the far hills seem far away?

Tips

- Let each hill dry before painting the next so the edges stay crisp.
- Test every mixture on a scrap of watercolor paper first.
- The farthest hills should be the palest and coolest; the nearest, the darkest and warmest.

Check your work

- ☐ My sky is mainly warm and glowing.
- ☐ My hills become cooler and paler as they go back.
- ☐ There is a clear difference between the warm foreground and the cool distance.

SKETCHBOOK PRACTICE

1. Paint or color two small squares of the same hue, one warmer and one cooler (for example, two greens). Do this for red, yellow and blue.
2. Draw the view from a window at two times of day. Note how the light and shadow colors change.
3. Make a quick oil pastel landscape using only cool colors, then the same landscape using only warm colors. How does the mood change?

From history. The Hudson River School was the first great group of American landscape painters, active from the 1820s to the 1870s. Thomas Cole, its founder, and his student Frederic Church traveled into the wilderness to sketch, then painted huge canvases in their studios. Many of them were devout Christians who saw the American wilderness as a fresh, unspoiled picture of God's creation.

COMMON MISTAKES

- Making far-away hills as dark and green as near ones.
- Painting shadows with gray or black instead of cool colors.
- Mixing warm sky colors into wet blue and getting gray or green mud. Let areas dry or keep them apart.

Make it a game • Warm Forward, Cool Back. Stand in the middle of the room. Your parent names things: a campfire, ice, a sunset, a shadowed hill. Step forward for warm colors, back for cool. Next, hear two versions of one hue, such as a warm red and a cool red, and say which one comes forward.

Scripture. “The heavens declare the glory of God; and the firmament sheweth his handywork.” (Psalms 19:1, KJV)

A sunset like Church’s is one of the ways the sky “declares” God’s glory. Painting it is a way of listening to what it says.

UNIT 3

COLOR THEORY

Color is one of the great joys of God’s world, and one of the hardest things in art to control. In this unit you will stop using paint straight from the tube and start mixing colors on purpose. You will paint your own twelve-part color wheel, discover that every color has a value (how light or dark it is), learn to make a color brighter or duller with its complement, and see how warm and cool colors make a landscape glow with light and fall back into distance.

Each idea is tied to a painter who used it on purpose: Seurat, who studied the science of color; Monet, who painted the sun on a misty morning; Van Gogh, who set yellow against blue; and Frederic Church, who painted the burning colors of a sunset in the American wilderness.

PREREQUISITES

- Knows the primary colors (red, yellow, blue) and the secondary colors (orange, green, violet)
- Can make a value scale from light to dark in pencil
- Has tempera or acrylic paint in the primaries plus white and black, and watercolors

MASTERY CHECKLIST

- ☐ I can paint a twelve-part color wheel with primary, secondary and tertiary colors.
- ☐ I can tell which of two colors is lighter or darker in value, even when the hues are different.
- ☐ I can make a color duller (less intense) by mixing in a little of its complement.
- ☐ I can use warm colors to bring things forward and cool colors to push them back in a landscape.
- ☐ I can explain hue, value, intensity and temperature in my own words.

LESSONS IN THIS UNIT

3.1 A Painted Color Wheel

2 sessions of 45 minutes

3.2 The Value of Colors

2 sessions of 45 minutes

3.3 Intensity and Complements

2 sessions of 45 minutes

UNIT 3 REVIEW

Answer each question in a sentence or two. You may point to your color wheel to help. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. 5 pts

Name the three primary colors and the three secondary colors in painting.

2. 5 pts

What is a tertiary color? Give two examples.

3. 5 pts

Explain the difference between hue and value.

4. 5 pts

Which pure hue is lightest in value, and which is darkest?

5. 5 pts

What is a tint, and what is a shade?

6. 5 pts

Name the complement of each: red, blue, yellow.

7. 5 pts

How can you make a color less intense without black?

8. 5 pts

What happens when complements are placed side by side instead of mixed?

9. 5 pts

Why do distant hills look cooler and paler?

10. 5 pts

What is special about the value of the sun in Monet's *Impression, Sunrise*?

ANSWER KEY

1. Primaries: red, yellow, blue. Secondaries: orange, green, violet.
2. A mix of a primary and the secondary next to it, such as red-orange and blue-green.
3. Hue is the color family (red, blue); value is how light or dark the color is.
4. Yellow is lightest; violet is darkest.
5. A tint is a color with white added (lighter); a shade is a color with black or a dark color added (darker).
6. Red-green, blue-orange, yellow-violet.
7. Mix in a small amount of its complement.
8. They make each other look brighter and more intense.
9. The air between you and the hills scatters blue light, so far things look bluer, paler and softer.
10. It is almost the same value as the sky around it; it stands out by hue (orange against blue-gray), so it seems to shimmer.

PORTFOLIO PIECE: A LANDSCAPE IN PLANNED COLOR

Paint a landscape from a place you know (your yard, a park, a field at evening). Before painting, plan your colors in a small swatch strip: choose a temperature (mostly warm or mostly cool), mix your neutrals from complements, and save your most intense color for one focal spot. Show warm light and cool shadows, and make the distance cooler and paler than the foreground.

LOOK FOR	WHAT IT MEANS
Color mixing	Colors are mixed from primaries and complements, not used straight from the tube; colors are clean, not muddy.
Value	Light and dark values are clear, and the picture still reads when squinting.
Intensity	Most colors are quieter, and the most intense color is saved for one important spot.
Temperature and depth	Warm light and cool shadows are used, and distant parts are cooler and paler.

UNIT 4

LIGHT AND SHADOW

Light is what lets us see form. When light falls on a round apple, it makes a pattern of light and dark that tells our eyes the apple is round. If you learn to see that pattern and draw it, your drawings will stop looking flat and start looking solid enough to pick up.

In this unit you will study the parts of the light pattern one at a time: the light side and the core shadow, with the edge between them called the terminator; the reflected light that bounces into shadows; and the cast shadow that every object throws onto the surfaces around it. At the end you will see how Johannes Vermeer put all of these together to paint quiet daylight falling into a room.

PREREQUISITES

- Can make a value scale from white to black in pencil
- Can draw a circle, a cube and a cylinder
- Knows that value means lightness or darkness (Lesson 3.2)

MASTERY CHECKLIST

- ☐ I can name the parts of light on a form: highlight, light side, terminator, core shadow, reflected light and cast shadow.
- ☐ I can shade a sphere so it looks round, with a clear terminator and core shadow.
- ☐ I can show reflected light without making it as light as the lit side.
- ☐ I can draw a cast shadow that points away from the light and is darkest and sharpest near the object.
- ☐ I can describe how Vermeer used window light in a painting.

LESSONS IN THIS UNIT

4.1 Core Shadow and the Terminator

2 sessions of 45 minutes

4.2 Reflected Light

2 sessions of 45 minutes

4.3 Cast Shadow Shapes

2 sessions of 45 minutes

UNIT 4 REVIEW

Answer each question in a sentence or two, or draw a quick sketch when asked. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What is the terminator on a form?

2. (5 pts)

Where is the core shadow, and why is it the darkest part of the form?

3. (5 pts)

Draw a sphere lit from the upper left. Label the highlight, light side, terminator, core shadow, reflected light and cast shadow.

4. (5 pts)

How is the terminator different on a ball and on a cube?

5. (5 pts)

What is reflected light, and what is the most important rule about it?

6. (5 pts)

What is an occlusion shadow?

7. (5 pts)

Which way does a cast shadow point, and what makes it long or short?

8. (5 pts)

Describe how a cast shadow's edge and value change as it gets farther from the object.

9. (5 pts)

Why are shadows outdoors on a sunny day often blue or violet?

10. 5 pts

Name two ways Vermeer showed window light in *The Milkmaid*.

ANSWER KEY

1. The edge where the lit side turns into shadow, where the light can no longer reach.
2. Just past the terminator on the shadow side; it gets neither direct light nor much reflected light.
3. Highlight upper left, shadow side lower right with a dark core band along the curved terminator, a slightly lighter band at the lower right edge, and a cast shadow falling to the lower right.
4. On a ball it is soft and gradual; on a cube it is a sharp edge between flat sides.
5. Light bounced from a nearby surface into the shadow side. It must always stay darker than the light side.
6. The very dark, thin shadow where an object touches the surface it rests on.
7. Away from the light. A low light makes long shadows; a high light makes short ones.
8. Near the object it is darkest with a hard edge; farther away it becomes lighter and softer.
9. They are lit only by the blue sky, not by the warm sun.
10. Any two: one light from the left window; the wall lighter and darker to set off the figure; soft shadows; tiny dots of highlight on the bread; the light fading into the room; the small cast shadow of the nail.

PORTFOLIO PIECE: A STILL LIFE IN THREE VALUES AND LIGHT

Set up three objects of different shapes (one round, one boxy, one cylindrical) on a light-colored cloth with a single light source, either a window or a lamp. Draw or paint them showing every part of the light pattern you learned: highlights, light sides, terminators, core shadows, reflected light, occlusion shadows and cast shadows. Write the direction of the light with a small arrow on the back.

LOOK FOR	WHAT IT MEANS
Light source	Highlights and shadows all agree on where the light comes from.
Form shadows	Each object has a clear terminator and core shadow that make it look round or solid.
Reflected light	Reflected light is visible in the shadows but stays darker than the light sides.
Cast shadows	Cast shadows point away from the light and are darkest and sharpest near the objects.
Craftsmanship	Shading is smooth and built in layers, and the paper is clean.

4.1 CORE SHADOW AND THE TERMINATOR

OBJECTIVES

- Name the parts of light on a round form.
- Find the terminator, the line where light turns into shadow.
- Shade a sphere and an egg with a clear light side, terminator and core shadow.

Warm-up. Darken the room and shine a lamp on an orange or a ball from one side. Slowly walk around it. Watch how the edge between light and shadow moves as you move. Sketch the ball from two positions, drawing only the line where light turns to shadow.

WATCH

How to Draw a 3D Sphere: Shading for Beginners

Circle Line Art School · 4:00

<https://www.youtube.com/watch?v=9r2SIYXQNgl>

WHEN TO WATCH

After the core ideas. Pause and point to the highlight, the core shadow and the cast shadow as he draws them.

BACKUP VIDEO

How to Shade a Sphere with Graphite Pencils | Realistic Shading for Beginners

Jennifer Funnell · 11:36

<https://www.youtube.com/watch?v=GN4nFsR5MJU>

A slower, more detailed version for the studio project; follow along step by step.

KEY TERMS

light source

Where the light comes from, such as the sun, a window or a lamp.

highlight

The brightest spot on a form, where the light hits most directly or reflects like a mirror.

terminator

The edge where the lit side of a form turns into shadow; it marks where light can no longer reach.

core shadow

The darkest band of shadow on a form, just past the terminator.

form shadow

All of the shadow on the form itself, on the side turned away from the light.

CORE IDEAS

Shading begins with one question: **where is the light source?** A single strong light, such as a lamp or a sunny window, makes the clearest pattern of light and shadow. Every value you draw on an object should agree with that one light.

On a round form like a ball, the side facing the light is the **light side**. The place that faces the light most directly holds the **highlight**, the brightest spot. On shiny things the highlight is small and sharp; on dull things like an orange or an egg it is larger and softer.

As the ball curves away from the light, it gets gradually darker, until it reaches a line where light cannot reach at all. This line is called the **terminator** (from a Latin word meaning “boundary”). Past the terminator is the **form shadow**. On a sphere the terminator is a curved line, like the edge of the dark side of a half moon.

Just past the terminator is the **core shadow**, the darkest band on the form. It is darkest because it gets neither direct light nor much light bounced back from the room. Beginners often put the darkest dark at the very edge of the ball; look carefully, and you will see it sits a little inside the shadow side, along the terminator.

On a sphere the light fades gradually into the terminator, which looks soft. On a cube the change is sudden: each flat side has one value, and the terminator is a sharp edge. The softness or sharpness of the terminator tells our eyes whether a form is round or angular.

To shade, first draw the terminator lightly. Then shade the whole shadow side one even middle-dark value. Next build the darkest core shadow along the terminator, and finally blend the light side from the terminator toward the highlight in smooth, gradual steps.

PICTURE STUDY



Still Life with Lemons, Oranges and a Rose, Francisco de Zurbarán, 1633 · Oil on canvas · Norton Simon Museum, Pasadena, California

Image: [Wikimedia Commons](#), public domain

Francisco de Zurbarán was a Spanish painter known for his religious paintings of monks and saints. This is the only still life he signed and dated. A strong light from the left shines on each object against a dark background, making the fruit look solid enough to pick up. Many viewers have seen in the cup of water and the rose a quiet tribute to the Virgin Mary, a symbol of purity and love.

Look closely

- Where is the light coming from? How can you tell?
- Choose one orange. Find its highlight, its light side, its terminator and its core shadow.
- Compare the terminator on the round oranges with the edges of light on the flat sides of the cup and plates.
- Look at the dark background. Why is there no detail behind the objects?

Talk about it

1. Which object looks the most three-dimensional to you? Why?
2. Why do you think Zurbarán placed the three groups in a simple row with space between them?

3. How does the dark background make you feel about these simple objects?

STUDIO PROJECT

Three Eggs by Lamplight

Eggs are perfect for studying light because they are smooth, white and round. You will set up three eggs under a lamp and shade them carefully, finding the terminator and core shadow on each. Then you will shade a sphere from your imagination using the same steps.

You will need

- Drawing paper (9×12 in)
- HB, 2B and 4B pencils
- Kneaded eraser
- A blending stump or a folded tissue (optional)
- Three eggs (or white balls)
- A dark cloth or dark paper
- A desk lamp

Steps

1. Put the eggs on a dark cloth. Place the lamp on one side, a little above the eggs, and turn off other lights. Turn the eggs so you see one on its side, one standing, and one leaning.
2. Lightly draw the outlines of the three eggs with the HB pencil, using sighting to get their sizes and spacing right.
3. Look carefully at each egg and lightly draw its terminator: the curved line where light becomes shadow.
4. With the 2B pencil, shade the whole shadow side of each one even, medium-dark value, staying inside the terminator line.
5. Now find the core shadow. With the 4B pencil, darken a band just inside the shadow side, along the terminator.
6. Shade the light side very gently, starting dark near the terminator and getting lighter toward the highlight. Leave the highlight white paper.
7. Blend the light side with a stump or tissue if you like, but keep the core shadow crisp enough to see.

8. On the same page, draw a circle and shade it as a sphere lit from the upper right, using the same steps from memory.

Tips

- Squint often. It hides small details and shows the big shapes of light and shadow.
- Shade in layers: many light layers make a smoother tone than pressing hard once.
- Keep your hand on a scrap of paper so you don't smudge your drawing.

Check your work

- ☐ Each egg has a clear terminator that agrees with my lamp.
- ☐ The darkest part of each egg is the core shadow, along the terminator.
- ☐ The light side changes gradually, with a white highlight.

SKETCHBOOK PRACTICE

1. Shade a cube and a sphere lit from the same direction. Notice that the cube's terminator is a sharp corner and the sphere's is soft.
2. Draw an apple, a lemon and a potato under a lamp. Find the terminator on each.
3. Look at a full moon or a half moon and draw it. Where is the terminator on the moon?

From history. Spanish painters of the 1600s, such as Zurbarán and Juan Sánchez Cotán, painted still lifes called *bodegones*. They lit their objects with strong light against deep darkness, a style learned from the Italian painter Caravaggio. The strong contrast makes even a lemon look solemn and important.

COMMON MISTAKES

- Outlining the ball and darkening the outline. Real forms have no dark lines around them.
- Shading all around the edge like a donut instead of on one side.
- Putting the darkest dark on the edge instead of on the core shadow.
- Changing the direction of the light from one object to another.

Make it a game • Point and Name. Hold an egg or an orange under a lamp. Your parent points to random spots on it while you name the part of the light: highlight, core shadow, terminator or light source. Then you point and your parent answers, but your parent may make one deliberate mistake for you to catch. Score each right name.

Scripture. “And God said, Let there be light: and there was light.” (Genesis 1:3, KJV)

Light was the first thing God made, and it is what lets us see everything else. When we draw light and shadow, we are drawing the gift of the first day.

4.2 REFLECTED LIGHT

OBJECTIVES

- Explain where reflected light comes from.
- Show reflected light in the shadow side of a form without making it as light as the lit side.
- Observe how reflected light carries the color of the surface it bounces from.

Warm-up. Place a white ball or egg on a sheet of white paper under a lamp. Look at the shadow side. Now slide a sheet of bright red or orange paper close to the shadow side. What happens to the shadow? Try a dark cloth. Sketch what you see.

WATCH

Reflected Light

Tucson Art Academy Online · 3:35

https://www.youtube.com/watch?v=df_kqhgpZIk

WHEN TO WATCH

After the warm-up. Watch, then repeat the warm-up experiment and look again.

BACKUP VIDEO

How to Shade Basic Forms - Pencil Tutorial

Drawing & Painting - The Virtual Instructor · 9:20

<https://www.youtube.com/watch?v=vMr6eimcolc>

Before the studio project. Watch how he leaves a little lighter tone at the shadow edge of each form for reflected light.

KEY TERMS

reflected light

Light that bounces off a nearby surface and lights up part of an object's shadow side.

bounce light

Another name for reflected light.

occlusion shadow

The very dark, thin shadow right where an object touches the surface it rests on.

local color

The true color of an object in plain light, such as the red of a red apple.

CORE IDEAS

Light does not stop when it hits something. Some of it bounces off, and that bounced light goes on to light up other things. When light bounces off the table, a wall or a white cloth and falls back onto the shadow side of an object, we call it **reflected light** or bounce light.

You will see reflected light as a slightly lighter band inside the shadow side, near the edge of the form farthest from the light. It is what makes the shadow side look round instead of like a flat, dark cutout.

Here is the most important rule: **reflected light is always darker than the light side.** It is light inside the shadow, so it belongs to the shadow family. If you make it too bright, the form will look like it has two light sources, or it will look like glass. Keep it subtle, a step or two lighter than the core shadow.

Reflected light carries color. Light bouncing off a red tablecloth puts a warm red glow into the shadow of a white cup. Light from a blue sky puts a cool blue into shadows outdoors. Painters notice these colors and use them to make shadows rich and alive instead of gray.

Where an object touches the table, no light can reach at all. A thin, very dark line forms there, called the **occlusion shadow**. It anchors the object so it sits firmly on the surface instead of floating. Together, the core shadow, the reflected light and the occlusion shadow make a form look truly solid.

PICTURE STUDY



Saying Grace, Jean-Baptiste-Siméon Chardin, 1740 · Oil on canvas · Louvre, Paris

Image: [Wikimedia Commons](#), public domain

Chardin was a French painter who loved quiet scenes of ordinary home life. Here a mother pauses as she serves dinner while the youngest child says grace and the older sister watches. Chardin painted the soft light in the room with great care, and if you look closely you will find light bouncing from the white tablecloth and the children's white clothes into the shadows.

Look closely

- Where is the light coming from? Which side of each figure is lit?
- Look at the white tablecloth. Then look at the undersides of the dishes, the children's faces and their hands. Can you see a soft glow there, bounced up from the cloth?
- Find the white dress of the child in front. Is the shadow side of the dress dark gray, or does it glow a little?
- Find the darkest darks in the painting. Where are they?

Talk about it

1. What is the little child doing, and how do the mother and sister respond?
2. Why do you think Chardin chose such a simple, everyday moment to paint?
3. How does the soft light change the feeling of the scene?

STUDIO PROJECT

A White Cup on a Colored Cloth

You will draw a white cup or mug and a round fruit on a colored cloth under a lamp, shading the core shadows, reflected light and occlusion shadows. Then you will add color with colored pencils to show the color that bounces into the shadows.

You will need

- Drawing paper or mixed-media paper (9×12 in)
- HB and 2B pencils
- Colored pencils
- Kneaded eraser
- A white cup or mug and a round fruit (an orange or apple)
- A brightly colored cloth or sheet of paper (red, orange or yellow works well)
- A desk lamp

Steps

1. Set the cup and the fruit on the colored cloth, close together, with the lamp on one side. Turn off other lights.
2. Lightly draw both objects with the HB pencil, using sighting for proportions. Draw the ellipse of the cup's rim carefully.
3. Find and draw the terminator on each object.
4. Shade the shadow sides with an even middle value using the 2B pencil.
5. Find the reflected light: look at the shadow side near the edge closest to the cloth. Lift a little graphite there with the kneaded eraser, but keep it darker than the light side.
6. Darken the core shadow along the terminator, and add the thin, dark occlusion shadow where each object touches the cloth.
7. Now add color with colored pencils. Color the cloth. Color the fruit with its local color. Then layer a light touch of the cloth's color into the reflected light on the cup and on the underside of the fruit.

8. Draw the cast shadows on the cloth, making them darker and richer versions of the cloth color.

Tips

- Compare the reflected light with the light side by squinting. If the reflected light looks as bright as the light side, darken it.
- Move the objects closer to the cloth or to each other to see stronger reflected light.
- A white sheet of paper held next to the shadow side shows how a reflector works; photographers use the same trick.

Check your work

- ☐ Each object has a core shadow and a gentle reflected light that is darker than the light side.
- ☐ I drew a thin, dark occlusion shadow where the objects touch the cloth.
- ☐ I added a touch of the cloth's color into the reflected light.

SKETCHBOOK PRACTICE

1. Draw a friend's or family member's face lit by a lamp, and look for reflected light under the chin and along the jaw.
2. Shade three spheres: one with no reflected light, one with too much, and one just right. Label them.
3. Find a shiny pot or spoon and draw the reflections you see in it.

From history. Chardin was admired by the other artists of Paris for his patient, quiet way of painting. He worked slowly, laying on many layers of paint to capture the soft light of a room. The king of France owned a version of *Saying Grace*, and Chardin painted it several times because people loved it so much.

COMMON MISTAKES

- Making the reflected light as bright as the light side.
- Shading the shadow side flat black so the form looks like a cutout.
- Forgetting the occlusion shadow, so objects seem to float.

Make it a game • Bounce Light Hunt. Hunt through the house for three places where color bounces from one surface onto another, such as a red book beside white paper. Each time, point to the source and the shadow side it glows into. Then say why that reflected light is always darker than the lit side. One point per place.

4.3 CAST SHADOW SHAPES

OBJECTIVES

- Explain how the direction and height of the light change a cast shadow's shape and length.
- Draw cast shadows that point away from the light.
- Show that cast shadows are darkest and sharpest near the object and lighter and softer farther away.

Warm-up. Go outside at two different times of day (or move a lamp from high to low above a cup). Trace the shadow of a stick, a cup or a toy with chalk on the sidewalk or with pencil on paper. Compare the two shadows. Which is longer? Why?

WATCH

How to Draw and Paint Cast Shadows

Drawing & Painting - The Virtual Instructor · 10:48

<https://www.youtube.com/watch?v=ytW62RhHkDE>

WHEN TO WATCH

After the core ideas. Watch the first half, then try the cube shadow along with him.

BACKUP VIDEO

Quick Tip 233 - Locating Cast Shadows

In the Studio Art Instruction · 9:07

<https://www.youtube.com/watch?v=vld2WGUQQjc>

A painter's explanation of finding where cast shadows fall; good before the studio project.

KEY TERMS

cast shadow

The shadow an object throws onto another surface because it blocks the light.

direction of light

The way the light travels from its source; cast shadows always fall on the opposite side.

hard edge

A sharp, clear boundary between light and shadow.

soft edge

A blurred, gradual boundary between light and shadow.

CORE IDEAS

When an object blocks the light, it throws a **cast shadow** onto the table, the ground, a wall or another object. The cast shadow always falls on the side **opposite the light**. If the light comes from the upper left, the shadow falls to the lower right.

The height of the light changes the length of the shadow. A high light (the sun at noon, or a lamp straight above) makes a short shadow. A low light (early morning, late evening, or a lamp near the table) makes a long, stretched shadow. Check your warm-up drawings: you made this discovery yourself.

The shape of the cast shadow depends on the shape of the object and the surface it falls on. A ball casts an oval shadow on the table. A box casts a shadow with straight edges. A shadow that falls across a step or a wrinkled cloth bends and breaks to follow the surface, which is a wonderful way to show that surface's shape.

Cast shadows have edges that change. Right next to the object the shadow is darkest and has a **hard edge**. Farther away it becomes a little lighter, because more reflected light reaches it, and its edge becomes **softer** and blurrier. A soft, cloudy day makes very soft shadows; bright sun makes hard ones.

A cast shadow is usually darker than the form shadow on the object itself, because it is blocked from the light more completely. Outdoors on a sunny day, cast shadows are often cool blue or violet, since they are lit only by the blue sky.

PICTURE STUDY



Woman with a Parasol – Madame Monet and Her Son, Claude Monet, 1875 · Oil on canvas · National Gallery of Art, Washington, D.C.

Image: [Wikimedia Commons](#), public domain

Monet painted his wife, Camille, and their son, Jean, outdoors on a windy summer day, quickly, as if he caught a single moment. The sun is high and behind them, so Camille's parasol throws shadow over her face and shoulders, and parts of her dress and the grass in front of her fall into shadow. Notice how much color is in the shadows.

Look closely

- Find the shadowed grass in front of Camille and the shaded side of her dress. Where must the sun be?
- Look at the shadow of the parasol on her dress and face. What colors are in it?
- Are the shadows on her white dress dull gray, or do they have blues, greens and violets?
- Look at the edges of the shadows. Are they hard or soft?

Talk about it

1. How did Monet show that the day was windy?
2. Why are the shadows on her white dress blue and not gray?

3. How would this painting look different if the sun were straight overhead?

STUDIO PROJECT

Shadows on the Move

You will draw a simple group of objects twice, under two different lights: once with a high light and once with a low light. Then you will paint or color one of the drawings, giving the cast shadows the right direction, length, edges and color.

You will need

- Drawing paper or mixed-media paper (two 9×12 in sheets)
- HB and 2B pencils
- Colored pencils or watercolors
- Kneaded eraser
- Three simple objects: a ball or orange, a box, and a cylinder such as a can or cup
- A desk lamp you can raise and lower

Steps

1. Set the three objects on a white sheet of paper with some space between them. Raise the lamp high and a little to one side.
2. On the first sheet, lightly draw the objects. Then look at the cast shadows: which way do they point? How long are they? Draw their shapes lightly.
3. Shade the form shadows on the objects, then the cast shadows. Make each cast shadow darkest and sharpest right next to the object and a little lighter and softer at its far end.
4. Now lower the lamp close to the table and move it to the other side. Look again: the shadows have become longer and point the other way.
5. On the second sheet, draw the same objects with the new long shadows. Shade them the same way.
6. Choose your favorite drawing and add color. Color the objects with their local colors.
7. Color the cast shadows with a darker, cooler version of the paper or table color (a blue-gray or violet-gray on white), not plain black.

8. Write an arrow on each page showing the direction of the light.

Tips

- Imagine lines (rays) from the light passing over the tops of each object; they show where the shadow ends.
- Look for the occlusion shadow at the base of each object, darkest of all.
- Shadows of round objects are ovals; shadows of boxes have straight edges and corners.

Check your work

- ☐ All my cast shadows point away from the light in both drawings.
- ☐ The low light made longer shadows than the high light.
- ☐ My shadows are darkest and sharpest near the objects and softer farther away.

SKETCHBOOK PRACTICE

1. Draw the shadow of a chair or a bicycle on the ground on a sunny day. Notice how the shadow shape stretches.
2. Draw a cup with its shadow falling across a folded towel, so the shadow bends over the folds.
3. Draw a tree and its long shadow in the late afternoon.

From history. Monet and the Impressionists liked to paint outdoors, “en plein air” (in the open air), which became much easier after paint was sold in squeezable metal tubes beginning in the 1840s. Outdoors they discovered that shadows on a sunny day are full of color, especially blue and violet from the sky.

COMMON MISTAKES

- Cast shadows pointing toward the light, or in different directions for different objects.
- Drawing cast shadows with a dark outline and no edge changes.
- Making every shadow plain black or gray, with no color.

Make it a game • Shadow Forecast. Place a cup under a lamp. Before each move, predict aloud which direction its shadow will point and whether it will get longer or shorter: lamp raised, lamp lowered, lamp moved to the side. Then test it. Shadows always point away from the light. Score a point for every correct forecast.

4.4 LIGHT IN VERMEER

OBJECTIVES

- Describe how Vermeer used one window light to model forms and create a quiet mood.
- Identify highlights, form shadows, cast shadows and reflected light in a master painting.
- Paint or draw a simple scene lit by window light.

Warm-up. Sit near a window in a room with the lights off. Hold an object (a jug, a loaf of bread or a cup) near the window and slowly move it away into the room. Write three sentences about how the light on it changes.

WATCH

Vermeer: In the Light of Delft

National Gallery of Art · 6:28

<https://www.youtube.com/watch?v=cxZFUNWNaA0>

WHEN TO WATCH

Before the picture study. A quiet film from the National Gallery of Art that moves slowly over Vermeer's *A Lady Writing*. Notice where the light falls.

BACKUP VIDEO

HOW to create a VERMEER painting | Rijksmuseum tutorial

RijksCreative · 16:12

<https://www.youtube.com/watch?v=QKxDtJEKihU>

A Rijksmuseum painting lesson that builds a still life in Vermeer's way, from dark underpainting to bright lights.

KEY TERMS

window light

Daylight coming through a window from one side; it falls off gradually as it goes deeper into the room.

light falloff

The way light becomes weaker the farther it travels from its source.

genre painting

A painting of everyday life, such as people working, cooking or reading at home.

camera obscura

A dark box or room with a small hole or lens that projects an image of the outside scene onto a surface.

CORE IDEAS

Johannes Vermeer painted the inside of Dutch homes, usually with one window on the left letting in soft daylight. With that single light source he modeled every form in the room: the face, the folds of cloth, the bread, the jug. Everything you learned in this unit is in his paintings.

Window light is different from lamplight. It is soft and broad, so shadows have soft edges. And it shows **light falloff**: things near the window are bright, things deeper in the room are dimmer. Vermeer painted this gradual change on his walls and floors so carefully that you can feel the depth of the room.

Vermeer also used contrast against the background. Where a figure's lit side is, he darkened the wall behind it a little; where the figure is in shadow, he made the wall a little lighter. This makes the figure seem to stand out from the wall, almost in three dimensions.

He painted highlights as tiny dots of light-colored paint, like sparkles on bread, metal or a pearl. These dots imitate the way light glitters on rough or shiny surfaces, and they make his paintings shimmer.

Some scholars think Vermeer may have used a **camera obscura**, a device that projects an image, to study how light and color appear. Whether he did or not, his paintings come from years of patient looking at light falling into a room.

PICTURE STUDY



The Milkmaid, Johannes Vermeer, about 1658 · Oil on canvas · Rijksmuseum, Amsterdam

Image: [Wikimedia Commons](#), public domain

A kitchen maid stands by the window, carefully pouring milk into a bowl. Nothing else happens, yet this small painting is one of the most loved works in the Netherlands. Vermeer made an ordinary task look calm and dignified, and he painted the daylight in that kitchen so truly that you can almost feel its coolness.

Look closely

- Find the window. Which side of the maid is lit?
- Look at the wall behind her. Where is it lighter and where is it darker? Compare it with her lit side and her shadowed side.
- Find the bread on the table. Can you see the small dots of light on the crust?
- Look at the nail and the small hole in the wall at the upper right. Can you see the tiny cast shadow of the nail?

Talk about it

1. How does the light make this simple chore seem important?
2. Where is the brightest highlight in the whole painting?
3. What everyday task in your home could be painted like this?

STUDIO PROJECT

A Still Life in Window Light

Like Vermeer, you will work with one window as your only light. You will set up a simple still life of kitchen things (a jug, bread, a bowl) on a table beside a window and paint or draw it, showing the light side, core shadows, reflected light, cast shadows and the gentle falloff of the light.

You will need

- Mixed-media or watercolor paper (9×12 in), or toned paper
- HB and 2B pencils
- Watercolors, tempera or colored pencils
- A white colored pencil or white paint for highlights
- A jug or pitcher, a loaf or roll of bread, a bowl, a cloth
- A table near a window (turn off room lights)

Steps

1. Set the objects on the table close to the window so the light falls on them from the side. Turn off all room lights. Close curtains on other windows if you can.
2. Look through your viewfinder and choose a composition. Make a small value thumbnail in your sketchbook with three values: light, middle and dark.
3. Lightly draw the objects on your paper with the HB pencil, using sighting.
4. Mark the terminator on each object, and the shapes of the cast shadows falling away from the window.
5. Paint or color the background wall first. Make it slightly lighter near the window and slightly darker farther away. Behind the lit side of the jug, make it a little darker; behind the shadow side, a little lighter.
6. Paint the objects: light sides warm and bright, shadow sides cooler and darker, with a darker core shadow and a little reflected light from the table or cloth.
7. Paint the cast shadows on the table, darkest close to each object.

8. Last, add small highlights with white: on the rim and handle of the jug, and a few tiny dots on the bread crust, as Vermeer did.

Tips

- Work at the same time of day for both sessions; the light changes over the day.
- If there is no good window, use one lamp with a sheet of white paper in front of it to soften the light.
- Keep it simple. Three objects painted with care are better than ten painted quickly.

Check your work

- ☐ All the light in my picture comes from one window side.
- ☐ My objects have light sides, core shadows, reflected light and cast shadows.
- ☐ I added small highlights, and the background helps the objects stand out.

SKETCHBOOK PRACTICE

1. Draw a family member reading by a window. Shade only the shadow shapes.
2. Copy a small section of *The Milkmaid*, such as the jug and bowl, in pencil, matching Vermeer's values.
3. Draw the same object near the window and three steps farther into the room. Show how the light weakens.

From history. Vermeer lived all his life in the city of Delft, in the Netherlands, and after his death in 1675 he was almost forgotten for two hundred years. In the 1860s a French writer, Théophile Thoré-Bürger, rediscovered his paintings and wrote about them with great enthusiasm. Today, only about 35 paintings by Vermeer are known, and each is a treasure.

COMMON MISTAKES

- Using a room light and window light at the same time, which makes confusing double shadows.
- Painting the background one flat value.
- Putting white highlights everywhere instead of only on the brightest spots.

Make it a game • Museum Guide Trap. You are the museum guide for a Vermeer painting of a woman by a window. Tell your parent four facts about his window light and where to find the highlight, form shadow, cast shadow and reflected light. Your parent will slip in one false fact. Catch it and win the round.

UNIT 4

LIGHT AND SHADOW

Light is what lets us see form. When light falls on a round apple, it makes a pattern of light and dark that tells our eyes the apple is round. If you learn to see that pattern and draw it, your drawings will stop looking flat and start looking solid enough to pick up.

In this unit you will study the parts of the light pattern one at a time: the light side and the core shadow, with the edge between them called the terminator; the reflected light that bounces into shadows; and the cast shadow that every object throws onto the surfaces around it. At the end you will see how Johannes Vermeer put all of these together to paint quiet daylight falling into a room.

PREREQUISITES

- Can make a value scale from white to black in pencil
- Can draw a circle, a cube and a cylinder
- Knows that value means lightness or darkness (Lesson 3.2)

MASTERY CHECKLIST

- ☐ I can name the parts of light on a form: highlight, light side, terminator, core shadow, reflected light and cast shadow.
- ☐ I can shade a sphere so it looks round, with a clear terminator and core shadow.
- ☐ I can show reflected light without making it as light as the lit side.
- ☐ I can draw a cast shadow that points away from the light and is darkest and sharpest near the object.
- ☐ I can describe how Vermeer used window light in a painting.

LESSONS IN THIS UNIT

4.1 Core Shadow and the Terminator

2 sessions of 45 minutes

4.2 Reflected Light

2 sessions of 45 minutes

4.3 Cast Shadow Shapes

2 sessions of 45 minutes

UNIT 4 REVIEW

Answer each question in a sentence or two, or draw a quick sketch when asked. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What is the terminator on a form?

2. (5 pts)

Where is the core shadow, and why is it the darkest part of the form?

3. (5 pts)

Draw a sphere lit from the upper left. Label the highlight, light side, terminator, core shadow, reflected light and cast shadow.

4. (5 pts)

How is the terminator different on a ball and on a cube?

5. (5 pts)

What is reflected light, and what is the most important rule about it?

6. (5 pts)

What is an occlusion shadow?

7. (5 pts)

Which way does a cast shadow point, and what makes it long or short?

8. (5 pts)

Describe how a cast shadow's edge and value change as it gets farther from the object.

9. (5 pts)

Why are shadows outdoors on a sunny day often blue or violet?

10. 5 pts

Name two ways Vermeer showed window light in *The Milkmaid*.

ANSWER KEY

1. The edge where the lit side turns into shadow, where the light can no longer reach.
2. Just past the terminator on the shadow side; it gets neither direct light nor much reflected light.
3. Highlight upper left, shadow side lower right with a dark core band along the curved terminator, a slightly lighter band at the lower right edge, and a cast shadow falling to the lower right.
4. On a ball it is soft and gradual; on a cube it is a sharp edge between flat sides.
5. Light bounced from a nearby surface into the shadow side. It must always stay darker than the light side.
6. The very dark, thin shadow where an object touches the surface it rests on.
7. Away from the light. A low light makes long shadows; a high light makes short ones.
8. Near the object it is darkest with a hard edge; farther away it becomes lighter and softer.
9. They are lit only by the blue sky, not by the warm sun.
10. Any two: one light from the left window; the wall lighter and darker to set off the figure; soft shadows; tiny dots of highlight on the bread; the light fading into the room; the small cast shadow of the nail.

PORTFOLIO PIECE: A STILL LIFE IN THREE VALUES AND LIGHT

Set up three objects of different shapes (one round, one boxy, one cylindrical) on a light-colored cloth with a single light source, either a window or a lamp. Draw or paint them showing every part of the light pattern you learned: highlights, light sides, terminators, core shadows, reflected light, occlusion shadows and cast shadows. Write the direction of the light with a small arrow on the back.

LOOK FOR	WHAT IT MEANS
Light source	Highlights and shadows all agree on where the light comes from.
Form shadows	Each object has a clear terminator and core shadow that make it look round or solid.
Reflected light	Reflected light is visible in the shadows but stays darker than the light sides.
Cast shadows	Cast shadows point away from the light and are darkest and sharpest near the objects.
Craftsmanship	Shading is smooth and built in layers, and the paper is clean.

UNIT 5

MATERIAL SCIENCE: WHERE COLOR COMES FROM

Every paint you have ever used is made of two things: a colored powder called a **pigment**, and a sticky substance called a **binder** that glues the powder to the paper. Change the binder and you change the paint. The same red earth mixed with gum arabic becomes watercolor, mixed with egg yolk becomes egg tempera, and mixed with linseed oil becomes oil paint.

In this unit you will become a paint maker. You will learn where the oldest colors came from (colored earth dug from the ground), why one blue cost more than gold, how medieval artists painted with eggs, and why some colors fade in sunlight while others last for centuries. You will make your own earth paint and egg tempera, and run a real science test on your own art supplies.

PREREQUISITES

- Can mix colors and knows hue, value and intensity (Unit 3)
- Can follow a recipe and work carefully with an adult's help
- Has a small jar, a few eggs, and some earth pigment or chalk pastels

MASTERY CHECKLIST

- ☐ I can explain the difference between a pigment and a binder.
- ☐ I can name the binders in watercolor, oil paint, egg tempera, acrylic and crayons.
- ☐ I can name some earth pigments and explain where they come from.
- ☐ I can tell the story of ultramarine blue and how it is made today.
- ☐ I can explain lightfastness and test whether my art supplies fade.

LESSONS IN THIS UNIT

5.1 Earth Pigments

2 sessions of 45 minutes

5.2 Ultramarine from Lapis Lazuli

2 sessions of 45 minutes

5.3 Egg Tempera

2 sessions of 45 minutes

5.4 Why Paint Fades: Lightfastness

2 sessions of 45 minutes

UNIT 5 REVIEW

Answer each question in a sentence or two. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What are the two main parts of every paint, and what does each do?

2. (5 pts)

Name the binder in each: watercolor, oil paint, egg tempera, acrylic, crayon.

3. (5 pts)

What gives most earth pigments their color?

4. (5 pts)

What happens when raw sienna is roasted, and why?

5. (5 pts)

Where did natural ultramarine come from, and what does its name mean?

6. (5 pts)

Why did painters save ultramarine for the most important part of a picture, such as the Virgin's robe?

7. (5 pts)

Why can't you blend egg tempera like oil paint, and how do painters shade with it instead?

8. (5 pts)

What is lightfastness? What does a fugitive color do?

9. (5 pts)

Why do the walls in Van Gogh's *Bedroom in Arles* look blue today?

10. (5 pts)

Report the results of your lightfastness test: which materials faded most and which least?

ANSWER KEY

1. Pigment gives the color; binder holds the pigment particles together and sticks them to the surface.
2. Gum arabic; linseed oil; egg yolk; acrylic polymer; wax.
3. Iron oxides (the same family as rust); umber also contains manganese.
4. It becomes burnt sienna, a redder brown, because heat drives water out of the yellow iron mineral and turns it into red iron oxide.
5. From lapis lazuli mined in Afghanistan; it means “beyond the sea.”
6. It was extremely costly, more than gold, and contracts often required it for the most honored figure.
7. It dries almost instantly; painters build thin layers and shade with fine hatching strokes.
8. Lightfastness is how well a color resists fading in light; a fugitive color fades quickly.
9. He mixed violet from blue and a red lake pigment that faded in light, leaving the blue.
10. Answers vary; usually markers, highlighters and bright pinks/violets fade most, while earth colors, ultramarine, black and good pencils or paints fade least.

PORTFOLIO PIECE: A MATERIALS SAMPLER: ONE SUBJECT, THREE BINDERS

Paint the same simple subject (a pear, a cup or a flower) three times, each about 4×5 in, mounted together on one sheet: once in watercolor (gum arabic binder), once in your earth paint or acrylic (polymer binder), and once in egg tempera (egg binder). Use earth colors and ultramarine. Under each panel, write the binder, how the paint behaved, and how lightfast you expect it to be.

LOOK FOR	WHAT IT MEANS
Three media	All three panels are complete, each in a different paint with a different binder.
Handling each medium	Each panel uses its paint well: watercolor washes, smooth polymer paint, tempera layers and hatching.
Labels and science	Each panel has a clear, correct label naming the binder and describing its behavior and lightfastness.
Color and value	Earth colors and ultramarine are mixed well, with a clear light side and shadow side.

5.1 EARTH PIGMENTS

OBJECTIVES

- Explain that paint is made of pigment and binder, and name several binders.
- Name the earth pigments (ochres, siennas, umbers, green earth) and explain what gives them their color.
- Make a simple paint from earth pigment and test what happens with and without a binder.

Warm-up. Rub a smear of damp garden soil, clay or brick dust on a scrap of paper with your finger. Let it dry, then rub it again. Does the color stay, or does it come off as dust? Write down what you think is missing.

WATCH

Ancient Art: Making earth pigments

WoodlandsTV • 4:43

<https://www.youtube.com/watch?v=6k8JEEP0QNg>

WHEN TO WATCH

After the core ideas. Watch how colored earth is ground, washed and mixed into paint.

BACKUP VIDEO

Introduction to Earth Pigments

EarthPigmentsCompany • 3:55

<https://www.youtube.com/watch?v=qp57fu7jbsI>

A short introduction to what earth pigments are and where they come from.

KEY TERMS

pigment

A finely ground colored powder that gives paint its color. Pigments do not dissolve; they stay as tiny solid particles.

binder

The sticky substance that holds pigment particles together and glues them to the surface, such as gum arabic, oil, egg or acrylic.

earth pigments

Pigments made from colored clay, soil and rock, mainly ochres, siennas, umbers and green earth.

iron oxide

A compound of iron and oxygen (the same family as rust) that colors most earth pigments yellow, red and brown.

medium

The kind of material an artist uses (watercolor, oil, pencil); also the liquid used to thin or bind paint.

CORE IDEAS

All paint has two main parts. The **pigment** is the color: a powder of tiny solid particles. The **binder** is the glue that holds the particles together and sticks them to the paper, wall or canvas. Without a binder, pigment is just colored dust that rubs away, as you saw in the warm-up.

The binder decides what kind of paint you have. **Watercolor** uses gum arabic, the dried sap of the acacia tree, which dissolves in water. **Oil paint** uses linseed oil, pressed from the seeds of the flax plant, which slowly hardens in air. **Egg tempera** uses egg yolk. **Acrylic** uses an acrylic polymer, a kind of plastic that is milky when wet and clear when dry. **Crayons** use wax, and pastels use just a little gum. Same pigments, different binders, very different paints.

The oldest pigments of all are **earth pigments**: colored clays and rocks dug from the ground, washed, dried and ground fine. Most get their color from **iron oxide**, the same family of chemicals as rust. **Yellow ochre** is clay colored by a yellow iron mineral. **Red ochre** is colored by red iron oxide. **Raw sienna**, first famous from the hills around Siena in Italy, is a golden brown. **Umber** contains manganese too, which makes it a darker, cooler brown. **Green earth** is a soft gray-green clay.

Heat changes earth colors. When yellow ochre or raw sienna is roasted in a fire, the heat drives out water bound up in the yellow iron mineral and turns it into red iron oxide. That is why **burnt sienna** is a warm reddish brown and **burnt umber** a rich dark brown. Painters have used these “raw” and “burnt” colors for centuries.

Earth pigments are cheap, safe to handle, and very **permanent**: they do not fade in light, because they are already as stable as rock. The cave painters of Lascaux in France used red and yellow ochre and charcoal black, and their colors are still

visible after many thousands of years. Rembrandt painted most of his portraits with just earth colors plus white, black and a little red.

Safety: any fine powder can irritate your lungs. Work with pigments slightly damp, never blow on dry powder, wear a dust mask if you grind or sift, keep pigments away from food, and wash your hands afterward. Use only earth pigments or chalk pastels for home paint-making; some artists' pigments (such as those with lead or cadmium) are toxic as powders.

PICTURE STUDY



Self-Portrait with Two Circles, Rembrandt van Rijn, about 1665–1669 · Oil on canvas · Kenwood House, London

Image: [Wikimedia Commons](#), public domain

Rembrandt painted more than forty self-portraits during his life, and this is one of the last and greatest. He shows himself as a working painter, holding his palette and brushes. Almost everything you see here was painted with earth colors: ochres, umbers and siennas, with white, black and a little red. Notice how rich and warm such a simple palette can be.

Look closely

- Find the colors in the painting. How many are browns, tans and golds? Can you find any bright blue or green?
- Look at his face. Where is the paint thick and rough? Where is it thin and smooth?
- Find the palette and brushes in his hand. They are painted with just a few quick strokes.
- Find the two circles on the wall behind him. How do they balance the picture?

Talk about it

1. How does Rembrandt make his face the most important part of the picture?
2. What do you think he wanted to tell us about himself as a painter?

3. Why might an artist choose to use only a few earth colors instead of many bright ones?

STUDIO PROJECT

Make Earth Paint

You will become a paint maker. You will test pigment with and without a binder, make two earth-color paints, and use them to paint a small study in the warm earth colors of the old masters.

You will need

- Earth pigments (yellow ochre, red ochre or burnt sienna, umber), or brown, rust and yellow-ochre chalk pastels scraped into powder with a craft stick, or fine, sifted soil or clay from your yard
- White school glue (PVA) and water
- Small jars or a muffin tin, craft sticks or palette knives
- A strainer or old sieve (for soil)
- Brushes, heavy paper or watercolor paper
- Dust mask, old newspaper, paper towels

Steps

1. Cover the table with newspaper. Put on a dust mask before opening or sifting any powder. If you are using soil, crush it, sift it through the strainer, and use only the finest dust.
2. The binder test: put a pea-sized pile of pigment on your palette, add a few drops of water only, and paint a small square on scrap paper. Label it “no binder.”
3. Make a simple binder: mix 1 spoon of white glue with 1 spoon of water in a jar. (White glue is a polymer binder, much like the binder in acrylic paint.)
4. Put a small pile of each pigment in its own well. Add the glue binder a few drops at a time and mix with a craft stick, pressing and smearing the pigment against the side, until it is smooth like thin yogurt.
5. Paint a square of each color on scrap paper and label it with the pigment name. When the squares are dry, rub each one with a finger, including the “no binder” square. Write what happens.

6. On good paper, paint a small study (about 5×7 in) using only your earth paints and white: a loaf of bread, a clay pot, a tree trunk, or a simple self-portrait in the style of Rembrandt.
7. Build from light to dark: paint the light shapes in yellow ochre first, then the middle tones in red or sienna, and the darkest shadows in umber.
8. Clean up: wipe palettes, wash brushes before the glue dries, and wash your hands.

Tips

- Grind longer for smoother paint. Gritty paint means the particles are still big.
- Mixed paint with glue binder dries quickly. Make small batches and cover the jars.
- Try mixing yellow ochre with a tiny bit of black. You will get a surprising olive green.

Check your work

- ☐ I tested pigment with and without a binder and can explain the difference.
- ☐ I made at least two earth-color paints and labeled their swatches.
- ☐ I painted a study from light to dark using only earth colors and white.

SKETCHBOOK PRACTICE

1. Collect soil, clay or soft rock from three different places (with permission). Rub each on paper and label where it came from. Which colors are the most different?
2. Make a “raw and burnt” chart from colored pencils or paints: yellow ochre beside burnt sienna, raw umber beside burnt umber.
3. Look at the labels on your watercolors, crayons or pencils. Write down any that say ochre, sienna, umber or iron oxide (sometimes written PY42, PR101 or PBr7).

From history. The paintings in the caves of Lascaux, in southern France, are some of the oldest pictures ever found. They show horses, deer and cattle painted with red and yellow ochre, brown earth and charcoal black. Those same earth colors were used by Egyptian tomb painters, Roman fresco painters and Rembrandt, and they are still in every artist’s paint box today.

COMMON MISTAKES

- Thinking the binder is the color. The binder is nearly colorless; the pigment gives the color.
- Using too much binder (the paint turns shiny and sticky) or too little (it rubs off).
- Breathing dry pigment dust. Keep powders damp and wear a mask.

Make it a game • Riddles from the Earth. Take turns reading riddle clues and answering. 'I am yellow-brown, and iron oxide gives me my color.' Answers include ochre, sienna, umber and green earth. Make up three more riddles. Then both of you name every binder you can think of, such as egg yolk, in sixty seconds.

5.2 ULTRAMARINE FROM LAPIS LAZULI

OBJECTIVES

- Tell the story of ultramarine: where lapis lazuli comes from, how the pigment was made, and why it was so costly.
- Explain the difference between natural and synthetic ultramarine.
- Paint a picture in which blue is used as the most precious color, as medieval and Renaissance painters did.

Warm-up. Look at all the blues you own: crayons, pencils, paints, markers. Line them up from greenish blue to violet blue. Which one is closest to the deep blue of a summer evening sky?

WATCH

Making the most blue natural pigment out of lapis lazuli into handmade watercolor paint

Dirty Blue Tube • 6:21

<https://www.youtube.com/watch?v=FmMBDsvzVT8>

WHEN TO WATCH

After the core ideas. Watch the long process of turning blue lapis lazuli into paint, and think about why it cost so much.

BACKUP VIDEO

Fra Angelico blue pigment extraction

Master Pigments • 6:13

https://www.youtube.com/watch?v=JBzEAt_ynvc

The medieval method of pulling the blue out of the stone with a wax dough.

KEY TERMS

lapis lazuli

A deep blue rock containing the blue mineral lazurite, flecked with white calcite and gold-colored pyrite.

ultramarine

The blue pigment made from lapis lazuli; its name means “beyond the sea,” because it came to Europe from far away.

synthetic pigment

A pigment made in a factory by chemistry rather than dug from the earth.

patron

A person or group who pays an artist to make a work of art.

CORE IDEAS

For centuries the finest blue in Europe came from a single place: the mountains of Badakhshan in Afghanistan, where **lapis lazuli** has been mined for thousands of years. Lapis is a deep blue rock. Its color comes from a mineral called lazurite, mixed with white calcite and little gold-colored flecks of pyrite.

The stone traveled by camel and ship across thousands of miles to Venice. Italians called the blue *azzurro oltremarino*, “blue from beyond the sea,” and that is where our word **ultramarine** comes from. By the time it reached a painter, the best ultramarine could cost more than its weight in gold.

Simply grinding lapis gives a disappointing grayish blue, because the white and gold minerals dilute the color. Around the year 1400 the Italian painter Cennino Cennini wrote down a method: grind the stone, knead the powder into a dough of wax, pine resin and oil, and then knead the dough in a mild lye solution. The blue particles slowly wash out into the liquid while the gray impurities stay trapped in the dough. It took days of work to get a small amount of brilliant blue.

Because it was so precious, ultramarine was saved for the most important part of a picture, usually the robe of the Virgin Mary. A **patron** ordering an altarpiece would write into the contract how much ultramarine the painter must use, so the artist could not substitute a cheaper blue such as azurite.

In 1824 a French society offered a prize to anyone who could make ultramarine artificially. In 1826 a chemist named Jean-Baptiste Guimet succeeded, and soon **synthetic** “French ultramarine” was being made in factories from clay, soda, sulfur and charcoal. It has the same chemical structure as the natural pigment and is just as lightfast, but costs very little. The ultramarine in your own paint box is almost certainly this synthetic kind, and you can use it freely.

PICTURE STUDY



The Virgin in Prayer, Giovanni Battista Salvi da Sassoferrato, 1640–1650 · Oil on canvas · National Gallery, London

Image: [Wikimedia Commons](#), public domain

Sassoferrato was an Italian painter who made calm, gentle paintings of the Virgin Mary for people to pray before. He used the most costly natural ultramarine for her cloak, and even after nearly four hundred years it is still a dazzling blue. This is one of the most famous examples of ultramarine in all of painting.

Look closely

- Find the blue cloak. How many different values of blue can you see, from light to dark?
- Look at the shadows in the folds. Are they black, or a darker blue?
- Find the red dress and the white veil. How do they make the blue look even stronger?
- Notice the plain dark background. What does it add?

Talk about it

1. Why do you think Sassoferrato made the blue the largest and brightest area in the painting?
2. How does Mary's pose and expression make the painting feel peaceful?

3. If you had a color worth more than gold, what would you use it for in a painting?

STUDIO PROJECT

The Precious Blue

You will paint a small picture the way a medieval or Renaissance painter would plan it: most of the picture in modest earth colors, and the precious ultramarine saved for the single most important thing. You might paint a cloak, a bluebird on a brown branch, a blue jug on a wooden table, or a deep blue sky over brown hills.

You will need

- Watercolor paper or heavy paper (about 8×10 in)
- Ultramarine blue paint (look for “ultramarine” on the label)
- White paint
- Earth colors (yellow ochre, burnt sienna, burnt umber), from your paint set or your earth paints from Lesson 5.1
- Brushes, palette, water, paper towels
- Pencil

Steps

1. Choose your subject and make two thumbnail sketches in your sketchbook. Circle the one where the blue thing is largest and most important.
2. Lightly draw your design on the paper. Keep the shapes simple and large.
3. Mix and paint everything except the blue object, using only earth colors and white. Keep these colors warm and modest.
4. Let the painting dry.
5. Make a value strip of ultramarine on scrap paper: pure ultramarine, then two tints with white, then a shade mixed with a little burnt umber (a near-complement).
6. Paint the blue object. Use the darkest blue in the folds or shadow side, the middle blue for most of it, and the lightest tint on the light side.
7. Add a touch of white or a pale tint where the light hits strongest.
8. Step back. Does the blue draw your eye first? If not, dull the earth colors around it a little more.

Tips

- Ultramarine mixed with burnt umber makes beautiful warm and cool darks, better than black.
- Rinse your brush very well before using blue so it stays pure.
- Notice how ultramarine leans slightly toward violet. That makes it a perfect blue for shadows.

Check your work

- ☐ Ultramarine is used only for the most important part of my picture.
- ☐ My blue has at least three values: tint, pure and shade.
- ☐ The rest of the painting is in earth colors, so the blue shines.

SKETCHBOOK PRACTICE

1. Paint or color swatches of every blue you own and label them warm (green-leaning) or cool (violet-leaning).
2. Write a short paragraph pretending to be a merchant carrying lapis lazuli from Afghanistan to Venice. What did you see on the way?
3. Look for a picture of lapis lazuli stone online or in a book, and draw a small piece of it, showing the blue, white and gold flecks.

From history. The Italian painter Cennino Cennini wrote *Il Libro dell'Arte* (The Craftsman's Handbook) around 1400. It is one of our best sources for how medieval painters made their materials. He called ultramarine "a color illustrious, beautiful, and most perfect, beyond all other colors."

COMMON MISTAKES

- Using blue everywhere, so nothing is special.
- Darkening blue with black, which kills it. Use umber or a little orange instead.
- Thinking modern ultramarine is fake or poor. It is the same compound as natural ultramarine.

Make it a game • Precious Blue Story Chain. Tell the story of ultramarine, one sentence each. Start with a mountain mine and lapis lazuli. Between you, you must mention grinding, the high cost, the patron who paid for it, and how a synthetic version later made the blue cheap. Keep the chain going until every item is mentioned.

Scripture. “Moreover thou shalt make the tabernacle with ten curtains of fine twined linen, and blue, and purple, and scarlet” (Exodus 26:1, KJV)

God asked for costly blue, purple and scarlet in the tabernacle. Precious colors were offered in His worship long before painters saved ultramarine for their altarpieces.

5.3 EGG TEMPERA

OBJECTIVES

- Explain how egg yolk works as a binder and why egg tempera dries quickly.
- Make egg tempera paint and paint with thin, layered strokes.
- Recognize egg tempera in icons and early Renaissance paintings.

Warm-up. Crack an egg and gently separate the yolk from the white over a bowl (an adult can help). Roll the yolk on a paper towel. Notice the thin skin around it. What do you think the yolk is made of that could make it a good glue?

WATCH

So THAT'S How You Make Paint? Egg Tempera | #MetKids Microscope

The Met • 2:54

<https://www.youtube.com/watch?v=WeugO7rZZqQ>

WHEN TO WATCH

Before making egg tempera. Learn why egg yolk holds pigment together so well.

BACKUP VIDEO

Icon painter Peter Murphy's tutorial on Egg Tempera and Icon Painting, Lovelys Gallery.

Lovelys Gallery • 8:06

<https://www.youtube.com/watch?v=geafR2FIHO4>

An icon painter shows how he mixes and applies egg tempera in thin layers; good with the picture study.

KEY TERMS

egg tempera

Paint made by mixing pigment with egg yolk; used for icons and most European panel paintings before about 1500.

emulsion

A mixture of oily and watery liquids held together, like egg yolk, milk or mayonnaise.

gesso

A smooth white ground of chalk or gypsum and glue, painted on wood panels before painting.

icon

A sacred image of Christ, the Virgin Mary or a saint, traditionally painted in egg tempera on wood.

hatching

Building up tone with many fine parallel strokes, because tempera dries too fast to blend.

CORE IDEAS

Egg yolk is a natural **emulsion**: tiny droplets of oil-like fats held in water by proteins. When you mix yolk with pigment and a little water, the water dries away within seconds and leaves the pigment held in the egg. Over the next months, the egg slowly hardens into a tough, water-resistant film. This paint is called **egg tempera**.

For about a thousand years, egg tempera was the main paint for pictures on wood. Icon painters of Byzantium and Russia used it, and so did Italian masters such as Duccio, Giotto (for his altarpieces) and Fra Angelico. Then, in the 1400s and 1500s, oil paint slowly took its place.

Tempera has its own personality. It dries almost instantly, so you cannot blend wet colors smoothly. Instead, painters build up color in many thin, transparent layers and fine strokes. To shade, they use **hatching**: rows of tiny parallel strokes, like shading with a pencil but with a brush. The result is luminous and precise, with colors that stay bright and never turn yellow the way old oil paint can.

Tempera needs a stiff, smooth surface, because the dried paint is brittle and can crack if bent. Traditional painters covered a wooden panel with many coats of **gesso** (chalk or gypsum mixed with animal glue), sanded it as smooth as ivory, and sometimes laid gold leaf on the background. For practice at home, heavy cardstock or a small board painted white works well.

Making tempera is simple: separate a yolk, pinch the yolk skin and let the liquid yolk drip into a cup, and mix it with an equal amount of water. That is your medium. Add it to a small pile of pigment and mix to a creamy paint. Make only what you need for one session; fresh egg spoils. Wash your hands after handling raw egg.

PICTURE STUDY



Trinity, Andrei Rublev, about 1411 or 1425–1427 · Egg tempera on wood panel · Tretyakov Gallery, Moscow

Image: [Wikimedia Commons](#), public domain

Andrei Rublev was a Russian monk and the most famous icon painter of his land. This icon shows the three visitors who came to Abraham at Mamre in Genesis 18, painted as three angels at a table. Christians have long seen in it an image of the Holy Trinity. Rublev painted it in egg tempera, layer upon thin layer, and its soft blues and greens still glow six hundred years later.

Look closely

- Find the three angels. How are their poses alike and how are they different?
- Trace the shape their bodies make together. Is it a circle?
- Look for the colors: soft blue, green, gold, rose. Which color appears on all three angels?
- Find the cup on the table in the middle. Where do the angels' hands and heads point?

Talk about it

1. How does Rublev make the painting feel calm and peaceful?
2. Why might an icon painter use fine, careful strokes and thin layers instead of thick paint?

3. How is this icon different from a painting that tries to look like a photograph?

STUDIO PROJECT

A Small Icon-Style Panel in Egg Tempera

You will make egg tempera paint and use it to paint a small panel in the careful, layered style of the icon painters. Choose a simple subject: a single flower, a dove, a cup, a star, or a pear. Paint it in thin layers and shade it with fine hatching strokes.

You will need

- 1 egg (adult help to separate it)
- Water, a small cup and a drop of vinegar (optional, slows spoiling)
- Pigments: your earth pigments, dry powder pigments, or chalk pastels scraped into powder
- Heavy cardstock or a small piece of wood or mat board (about 5×7 in), painted white with white acrylic paint or gesso and dried
- Small round brushes (size 0 and 2)
- Palette or white plate, palette knife or craft stick
- Pencil, paper towels

Steps

1. Draw your design lightly in pencil on the white panel. Keep it simple and bold, with a clear outline.
2. Make the medium: separate the egg. Roll the yolk on a paper towel to dry it, pinch the yolk skin over a cup, and let the liquid yolk run into the cup. Add an equal amount of water (and a drop of vinegar) and stir.
3. Put a small pile of pigment on the palette. Add a few drops of water and mix to a paste, then add about an equal amount of the egg medium and mix until creamy. Test: a stroke on scrap paper should dry quickly and not rub off.
4. Paint the background first with thin, even coats. Each coat dries in a minute. Two or three thin coats look better than one thick one.
5. Paint the main shape with its middle color in two thin coats.
6. Shade with hatching: with a small brush and a darker mixture, make many fine parallel strokes on the shadow side. Build darkness with more layers of

strokes, not thicker paint.

7. Add light the same way: fine strokes of a lighter mixture (add white or chalk) on the lit side.
8. Finish with a thin, clean border line around your panel, as icon painters often did. Let it dry overnight. Wash your hands and brushes well.

Tips

- If the paint cracks or peels, it has too much egg or is too thick; add water and paint thinner layers.
- If it rubs off when dry, it needs a little more egg.
- Mix fresh paint each session and throw away leftover yolk.

Check your work

- ☐ I made egg tempera paint from pigment and egg yolk.
- ☐ I painted in thin layers and shaded with fine hatching strokes.
- ☐ My panel has a clear design and a neat, careful finish.

SKETCHBOOK PRACTICE

1. Practice hatching with a fine brush and watercolor: make a value scale of five squares using only parallel strokes.
2. Draw one of the angels from Rublev's *Trinity*, paying attention to the curves of the robe.
3. Write a short comparison: egg tempera and watercolor. How are their binders and drying different?

From history. Icons are still painted today in egg tempera using the same methods as Rublev, often with prayer and fasting. Icon painters speak of “writing” an icon rather than painting it, because they think of an icon as a kind of visual Scripture. In 1988 the Russian Orthodox Church recognized Andrei Rublev as a saint.

COMMON MISTAKES

- Trying to blend wet tempera like oil paint. Layer and hatch instead.
- Using the yolk skin. It makes lumps; let only the liquid yolk drip out.
- Painting on thin paper, which bends and cracks the paint.

Make it a game • Paint Steps in Order. Write each step of making egg tempera on its own slip: separate the yolk, add pigment, add water, paint thin layers, hatch. Shuffle them. Race to put them in order from memory, then act out each step in pretend, with no real eggs. Explain why it dries so fast.

Scripture. “And he lift up his eyes and looked, and, lo, three men stood by him: and when he saw them, he ran to meet them from the tent door” (Genesis 18:2, KJV)

This is the visit Rublev painted. Abraham’s welcome of the three strangers became one of the most beloved subjects of Christian art.

5.4 WHY PAINT FADES: LIGHTFASTNESS

OBJECTIVES

- Explain why some colors fade in light and others do not.
- Read lightfastness ratings on art supply labels.
- Run a lightfastness test on your own art supplies and record the results.

Warm-up. Look around your house for something that has faded in the sun: a book spine, a curtain, a poster, a toy or a car. Compare the faded part with a part that was kept out of the light. Which colors faded most?

WATCH

What is Lightfastness?

Cinder Block Studios • 4:25

https://www.youtube.com/watch?v=-JQd_YxNzt8

WHEN TO WATCH

After the warm-up and before the core ideas.

BACKUP VIDEO

Lightfastness, How It's Tested And What It Means For You | Acrylic Painting Liquitex

Liquitex Official • 6:25

<https://www.youtube.com/watch?v=4XKDtXBV5s>

A paint maker explains how lightfastness is tested and rated; good before setting up your own test.

KEY TERMS

lightfastness

How well a pigment or dye resists fading or changing color in light.

dye

A coloring substance that dissolves in liquid, used in most markers and inks; dyes usually fade faster than pigments.

fugitive

Describes a color that fades quickly in light.

ultraviolet (UV) light

Invisible, high-energy light in sunlight that causes most fading.

ASTM rating

A lightfastness rating printed on many artist paints: I is excellent and II is very good; III or lower will fade.

CORE IDEAS

Light is energy. When light, especially invisible **ultraviolet (UV) light** in sunlight, strikes a colored substance, its energy can break apart some of the color molecules. Once they break, they no longer reflect that color, and the color fades. This is why curtains and book covers fade in a sunny window.

Some colorants are much tougher than others. Earth pigments, ultramarine, and many modern pigments hardly change even after centuries. Others are **fugitive**: they fade in months or a few years. Many bright pinks, magentas and violets, and especially **dyes**, which dissolve in liquid and are used in most markers, highlighters and fountain-pen inks, are fugitive.

Lightfastness is measured by testing. Makers put samples under strong light for a long time and compare them with samples kept in the dark. Good artist paints and colored pencils print a rating on the label: an **ASTM rating** of I (excellent) or II (very good) means the color is permanent for art; III, IV or V means it will fade. Some brands use stars, or the Blue Wool Scale from 1 to 8, where 7 and 8 are best.

Even great painters were caught by fugitive colors. When Van Gogh painted his bedroom in 1888, he wrote that the walls were pale violet. Today they look blue, because he mixed the violet from blue and a red lake pigment that faded away in the light, leaving only the blue behind. Scientists studying the painting confirmed what had happened.

Paper matters too. Cheap paper made from wood pulp, such as newsprint, contains acids and a substance called lignin that make it turn yellow and brittle. Good drawing and watercolor paper is labeled **acid-free** and lasts for centuries.

To make art that lasts: use lightfast materials for work you want to keep, use acid-free paper, and display art out of direct sunlight. Museums keep light low on old drawings and watercolors for this reason, and rotate them into storage to rest.

PICTURE STUDY



Bedroom in Arles, Vincent van Gogh, 1888 · Oil on canvas · Van Gogh Museum, Amsterdam

Image: [Wikimedia Commons](#), public domain

Van Gogh painted his own small bedroom in the Yellow House in Arles. He wanted it to look restful and simple, and he described every color in a letter to his brother Theo. But the painting we see today is not quite the painting he made: some of his colors have faded. This picture is a lesson in color theory and in material science at the same time.

Look closely

- Find the walls and the doors. What color are they now?
- Van Gogh wrote that the walls were pale violet. Imagine the walls violet instead of blue. How would the painting feel different?
- Find complementary pairs: the red bedcover against green, the yellow furniture against violet-blue.
- Notice the thick, simple outlines and flat colors. Where else have you seen this style? (Think of Hiroshige's print in Lesson 1.2.)

Talk about it

1. Why did the violet walls turn blue?
2. If you were the museum director, would you change the painting back to violet? Why or why not?

3. What could Van Gogh have done to keep his colors from fading?

STUDIO PROJECT

My Lightfastness Test

You will become a scientist and test your own art supplies, the same way paint makers do. Half of each sample will sit in the sunlight for at least four weeks and half will stay in the dark. Then you will compare them and make a chart of which of your colors are lightfast and which are fugitive.

You will need

- Two sheets of white cardstock or watercolor paper
- Every kind of color you own: markers, highlighters, crayons, colored pencils, watercolors, tempera, oil pastels
- Ruler, pencil, scissors
- Tape
- A book or a drawer (for the dark half)
- A sunny window

Steps

1. On cardstock, draw a grid of strips about $\frac{1}{2}$ in tall and 4 in long, one strip for each color you will test. Number each strip and write the material and color name beside it (for example, “7. pink marker”).
2. Color each strip solidly with its material. Include at least: three markers (especially pink, violet and light blue), a highlighter, two crayons, two colored pencils, three watercolors (including any “rose” or “magenta”), and two tempera or acrylic paints.
3. Let the paints dry. Then cut the sheet in half lengthwise, so every strip is split into two matching halves, each still numbered.
4. Place one half inside a closed book or a dark drawer. Label it “DARK” and write the date.
5. Tape the other half to the inside of a sunny window, facing out, and label it “LIGHT” with the date. (A south-facing window works best in the Northern Hemisphere.)

6. Check the light half every week. After four weeks or more (eight is better), bring the halves together and line them up strip by strip.
7. Rate each color: 3 = no change, 2 = slight change, 1 = clearly faded, 0 = nearly gone. Record the ratings in a chart in your sketchbook.
8. Write a conclusion: which kinds of materials were most lightfast? Which colors (hues) faded most? What will you use for art you want to keep?

Tips

- Start this test at the beginning of this lesson so the results are ready for the unit review; you can do the second session's picture study while you wait.
- Expect markers and highlighters to fade most. Earth colors, ultramarine and black usually do not change.
- Check the labels of the colors that passed. Do any have ASTM I or II ratings or pigment codes?

Check your work

- ☐ I tested at least twelve colors from different materials.
- ☐ I kept a dark half for fair comparison and dated both halves.
- ☐ I recorded ratings and wrote a conclusion about which materials are lightfast.

SKETCHBOOK PRACTICE

1. Read the labels on three of your paints or pencils. Copy down any lightfastness ratings and pigment codes you find.
2. Paint a small picture using only colors that passed your lightfastness test.
3. Write a short letter of advice to an artist friend about how to make art that lasts.

From history. In 2016 scientists at the Van Gogh Museum studied *The Bedroom* with microscopes and special light. They found traces of a faded red pigment in the blue paint of the walls and doors, confirming that the walls were once the violet Van Gogh described in his letters. They even made a digital reconstruction showing how the room originally looked.

COMMON MISTAKES

- Testing without a dark half to compare with. You need a control sample.
- Judging the test after only a few days. Fading takes weeks.

- Assuming bright colors are strong. Many of the brightest colors are the most fugitive.

Make it a game • Fade Forecast. Gather six colored items, such as markers, paper and fabric scraps. Predict which will fade first in sunshine and rank them. Say aloud what you think causes fading, such as ultraviolet light and fugitive dyes. Then read any labels you can find and see whether your ranking matches. One point per right guess.

UNIT 5

MATERIAL SCIENCE: WHERE COLOR COMES FROM

Every paint you have ever used is made of two things: a colored powder called a **pigment**, and a sticky substance called a **binder** that glues the powder to the paper. Change the binder and you change the paint. The same red earth mixed with gum arabic becomes watercolor, mixed with egg yolk becomes egg tempera, and mixed with linseed oil becomes oil paint.

In this unit you will become a paint maker. You will learn where the oldest colors came from (colored earth dug from the ground), why one blue cost more than gold, how medieval artists painted with eggs, and why some colors fade in sunlight while others last for centuries. You will make your own earth paint and egg tempera, and run a real science test on your own art supplies.

PREREQUISITES

- Can mix colors and knows hue, value and intensity (Unit 3)
- Can follow a recipe and work carefully with an adult's help
- Has a small jar, a few eggs, and some earth pigment or chalk pastels

MASTERY CHECKLIST

- ☐ I can explain the difference between a pigment and a binder.
- ☐ I can name the binders in watercolor, oil paint, egg tempera, acrylic and crayons.
- ☐ I can name some earth pigments and explain where they come from.
- ☐ I can tell the story of ultramarine blue and how it is made today.
- ☐ I can explain lightfastness and test whether my art supplies fade.

LESSONS IN THIS UNIT

5.1 Earth Pigments

2 sessions of 45 minutes

5.2 Ultramarine from Lapis Lazuli

2 sessions of 45 minutes

5.3 Egg Tempera

2 sessions of 45 minutes

5.4 Why Paint Fades: Lightfastness

2 sessions of 45 minutes

UNIT 5 REVIEW

Answer each question in a sentence or two. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What are the two main parts of every paint, and what does each do?

2. (5 pts)

Name the binder in each: watercolor, oil paint, egg tempera, acrylic, crayon.

3. (5 pts)

What gives most earth pigments their color?

4. (5 pts)

What happens when raw sienna is roasted, and why?

5. (5 pts)

Where did natural ultramarine come from, and what does its name mean?

6. (5 pts)

Why did painters save ultramarine for the most important part of a picture, such as the Virgin's robe?

7. (5 pts)

Why can't you blend egg tempera like oil paint, and how do painters shade with it instead?

8. (5 pts)

What is lightfastness? What does a fugitive color do?

9. (5 pts)

Why do the walls in Van Gogh's *Bedroom in Arles* look blue today?

10. (5 pts)

Report the results of your lightfastness test: which materials faded most and which least?

ANSWER KEY

1. Pigment gives the color; binder holds the pigment particles together and sticks them to the surface.
2. Gum arabic; linseed oil; egg yolk; acrylic polymer; wax.
3. Iron oxides (the same family as rust); umber also contains manganese.
4. It becomes burnt sienna, a redder brown, because heat drives water out of the yellow iron mineral and turns it into red iron oxide.
5. From lapis lazuli mined in Afghanistan; it means “beyond the sea.”
6. It was extremely costly, more than gold, and contracts often required it for the most honored figure.
7. It dries almost instantly; painters build thin layers and shade with fine hatching strokes.
8. Lightfastness is how well a color resists fading in light; a fugitive color fades quickly.
9. He mixed violet from blue and a red lake pigment that faded in light, leaving the blue.
10. Answers vary; usually markers, highlighters and bright pinks/violets fade most, while earth colors, ultramarine, black and good pencils or paints fade least.

PORTFOLIO PIECE: A MATERIALS SAMPLER: ONE SUBJECT, THREE BINDERS

Paint the same simple subject (a pear, a cup or a flower) three times, each about 4×5 in, mounted together on one sheet: once in watercolor (gum arabic binder), once in your earth paint or acrylic (polymer binder), and once in egg tempera (egg binder). Use earth colors and ultramarine. Under each panel, write the binder, how the paint behaved, and how lightfast you expect it to be.

LOOK FOR	WHAT IT MEANS
Three media	All three panels are complete, each in a different paint with a different binder.
Handling each medium	Each panel uses its paint well: watercolor washes, smooth polymer paint, tempera layers and hatching.
Labels and science	Each panel has a clear, correct label naming the binder and describing its behavior and lightfastness.
Color and value	Earth colors and ultramarine are mixed well, with a clear light side and shadow side.

UNIT 6

PERSPECTIVE

Perspective is a way of drawing a world that has depth on a flat sheet of paper. It rests on one simple fact: things look smaller the farther away they are. Renaissance artists in Florence worked out the rules of this shrinking in the early 1400s, and those rules changed painting forever.

In this unit you will review one-point perspective, learn to draw boxes in two-point perspective, use boxes to build houses, barns and churches, and finally learn atmospheric perspective, the way air itself makes faraway things look pale and blue. Each lesson is paired with a master who used perspective to make us feel that we could walk right into his picture.

PREREQUISITES

- Can use a ruler to draw straight lines lightly
- Knows horizon line, vanishing point and one-point perspective from earlier grades (reviewed in Lesson 6.1)
- Knows that cool, pale colors seem to recede (Lesson 3.4)

MASTERY CHECKLIST

- ☐ I can draw a horizon line and vanishing point and explain that the horizon line is my eye level.
- ☐ I can draw a scene in one-point perspective with orthogonals that meet at one vanishing point.
- ☐ I can draw boxes in two-point perspective above, below and on the horizon line.
- ☐ I can build a house or church from a two-point box, with a correct roof, doors and windows.
- ☐ I can show distance using atmospheric perspective: lighter, cooler, softer and less detailed.

LESSONS IN THIS UNIT

6.1 One-Point Perspective Review

2 sessions of 45 minutes

6.2 Boxes in Two-Point Perspective

2 sessions of 45 minutes

6.3 Drawing Buildings

2 sessions of 45 minutes

UNIT 6 REVIEW

Answer each question in a sentence or two, or draw a quick sketch when asked. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What is the horizon line, and what happens to it if you climb a ladder?

2. (5 pts)

What are orthogonals, and where do they go in one-point perspective?

3. (5 pts)

In a scene on flat ground, where are the eyes of standing grown-ups, whether they are near or far?

4. (5 pts)

When do you use two-point perspective instead of one-point?

5. (5 pts)

Sketch a box below the horizon line in two-point perspective. Which faces can you see?

6. (5 pts)

Which lines stay perfectly vertical in two-point perspective?

7. (5 pts)

How do you find the place for the peak of a gable roof in perspective?

8. (5 pts)

Where do the tops and bottoms of windows go in two-point perspective?

9. (5 pts)

Name the four signs of atmospheric perspective.

10. 5 pts

Name one painting from this unit and explain how it shows depth.

ANSWER KEY

1. It is your eye level; when you climb higher, it goes up.
2. Lines that go straight back into the picture; they all meet at the single vanishing point.
3. On or near the horizon line.
4. When you see an object from its corner, so no side faces you flat.
5. Two sides and the top.
6. The vertical edges, such as corners of buildings and boxes.
7. Draw an X from corner to corner on the end wall and draw a vertical line up through its center.
8. To the same vanishing point as the wall they are on.
9. Farther things are lighter in value, lower in contrast, cooler and bluer, and less detailed with softer edges.
10. For example: Perugino's *Delivery of the Keys* uses a paved grid that meets at one vanishing point; Bierstadt's *Among the Sierra Nevada* uses pale, misty, blue mountains.

PORTFOLIO PIECE: A VILLAGE STREET

Draw and color a village or farm scene with at least three buildings (one may be a church), a road or path leading back, and hills or mountains in the distance. Use two-point perspective for the buildings (or one-point if the street goes straight back), and atmospheric perspective for the distance. Add a few people with their eyes on the horizon line.

LOOK FOR	WHAT IT MEANS
Linear perspective	Buildings, windows and roofs follow correct vanishing points on one horizon line.
Buildings	Roofs are placed with the perspective center, and details such as doors, windows and chimneys are added.
Atmospheric perspective	The distance is lighter, cooler, softer and less detailed than the foreground.
Figures and scale	People are sized for their distance, with their eyes on the horizon line.
Craftsmanship	Ruler lines are clean, guidelines are erased, and shading or color is careful.

6.1 ONE-POINT PERSPECTIVE REVIEW

OBJECTIVES

- Explain horizon line, vanishing point and orthogonals.
- Draw a scene in one-point perspective with a floor or pavement grid.
- Place figures so their heads line up with the horizon line.

Warm-up. Stand at the end of a long hallway, a sidewalk or a straight road (with an adult). Hold your pencil at arm's length and line it up with the edges of the floor, the walls or the curbs. Which way do they slant? Where do they seem to go? Sketch what you see in two minutes.

WATCH

How to Draw a Room in 1-Point Perspective for Beginners

Circle Line Art School · 10:03

<https://www.youtube.com/watch?v=qOojGBEsWQw>

WHEN TO WATCH

After the core ideas. Pause after he places the vanishing point and the back wall, and try those steps yourself.

BACKUP VIDEO

How to Draw a Room using One-Point Perspective for Beginners

Circle Line Art School · 4:06

<https://www.youtube.com/watch?v=Dl4QAT5XEPQ>

A shorter version of the same method, with furniture; good for the sketchbook exercise.

KEY TERMS

linear perspective

A system of drawing depth with straight lines that come together at points on the horizon.

horizon line

A horizontal line across the picture at the viewer's eye level, where the sky seems to meet the earth.

vanishing point

The point on the horizon line where parallel lines going away from you seem to meet and disappear.

orthogonals

Lines that go straight back into the picture and meet at the vanishing point.

eye level

The height of your eyes; in a drawing it is always the same as the horizon line.

CORE IDEAS

Linear perspective is based on what you see every day: railroad tracks, the sides of a road, or the edges of a hallway seem to come together in the distance. They are really parallel, but as they go away from you the space between them looks smaller and smaller until it disappears at a point.

The **horizon line** is your **eye level**. If you sit down, the horizon line in your drawing goes down; if you climb a ladder, it goes up. Things above the horizon line are above your eyes, so you see their undersides (a ceiling). Things below it are below your eyes, so you see their tops (a floor or a table top).

In **one-point perspective**, you look straight at the front of things. Their fronts are drawn as flat shapes with true horizontal and vertical lines. Only the lines that go straight back away from you, the **orthogonals**, slant, and all of them meet at one **vanishing point** on the horizon line.

To draw a floor or pavement of square tiles, draw orthogonals from evenly spaced points along the bottom edge to the vanishing point. Then draw horizontal lines across them, closer and closer together as they go back. A diagonal line drawn corner to corner through the grid shows exactly where each horizontal line should go.

A useful rule for people: if the ground is flat and the artist is standing, the heads of all the standing grown-ups line up near the horizon line, whether they are near or far. Near people are large, far people are small, but their eyes stay at about the same level as the horizon. Renaissance painters used this rule to place crowds convincingly.

PICTURE STUDY



Delivery of the Keys, Pietro Perugino, 1481–1482 · Fresco · Sistine Chapel, Vatican City

Image: [Wikimedia Commons](#), public domain

Perugino painted this fresco on the wall of the Sistine Chapel in Rome. It shows Jesus giving Saint Peter the keys of the kingdom of heaven (Matthew 16:19). Behind them stretches an enormous piazza, paved in a grid that leads our eye straight back to a temple in the center. It is one of the clearest examples of one-point perspective in the Renaissance.

Look closely

- Find the lines of the paving stones. Follow them back with your finger. Where do they meet?
- Find the door of the temple in the center. What is there?
- Compare the people in the front row with the small people in the middle of the square. How much smaller are the far people? Why?
- Compare the size of the arches on the left and right. Are they the same size? Why do they look smaller than the people in front?

Talk about it

1. Why do you think Perugino put the vanishing point near the open door of the temple, right above the keys?
2. How does the empty piazza make the picture feel calm and orderly?

3. How would the picture feel if the floor were not drawn in perspective?

STUDIO PROJECT

A Church Square in One-Point Perspective

Like Perugino, you will draw a wide, paved square leading back to a church or temple in the center, with buildings along both sides and a few people standing in the square. You will use one vanishing point for everything.

You will need

- Drawing paper (11×14 in or 9×12 in, used sideways)
- HB and 2B pencils
- Ruler
- Kneaded eraser
- Colored pencils or watercolor (optional)

Steps

1. Draw a light horizon line about one-third down from the top of the paper. Put a vanishing point (VP) in the middle of it.
2. Draw the front of your church in the center, as a flat shape (rectangle plus triangle roof, or a dome on a square), with its door right below the VP.
3. Mark evenly spaced points (every inch) along the bottom edge of the paper. With the ruler, draw a light line from each point to the VP. These orthogonals make the lines of the pavement.
4. Draw one diagonal line from a bottom corner of your pavement up to where the outermost orthogonal meets the base of the church. Wherever the diagonal crosses an orthogonal, draw a horizontal line across. The tiles now get smaller as they go back.
5. Draw a building on each side: start with a tall rectangle for its front edge near the viewer, then draw orthogonals from its top and bottom corners to the VP. Stop the building with a vertical line.
6. Add windows and doors on the side buildings. Their tops and bottoms are orthogonals too, aimed at the VP.
7. Add three or four simple standing figures: one large near the bottom, one middle, one small near the church. Place the eyes of each figure on the

horizon line.

8. Erase extra guidelines, darken the final lines, and add shading or color. Make one side of each building darker to show light coming from one side.

Tips

- Keep the ruler lines very light; many will be erased.
- All orthogonals go to the same point. Check each one with the ruler.
- If your figures look wrong, check that their eyes are on the horizon line.

Check your work

- ☐ All my orthogonals meet at one vanishing point on the horizon line.
- ☐ My pavement tiles get smaller as they go back.
- ☐ The eyes of my standing figures are on the horizon line.

SKETCHBOOK PRACTICE

1. Draw a hallway or a room in your house from one end, in one-point perspective.
2. Draw the same box three times: above the horizon line, on it, and below it. Notice which faces you can see.
3. Draw a straight road with telephone poles getting smaller toward the vanishing point.

From history. Around 1415 the Florentine architect Filippo Brunelleschi showed how to draw true perspective with a famous experiment using a painting of a church and a mirror. The architect Leon Battista Alberti wrote down the rules in his book *On Painting* in 1435. Within a few decades, painters such as Perugino were using them to build grand, orderly spaces.

COMMON MISTAKES

- Orthogonals that miss the vanishing point.
- Pavement lines evenly spaced instead of getting closer together as they go back.
- Putting the horizon line on a slant. It must be perfectly level.

Make it a game • Find the Vanishing Point. Hunt for three places in your house or yard where lines seem to meet far away, such as a hallway, a tiled floor or a street out the window. At each, stand still, point to the horizon line at your eye level, and trace the orthogonals with your finger. Three points to win.

6.2 BOXES IN TWO-POINT PERSPECTIVE

OBJECTIVES

- Explain when to use two-point perspective.
- Draw boxes in two-point perspective above, below and on the horizon line.
- Draw transparent boxes to check that all hidden edges line up.

Warm-up. Set a cereal box on a table so that a corner points straight at you. Draw it quickly. Then turn it so a flat side faces you and draw it again. Which edges slant in each drawing?

WATCH

How to draw 2 point perspective cubes

Mr. Otter Art Studio • 5:08

<https://www.youtube.com/watch?v=IXlpsRQDTcI>

WHEN TO WATCH

After the core ideas. Draw the cubes along with the video.

BACKUP VIDEO

Two Point Perspective

Drawing & Painting - The Virtual Instructor • 11:50

https://www.youtube.com/watch?v=1Fcbk_K5qWA

A longer explanation that goes on to buildings; good review before Lesson 6.3.

KEY TERMS

two-point perspective

A perspective system with two vanishing points on the horizon line, used when an object's corner faces the viewer.

leading edge

The vertical edge of a box nearest to the viewer, drawn first.

converging lines

Lines that come closer together as they go back toward a vanishing point.

transparent construction

Drawing a box as if it were made of glass, showing its hidden edges, to check accuracy.

CORE IDEAS

Use **two-point perspective** when you look at an object from the corner, so that no side faces you flat. Each set of parallel edges going back has its own vanishing point: the left side goes to a vanishing point on the left, and the right side to one on the right. Both vanishing points sit on the horizon line.

In two-point perspective, only the vertical lines stay truly vertical. Every horizontal edge of the box slants toward one of the two vanishing points. These lines are called **converging lines** because they come together.

Begin every box with its **leading edge**, the vertical line nearest you. Draw lines from its top and bottom to both vanishing points. Then decide how deep each side is and draw a vertical line on each side. Finally, connect the tops of those verticals to the opposite vanishing points to close the top or bottom face.

Where the box sits compared with the horizon line changes what you see. A box below the horizon shows its top. A box above the horizon shows its bottom. A box that straddles the horizon shows only two sides, no top or bottom.

Put the vanishing points far apart, near the edges of your paper or even off it on tape. If they are too close together, boxes look stretched and distorted. Drawing boxes as if they were glass, with hidden edges dotted in, called **transparent construction**, is the best way to check your work: all the hidden lines must also go to the vanishing points.

PICTURE STUDY



Paris Street; Rainy Day, Gustave Caillebotte, 1877 · Oil on canvas · Art Institute of Chicago

Image: [Wikimedia Commons](#), public domain

Caillebotte was a French painter who also designed racing sailboats, and he loved the new, wide boulevards of Paris. In this huge painting, almost life-size, streets meet at a corner, and the tall building in the center is seen corner-first, like a giant box in two-point perspective. A lamp post divides the picture in half.

Look closely

- Find the tall building in the middle. Which corner points toward you?
- Follow the lines of the rooftop and the rows of windows on its left side and on its right side. Which way does each set slant?
- Find the eye level. Look at the heads of the people walking: are most of them at about the same height?
- Look at the cobblestones. How do they change from the front of the picture to the back?

Talk about it

1. How did Caillebotte make the street feel wide and open?
2. Why do you think he put a lamp post right in the middle?
3. What details tell you it has been raining?

STUDIO PROJECT

A Stack of Boxes

You will fill a page with boxes in two-point perspective: some above the horizon, some below, some on it. Then you will turn some boxes into things: a gift, a book, a crate, a table, a building block. Finally you will shade every box from one light source.

You will need

- Drawing paper (11×14 in or 9×12 in, used sideways)
- HB and 2B pencils
- Ruler (an 18 in ruler is helpful)
- Kneaded eraser
- Masking tape

Steps

1. Draw a light horizon line across the middle of the page. Put a vanishing point near the left edge and another near the right edge. (For wider points, tape scrap paper to each side of your page and put the points on the tape.)
2. Draw a box below the horizon: draw a short vertical leading edge. From its top and bottom, draw light lines to both vanishing points.
3. Draw a vertical line on the left side and one on the right side to set the box's width and depth.
4. From the top of the left vertical, draw a line to the right vanishing point; from the top of the right vertical, draw a line to the left vanishing point. Where they cross is the back corner of the top face.
5. Draw two more boxes below the horizon, one above the horizon (now you will close the bottom face instead of the top), and one that crosses the horizon line.
6. Draw one box as transparent construction: dot in the hidden edges and check that they also go to the vanishing points.
7. Turn three of your boxes into objects by adding details: a ribbon on a gift, the pages of a book, the slats of a crate. Ribbons and stripes must follow the

vanishing points too.

8. Choose a light direction. Leave the top faces (or bottom faces) light, shade one side face middle and the other side dark. Add cast shadows.

Tips

- Draw lightly until the box is right, then darken the visible edges.
- Vertical lines must be perfectly vertical. Check them against the edge of the paper.
- If a box looks stretched, its vanishing points are too close; move them farther apart next time.

Check your work

- ☐ Every slanting edge goes to one of the two vanishing points.
- ☐ I drew boxes above, below and on the horizon, and each shows the correct faces.
- ☐ My shading uses the same light direction on every box.

SKETCHBOOK PRACTICE

1. Draw a row of three boxes of different sizes, all using the same two vanishing points.
2. Draw a table and a chair in two-point perspective by starting with boxes.
3. Look at a building on your street from the corner. Sketch it as a box first.

From history. Two-point perspective became especially important to architects, who needed to show how a building would look from a street corner before it was built. Caillebotte, who also designed sailboats, made careful perspective drawings to plan his paintings, then painted the scene in oil with great precision.

COMMON MISTAKES

- Slanting the vertical lines.
- Putting the two vanishing points at different heights. Both must be on the same horizon line.
- Placing the vanishing points too close together, which distorts the boxes.

Make it a game • Ninety-Second Box. Set a timer for ninety seconds. Draw a box in two-point perspective: horizon line, two vanishing points, leading edge, converging lines. Your parent checks that every line aims correctly. Then draw one above the horizon, one below, and one on it. Score a point for each box that looks solid.

6.3 DRAWING BUILDINGS

OBJECTIVES

- Build a house, barn or church from a two-point box.
- Find the center of a wall in perspective to place a roof peak.
- Draw doors, windows and roofs that follow the vanishing points.

Warm-up. Look out of a window or walk outside and find a building. Hold your pencil level and compare it with the roof line and the bottoms of the windows. Which lines slant up and which slant down? Sketch the building as a simple box in two minutes.

WATCH

How to Draw a House using Two Point Perspective for Beginners

[Circle Line Art School](https://www.youtube.com/watch?v=wZbTBgUSn7o) · 5:34

<https://www.youtube.com/watch?v=wZbTBgUSn7o>

WHEN TO WATCH

During the studio project. Watch once, then draw your own building step by step, pausing the video at each step.

BACKUP VIDEO

How to Draw a Barn in 2-point perspective

[two nickels sketch and draw](https://www.youtube.com/watch?v=Q9VB5Dbt_mQ) · 8:13

https://www.youtube.com/watch?v=Q9VB5Dbt_mQ

An alternative subject; useful for country families who would rather draw a barn.

KEY TERMS

gable

The triangular top part of a wall under the two slopes of a pitched roof.

ridge

The top line of a roof, where the two slopes meet.

perspective center

The true middle of a wall in perspective, found by drawing an X from corner to corner.

architecture

The art and science of designing buildings.

CORE IDEAS

Almost every building is a box, or several boxes joined together. To draw a house, barn or church, first draw a box in two-point perspective that is the size of the main walls. Then add the roof, the doors, the windows and the details.

A peaked roof needs a **gable**, a triangle on the end wall. The peak of the gable must be above the middle of that wall, but in perspective the middle is not halfway between the edges: the far half looks smaller. To find the true **perspective center**, draw an X from corner to corner across the end wall. Draw a vertical line up through the center of the X. The roof peak goes on this line.

The **ridge** of the roof is parallel to the long walls, so it goes to the same vanishing point as the long walls. Draw a line from the gable peak toward that vanishing point, then finish the far slope of the roof.

Doors and windows are rectangles that lie flat on the walls, so their top and bottom edges go to the same vanishing point as the wall they are on. Their sides are vertical. Windows on the same floor share one top line and one bottom line aimed at the vanishing point.

Details make a building believable: the thickness of a window frame, a chimney (a small box on the roof), steps (a set of thin boxes), and shadows under the eaves. Shade one side of the building darker than the other to match the light, as Canaletto did.

PICTURE STUDY



The Stonemason's Yard, Canaletto, about 1725 · Oil on canvas · National Gallery, London

Image: [Wikimedia Commons](#), public domain

Canaletto was a Venetian painter famous for his views of Venice. Here, instead of a grand palace, he painted a humble stonemason's yard where workers are cutting stone for a church. The houses, with their walls, windows, chimneys and roofs, are drawn with careful perspective, and strong sunlight falls across the scene.

Look closely

- Find a house on the left side. Which way do its window lines slant?
- Find the church and its bell tower across the water. Which direction is it facing?
- Find the sunny walls and the shady walls. Where is the sun?
- Look for small signs of daily life: laundry, people at windows, a mother with a child, stonemasons at work.

Talk about it

1. Why do you think Canaletto chose to paint a working yard instead of a famous palace?
2. How does the sunlight on the white stones help the picture?
3. Which part of this painting would you most like to walk into, and why?

STUDIO PROJECT

A Building from the Corner

You will draw a building in two-point perspective from its corner: your own house, a barn, a church or a small chapel. Start with a box, find the perspective center for the roof, and add doors, windows and details. Finish with shading that shows sunlight on one side.

You will need

- Drawing paper (11×14 in or 9×12 in, used sideways)
- HB and 2B pencils
- Ruler
- Kneaded eraser
- Colored pencils or watercolor (optional)
- A photo or a real view of a building seen from the corner (optional)

Steps

1. Draw a horizon line about one-third up from the bottom (you are standing on the ground looking at a building). Put two vanishing points near the edges.
2. Draw the leading edge of the building, a tall vertical line, below and above the horizon. Draw lines from its top and bottom to both vanishing points, and close the walls with vertical lines.
3. On the end wall (the shorter side), draw a light X from corner to corner. Draw a vertical line up through the center of the X. Mark the roof peak on that line.
4. Draw the two sloped edges of the gable from the wall's top corners to the peak. From the peak, draw the roof ridge toward the vanishing point of the long wall. End it above the far wall and draw the back slope of the roof.
5. Draw the door: two vertical lines and a top line aimed at the correct vanishing point.
6. Draw the windows. Draw one light line from the leading edge to the vanishing point for all window tops and another for all window bottoms on that floor, then add the vertical sides.

7. Add a chimney (a little box), steps, a fence or a bell tower. For a church, add a tower made of a tall box with a pointed roof.
8. Erase the guidelines. Shade the walls: one side light, the other darker, the roof overhang casting shadow on the walls. Add a tree or a path if you like.

Tips

- Draw the whole building lightly first; details come last.
- Check every window line with your ruler aimed at its vanishing point.
- If you draw your own house, simplify it into one or two boxes.

Check your work

- ☐ My building is built on a two-point box with correct vanishing points.
- ☐ The roof peak is over the perspective center of the end wall, and the ridge goes to the correct vanishing point.
- ☐ Doors and windows follow the vanishing points of their walls.

SKETCHBOOK PRACTICE

1. Draw a birdhouse or doghouse in two-point perspective.
2. Draw a street of three houses using the same two vanishing points.
3. Draw a church steeple: a tall box with a pyramid roof. Find the peak with an X on the top of the box.

From history. Canaletto sometimes used a camera obscura to help him sketch the buildings of Venice accurately, then he rearranged them in his studio for the best composition. Many of his views were bought by British travelers as souvenirs of their trip to Italy, which is why so many of his paintings are in England today.

COMMON MISTAKES

- Putting the roof peak halfway between the corners instead of over the perspective center.
- Window lines that don't go to the same vanishing point as their wall.
- Drawing all the details before the main box is correct.

Make it a game • Find the Wall's Middle. Draw a wall in two-point perspective. Race to find its center by drawing diagonals from corner to corner, then lift a vertical line from the crossing to place the roof peak. Your parent calls out 'house,' 'barn' or 'church' for the next challenge. Beat your own time each round.

6.4 ATMOSPHERIC PERSPECTIVE

OBJECTIVES

- Name the four signs of atmospheric perspective.
- Combine linear and atmospheric perspective in one landscape.
- Paint a landscape with at least four planes of distance.

Warm-up. Look out of a window or go outside where you can see far. Make a list: what is nearest, what is in the middle, what is farthest? For each, write one word about its color and one about how much detail you can see.

WATCH

How to Draw a Landscape using Atmospheric Perspective

Circle Line Art School · 6:27

https://www.youtube.com/watch?v=M_HG8yn7KJ8

WHEN TO WATCH

Before the studio project. Watch how he makes the far hills lighter and less detailed.

BACKUP VIDEO

Aerial Perspective | Atmospheric Perspective - What is it and how is it used?

Riecreate · 3:24

<https://www.youtube.com/watch?v=r8GgE4BYhyA>

A short explanation with examples from paintings; good before the picture study.

KEY TERMS

atmospheric perspective

Showing distance by making far things lighter, bluer, softer and less detailed, the way air makes them look. Also called aerial perspective.

foreground

The part of a picture that seems closest to the viewer.

middle ground

The part of a picture between the foreground and the background.

background

The part of a picture that seems farthest away.

contrast

The difference between lights and darks, or between colors, next to each other.

CORE IDEAS

The air between you and a faraway mountain is not perfectly clear. It is full of tiny particles of water and dust that scatter light, especially blue light. The more air there is between you and something, the more it is veiled. Painters copy this effect to show distance; it is called **atmospheric perspective** (or aerial perspective).

There are four signs of atmospheric perspective. As things go back in space, they become: (1) **lighter in value**, closer to the value of the sky; (2) **lower in contrast**, with darks and lights closer together; (3) **cooler and bluer**, and duller in intensity; and (4) **less detailed, with softer edges**.

Think in layers or planes. The **foreground** has the darkest darks, the brightest lights, the warmest colors, sharp edges and the most detail: you can see individual leaves and blades of grass. The **middle ground** is softer: you see trees as shapes, not leaves. The **background** is pale, blue and simple: mountains are flat, soft silhouettes.

Linear and atmospheric perspective work together. A road or river that narrows as it goes back, trees that get smaller, and hills that overlap all show distance by size and position. Atmospheric perspective adds the feeling of air and light.

Leonardo da Vinci wrote about this hundreds of years ago and painted bluish, misty distances behind many of his figures. The Hudson River School painters made it their specialty, filling their huge canvases with glowing air.

PICTURE STUDY



Among the Sierra Nevada, California, Albert Bierstadt, 1868 · Oil on canvas · Smithsonian American Art Museum, Washington, D.C.

Image: [Wikimedia Commons](#), public domain

Albert Bierstadt traveled west with survey expeditions and made sketches of the Rocky Mountains and the Sierra Nevada, then painted enormous canvases in his studio. This one is about ten feet wide. He used atmospheric perspective to make the mountains seem miles away and to fill the valley with light and mist.

Look closely

- Find the darkest darks in the painting. Are they in the front or in the back?
- Compare the nearest trees with the farthest mountains. How are their colors and edges different?
- Find the waterfall and the mist. How does the mist help show distance?
- Look for the deer in the foreground. How much detail can you see on them compared with the far cliffs?

Talk about it

1. How many layers of distance can you count, from front to back?
2. Why might Bierstadt have put the brightest light in the middle of the painting?
3. How does this painting make you feel about the size of God's creation?

STUDIO PROJECT

A Valley in Five Planes

You will paint a mountain valley with five layers of distance, using all four signs of atmospheric perspective. A river or road will wind back into the valley to add linear perspective too.

You will need

- Watercolor paper (9×12 in, 140 lb)
- Watercolors (or tempera with white)
- Round brushes (sizes 4 and 8)
- Pencil, masking tape, water, paper towels

Steps

1. Tape your paper down. Lightly draw a horizon about halfway up. Draw five layers of land: far mountains, nearer mountains, hills, a middle-ground meadow with trees, and a foreground bank with rocks or plants. Draw a river or road that starts wide at the bottom and narrows as it winds back.
2. Paint the sky with a pale wash of blue, lighter near the horizon. Let it dry.
3. Plane 5 (farthest mountains): mix a very pale blue-violet (lots of water). Paint the shape with one soft, flat wash. No details. Let it dry.
4. Plane 4: a slightly darker, slightly less blue mixture (add a touch of green or gray). Paint the nearer mountains. Let dry.
5. Plane 3 (hills): a middle blue-green. Suggest a few tree shapes along the top edge only.
6. Plane 2 (meadow and trees): warmer greens and yellow-greens. Paint trees as shapes with a darker side. Paint the river with a little of the sky color, narrowing as it goes back.
7. Plane 1 (foreground): your darkest, warmest, most intense colors. Add details here only: blades of grass, rocks with shadows, a few flowers.
8. When dry, remove the tape. Squint at your painting: do the values step evenly from pale in the back to dark in the front?

Tips

- Let each plane dry before painting the next so the edges stay clean.
- Test each color on scrap paper and compare it with the plane behind it; each should be a little darker and warmer.
- Save your sharpest details and darkest darks for the foreground.

Check your work

- ☐ My painting has five planes that get lighter, cooler and simpler as they go back.
- ☐ The foreground has the most detail, contrast and warmth.
- ☐ My river or road narrows as it goes back, adding linear perspective.

SKETCHBOOK PRACTICE

1. Draw a row of fence posts or trees going back into the distance, making them smaller and lighter in pencil.
2. Make a five-step value scale using only one blue watercolor, and paint five overlapping hill shapes, one value for each.
3. Copy a small part of Bierstadt's painting in colored pencil, matching the change from dark front to pale back.

From history. Leonardo da Vinci wrote in his notebooks that the farther away a mountain is, the bluer and paler it appears, and he painted soft blue distances in works such as the *Mona Lisa*. Three and a half centuries later, American painters like Bierstadt used the same principle to show the vast scale of the western mountains to people back East who had never seen them.

COMMON MISTAKES

- Making far mountains dark and detailed.
- Using the same green everywhere. Greens become bluer and paler as they go back.
- Putting outlines around faraway shapes.

Make it a game • Walk the Five Planes. Stand in different parts of a room or yard as your parent calls 'foreground,' 'middle ground,' or 'background.' For each plane, say how a tree would look: sharper or fainter, darker or lighter, warm or cool. Name all four signs of atmospheric perspective before you go. Switch roles and try to catch a mistake.

UNIT 6

PERSPECTIVE

Perspective is a way of drawing a world that has depth on a flat sheet of paper. It rests on one simple fact: things look smaller the farther away they are. Renaissance artists in Florence worked out the rules of this shrinking in the early 1400s, and those rules changed painting forever.

In this unit you will review one-point perspective, learn to draw boxes in two-point perspective, use boxes to build houses, barns and churches, and finally learn atmospheric perspective, the way air itself makes faraway things look pale and blue. Each lesson is paired with a master who used perspective to make us feel that we could walk right into his picture.

PREREQUISITES

- Can use a ruler to draw straight lines lightly
- Knows horizon line, vanishing point and one-point perspective from earlier grades (reviewed in Lesson 6.1)
- Knows that cool, pale colors seem to recede (Lesson 3.4)

MASTERY CHECKLIST

- ☐ I can draw a horizon line and vanishing point and explain that the horizon line is my eye level.
- ☐ I can draw a scene in one-point perspective with orthogonals that meet at one vanishing point.
- ☐ I can draw boxes in two-point perspective above, below and on the horizon line.
- ☐ I can build a house or church from a two-point box, with a correct roof, doors and windows.
- ☐ I can show distance using atmospheric perspective: lighter, cooler, softer and less detailed.

LESSONS IN THIS UNIT

6.1 One-Point Perspective Review

2 sessions of 45 minutes

6.2 Boxes in Two-Point Perspective

2 sessions of 45 minutes

6.3 Drawing Buildings

2 sessions of 45 minutes

UNIT 6 REVIEW

Answer each question in a sentence or two, or draw a quick sketch when asked. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What is the horizon line, and what happens to it if you climb a ladder?

2. (5 pts)

What are orthogonals, and where do they go in one-point perspective?

3. (5 pts)

In a scene on flat ground, where are the eyes of standing grown-ups, whether they are near or far?

4. (5 pts)

When do you use two-point perspective instead of one-point?

5. (5 pts)

Sketch a box below the horizon line in two-point perspective. Which faces can you see?

6. (5 pts)

Which lines stay perfectly vertical in two-point perspective?

7. (5 pts)

How do you find the place for the peak of a gable roof in perspective?

8. (5 pts)

Where do the tops and bottoms of windows go in two-point perspective?

9. (5 pts)

Name the four signs of atmospheric perspective.

10. 5 pts

Name one painting from this unit and explain how it shows depth.

ANSWER KEY

1. It is your eye level; when you climb higher, it goes up.
2. Lines that go straight back into the picture; they all meet at the single vanishing point.
3. On or near the horizon line.
4. When you see an object from its corner, so no side faces you flat.
5. Two sides and the top.
6. The vertical edges, such as corners of buildings and boxes.
7. Draw an X from corner to corner on the end wall and draw a vertical line up through its center.
8. To the same vanishing point as the wall they are on.
9. Farther things are lighter in value, lower in contrast, cooler and bluer, and less detailed with softer edges.
10. For example: Perugino's *Delivery of the Keys* uses a paved grid that meets at one vanishing point; Bierstadt's *Among the Sierra Nevada* uses pale, misty, blue mountains.

PORTFOLIO PIECE: A VILLAGE STREET

Draw and color a village or farm scene with at least three buildings (one may be a church), a road or path leading back, and hills or mountains in the distance. Use two-point perspective for the buildings (or one-point if the street goes straight back), and atmospheric perspective for the distance. Add a few people with their eyes on the horizon line.

LOOK FOR	WHAT IT MEANS
Linear perspective	Buildings, windows and roofs follow correct vanishing points on one horizon line.
Buildings	Roofs are placed with the perspective center, and details such as doors, windows and chimneys are added.
Atmospheric perspective	The distance is lighter, cooler, softer and less detailed than the foreground.
Figures and scale	People are sized for their distance, with their eyes on the horizon line.
Craftsmanship	Ruler lines are clean, guidelines are erased, and shading or color is careful.

COMPOSITION AND DESIGN

A pile of good bricks is not yet a house. In the same way, good drawing and good color are not yet a good picture: they must be arranged. The arrangement of a picture is called its **composition**, and artists use a set of ideas called the **principles of design** to arrange it well.

In this unit you will learn four of the most important principles: **balance**, **emphasis**, **movement**, and **unity with variety**. You will also learn the habit that professional artists rely on to plan a composition: the small, quick drawings called thumbnail sketches. Constable, Rembrandt, Hokusai and Bruegel will show you how each principle works.

PREREQUISITES

- Can use a viewfinder to choose a composition (Lesson 1.3)
- Understands value, intensity and color temperature (Units 3 and 4)
- Can draw simple figures and landscapes

MASTERY CHECKLIST

- ☐ I can explain symmetrical, asymmetrical and radial balance and find them in artworks.
- ☐ I can create a focal point using contrast, color, placement and leading lines.
- ☐ I can make a viewer's eye move through a picture with lines, repetition and rhythm.
- ☐ I can use unity and variety together so a picture feels whole but not boring.
- ☐ I can plan a picture with several thumbnail sketches before starting the final work.

LESSONS IN THIS UNIT

7.1 Balance

2 sessions of 45 minutes

7.2 Emphasis

2 sessions of 45 minutes

7.3 Movement

2 sessions of 45 minutes

UNIT 7 REVIEW

Answer each question in a sentence or two. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What is visual weight? Name three things that make a shape look heavier.

2. (5 pts)

Explain the difference between symmetrical and asymmetrical balance.

3. (5 pts)

Give an example of radial balance.

4. (5 pts)

How does Constable balance *The Hay Wain*?

5. (5 pts)

What is a focal point? Name three ways to create one.

6. (5 pts)

How did Rembrandt create emphasis in *The Return of the Prodigal Son*?

7. (5 pts)

What kinds of lines suggest motion, and what kinds suggest stillness?

8. (5 pts)

How do repetition and rhythm create movement?

9. (5 pts)

Why does a picture need both unity and variety?

10. (5 pts)

What is a thumbnail sketch, and why do artists make several?

ANSWER KEY

1. The pull a part of a picture has on the eye. Any three: larger size, darker value, brighter color, more detail, being isolated.
2. Symmetrical balance has matching halves like a mirror; asymmetrical balance uses different things on each side with equal visual weight.
3. A rose window, a wheel, a daisy seen from above, a snowflake.
4. Dark trees and the cottage on the left are balanced by open, light meadows and sky on the right, with the cart and small red accents helping.
5. The place the eye goes first. Any three: contrast of light and dark, intense or warm color, detail, size, isolation, placement, leading lines, gazes.
6. He put the brightest light and warm red on the father and son, left the other figures in shadow, and the onlookers' gazes lead to them.
7. Diagonals and curves suggest motion; horizontals and verticals suggest stillness.
8. Repeated shapes make the eye jump from one to the next, like beats in music, carrying it through the picture.
9. Unity makes it feel whole; variety keeps it interesting. Too much unity is boring and too much variety is chaotic.
10. A very small, quick plan of a composition; making several lets you try different ideas quickly and choose the best before starting the final work.

PORTFOLIO PIECE: A PARABLE IN PICTURES

Choose one of Jesus's parables or another Bible story, such as the lost sheep, the sower, Ruth gleaning in the fields, or the calming of the storm. Make at least four thumbnails, then a finished color picture that uses all four principles from this unit: balance, a clear focal point at the heart of the story, movement that leads the eye there, and unity with variety. Write the Scripture reference on the back.

LOOK FOR	WHAT IT MEANS
Planning	At least four different thumbnails were made, and the best was chosen and improved.
Balance	The picture feels stable, using symmetrical or asymmetrical balance on purpose.
Emphasis	The most important moment of the story is the clear focal point.
Movement	Lines, gazes or repeated shapes lead the eye to the focal point and through the picture.
Unity and variety	A limited color scheme and repeated shapes unify the picture, while sizes and poses vary.

7.1 BALANCE

OBJECTIVES

- Define visual weight and explain what makes a shape look heavy or light.
- Recognize symmetrical, asymmetrical and radial balance.
- Compose a landscape with asymmetrical balance.

Warm-up. Cut five shapes from scrap paper: one large dark square, one small dark square, two medium gray shapes and one small bright red circle. On a sheet of white paper, move them around until the arrangement feels balanced, not tipping to one side. Then try to balance the big dark square with only the small pieces.

WATCH

Art Education - Principles of Design - Balance - Back to the Basics - Art Lesson

Paint It Kids · 4:34

<https://www.youtube.com/watch?v=jCx-XoBj8Q0>

WHEN TO WATCH

After the core ideas. Pause after each kind of visual weight and find an example in the room.

KEY TERMS

balance

The way the visual weight of a picture is spread out so it feels stable.

symmetrical balance

Balance in which both halves of a picture are the same or nearly the same, like a mirror image.

visual weight

How strongly a part of a picture pulls on the eye; large, dark, bright, detailed or isolated things look heavier.

asymmetrical balance

Balance in which different things on each side carry equal visual weight.

radial balance

Balance in which parts spread out from a center, like the spokes of a wheel or a rose window.

CORE IDEAS

Every part of a picture has **visual weight**, the pull it has on our eyes. A large shape looks heavier than a small one. A dark shape looks heavier than a light one on a white page. A bright, intense color, a detailed area, or something placed alone in an empty space also looks heavy. A picture feels **balanced** when its weights feel steady, like a seesaw at rest.

Symmetrical balance is mirror balance: the left side matches the right. It feels calm, formal, dignified and permanent. That is why it is used for church fronts, altarpieces and icons, like Perugino's temple or Rublev's three angels.

Asymmetrical balance uses different things on each side that carry the same weight. A large, dull shape near the center can balance a small, bright shape near the edge, just as a heavy child sitting near the middle of a seesaw can balance a light child at the far end. Asymmetrical balance feels natural, lively and interesting, and most landscapes use it.

Radial balance spreads out from a center point: a wheel, a daisy, a snowflake or the great rose windows of Gothic cathedrals. Your eye is drawn to the center and then travels around and out.

To test balance, turn your picture upside down or look at it in a mirror. Problems jump out when the picture is unfamiliar. Squint, too: squinting shows where the heavy dark masses are.

PICTURE STUDY



The Hay Wain, John Constable, 1821 · Oil on canvas · National Gallery, London

Image: [Wikimedia Commons](#), public domain

John Constable loved the countryside of Suffolk, in England, where he grew up. This painting shows an empty hay wagon (a “wain”) crossing the river Stour beside the cottage of a farmer, Willy Lott. Constable made the scene feel peaceful and stable, though the two sides of the picture are very different.

Look closely

- Squint. Where are the biggest, darkest shapes? Which side of the picture are they on?
- What fills the other side of the picture? Is it light or dark? Large or small?
- Find the hay wain. Is it in the exact center? What does it add to the balance?
- Find small spots of red. Where are they, and why might Constable have put them there?

Talk about it

1. Is this painting symmetrical or asymmetrical? How can you tell?
2. If the dark trees were moved to the middle, how would the picture change?
3. What sounds might you hear if you stood in this scene?

STUDIO PROJECT

A Balanced Landscape

You will design a landscape with asymmetrical balance, like Constable's. First you will try both kinds of balance with quick thumbnail sketches, then make a finished oil pastel or watercolor landscape in which a big, dark mass on one side is balanced by smaller, brighter, or more interesting things on the other.

You will need

- Sketchbook and pencil
- Drawing or mixed-media paper (9×12 in)
- Oil pastels (or watercolors)
- Optional: the cut-paper shapes from the warm-up

Steps

1. In your sketchbook, draw two small rectangles (2×3 in). In the first, sketch a symmetrical landscape: a road going straight back with matching trees on both sides.
2. In the second rectangle, sketch an asymmetrical version: a large group of dark trees on one side, open space on the other, and something small but interesting (a house, a cart, a figure) placed to balance them.
3. Make one more asymmetrical thumbnail, switching the sides or changing the small object. Choose the one that feels most balanced and interesting.
4. On your paper, lightly draw the chosen design. Make the horizon line above or below the middle, not exactly in the center.
5. Color the sky first, lightly. Then add the big dark mass of trees, using deep greens, blues and browns.
6. Color the open side with lighter, sunnier colors.
7. Add the small balancing element and give it a touch of bright, intense color (red against green works well, as Constable knew).
8. Turn the picture upside down and look. Does it tip to one side? If so, add weight to the light side or lighten the heavy side.

Tips

- Remember the seesaw: the small object should be farther from the center than the big mass.
- Avoid placing the horizon or a large tree exactly in the middle; it cuts the picture in two.
- Oil pastels blend well if you layer light colors first and dark colors on top.

Check your work

- ☐ My landscape uses asymmetrical balance: different things on each side with equal weight.
- ☐ A small, bright or interesting element balances the large dark mass.
- ☐ The picture feels stable when I look at it upside down.

SKETCHBOOK PRACTICE

1. Find three examples of symmetrical balance in your home or church (a door, a clock, a window) and draw them.
2. Draw a flower from directly above to show radial balance.
3. Rearrange three objects on a table until they are balanced asymmetrally, then draw them.

From history. Constable painted *The Hay Wain* in his London studio from many oil sketches he made outdoors. The painting did not sell in England at first, but it won a gold medal when it was shown in Paris in 1824, and French painters were amazed by its fresh, natural greens and sparkling light.

COMMON MISTAKES

- Thinking balance means everything is the same size. Asymmetrical balance uses different sizes.
- Putting everything heavy on one side.
- Centering the horizon line so the picture is split in half.

Make it a game • Balance Judge. Arrange buttons or coins on a sheet of paper in three ways: symmetrical, asymmetrical and radial. Your parent judges which is which and points to the heaviest-looking item. Then switch roles. Explain why a big dark shape feels heavier than a small pale one. One point for every correct call.

7.2 EMPHASIS

OBJECTIVES

- Define emphasis and focal point.
- Name at least five ways artists create a focal point.
- Make a picture with one clear focal point using light, contrast and leading lines.

Warm-up. Look at the picture-study painting for ten seconds only, then cover it. Where did your eyes go first? Second? Draw a quick diagram of the path your eyes took.

WATCH

Art Education - Principles of Design - Emphasis - Getting Back to the Basics - Art Lesson

Paint It Kids · 4:15

<https://www.youtube.com/watch?v=I9tvLdNTRJI>

WHEN TO WATCH

After the core ideas. Watch for the different ways an artist makes one part of a picture the star.

BACKUP VIDEO

How to Create Focal Points in Art

Drawing & Painting - The Virtual Instructor · 2:02

https://www.youtube.com/watch?v=bFEC9v4_TUM

A short summary of the ways to make a focal point.

KEY TERMS

emphasis

Making one part of a picture stand out more than the rest.

contrast

A strong difference, such as light against dark, warm against cool, or bright against dull.

focal point

The place in a picture where the eye goes first and returns to most often.

leading lines

Lines in a picture (roads, arms, gazes, edges) that guide the eye toward the focal point.

subordinate

Less important; the parts of a picture that support the focal point without competing with it.

CORE IDEAS

A good picture tells you where to look. **Emphasis** is the principle of making one part stand out, and that part is the **focal point**. Everything else should be **subordinate**: present and supporting, but quieter.

The strongest tool for emphasis is **contrast**. The eye goes straight to the place where the lightest light meets the darkest dark. It also goes to the warmest, most intense color among cool, dull colors, and to the sharpest, most detailed area among soft, simple ones.

Other tools: **placement** (near the center, or at a strong point a third of the way in from the edges); **isolation** (one thing set apart from a group); **size** (the biggest figure); and **leading lines**, which include roads, rivers, arms and even the direction people in the picture are looking. If every figure looks at one person, so will we.

Use one focal point, maybe with a second, quieter one. If everything is bright, sharp and detailed, nothing stands out and the eye wanders. Choose the most important thing first, then make everything else serve it.

Rembrandt was a master of emphasis. He often let most of his painting sink into warm, brown shadow and placed the brightest light on the faces and hands that tell the story. Our eyes go exactly where he wants them, and stay there.

PICTURE STUDY



The Return of the Prodigal Son, Rembrandt van Rijn, about 1661–1669 · Oil on canvas · Hermitage Museum, Saint Petersburg

Image: [Wikimedia Commons](#), public domain

This large painting, made near the end of Rembrandt's life, tells the parable Jesus told in Luke 15. A son who wasted everything comes home in rags, and his father welcomes him. Rembrandt put the brightest light and the warmest red on the father's embrace, and he made the other figures fade into the dark.

Look closely

- Where did your eye go first? What is there?
- Find the brightest light in the painting. What is it falling on?
- Find the father's hands. Are they the same? How do they show his love?
- Find the tall man standing on the right. Where is he looking? How does his gaze lead your eye?

Talk about it

1. Why do you think Rembrandt kept the other figures in shadow?
2. What do the son's worn shoes and shaved head tell you about his journey?
3. How does this painting help you understand the parable?

STUDIO PROJECT

Out of the Dark

Like Rembrandt, you will make a picture where light picks out the most important part and the rest falls into shadow. You will work on toned or dark paper, adding light with white and pale colors, so that the focal point glows. Choose a simple subject: hands holding a cup or a book, a person reading by lamplight, a bowl of fruit, or a loaf of bread on a table.

You will need

- Toned paper (tan, gray or brown), or black construction paper
- Black or brown colored pencil or soft charcoal pencil
- White and light-colored pastels or colored pencils (cream, yellow, orange)
- A lamp
- Your subject (objects or a family member to pose)

Steps

1. Set up your subject in a dark room with one lamp shining on the most important part, for example the hands and the face of someone reading.
2. Make two thumbnails in your sketchbook. Shade everything dark except the lit focal point. Choose the stronger design.
3. On the toned paper, lightly sketch the main shapes with the dark pencil.
4. Darken the shadows and background with the dark pencil. Let large areas sink into darkness; you do not need to show every detail there.
5. With white or cream, add light only where the lamp hits most strongly on your focal point. Build it up in layers so it glows.
6. Add warm yellow or orange in the half-lights near the focal point. Keep other areas dull.
7. Add a leading line: a table edge, an arm or a gaze that points toward the focal point.
8. Step back. Cover the focal point with your hand. Does the picture become dull? Uncover it. Does your eye go there right away?

Tips

- The highest contrast (lightest light next to darkest dark) should be at the focal point only.
- Leave sharp edges and details at the focal point; soften edges elsewhere.
- On toned paper, the paper itself is your middle value; you only need to add darks and lights.

Check your work

- ☐ My picture has one clear focal point that the eye finds first.
- ☐ I used contrast of light and dark, plus at least one other tool (color, detail, leading lines).
- ☐ The rest of the picture is subordinate and does not compete.

SKETCHBOOK PRACTICE

1. Find a photo in a magazine or book and draw an arrow showing where your eye goes first. Write which tool of emphasis made it happen.
2. Draw a row of five identical cups and make one of them the focal point by changing only its value or color.
3. Draw a group of people all looking toward one person.

From history. Rembrandt's later years were hard: he lost his wife, his son and most of his money. Many think this sorrow deepened his art, especially his late paintings of Bible stories like the *Prodigal Son*, which show forgiveness and mercy with great tenderness.

COMMON MISTAKES

- Making everything bright and detailed, so nothing stands out.
- Putting the focal point at the very edge or in a corner where the eye slides out.
- Having two equally strong focal points that compete.

Make it a game • Five Ways to Stand Out. Draw a row of five identical circles. Make one the focal point in five different ways, one row at a time: bigger, brighter color, stronger contrast, isolated from the rest, or pointed to by lines. Your parent names the method used. Race the clock, and see whether you can find a sixth.

Scripture. “But when he was yet a great way off, his father saw him, and had compassion, and ran” (Luke 15:20, KJV)

Rembrandt chose the moment of welcome and put all his light there. The focal point of the painting is the focal point of the parable: the father’s mercy.

7.3 MOVEMENT

OBJECTIVES

- Explain two meanings of movement in art: showing motion and guiding the eye.
- Use diagonals, curves, repetition and rhythm to create movement.
- Make a picture of moving water, wind or animals with a clear path for the eye.

Warm-up. Draw ten different lines that look like they are moving: a gust of wind, a rolling wave, a hopping rabbit, a falling leaf, a spinning wheel. Then draw three lines that look perfectly still. What makes the difference?

WATCH

Art Education - Principles of Design - Movement - Back to the Basics - Art Lesson

Paint It Kids · 3:15

https://www.youtube.com/watch?v=nJnVsGY2r_s

WHEN TO WATCH

After the core ideas. Notice how curves, diagonals and repeated shapes move your eye.

BACKUP VIDEO

Principles of Design: Movement

Matthew Watt · 3:07

<https://www.youtube.com/watch?v=9Yw8gClysNg>

A short second explanation of movement in art.

KEY TERMS

movement

The way a picture shows action, or the path the viewer's eye travels through a picture.

repetition

Using the same or similar shapes, lines or colors several times.

rhythm

A repeated pattern of shapes, lines or colors that creates a beat, like music.

diagonal

A slanted line; diagonals feel active, unlike calm horizontals and verticals.

CORE IDEAS

Movement means two things in art. First, a picture can show things moving: waves breaking, trees bending, horses running. Second, a picture can move your **eye** along a path, from one part to another, until you have seen the whole thing and come back to the focal point.

Lines carry feeling. Horizontal lines feel calm and resting, like a sleeping person or a still lake. Vertical lines feel strong and still, like a tree or a tower. **Diagonal** lines feel active and unstable, as if something is falling, climbing or rushing. Curves feel flowing and graceful. To show motion, use diagonals and curves.

Repetition and **rhythm** create movement too. A row of fence posts, a series of waves, or a flock of birds repeated across the page makes the eye jump from one to the next, like the beats in music. If the shapes get bigger or smaller as they repeat, the rhythm seems to rush toward you or away.

Artists show motion with tricks we accept without thinking: hair and clothes blown in one direction, a figure caught off balance, blurred or repeated edges, foam and spray flying off a wave, and lines that follow the direction of movement.

Plan a path for the eye. Good pictures often lead the eye in a curve or zigzag from the edge toward the focal point, around the picture and back again, without letting it slide off the edge. Edges, gazes and repeated shapes all act like stepping stones.

PICTURE STUDY



The Great Wave off Kanagawa, Katsushika Hokusai, about 1831 · Woodblock print, ink and color on paper · Many impressions exist; examples are in the Metropolitan Museum of Art, New York, and the British Museum, London

Image: [Wikimedia Commons](#), public domain

Hokusai was a Japanese artist who made thousands of drawings and prints during his long life. This print is from a series called *Thirty-Six Views of Mount Fuji*. A towering wave curls over fishing boats, and in the distance, tiny and still, sits Mount Fuji. It is one of the most famous images of movement ever made.

Look closely

- Trace the curve of the great wave with your finger. Where does it start and where does it end?
- Find the small wave in the front. What shape does it make? What does it remind you of?
- Look at the foam at the top of the wave. How did Hokusai show spray and motion?
- Find Mount Fuji. How does its stillness make the wave seem even more powerful?

Talk about it

1. What path does your eye take through the picture?
2. Why do you think Hokusai made the mountain so small?

3. How are the boats and the rowers drawn to show that they are moving with the water?

STUDIO PROJECT

Wind and Water

You will make a picture full of movement: a stormy sea, a windy field, a flock of birds, or a galloping horse. You will use curves, diagonals, repetition and rhythm, and you will plan a path for the eye that leads to a focal point.

You will need

- Drawing paper or watercolor paper (9×12 in)
- Pencil
- Black fine-line marker (waterproof)
- Watercolors or colored pencils (a limited palette of blues and one warm color works well, like Hokusai's)
- Sketchbook

Steps

1. Choose your subject. In your sketchbook, make three thumbnails. In each, draw an arrow showing the path the eye will take.
2. Choose the thumbnail with the strongest movement. Check that the main lines are curves and diagonals, not straight horizontals.
3. Lightly draw the big shapes on your paper: the large wave or the bending trees or the line of birds.
4. Add repeated shapes that create rhythm: smaller waves that echo the big one, rows of grass bending the same way, birds of different sizes flying in a curve.
5. Add one still element for contrast, such as a distant mountain, a house or a sun. Stillness makes motion look stronger.
6. Go over the main lines with the fine-line marker. Use thicker lines in front and thinner lines far away.
7. Add color with a limited palette: two or three blues for water, or greens and golds for a field, plus one warm accent at the focal point.
8. Check the path: follow it with your finger. Does it lead to the focal point and around the picture without sliding off the edge?

Tips

- Draw curves with your whole arm, not just your fingers, for smooth, flowing lines.
- Everything blown by the wind should lean the same direction.
- Repetition with small changes (different sizes, different spacing) feels more alive than exact copies.

Check your work

- ☐ My picture uses curves and diagonals to show motion.
- ☐ Repeated shapes create a rhythm that moves the eye.
- ☐ There is a clear path for the eye leading to a focal point, with one still element for contrast.

SKETCHBOOK PRACTICE

1. Watch leaves or laundry blowing in the wind and draw five quick sketches showing which way they move.
2. Draw a row of waves, each a little different, to create rhythm.
3. Copy the small foreground wave from *The Great Wave* in pencil, paying attention to the claw-like foam.

From history. Hokusai was over seventy when he made *The Great Wave*. He once wrote that nothing he drew before age seventy was worth much, and that he hoped to keep improving until he was over a hundred. He signed some late works “the old man mad about drawing.”

COMMON MISTAKES

- Using mostly straight horizontal and vertical lines, which make the picture feel still.
- Making everything move in different directions, so the picture feels chaotic.
- Letting the eye path run straight off the edge of the page.

Make it a game • Line Charades. Draw lines that show movement without drawing any object: a zigzag, a wave, repeating dashes, a diagonal. Your parent guesses what is moving, such as wind, water or a galloping horse, and which tool you used: rhythm, repetition, curve or diagonal. Switch turns. Score a point for each right guess.

7.4 UNITY, VARIETY AND THUMBNAILS

OBJECTIVES

- Explain unity and variety and why a picture needs both.
- Use repeated colors and shapes for unity, and different sizes and poses for variety.
- Plan a composition with a set of thumbnail sketches before making the final work.

Warm-up. Set a timer for five minutes. Draw as many tiny rectangles (about 1×1½ in) as you can, and in each one draw a different arrangement of just three things: a tree, a house and a path. Do not worry about details. How many different pictures did you invent?

WATCH

About Thumbnail Sketches

Owings Art · 6:42

<https://www.youtube.com/watch?v=gYTukZ3TbMk>

WHEN TO WATCH

Before you plan your composition. Watch how small, quick thumbnails help choose the best arrangement.

KEY TERMS

unity

The sense that all the parts of a picture belong together as one whole.

variety

Differences in a picture (of size, shape, color, value, direction) that keep it interesting.

harmony

A pleasing agreement among parts, often made by repeating related colors or shapes.

thumbnail sketch

A very small, quick drawing used to plan a composition.

CORE IDEAS

Unity means that everything in a picture belongs together, so it feels like one complete world. You create unity by repeating: using a limited set of related colors throughout, repeating similar shapes, keeping the light coming from one direction, and keeping one style of mark-making.

Variety means differences that keep a picture alive. You create variety with different sizes (big, medium, small), different shapes, different values, different directions and different textures. Variety keeps the eye interested.

A picture needs both. Too much unity is boring, like a page of identical circles. Too much variety is chaos, like a room where everyone talks at once. The best pictures have a strong, simple unity with plenty of variety inside it. Think of a choir: many different voices singing one song.

Artists plan with **thumbnail sketches**: tiny, fast drawings, often only 2 or 3 inches wide, that show just the big shapes and darks and lights. Because they are small and quick, you can try five or ten arrangements in a few minutes. Most bad compositions could have been fixed at the thumbnail stage.

Good thumbnail habits: draw the frame first, in the same proportions as your final paper; use only three values (light, middle, dark); show no details; try a different idea in each one; then choose the best and ask why it is best.

PICTURE STUDY



The Harvesters, Pieter Bruegel the Elder, 1565 · Oil on wood · Metropolitan Museum of Art, New York

Image: [Wikimedia Commons](#), public domain

Bruegel painted a series of six pictures showing the seasons of the year, and this one shows high summer, when the wheat is harvested. Dozens of people work, rest, eat and walk through the landscape, yet the whole painting feels like one golden afternoon.

Look closely

- What color is repeated across most of the painting? How does it tie everything together?
- Count how many different activities you can see people doing.
- Find people who are near and large, and people who are far and tiny.
- Find the church in the middle distance. How does it fit into the scene?

Talk about it

1. What gives this painting unity? What gives it variety?
2. Why might Bruegel have painted ordinary farm workers instead of kings and nobles?
3. Which person would you most like to be in this painting, and why?

STUDIO PROJECT

A Season of Work and Rest

You will plan and make a picture of people at work and rest in a season of the year, like Bruegel's harvesters: raking leaves in autumn, planting a garden in spring, picking apples, sledding, or a family picnic after chores. You will begin with at least six thumbnails, and your final picture will have strong unity and lively variety.

You will need

- Sketchbook and pencil
- Drawing or mixed-media paper (11×14 in or 9×12 in)
- Colored pencils, watercolors or oil pastels
- A ruler for drawing thumbnail frames

Steps

1. Choose your season and the activity. List five things people could be doing in your scene.
2. In your sketchbook, draw six frames about 2×3 in, in the same proportions as your final paper.
3. Fill each frame with a different arrangement. Use only three values. Try a high horizon and a low one, a big tree on the left and on the right, figures near and far.
4. Pick the best thumbnail. Write two sentences about why it works, using the words balance, emphasis or movement.
5. Choose a limited color scheme for unity: for example, golds, browns and soft greens for harvest; or blues, whites and one warm red for winter. Make a small swatch strip.
6. Lightly draw your scene on the final paper, enlarging the thumbnail. Include at least five figures of different sizes doing different things (variety).
7. Repeat a few shapes for unity: the rounded shapes of haystacks or trees, the curves of hills, or the angles of rooftops.

8. Color the picture using only your chosen color scheme, with one small accent of a contrasting color at the focal point.

Tips

- Thumbnails should take one or two minutes each. Speed helps you think in big shapes.
- Simple figures are fine: think of them as shapes with a gesture, like Bruegel's sturdy peasants.
- If the picture feels busy, simplify the background or repeat a color more.

Check your work

- ☐ I made at least six different thumbnails and chose the best one for a reason.
- ☐ My picture has unity from a limited color scheme and repeated shapes.
- ☐ My picture has variety in sizes, activities and directions.

SKETCHBOOK PRACTICE

1. Draw a page of ten thumbnails of the view from your window, each with a different frame or arrangement.
2. Make a design of only circles that has variety (different sizes, values, spacing) but still feels unified.
3. Choose a painting from this course and make a thumbnail of it in three values. Notice how simple its big design is.

From history. Only five of Bruegel's six season paintings survive. *The Harvesters* is now in the Metropolitan Museum of Art in New York, and four others, including *The Hunters in the Snow*, are in Vienna and Prague. Bruegel was one of the first great painters to make ordinary country life and the landscape itself the main subjects of a picture.

COMMON MISTAKES

- Skipping thumbnails and starting the final work with no plan.
- Making every figure the same size and pose, which feels stiff.
- Using every color in the box, so the picture loses unity.

Make it a game • Same and Different. Quickly draw a row of six shapes that has unity because something repeats, and variety because something changes. Your parent names what repeats and what differs. Then your parent adds one intruder shape that spoils the unity and you must spot it. Draw a thumbnail sketch of a season of work and rest.

Scripture. “O LORD, how manifold are thy works! in wisdom hast thou made them all: the earth is full of thy riches.” (Psalms 104:24, KJV)

Creation has endless variety, “manifold” works, and yet it is one world made in wisdom by one Maker. That is unity and variety on the grandest scale.

COMPOSITION AND DESIGN

A pile of good bricks is not yet a house. In the same way, good drawing and good color are not yet a good picture: they must be arranged. The arrangement of a picture is called its **composition**, and artists use a set of ideas called the **principles of design** to arrange it well.

In this unit you will learn four of the most important principles: **balance**, **emphasis**, **movement**, and **unity with variety**. You will also learn the habit that professional artists rely on to plan a composition: the small, quick drawings called thumbnail sketches. Constable, Rembrandt, Hokusai and Bruegel will show you how each principle works.

PREREQUISITES

- Can use a viewfinder to choose a composition (Lesson 1.3)
- Understands value, intensity and color temperature (Units 3 and 4)
- Can draw simple figures and landscapes

MASTERY CHECKLIST

- ☐ I can explain symmetrical, asymmetrical and radial balance and find them in artworks.
- ☐ I can create a focal point using contrast, color, placement and leading lines.
- ☐ I can make a viewer's eye move through a picture with lines, repetition and rhythm.
- ☐ I can use unity and variety together so a picture feels whole but not boring.
- ☐ I can plan a picture with several thumbnail sketches before starting the final work.

LESSONS IN THIS UNIT

7.1 Balance

2 sessions of 45 minutes

7.2 Emphasis

2 sessions of 45 minutes

7.3 Movement

2 sessions of 45 minutes

UNIT 7 REVIEW

Answer each question in a sentence or two. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. (5 pts)

What is visual weight? Name three things that make a shape look heavier.

2. (5 pts)

Explain the difference between symmetrical and asymmetrical balance.

3. (5 pts)

Give an example of radial balance.

4. (5 pts)

How does Constable balance *The Hay Wain*?

5. (5 pts)

What is a focal point? Name three ways to create one.

6. (5 pts)

How did Rembrandt create emphasis in *The Return of the Prodigal Son*?

7. (5 pts)

What kinds of lines suggest motion, and what kinds suggest stillness?

8. (5 pts)

How do repetition and rhythm create movement?

9. (5 pts)

Why does a picture need both unity and variety?

10. (5 pts)

What is a thumbnail sketch, and why do artists make several?

ANSWER KEY

1. The pull a part of a picture has on the eye. Any three: larger size, darker value, brighter color, more detail, being isolated.
2. Symmetrical balance has matching halves like a mirror; asymmetrical balance uses different things on each side with equal visual weight.
3. A rose window, a wheel, a daisy seen from above, a snowflake.
4. Dark trees and the cottage on the left are balanced by open, light meadows and sky on the right, with the cart and small red accents helping.
5. The place the eye goes first. Any three: contrast of light and dark, intense or warm color, detail, size, isolation, placement, leading lines, gazes.
6. He put the brightest light and warm red on the father and son, left the other figures in shadow, and the onlookers' gazes lead to them.
7. Diagonals and curves suggest motion; horizontals and verticals suggest stillness.
8. Repeated shapes make the eye jump from one to the next, like beats in music, carrying it through the picture.
9. Unity makes it feel whole; variety keeps it interesting. Too much unity is boring and too much variety is chaotic.
10. A very small, quick plan of a composition; making several lets you try different ideas quickly and choose the best before starting the final work.

PORTFOLIO PIECE: A PARABLE IN PICTURES

Choose one of Jesus's parables or another Bible story, such as the lost sheep, the sower, Ruth gleaning in the fields, or the calming of the storm. Make at least four thumbnails, then a finished color picture that uses all four principles from this unit: balance, a clear focal point at the heart of the story, movement that leads the eye there, and unity with variety. Write the Scripture reference on the back.

LOOK FOR	WHAT IT MEANS
Planning	At least four different thumbnails were made, and the best was chosen and improved.
Balance	The picture feels stable, using symmetrical or asymmetrical balance on purpose.
Emphasis	The most important moment of the story is the clear focal point.
Movement	Lines, gazes or repeated shapes lead the eye to the focal point and through the picture.
Unity and variety	A limited color scheme and repeated shapes unify the picture, while sizes and poses vary.

UNIT 8

SACRED ART AND THE RENAISSANCE

For most of the history of Europe, the greatest art was made for churches: to tell the stories of Scripture, to help people pray, and to make the house of God beautiful. In this last unit you will study four high points of that tradition. Giotto brought weight, space and real human feeling into painting around 1300. Fra Angelico, a friar, painted with luminous color and quiet devotion. Raphael brought the Renaissance to its height of harmony and grace. And the builders of the Gothic cathedrals filled whole walls with colored light.

In each lesson you will look closely, learn how the work was made, and make something in the same spirit, using everything you have learned this year: drawing from observation, proportion, color, light, materials, perspective and composition.

PREREQUISITES

- Can draw figures in proportion (Unit 2)
- Understands value, color and light (Units 3 and 4)
- Knows pigments, binders and egg tempera (Unit 5)
- Knows one-point perspective and the principles of design (Units 6 and 7)

MASTERY CHECKLIST

- ☐ I can explain what was new about Giotto's painting and how fresco is made.
- ☐ I can describe Fra Angelico's Annunciation and make a careful master copy.
- ☐ I can identify a triangular (pyramid) composition in Raphael's work and use one myself.
- ☐ I can describe how Gothic cathedrals made room for large windows and how stained glass is made.
- ☐ I can explain how sacred art served worship and teaching in the Church.

LESSONS IN THIS UNIT

8.1 Giotto and the Fresco

2 sessions of 45 minutes

8.2 Fra Angelico

2 sessions of 45 minutes

UNIT 8 REVIEW

Answer each question in a sentence or two. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. 5 pts

Name two ways Giotto's painting was different from the Byzantine style before him.

2. 5 pts

How is a true fresco made, and why does it last so long?

3. 5 pts

What is a giornata?

4. 5 pts

Who was Fra Angelico, and why did he paint the frescoes at San Marco?

5. 5 pts

Name one Renaissance tool and one older quality you can see in Fra Angelico's *Annunciation*.

6. 5 pts

Why do artists make master copies?

7. 5 pts

What is a pyramidal composition, and why does it feel stable?

8. 5 pts

Name the three Gothic building inventions that made large windows possible.

9. 5 pts

How was medieval stained glass colored, painted and held together?

10. **5 pts**

Choose one artwork from this unit and explain how it served worship or teaching.

ANSWER KEY

1. Any two: his figures have solid volume and weight; they stand in real space; they show real human emotion; some even turn their backs to us.
2. Pigment mixed with water is painted on wet lime plaster; as the plaster dries, the lime turns to calcium carbonate and locks the pigment into the wall.
3. The patch of fresh plaster a fresco painter could paint in one day.
4. A Dominican friar in Florence; he painted them to help the friars pray.
5. Renaissance: one-point perspective of the loggia or soft modeling with light. Older quality: clear, luminous colors, stillness, simplicity.
6. To learn the master's methods by looking slowly and closely at every choice.
7. Figures arranged in a triangle shape; a triangle with a wide base is the most stable shape.
8. Pointed arches, ribbed vaults and flying buttresses.
9. Colored with metal compounds in the molten glass (such as cobalt for blue); details painted with a glass-and-iron-oxide paint and fired in a kiln; pieces held by lead comes.
10. For example: the Chartres windows told Bible stories to people who could not read; Fra Angelico's fresco helped the friars pray; Giotto's frescoes told the life of Christ on the chapel walls.

PORTFOLIO PIECE: A SACRED PICTURE

Make a finished sacred picture in the medium you like best from this year (pencil, watercolor, tempera, egg tempera or paper stained glass). Choose a Bible scene or a sacred symbol, plan it with thumbnails, and use what you learned from the masters: Giotto's solid figures and real feeling, Fra Angelico's clear color and perspective, Raphael's triangle composition, or the glowing color of stained glass. Write a short paragraph on the back naming the master you learned from and how.

LOOK FOR	WHAT IT MEANS
Subject and meaning	The Bible scene or symbol is clear and treated with reverence.
Learning from a master	The work shows a specific lesson from Giotto, Fra Angelico, Raphael or the Gothic glaziers, explained on the back.
Composition	The picture was planned with thumbnails and uses balance and a clear focal point.
Skill and craftsmanship	Drawing, color and finish show care, patience and the skills from this year.

8.1 GIOTTO AND THE FRESCO

OBJECTIVES

- Explain how Giotto changed painting: solid figures, real space and true emotion.
- Describe how buon fresco is made and why it lasts.
- Paint a simple scene on damp plaster in the spirit of a fresco.

Warm-up. Draw two simple figures standing side by side, then draw them again turned toward each other, one comforting the other, with heads bent and arms reaching. Which drawing tells more? What changed?

WATCH

Alchemy of Art: Fresco

Columbia Museum of Art • 2:10

<https://www.youtube.com/watch?v=HslpF4jrQHU>

WHEN TO WATCH

After the core ideas. A museum demonstration of how a fresco is made: wet plaster, then pigment in water.

BACKUP VIDEO

How To Make A Fresco Painting - with Artist Georges Le Chevallier

Jerry's Artarama Art Supplies • 14:02

<https://www.youtube.com/watch?v=G7szlL-0vrU>

A longer demonstration of a whole fresco panel, from plaster to finished painting.

KEY TERMS

fresco

Painting on fresh, wet lime plaster, so that the color becomes part of the wall as it dries. In Italian, buon fresco means “true fresco.”

giornata

Italian for “a day’s work”: the patch of fresh plaster a fresco painter could paint before it dried.

Byzantine style

The flat, golden, solemn style of sacred art from the Eastern Roman Empire, used in icons and mosaics.

volume

The look of three-dimensional bulk and weight in a figure or form.

CORE IDEAS

Before Giotto, most Italian painting followed the **Byzantine style**: holy figures painted flat and solemn against gold backgrounds, beautiful and reverent but not like real people in real space. Around 1300, Giotto di Bondone of Florence began to paint figures with **volume**, solid bodies under heavy robes, standing on real ground, in spaces you could step into.

Giotto also painted true feeling. His people weep, embrace, turn away, lean in. In the *Lamentation*, even the angels in the sky cry out in grief. He even dared to paint figures with their backs to us, as if we stood behind them, which pulls us into the scene. Later artists called him the father of Western painting.

Giotto painted most of his great works in **fresco**. The painter spread a fresh layer of wet lime plaster on the wall and painted into it with pigments mixed only in water. As the plaster dried over the next hours, the lime slowly combined with carbon dioxide from the air and turned into calcium carbonate, a kind of limestone, locking the pigment inside. That is why a true fresco lasts for centuries: the color is part of the wall.

Because plaster dries in a day, the painter laid only as much as he could paint before evening, a patch called a **giornata**. You can still find the seams between the giornate in the Scrovegni Chapel. Fresco must be planned carefully, painted quickly and confidently, and it is hard to correct.

Some colors could not be used in true fresco. Giotto's beautiful blue skies were made of azurite, a blue mineral that had to be added after the plaster dried, with a binder (called *fresco secco*, "dry fresco"). In places this blue has flaked off over seven centuries, while the true fresco around it remains.

PICTURE STUDY



Lamentation (The Mourning of Christ), Giotto di Bondone, about 1305 · Fresco · Scrovegni Chapel, Padua, Italy

Image: [Wikimedia Commons](#), public domain

This is one of a series of frescoes Giotto painted to cover the walls of a small chapel in Padua with the life of the Virgin Mary and of Christ. It shows the moment after the Crucifixion when Christ's mother and friends mourn over His body. It is full of sorrow, but it points toward Easter: it was painted in a chapel built to tell the whole story, which ends in the Resurrection.

Look closely

- Find Mary, holding her Son's head close to her face. Where are the other figures looking?
- Find the line of the hill. It slopes down from the upper right. Where does it lead your eye?
- Find the two figures sitting with their backs to us. How do they make you feel part of the scene?
- Look at the robes. How did Giotto make the bodies under them look solid and heavy?

Talk about it

1. How does Giotto show grief without showing anything gruesome?

2. Why might a painter want people who look at a sacred picture to feel as if they were there?
3. What makes the angels in the sky different from the calm, still angels in Rublev's icon?

STUDIO PROJECT

A Plaster Panel in the Spirit of Fresco

Real fresco uses lime plaster, which is caustic and needs special care, so you will make a simple classroom version: painting into damp plaster of Paris. You will plan a small scene of two figures showing a feeling (comfort, greeting, joy or prayer), with solid, rounded forms like Giotto's and a blue sky behind them.

You will need

- Plaster of Paris (about 2 cups) and water
- A disposable foil pie pan or a sturdy paper plate with a rim
- A mixing container you can throw away, and a craft stick
- Watercolors or thinned tempera, brushes, water
- Pencil and sketchbook
- Newspaper, old clothes or an apron

Steps

1. Plan first: make two thumbnails in your sketchbook of two simple figures showing a feeling. Give them solid, rounded robes and a simple ground line, with sky behind. Choose one and make a clean drawing the size of your pan.
2. With an adult, mix the plaster: put about 1 cup of water in the container and sprinkle in plaster until it rises to the surface (about 2 cups). Let it soak for a minute, then stir slowly with the craft stick until smooth, like thick pancake batter.
3. Pour the plaster into the pan about $\frac{3}{4}$ inch thick. Tap the pan on the table to release bubbles. Let it set for 20 to 30 minutes, until firm but still damp and cool.
4. Lightly draw your design on the damp plaster with a pencil (do not press hard).
5. Paint the sky first with a blue wash, and the ground with earth colors. Watch how the damp plaster soaks up the color.
6. Paint the figures' robes. Paint the middle color first, then darker folds on the shadow side, and lighter color on the lit side to give them volume, as Giotto

did.

7. Paint the faces and hands simply, with small touches of warm color. Work steadily: like a fresco painter, you have only a limited time before the plaster dries.
8. Let your panel dry for a day. Write the date and title on the back of the pan.

Tips

- Never pour plaster down a sink drain; it hardens in pipes. Throw leftovers in the trash.
- Plaster gets warm as it sets. Do not put your hands in setting plaster.
- If the plaster has dried before you finish, dampen it lightly with a wet brush, but notice that the paint now sits on top, like fresco secco.

Check your work

- ☐ I planned my design before painting, as fresco painters must.
- ☐ My figures look solid, with lights and darks on their robes.
- ☐ My two figures show a clear feeling through their poses.

SKETCHBOOK PRACTICE

1. Draw a figure seen from the back, sitting or kneeling, like Giotto's mourners.
2. Draw three people showing three different feelings using only their poses (no faces).
3. Draw the plan of a small chapel and mark where you would paint the scenes of a story on its walls.

From history. The Scrovegni Chapel in Padua was built by a wealthy man named Enrico Scrovegni, and Giotto covered its walls with about forty scenes from the lives of Joachim and Anne, the Virgin Mary, and Christ, finished around 1305. The ceiling is painted deep blue with gold stars, like the night sky. Visitors today may stay only fifteen minutes so the frescoes are protected from the moisture of their breath.

COMMON MISTAKES

- Painting the robes one flat color, so the figures look like paper cutouts.
- Starting to paint without a plan. Fresco does not allow many changes.
- Pressing hard into the soft plaster when drawing.

Make it a game • One Day's Plaster. Divide a paper into six patches. Each patch is a day's wet plaster, a giornata. You have sixty seconds to draw something in a patch before it 'dries.' When your parent calls time, stop and move on. After the last patch, say why fresco lasts so long and how Giotto's figures differed from older Byzantine ones.

8.2 FRA ANGELICO

OBJECTIVES

- Describe the life of Fra Angelico and the purpose of his paintings at San Marco.
- Identify perspective, light and color choices in his *Annunciation*.
- Make a careful master copy of part of the painting.

Warm-up. Look at the picture study for two minutes in silence, then close your eyes and picture it. Open your eyes and draw, from memory, just the arches and columns. Then compare your drawing with the painting.

WATCH

Fra Angelico, The Annunciation

Smarthistory • 11:37

https://www.youtube.com/watch?v=3B-V_pG3HPQ

WHEN TO WATCH

Before the picture study. Two art historians walk through San Marco and look closely at the *Annunciation* at the top of the stairs.

Note: Made for older students; watch together and pause to talk.

KEY TERMS

Annunciation

The announcement by the angel Gabriel to the Virgin Mary that she would bear the Son of God (Luke 1:26–38).

friar

A member of a religious order, such as the Dominicans, who lives in community and preaches.

loggia

An open, roofed porch or gallery with a row of arches on columns.

master copy

A careful copy of a great artwork, made to learn the master's methods.

CORE IDEAS

Fra Angelico (about 1395–1455) was a Dominican **friar** in Florence. His name means “the angelic brother,” given to him because of his gentle character and the heavenly

beauty of his paintings. He lived the life of prayer of his order and painted to help others pray.

In the convent of San Marco in Florence, he and his helpers painted a fresco in each of the friars' small rooms (cells) and a large *Annunciation* at the top of the main staircase. Each picture was simple and calm, with few details to distract, so that a friar could look at it and pray about the mystery it showed.

Fra Angelico used the newest Renaissance tools. The **loggia** in his *Annunciation* is drawn in one-point perspective, its arches and columns leading back into space, and the light falls softly from the left, giving the figures volume. Yet he kept the clear, luminous colors and quiet stillness of earlier sacred art.

Notice his color: soft rose, pale green, gold, and blue, against plain white walls. The angel's wings are striped with bright colors like a rainbow. The colors are clear and light, not heavy or dark, which gives the painting its sense of peace.

Artists have always learned by making a **master copy**. When you copy a great painting slowly, you notice choices you would never see by glancing: how far apart the columns are, how the folds of a robe fall, how a color is mixed. Copying is not cheating; it is one of the oldest ways of learning, practiced in every art academy.

PICTURE STUDY



Annunciation, Fra Angelico, about 1440–1445 · Fresco · Convent of San Marco, Florence

Image: [Wikimedia Commons](#), public domain

This fresco greets anyone who climbs the stairs to the friars' rooms at San Marco. The angel Gabriel bows to Mary, and she bows in return, accepting God's will. An inscription below the painting reminded each friar to say a Hail Mary as he passed. It is a picture made for prayer, quiet and full of light.

Look closely

- Find the vanishing point. Follow the lines of the loggia's arches and floor. Where do they lead?
- Look at the angel's wings. What colors are in them?
- Compare the angel's pose with Mary's. How do they mirror each other?
- Find the fenced garden on the left. Why might a closed garden be a fitting symbol for Mary?

Talk about it

1. How does the painting feel? Which colors and shapes create that feeling?
2. Why do you think Fra Angelico left the walls so plain and bare?
3. How is this picture different from Giotto's *Lamentation* in mood?

STUDIO PROJECT

A Master Copy of the Annunciation

You will make a careful master copy of Fra Angelico's *Annunciation*, or of one part of it (the angel, or Mary in the loggia). Work slowly, measuring with your eyes and pencil, and try to match his clear, soft colors.

You will need

- The picture study image, as large as possible (on a screen or a printout)
- Drawing or watercolor paper (9×12 in)
- HB pencil, ruler, kneaded eraser
- Watercolors or colored pencils
- Fine brush (size 2) and a medium brush

Steps

1. Decide whether you will copy the whole painting or one part. Draw a rectangle on your paper in the same proportions as that part of the painting.
2. Divide both the image and your rectangle into a light grid of four by four squares (on a printout, draw the grid with a ruler; on a screen, use your eye and a ruler held up to it). The grid helps you place things accurately.
3. Find the perspective lines of the loggia. Lightly draw the horizon and the vanishing point, and use the ruler to draw the arches, columns and floor lines.
4. Draw the figures, checking each square of the grid. Notice the proportions: how many heads tall are they? Where does each fold begin and end?
5. Erase the grid lines lightly so they barely show.
6. Paint or color the large, light areas first: the walls, the floor and the sky. Keep them pale.
7. Paint the robes: Mary's rose and blue, the angel's pink and gold. Add darker folds on the shadow side, as Fra Angelico did, with soft edges.
8. Paint the wings last, with careful stripes of color. Add a few fine details, such as the halos and the flowers in the garden.

Tips

- Look at the painting more than at your paper. Copying is mostly looking.
- Keep colors clear and light; avoid mixing in black.
- Write “after Fra Angelico” and the date on your copy, as artists do when they make a master copy.

Check your work

- ☐ My copy has the same proportions and perspective as the original.
- ☐ My colors are soft and clear, close to Fra Angelico’s.
- ☐ I signed my copy “after Fra Angelico” with the date.

SKETCHBOOK PRACTICE

1. Draw a row of arches in one-point perspective, like a loggia.
2. Copy just the angel’s wing in colored pencil, matching its stripes of color.
3. Draw a garden fence with flowers and trees behind it, like the enclosed garden in the painting.

From history. Fra Angelico was so admired for his holy life as well as his painting that he was beatified (declared “Blessed”) by Pope John Paul II in 1982, who named him the patron of artists. The Renaissance writer Giorgio Vasari said Fra Angelico never painted a crucifix without tears.

COMMON MISTAKES

- Rushing the drawing to get to the painting. The drawing is the foundation.
- Making the colors too dark and heavy.
- Ignoring the perspective of the loggia, so the arches look flat.

Make it a game • Annunciation Tableau. Stand together and pose as the angel and Mary from Fra Angelico’s Annunciation, quietly and reverently. Your parent asks questions: What is a friar? Where was San Marco? What is a loggia? Why is the perspective so careful? Answer each from memory, then switch poses and questions.

Scripture. “And the angel came in unto her, and said, Hail, thou that art highly favoured, the Lord is with thee” (Luke 1:28, KJV)

These are Gabriel’s words in the moment Fra Angelico painted. The friars at San Marco prayed them as they passed the fresco.

8.3 RAPHAEL

OBJECTIVES

- Describe Raphael's ideals of harmony, grace and balance.
- Find the triangular (pyramid) composition in Raphael's portrait of Castiglione.
- Draw a family group arranged in a triangle.

Warm-up. Draw a triangle. Inside it, draw three ovals for heads placed at the three corners. Then add simple bodies so the figures fill the triangle. How stable does it feel?

WATCH

Drawn to Figures: Triangle Composition

National Portrait Gallery • 3:50

<https://www.youtube.com/watch?v=Zfq0ZJbl2dY>

WHEN TO WATCH

After the core ideas. An educator at the Smithsonian's National Portrait Gallery shows how portrait painters build figures and groups into triangles. Then find the triangle in Raphael's portrait.

BACKUP VIDEO

Exploring the Pyramid Composition - with Payne and Cézanne

Painting Lessons with Marla • 4:21

<https://www.youtube.com/watch?v=LlksuXnneGU>

Optional, before the studio project: the same triangle idea used in mountain landscapes.

KEY TERMS

Renaissance

The great revival of art and learning in Europe from about 1400 to 1600, which began in Italy.

High Renaissance

The short peak of the Renaissance, about 1495–1520, the time of Leonardo, Michelangelo and Raphael.

pyramidal composition

An arrangement of figures that fits into a triangle or pyramid shape, giving stability and unity.

idealized

Made more perfect and harmonious than ordinary life, showing beauty as it ought to be.

CORE IDEAS

Raphael Sanzio (1483–1520) was born in Urbino and died in Rome at only thirty-seven. In that short life he became, with Leonardo da Vinci and Michelangelo, one of the three great masters of the **High Renaissance**. He was famous for his kindness and courtesy, and for paintings full of harmony, grace and calm.

Raphael often arranged his figures in a **pyramidal composition**: the head at the top and the body, arms or other figures spreading out below, forming a triangle. A triangle with a wide base is the most stable shape in design, so these pictures feel calm, balanced and complete. His portrait of his friend Castiglione is a perfect example: one figure, one quiet triangle.

Raphael's figures are **idealized**. Their faces are gently rounded and serene, their proportions perfect, their gestures graceful. He was not trying to show the faults of real people, but beauty as it ought to be, a picture of holiness and peace.

He learned from everyone. As a young man he studied with Perugino (whose *Delivery of the Keys* you saw in Unit 6), and in Florence he studied Leonardo's soft shading and pyramid groupings. He combined their lessons into his own clear, sweet style.

In the portrait of Castiglione, everything works together: the plain warm background lets the figure stand out; the dark coat and cap make a strong triangle; the light falls on his face and hands, the two places we look first; and the quiet colors make him seem wise and calm. Balance, emphasis and unity are all there.

PICTURE STUDY



Portrait of Baldassare Castiglione, Raphael, about 1514–1515 · Oil on canvas · Louvre, Paris

Image: [Wikimedia Commons](#), public domain

Baldassare Castiglione was Raphael's close friend, a diplomat and writer who described the ideal gentleman: wise, kind, modest and calm. Raphael painted him exactly that way. Many painters since, including Rembrandt and Rubens, studied this portrait and copied it.

Look closely

- Draw an imaginary triangle with your finger: from the top of his cap down to each folded hand. Does his whole figure fit inside it?
- Find his eyes. Where is he looking?
- Look at his colors: black, gray, warm brown and white. Are there any bright colors at all?
- Find the soft edges where his coat meets the background.

Talk about it

1. How does the triangle shape make this portrait feel?
2. What words would you use to describe this man's character from his face and pose?
3. Why do you think Raphael used so few colors?

STUDIO PROJECT

A Family Group in a Triangle

You will draw a family group of two or three people (or a person with a pet) arranged in a pyramidal composition, like Raphael's portrait. You might draw a parent and child sitting together, a grandmother reading to two children, or siblings side by side. Keep everyone fully clothed and comfortable. Draw from life if you can, or from a family photograph.

You will need

- Drawing paper (11×14 in or 9×12 in)
- HB, 2B and 4B pencils, or colored pencils
- Kneaded eraser
- Family members willing to pose, or a family photo
- Ruler

Steps

1. Arrange your models (or choose a photo) so the tallest head is at the top and the others are lower and to the sides. Look for the triangle.
2. Make three thumbnails in your sketchbook, each with a different triangle: tall and narrow, wide and low, and leaning.
3. Choose the best. On your paper, lightly draw a large triangle that fills most of the page.
4. Draw the head ovals inside the triangle, then the bodies, using the proportions from Unit 2 (heads as units, eyes halfway down the head).
5. Connect the figures with overlapping arms, laps and hands, so they look like a group rather than separate people.
6. Refine the faces and hands, and draw the clothing folds following the body.
7. Shade with one light source. Put your strongest light and darkest dark on the most important face (your focal point).
8. Erase the triangle guideline. Add a simple background (a curtain, a window or a soft landscape) that does not distract from the group.

Tips

- Gazes and gestures should lead toward the center or the focal point, as in Raphael's paintings.
- Overlap the figures to unify them.
- Keep the background quiet so the group stands out.

Check your work

- ☐ My figures fit a clear triangular composition.
- ☐ The figures overlap and connect as one group.
- ☐ Faces and hands are drawn with care, and there is one clear focal point.

SKETCHBOOK PRACTICE

1. Find three paintings in this course that use a triangle composition. Draw a quick diagram of each.
2. Copy Castiglione's folded hands from the portrait, paying attention to how the fingers overlap.
3. Draw a still life of three objects arranged in a triangle.

From history. Castiglione wrote *The Book of the Courtier*, one of the most widely read books of the Renaissance, about how a gentleman should speak and behave. Raphael's portrait was so admired that Rembrandt sketched it when it was sold at an auction in Amsterdam in 1639, and later used its pose for his own self-portraits.

COMMON MISTAKES

- Placing figures in a straight row instead of a triangle.
- Drawing figures as separate people with space between them, so the group falls apart.
- A busy background that competes with the figures.

Make it a game • Make a Pyramid Portrait. Gather three or four toys or family members and pose them so the heads form a triangle with the tallest at the peak, as in Raphael's Castiglione. Sketch the group in sixty seconds. Your parent points to the pyramid in your drawing. Then say two words that describe Raphael's art: harmony, grace or balance.

8.4 GOTHIC CATHEDRALS AND STAINED GLASS

OBJECTIVES

- Explain how Gothic builders made walls of glass possible: pointed arches, ribbed vaults and flying buttresses.
- Describe how stained glass is made: colored glass, painted detail and lead strips.
- Design and make a stained-glass window in paper.

Warm-up. Hold a piece of colored cellophane, tissue paper or a colored plastic folder up to a sunny window. Then lay it on the table. What happens to the color when light shines through it compared with light bouncing off it?

WATCH

How was it made? Stained glass window | V&A

Victoria and Albert Museum • 3:54

<https://www.youtube.com/watch?v=W5NOrG888CI>

WHEN TO WATCH

After the core ideas. Watch each step: cutting glass, painting details, firing, leading.

BACKUP VIDEO

How Are Stained Glass Windows Made?

History of Simple Things • 8:19

<https://www.youtube.com/watch?v=9ccm3QbtCI8>

A fuller look at how stained glass has been made from the Middle Ages to today; good before the picture study.

KEY TERMS

Gothic

The style of European architecture from about 1140 to 1500, with pointed arches, tall vaults and huge windows.

flying buttress

An arched stone support outside a wall that carries the push of the roof vault down to the ground.

stained glass

Pieces of colored glass held together by strips of lead to make a picture in a window.

came

A grooved strip of lead that holds pieces of stained glass together.

rose window

A large round window divided into petal-like sections that spread from the center.

CORE IDEAS

Earlier churches (called Romanesque) had thick walls and small windows, because heavy stone walls had to hold up the roof. In the 1140s, at the abbey of Saint-Denis near Paris, builders began to use a new set of tools that we call **Gothic**: pointed arches, which push the weight more downward; ribbed vaults, which gather the roof's weight onto a few points; and **flying buttresses**, stone arms outside the building that brace those points. With the weight carried by a stone framework, the walls between could become windows.

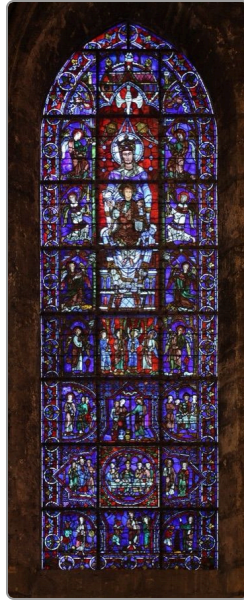
The builders filled these windows with **stained glass**. Glass makers colored molten glass by adding metal compounds: cobalt for deep blue, copper for red or green, and iron and manganese for yellows, browns and purples. Red was so dark that it was usually made as a thin layer of red on clear glass.

To make a window, the glazier drew the design full size on a whitewashed table, cut each piece of glass to shape, and painted faces, folds and details on the glass with a dark paint made of ground glass and iron oxide. The pieces were heated in a kiln so the paint melted onto the glass permanently. Then they were fitted into grooved strips of lead called **comes**, soldered together, and set in an iron frame.

Stained glass is a kind of painting with light. Its colors are seen by light shining *through* them, so they glow far more brightly than any paint, which we see only by reflected light. The color changes with the time of day, the season and the weather.

For people who could not read, the windows were also “the Bible of the poor.” Each window told a story in panels, from Creation to the life of Christ and the saints, to be read from bottom to top. The great **rose windows** show radial balance, with Christ or the Virgin at the center and the patterns spreading outward.

PICTURE STUDY



Notre-Dame de la Belle Verrière (Our Lady of the Beautiful Window), Unknown glaziers of Chartres, about 1180 (center panels), border about 1215–1220 · Stained glass and lead · Chartres Cathedral, France

Image: [Wikimedia Commons](#), public domain

Chartres Cathedral, in France, has more of its original medieval glass than almost any other cathedral, and its deep “Chartres blue” is famous. The central panels of this window survived a great fire in 1194 that destroyed most of the old church. When the new cathedral was built, the builders set the rescued panels in a new window and surrounded them with angels.

Look closely

- Find the Virgin and the Christ Child in the center. What colors are they wearing?
- Look at the dark lines in the window. These are the lead comes. How do they follow the shapes of the figures?
- Find the angels around the edges. What are they holding?
- Compare the blue of Mary’s robe with the blues in the angel panels. Are they the same?

Talk about it

1. Why do you think the builders saved these old panels after the fire?

2. How would it feel to stand in a dim stone church and see this window glowing?
3. Why are stained-glass colors brighter than painted colors?

STUDIO PROJECT

A Paper Lancet Window

You will design and make a stained-glass window in paper: a tall, pointed lancet window like those at Chartres, with black paper “lead” and colored tissue “glass.” Your window will tell a simple sacred story or show a symbol (a dove, a lamb, a cross with vines, a star over Bethlehem, a fish and loaves) and it will glow when you hang it in a sunny window.

You will need

- Black construction paper (two sheets, 12×18 in)
- Colored tissue paper or cellophane (blue, red, yellow, green, violet)
- White chalk or a white colored pencil
- Child scissors (and an adult with a craft knife for small inside cuts, if needed)
- Glue stick
- Pencil and sketchbook
- Black marker

Steps

1. In your sketchbook, design your window: draw a tall rectangle with a pointed arch at the top. Inside, draw your picture with simple, bold shapes. Every shape must be outlined by a thick line (at least $\frac{1}{2}$ in), because those lines will be the lead.
2. Check your design: every black line must connect to the border, so the black paper holds together in one piece.
3. Fold one sheet of black paper in half lengthwise if your design is symmetrical, or keep it flat if not. Copy your design onto it with chalk.
4. Carefully cut out the shapes that will be glass, leaving the thick black lines. Cut slowly. Ask an adult to help start small inside cuts with a craft knife.
5. Turn the black frame over. Cut pieces of tissue paper a little larger than each opening. Glue them around the edges of each opening on the back.

6. Use mostly deep blue and red, as at Chartres, with smaller amounts of yellow, green and violet. Place the same colors in several places to unify the window.
7. With the black marker, draw a few details on the tissue (a face, folds, feathers) as a glazier paints details on glass.
8. Hang your window in a sunny window and look at it from inside. Look again at a different time of day.

Tips

- Bigger, simpler shapes look best. Leave tiny details for the marker.
- Two layers of tissue make deeper colors; overlapping two colors makes a third.
- Keep scissors pointed away from your hand, and cut by turning the paper, not your wrist.

Check your work

- ☐ My window has a pointed arch and thick black lines that all connect.
- ☐ My design tells a story or shows a sacred symbol clearly.
- ☐ My colors are unified, with deep blue and red, and they glow in the light.

SKETCHBOOK PRACTICE

1. Draw a pointed Gothic arch and a round Romanesque arch side by side. Label them.
2. Design a rose window with radial balance using a compass or a round plate.
3. Visit a church near you and draw one of its windows or its doorway.

From history. Abbot Suger rebuilt the choir of the abbey church of Saint-Denis in the 1140s with large windows, and he wrote that the glowing colored light lifted the mind from earthly things to heavenly ones. His new style spread across France and then all of Europe. Chartres Cathedral was rebuilt in only about twenty-five years after its fire in 1194, and most of its 176 windows are still the original medieval glass.

COMMON MISTAKES

- Making the black lines too thin, so the frame tears.
- Cutting shapes that float without connecting to the frame.
- Using too many colors evenly, so the window lacks unity.

Make it a game • Build a Gothic Wall. Race to name Gothic builders' three inventions in sixty seconds: pointed arches, ribbed vaults, flying buttresses. Then act them out. Lean your arms together for a pointed arch. Your parent stands to the side and leans a hand against yours like a buttress. Finish by telling how stained glass is held in lead came.

Scripture. “And I have filled him with the spirit of God, in wisdom, and in understanding, and in knowledge, and in all manner of workmanship” (Exodus 31:3, KJV)

God gave Bezalel skill to make the tabernacle beautiful. The unnamed glaziers and masons of the cathedrals offered the same kind of skilled work, and so do we when we make things well.

UNIT 8

SACRED ART AND THE RENAISSANCE

For most of the history of Europe, the greatest art was made for churches: to tell the stories of Scripture, to help people pray, and to make the house of God beautiful. In this last unit you will study four high points of that tradition. Giotto brought weight, space and real human feeling into painting around 1300. Fra Angelico, a friar, painted with luminous color and quiet devotion. Raphael brought the Renaissance to its height of harmony and grace. And the builders of the Gothic cathedrals filled whole walls with colored light.

In each lesson you will look closely, learn how the work was made, and make something in the same spirit, using everything you have learned this year: drawing from observation, proportion, color, light, materials, perspective and composition.

PREREQUISITES

- Can draw figures in proportion (Unit 2)
- Understands value, color and light (Units 3 and 4)
- Knows pigments, binders and egg tempera (Unit 5)
- Knows one-point perspective and the principles of design (Units 6 and 7)

MASTERY CHECKLIST

- ☐ I can explain what was new about Giotto's painting and how fresco is made.
- ☐ I can describe Fra Angelico's Annunciation and make a careful master copy.
- ☐ I can identify a triangular (pyramid) composition in Raphael's work and use one myself.
- ☐ I can describe how Gothic cathedrals made room for large windows and how stained glass is made.
- ☐ I can explain how sacred art served worship and teaching in the Church.

LESSONS IN THIS UNIT

8.1 Giotto and the Fresco

2 sessions of 45 minutes

8.2 Fra Angelico

2 sessions of 45 minutes

UNIT 8 REVIEW

Answer each question in a sentence or two. A parent may read the questions aloud and write down spoken answers. Total: 50 points.

1. 5 pts

Name two ways Giotto's painting was different from the Byzantine style before him.

2. 5 pts

How is a true fresco made, and why does it last so long?

3. 5 pts

What is a giornata?

4. 5 pts

Who was Fra Angelico, and why did he paint the frescoes at San Marco?

5. 5 pts

Name one Renaissance tool and one older quality you can see in Fra Angelico's *Annunciation*.

6. 5 pts

Why do artists make master copies?

7. 5 pts

What is a pyramidal composition, and why does it feel stable?

8. 5 pts

Name the three Gothic building inventions that made large windows possible.

9. 5 pts

How was medieval stained glass colored, painted and held together?

10. **5 pts**

Choose one artwork from this unit and explain how it served worship or teaching.

ANSWER KEY

1. Any two: his figures have solid volume and weight; they stand in real space; they show real human emotion; some even turn their backs to us.
2. Pigment mixed with water is painted on wet lime plaster; as the plaster dries, the lime turns to calcium carbonate and locks the pigment into the wall.
3. The patch of fresh plaster a fresco painter could paint in one day.
4. A Dominican friar in Florence; he painted them to help the friars pray.
5. Renaissance: one-point perspective of the loggia or soft modeling with light. Older quality: clear, luminous colors, stillness, simplicity.
6. To learn the master's methods by looking slowly and closely at every choice.
7. Figures arranged in a triangle shape; a triangle with a wide base is the most stable shape.
8. Pointed arches, ribbed vaults and flying buttresses.
9. Colored with metal compounds in the molten glass (such as cobalt for blue); details painted with a glass-and-iron-oxide paint and fired in a kiln; pieces held by lead comes.
10. For example: the Chartres windows told Bible stories to people who could not read; Fra Angelico's fresco helped the friars pray; Giotto's frescoes told the life of Christ on the chapel walls.

PORTFOLIO PIECE: A SACRED PICTURE

Make a finished sacred picture in the medium you like best from this year (pencil, watercolor, tempera, egg tempera or paper stained glass). Choose a Bible scene or a sacred symbol, plan it with thumbnails, and use what you learned from the masters: Giotto's solid figures and real feeling, Fra Angelico's clear color and perspective, Raphael's triangle composition, or the glowing color of stained glass. Write a short paragraph on the back naming the master you learned from and how.

LOOK FOR	WHAT IT MEANS
Subject and meaning	The Bible scene or symbol is clear and treated with reverence.
Learning from a master	The work shows a specific lesson from Giotto, Fra Angelico, Raphael or the Gothic glaziers, explained on the back.
Composition	The picture was planned with thumbnails and uses balance and a clear focal point.
Skill and craftsmanship	Drawing, color and finish show care, patience and the skills from this year.