

KINDERGARTEN GARDENING & ANIMALS

First edition

8 units

32 lessons

A video for every lesson

FIRST EDITION

COURSE GUIDE

This is a first year of real gardening and real animal care for five- and six-year-olds. Your child will plant beans and radishes, dig for worms, watch birds at a feeder, learn what a goldfish and a guinea pig need, visit (in person or by video) the chickens, cows and bees on a farm, and watch the seasons turn from fall to summer.

Every lesson follows the same simple path: **observe** something real, **learn** a few true words about it, then **tend and grow** with your own hands. Each week has a short video, a great picture to look at closely, a hands-on project and a page in the nature journal. The lessons are short, cheerful and concrete, written to be read aloud by a parent.

Running through the year is a quiet thread: God made the seeds, the soil, the creatures and the seasons, and He gave us the joyful work of caring for them. We learn to look carefully, to be gentle with animals, to keep at our chores, and to say thank you for our food.

Most videos come from SciShow Kids, FreeSchool, Learn Bright and Homeschool Pop, with real-farm and real-garden videos from George the Farmer, Caitie's Classroom, gardening educators, wildlife agencies and pet charities. Every video was watched through for content before it was chosen. Please preview each one, sit with your child while it plays, and stop when a note tells you to. A few channels show a short promo or a list of other videos at the end; you can skip those.

Start with Lesson 1.1 →

WHO IT IS FOR

Children ages 5–6 (kindergarten), with a parent reading aloud and helping. No reading is required. No yard and no animals are needed: every lesson works with a sunny windowsill, a few pots or cups, a library book or a visit to a park, farm, pet store or shelter.

HOW TO USE THIS COURSE

1. **Weekly rhythm.** Do one lesson a week in two sessions of about 30 minutes.
Session 1: warm-up, core ideas read aloud, the video and the picture study.
Session 2: the hands-on project and the nature journal. Thirty-two lessons fill a school year with room for holidays and catch-up weeks.
2. **Calendar.** The units follow a school year that begins in late summer: harvest and wildlife in fall, soil and pets in early winter, seeds indoors in late winter, farm animals and bees in early spring, planting in spring, and garden helpers and troubles as the garden grows. If your last spring frost comes early or late, shift Units 5–8 a few weeks to match your own frost dates (your local extension office or a seed packet map will tell you).
3. **Picture study.** Show the picture and let your child look quietly for about two minutes. Then put it away and ask, “What did you see?” Let your child tell back everything remembered. Then look again together with the “Look for” list and talk about the questions.
4. **Nature journal.** Give your child a sturdy sketchbook. Each week your child draws what was seen: a leaf, a worm, a bean root, a bird at the feeder. You can write the date, the weather and your child’s words beside the drawing. A five-year-old’s drawing does not need to be neat; it needs to be looked at.
5. **Unit review and portfolio.** Each unit ends with a short oral review (no grades: your child points, draws or tells) and a portfolio project, such as a growing bean with a picture log or a pet-care chart. Keep journal pages and photos in a folder for the year.
6. **Safety.** An adult is with the child for every project. Wash hands after touching soil, compost, animals or their homes. Never touch or feed wild animals, never eat a wild mushroom or berry, and let an adult handle tools, hot water and anything sharp. Safety notes appear on the lessons that need them.

7. **4-H, fairs and show-and-tell.** Kindergartners can join 4-H Cloverbuds (about ages 5–8) through your county extension office. Cloverbuds is non-competitive: children make display-only projects, give short show-and-tell talks and receive participation ribbons. This course builds those habits: a picture record of growing plants (Units 5 and 7), a one-minute “show your sprout” talk (Lesson 7.1), a farm chore chart show-and-tell (Unit 6), a soil poster (Lesson 3.3) and a harvest exhibit plate (Lesson 8.4). Check your county extension office or fair book for local details.
8. **Videos.** Watch each video together. Many are only 2–7 minutes. If a lesson has a backup video, it is for a second look later in the week or for a curious child who wants more.

SCOPE AND SEQUENCE

UNIT 1 • WEEKS 1–4

Seasons and Harvest

God’s four seasons, fall leaves and apples, pumpkins and the seeds inside, and giving thanks for the harvest.

- 1.1 God’s Four Seasons
- 1.2 Fall Leaves and Apples
- 1.3 Pumpkins and Squash
- 1.4 Giving Thanks for Food

UNIT 3 • WEEKS 9–12

Dirt and Worms

What soil is (look, feel, smell), earthworms, how fallen leaves turn into soil, and sand, clay and mud.

- 3.1 What Is Soil?
- 3.2 Earthworms
- 3.3 Leaves Turn into Soil
- 3.4 Sand, Clay and Mud

UNIT 2 • WEEKS 5–8

Animals Near Our Home

Squirrels storing nuts, birds at the feeder, deer and rabbits, and night animals we look at but never touch.

- 2.1 Squirrels Gather Nuts
- 2.2 Birds at the Feeder
- 2.3 Deer and Rabbits
- 2.4 Night Animals: Look, Don’t Touch

UNIT 4 • WEEKS 13–16

Pets

What every pet needs, goldfish, hamsters and guinea pigs, and being safe and kind with cats and dogs.

- 4.1 What Every Pet Needs
- 4.2 Goldfish
- 4.3 Hamsters and Guinea Pigs
- 4.4 Safe and Kind with Cats and Dogs

UNIT 5 • WEEKS 17–20

Seeds and Sprouts

What is inside a seed, a bean sprouting in a bag, why plants need sun and water, and the parts of a plant.

- 5.1 What Is Inside a Seed?
- 5.2 A Bean in a Bag
- 5.3 Sun and Water
- 5.4 Parts of a Plant

UNIT 7 • WEEKS 25–28

Let's Plant!

Planting a seed in a cup, watering just right, a garden bed of radishes and sunflowers, and how wheat becomes bread.

- 7.1 A Seed in a Cup
- 7.2 Watering Just Right
- 7.3 A Garden Bed of Radishes and Sunflowers
- 7.4 Wheat in a Field Becomes Bread

UNIT 6 • WEEKS 21–24

On the Farm

What farm animals give us, chickens and eggs, cows and milk, and how bees make honey.

- 6.1 What Farm Animals Give Us
- 6.2 Chickens and Eggs
- 6.3 Cows and Milk
- 6.4 Bees and Honey

UNIT 8 • WEEKS 29–32

Garden Helpers and Garden Troubles

Ladybugs and other garden helpers, hungry caterpillars and slugs, mold and mushrooms (never eat wild ones), and our first harvest.

- 8.1 Ladybugs and Good Bugs
- 8.2 Hungry Caterpillars and Slugs
- 8.3 Mold and Mushrooms
- 8.4 Our First Harvest

WEEKLY PACING CALENDAR

WEEK	PLAN
1	• Session 1: Lesson 1.1 God's Four Seasons: warm-up, video, teaching and picture study • Session 2: Lesson 1.1 hands-on project and nature journal <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 Fall Leaves and Apples: warm-up, video, teaching and picture study • Session 2: Lesson 1.2 hands-on project and nature journal
3	• Session 1: Lesson 1.3 Pumpkins and Squash: warm-up, video, teaching and picture study

WEEK	PLAN
	Session 2: Lesson 1.3 hands-on project and nature journal
4	- Session 1: Lesson 1.4 Giving Thanks for Food: warm-up, video, teaching and picture study - Session 2: Lesson 1.4 hands-on project and nature journal - Session 3: Unit 1 review and portfolio project
5	- Session 1: Lesson 2.1 Squirrels Gather Nuts: warm-up, video, teaching and picture study - Session 2: Lesson 2.1 hands-on project and nature journal
6	- Session 1: Lesson 2.2 Birds at the Feeder: warm-up, video, teaching and picture study - Session 2: Lesson 2.2 hands-on project and nature journal
7	- Session 1: Lesson 2.3 Deer and Rabbits: warm-up, video, teaching and picture study - Session 2: Lesson 2.3 hands-on project and nature journal
8	- Session 1: Lesson 2.4 Night Animals: Look, Don't Touch: warm-up, video, teaching and picture study - Session 2: Lesson 2.4 hands-on project and nature journal - Session 3: Unit 2 review and portfolio project
9	- Session 1: Lesson 3.1 What Is Soil?: warm-up, video, teaching and picture study - Session 2: Lesson 3.1 hands-on project and nature journal
10	- Session 1: Lesson 3.2 Earthworms: warm-up, video, teaching and picture study - Session 2: Lesson 3.2 hands-on project and nature journal
11	- Session 1: Lesson 3.3 Leaves Turn into Soil: warm-up, video, teaching and picture study - Session 2: Lesson 3.3 hands-on project and nature journal
12	- Session 1: Lesson 3.4 Sand, Clay and Mud: warm-up, video, teaching and picture study - Session 2: Lesson 3.4 hands-on project and nature journal - Session 3: Unit 3 review and portfolio project
13	- Session 1: Lesson 4.1 What Every Pet Needs: warm-up, video, teaching and picture study - Session 2: Lesson 4.1 hands-on project and nature journal

WEEK	PLAN
14	• Session 1: Lesson 4.2 Goldfish: warm-up, video, teaching and picture study • Session 2: Lesson 4.2 hands-on project and nature journal
15	• Session 1: Lesson 4.3 Hamsters and Guinea Pigs: warm-up, video, teaching and picture study • Session 2: Lesson 4.3 hands-on project and nature journal
16	• Session 1: Lesson 4.4 Safe and Kind with Cats and Dogs: warm-up, video, teaching and picture study • Session 2: Lesson 4.4 hands-on project and nature journal • Session 3: Unit 4 review and portfolio project
17	• Session 1: Lesson 5.1 What Is Inside a Seed?: warm-up, video, teaching and picture study • Session 2: Lesson 5.1 hands-on project and nature journal
18	• Session 1: Lesson 5.2 A Bean in a Bag: warm-up, video, teaching and picture study • Session 2: Lesson 5.2 hands-on project and nature journal
19	• Session 1: Lesson 5.3 Sun and Water: warm-up, video, teaching and picture study • Session 2: Lesson 5.3 hands-on project and nature journal
20	• Session 1: Lesson 5.4 Parts of a Plant: warm-up, video, teaching and picture study • Session 2: Lesson 5.4 hands-on project and nature journal • Session 3: Unit 5 review and portfolio project
21	• Session 1: Lesson 6.1 What Farm Animals Give Us: warm-up, video, teaching and picture study • Session 2: Lesson 6.1 hands-on project and nature journal
22	• Session 1: Lesson 6.2 Chickens and Eggs: warm-up, video, teaching and picture study • Session 2: Lesson 6.2 hands-on project and nature journal
23	• Session 1: Lesson 6.3 Cows and Milk: warm-up, video, teaching and picture study • Session 2: Lesson 6.3 hands-on project and nature journal
24	• Session 1: Lesson 6.4 Bees and Honey: warm-up, video, teaching and picture study • Session 2: Lesson 6.4 hands-on project and nature journal

WEEK	PLAN
	Session 3: Unit 6 review and portfolio project
25	- Session 1: Lesson 7.1 A Seed in a Cup: warm-up, video, teaching and picture study - Session 2: Lesson 7.1 hands-on project and nature journal
26	- Session 1: Lesson 7.2 Watering Just Right: warm-up, video, teaching and picture study - Session 2: Lesson 7.2 hands-on project and nature journal
27	- Session 1: Lesson 7.3 A Garden Bed of Radishes and Sunflowers: warm-up, video, teaching and picture study - Session 2: Lesson 7.3 hands-on project and nature journal
28	- Session 1: Lesson 7.4 Wheat in a Field Becomes Bread: warm-up, video, teaching and picture study - Session 2: Lesson 7.4 hands-on project and nature journal - Session 3: Unit 7 review and portfolio project
29	- Session 1: Lesson 8.1 Ladybugs and Good Bugs: warm-up, video, teaching and picture study - Session 2: Lesson 8.1 hands-on project and nature journal
30	- Session 1: Lesson 8.2 Hungry Caterpillars and Slugs: warm-up, video, teaching and picture study - Session 2: Lesson 8.2 hands-on project and nature journal
31	- Session 1: Lesson 8.3 Mold and Mushrooms: warm-up, video, teaching and picture study - Session 2: Lesson 8.3 hands-on project and nature journal
32	- Session 1: Lesson 8.4 Our First Harvest: warm-up, video, teaching and picture study - Session 2: Lesson 8.4 hands-on project and nature journal - Session 3: Unit 8 review and portfolio project <i>Last week. Hold a family harvest fair: set out the best project from each unit (journal pages, plants, photos of animal care) and let the student show guests one of them.</i>

MATERIALS

Nature journal (a sketchbook or bound notebook with blank pages)

For weekly drawings, measurements and notes all year.

Crayons and colored pencils

For journal pages and projects.

A magnifying glass

For looking at seeds, soil, worms, leaves and bugs.

Seeds: dry beans (pinto or lima), radishes, sunflowers, lettuce and a few marigolds

Cheap seed packets from a hardware store; dry beans from the grocery store work for sprouting.

Potting mix and a few pots or clear plastic cups with drainage holes

An adult pokes holes in cups. Yogurt cups work too.

Zip-top bags, paper towels, clear jars and a spray bottle

For the bean-in-a-bag, soil-jar and watering projects.

A small watering can and a child-size trowel

For planting in Units 7–8. Adults handle larger tools.

A ruler and a simple outdoor thermometer (optional)

For measuring sprouts and noticing the seasons.

Garden gloves sized for a child

For digging, compost and handling soil.

A simple bird feeder or materials to make one (optional)

Birdseed, a pinecone or a clean milk jug for Unit 2.

A small patch of garden or a large pot or tub (optional)

For radishes and sunflowers in Unit 7; a big pot on a sunny step works fine.

A pet, a neighbor's pet, or a visit to a pet store, shelter or farm (optional)

No animals are required; every animal lesson has a visit, book or video option.

Picture books about seeds, farms, bees and animals from the library (optional)

To read alongside each unit.

GRADING

Kindergarten has no letter grades. Progress is shown by what your child can tell, point to, draw and do, and by the growing folder of journal pages, photos and projects.

Scale: No letter grades. Use the mastery checklist at the start of each unit and mark each “I can” statement as Not yet, Getting there, or Yes!

- After each unit review, write two or three sentences of narrative feedback: what your child noticed, what your child can now name or do, and one thing to keep practicing.
- Keep a portfolio folder for the year with the best journal pages, photos of plants and projects, and the unit portfolio projects.
- Celebrate faithfulness as well as knowledge: watering without being reminded, gentle hands with animals, and careful looking are real achievements at this age.

A NOTE TO PARENTS

You do not need a green thumb, a farm or a single pet to teach this course. You need a sunny window, a few cups of soil, a magnifying glass and a willingness to go outside and look. The best teacher here is the real world: a worm on the sidewalk after rain, a squirrel burying an acorn, a bean root pushing down through a wet paper towel.

Little children learn by doing, so let them get their hands dirty (and then wash them!). Let a bean fail and try again. Let your child water a plant every day for a week and see what faithful care does. As you go, point to the Giver of every good thing. “To dress it and to keep it” (Genesis 2:15) was the first work God gave to people, and it is still a good work for a five-year-old. *Fabricando fit faber*: by making, one becomes a maker, and by tending, one becomes a gardener.

UNIT 1

SEASONS AND HARVEST

Our year begins at harvest time, when apples are ripe, pumpkins sit fat and orange in the field and the leaves begin to turn. In this unit your child learns that God made four seasons, spring, summer, fall and winter, that come around again every year, and that fall is the time when farmers and gardeners gather in the food they have grown.

Each week has a short video, a great painting to look at (by Bruegel, Pissarro, Winslow Homer and Millet), and a hands-on project: a seasons wheel, an apple taste test, a look inside a real pumpkin and a thank-you harvest basket. By the end, your child will be able to name the seasons in order, tell what happens to trees in fall, show where a pumpkin keeps its seeds and say thank you to God for food.

PREREQUISITES

- Can sit and listen to a short read-aloud
- Can hold a crayon
- No gardening experience needed

MASTERY CHECKLIST

- ☐ I can name the four seasons in order.
- ☐ I can tell what trees do in the fall.
- ☐ I can tell how to know an apple is ripe.
- ☐ I can show where a pumpkin keeps its seeds.
- ☐ I can say thank you to God for my food and name a farmer's job.

LESSONS IN THIS UNIT

1.1 God's Four Seasons

2 sessions of 30 minutes

1.2 Fall Leaves and Apples

2 sessions of 30 minutes

1.3 Pumpkins and Squash

2 sessions of 30 minutes

1.4 Giving Thanks for Food

2 sessions of 30 minutes

UNIT 1 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Say the four seasons in order. Which season is it now?
2. What happens to many trees in the fall?
3. How can you tell an apple is ripe? Show how you would pick it.
4. Draw or point to where a pumpkin keeps its seeds.
5. Name a food and tell where it grew.
6. Who makes the seeds grow, and what do we say to Him?

ANSWER KEY

1. Spring, summer, fall (autumn), winter. The child names the current season.
2. Their leaves turn yellow, orange, red or brown and fall off; the tree rests through winter.
3. It has its full color, smells sweet and comes off with a gentle lift and twist.
4. Inside, in the hollow middle, held in the stringy pulp.
5. Any good answer, for example: apples grow on trees, potatoes grow under the ground, bread comes from wheat in a field.
6. God sends sun and rain and makes them grow; we say thank you.

PORTFOLIO PIECE: MY SEASONS AND HARVEST BOOK

Make a small book of five pages, stapled or tied with yarn. The first four pages show your tree in spring, summer, fall and winter. Glue a real fall leaf or a leaf rubbing on the fall page.

On the last page, draw your favorite harvest food and the plant it grew on, and write or dictate a thank-you prayer to God for it.

LOOK FOR	WHAT IT MEANS
Four seasons	Has a page for each season in the right order, with changes your child can explain.
Real nature	Includes a real leaf or leaf rubbing collected by your child.
Harvest	Shows a harvest food and correctly tells where it grew.
Thankfulness	Includes a thank-you prayer in your child's own words.

1.1 GOD'S FOUR SEASONS

OBJECTIVES

- Name the four seasons in order: spring, summer, fall and winter.
- Tell one thing that happens to plants in each season.
- Find signs of the season in a painting of a harvest.

Warm-up. Look out the window together (or step outside). Ask: Is it hot or cool? Are the leaves green, or are some turning yellow and red? Is anyone working in a garden or a field? Say, “These are clues! They tell us what season it is.” Name today’s season together.

WATCH

The Four Seasons for Kids | Learn about the four seasons throughout the year

Learn Bright · 6:48

<https://www.youtube.com/watch?v=4HeeCYVqf3U>

WHEN TO WATCH

After the core ideas. Hold up four fingers and name each season with the video.

BACKUP VIDEO

Why Are There Seasons?

SciShow Kids · 2:20

<https://www.youtube.com/watch?v=UQjT5uKp2hg>

Later in the week, for a curious child who asks why the seasons change.

KEY TERMS

season

One part of the year, with its own kind of weather. There are four: spring, summer, fall and winter.

harvest

Gathering in the food that has grown, like picking apples or digging potatoes.

fall

The season after summer, when days get cooler, leaves change color and farmers harvest. It is also called autumn.

CORE IDEAS

God made the year go around in a circle of four **seasons**: spring, summer, fall and winter. When winter ends, spring comes again. It happens every year, just as God promised.

In **spring**, the days get warmer, and seeds sprout and trees grow new leaves. Farmers plant. In **summer**, it is hot and sunny, and plants grow big and green.

In **fall**, the days get cooler and shorter. Leaves turn yellow, orange and red and float down. Apples and pumpkins are ripe. This is the **harvest**, when farmers gather in their food.

In **winter**, it is cold. Many trees have bare branches, and the garden rests. In many places snow falls. Under the ground, roots and seeds wait for spring.

Plants and animals know the seasons too. Plants grow when it is warm and rest when it is cold. Some animals store food for winter. A good gardener watches the seasons and does each job at the right time.

PICTURE STUDY



The Harvesters, Pieter Bruegel the Elder, 1565 · Oil on wood · The Metropolitan Museum of Art, New York

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

Pieter Bruegel painted this picture more than 450 years ago. It is one of a set of paintings about the times of the year. Here, farm workers are bringing in the wheat harvest on a hot day.

Look closely

- Find the tall golden wheat. Is it green and young, or golden and ripe?
- Find the workers cutting the wheat. What tool are they using?
- Find the bundles of wheat standing up in the field.
- Find the people resting under the tree. What are they eating?
- Are the trees green or bare? What season could this be?

Talk about it

1. How can you tell the wheat is ready to harvest?
2. Why do you think the workers stopped to rest in the shade?
3. What would you hear if you walked into this field?

HANDS-ON PROJECT

My Seasons Wheel

You will make a paper wheel with four parts, one for each season. You will draw the same tree in spring, summer, fall and winter, so you can see how it changes.

You will need

- A paper plate
- Crayons or colored pencils
- A ruler or the edge of a book
- A paper fastener (brad) and a paper arrow, or a clothespin (optional)

Steps

1. With a grown-up, draw two lines across the plate to cut it into four equal parts, like a pie.
2. In the first part, write or trace the word SPRING. Then SUMMER, FALL and WINTER going around the circle.
3. In each part, draw a tree trunk and branches with a brown crayon.
4. Spring: add little light-green leaves and some pink or white blossoms.
5. Summer: give the tree lots of big dark-green leaves and a yellow sun.
6. Fall: color the leaves yellow, orange and red, with a few falling to the ground.
7. Winter: leave the branches bare and add white snow on the ground.
8. Add an arrow with a paper fastener (or clip on a clothespin) and point it to the season it is now.
9. Move the arrow around the wheel and say the seasons in order.

Tips

- Use the same trunk shape in all four parts so you can see what changes and what stays the same.
- Hang the wheel where you can move the arrow when the season changes this year.

Check your work

- ☐ I drew a tree for each of the four seasons.

- ☐ I can say the seasons in order.
- ☐ I can point to the season it is now.

NATURE JOURNAL

1. Choose one tree you can see from your window or yard. Draw it today. Write the date. You will draw this same tree again later in the year.
2. Draw what you are wearing today. Is it summer clothes or warm clothes? What does that tell you about the season?
3. Go outside and find one sign of fall (a colored leaf, an acorn, a pumpkin on a porch). Draw it.

From history. Long ago, many families lived on farms and knew the seasons by heart, because their food depended on planting and harvesting at the right time. Old calendars often had a little picture for each month showing that month's farm work: plowing, planting, haying, harvesting and resting by the fire.

COMMON MISTAKES

- Mixing up the order. Say it like a little song every day this week: "Spring, summer, fall and winter, round and round we go."
- Thinking every place has snow in winter. Some places stay mild; talk about what winter is like where you live.

Make it a game • Season Statues. Stand in the middle of the room. Your grown-up calls out spring, summer, fall or winter, and you freeze like a statue showing what plants do then: pop up, grow tall, drop leaves, or sleep. Then name the four seasons in order. Race to do it three times without a mistake.

Scripture. "While the earth remaineth, seedtime and harvest, and cold and heat, and summer and winter, and day and night shall not cease." (Genesis 8:22, KJV)

After the great flood, God promised Noah that the seasons would keep coming. Every spring and every harvest reminds us that God keeps His promises.

1.2 FALL LEAVES AND APPLES

OBJECTIVES

- Tell why many leaves change color and fall in autumn.
- Tell how to know an apple is ripe and how to pick it gently.
- Compare apples by looking, smelling and tasting.

Warm-up. Leaf hunt! Collect five fallen leaves outside (or look at pictures). Sort them by color: green, yellow, orange, red and brown. Which pile is biggest? Feel them: are the brown ones soft or crunchy?

WATCH

Why Do Leaves Change Colors in the Fall? | Biology for Kids | SciShow Kids

SciShow Kids · 3:22

<https://www.youtube.com/watch?v=Xk4-6lI8l5Q>

WHEN TO WATCH

After the core ideas. Pause when the green goes away and say what colors are hiding underneath.

BACKUP VIDEO

Let's Go To An Apple Orchard | Caitie's Classroom Field Trips | Food Videos for Kids

Super Simple Play with Caitie! · 4:32

<https://www.youtube.com/watch?v=vUoc7j73iK4>

Before the apple project, for a trip to an apple orchard with Caitie.

KEY TERMS

ripe

Ready to pick and eat. A ripe apple has its full color, smells sweet and comes off the branch easily.

orchard

A farm or field full of fruit trees, like apple trees.

chlorophyll

The green stuff in leaves that helps the plant make food from sunlight.

CORE IDEAS

Leaves are green in spring and summer because they are full of **chlorophyll**. The green helps the leaf use sunlight to make food for the tree.

In fall the days get shorter and cooler, and the tree gets ready to rest. The green fades away. Then we can see the yellow and orange that were hiding in the leaf all along. Some leaves also make new red colors.

Then many trees let their leaves drop. The fallen leaves cover the ground like a blanket, and they slowly turn into new soil. The tree rests all winter and grows new leaves in spring.

Fall is apple time! Apples grow on trees in an **orchard**. In spring the tree had pink and white blossoms. Bees visited the blossoms, and each blossom grew into a little green apple. All summer the apples grew bigger.

A **ripe** apple has its full color, smells sweet, and comes off with a gentle twist. Hold the apple, lift it up and twist. If you have to pull hard, it is not ready yet. Handle apples gently: a dropped apple gets a bruise.

PICTURE STUDY



Apple Picking, Camille Pissarro, 1886 · Oil on canvas · Ohara Museum of Art, Kurashiki, Japan

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

Camille Pissarro loved to paint farm families at work in the fields and orchards near his home in France. He painted with many little dabs of color, so the whole picture seems to sparkle with sunshine.

Look closely

- Find the woman reaching up into the tree. What is she holding?
- Find the woman bending down. What is she putting in her basket?
- Find the woman sitting down. What is she doing with her apple?
- Look at the light. Where is it sunny, and where is it shady?

Talk about it

1. Why do you think they knock the apples down instead of climbing up?
2. How can you tell these apples are ripe?
3. Would you like to help with this harvest? Which job would you choose?

Safety first. Wash apples before eating. At an orchard, stay on the ground and let a grown-up use any ladder or pole. Do not eat fruit from a tree unless a grown-up says it is safe.

HANDS-ON PROJECT

An Apple Taste Test

God made many kinds of apples. You will look at, smell, cut open and taste three kinds and choose your favorite.

You will need

- Three kinds of apples (for example, a red Gala, a green Granny Smith and a yellow Golden Delicious)
- A knife and cutting board (for the grown-up)
- A plate and napkins
- Crayons and paper

Steps

1. Wash the apples. Line them up and look closely. What colors do you see? Are any striped or speckled?
2. Find the stem at the top. That is where the apple held on to the tree.
3. Smell each apple. Which smells the sweetest?
4. Ask your grown-up to cut each apple in half across the middle (sideways, not top to bottom).
5. Look at the middle. Do you see a star? Count the seeds inside the star.
6. Taste a slice of each apple. Is it sweet or sour? Crunchy or soft? Juicy?
7. Draw the three apples and color them. Put a big smile by your favorite.
8. Save a few seeds on a paper towel to look at with your magnifying glass.

Tips

- Taste a sip of water between apples so you can taste each one clearly.
- Ask everyone in the family to choose a favorite and make a tally chart.

Check your work

- ☐ I found the star and the seeds inside an apple.
- ☐ I can tell which apple was sweetest and which was most sour.
- ☐ I can tell how to pick a ripe apple gently.

NATURE JOURNAL

1. Choose your favorite fall leaf. Lay it in your journal, put a thin paper over it and rub a crayon on its side to make a leaf rubbing.
2. Draw an apple cut in half with its star of seeds. Count the seeds and write the number.
3. Draw the tree you chose last week. Have any of its leaves changed color yet?

From history. John Chapman, called Johnny Appleseed, was a real man who walked across the young American frontier about 200 years ago planting apple trees. He started little apple nurseries and sold or gave away young trees to families settling new farms, so they would have fruit for years to come.

COMMON MISTAKES

- Yanking an apple off the branch. Show how to lift and twist gently instead.
- Thinking leaves die because they are cold. Explain that the tree lets them go so it can rest safely all winter.

Make it a game • Leaf Float and Apple Pick. Toss a handful of paper leaves in the air and be a leaf: drift slowly down and land softly. Then pretend to find a ripe apple. Show how you check it is ripe and how you pick it gently without yanking. Your grown-up plays the tree and says ouch if you pull too hard.

1.3 PUMPKINS AND SQUASH

OBJECTIVES

- Tell that a pumpkin is a kind of squash that grows on a long vine.
- Find the seeds, pulp and shell inside a real pumpkin.
- Tell the pumpkin's life cycle: seed, sprout, vine, flower, green pumpkin, orange pumpkin.

Warm-up. Set out a pumpkin and, if you can, another squash (an acorn squash or butternut). Feel them. Which is heaviest? Which is bumpy or smooth? Knock on the pumpkin. Does it sound hollow? Guess: what is inside?

WATCH

[The Life Cycle of a Pumpkin for Kids!](#) | [Pumpkin Life Cycle](#) | [Science for Kids](#)

Twinkl Educational Publishing · 3:28

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

WHEN TO WATCH

After the core ideas, before you open your pumpkin.

Note: Stop the video at 2:37. The last part is about autumn decorations, which this lesson does not need.

KEY TERMS

squash

A family of big vegetables that grow on vines, like pumpkins, zucchini and acorn squash.

vine

A long, creeping stem that spreads along the ground or climbs.

pulp

The stringy, wet inside of a pumpkin that holds the seeds.

CORE IDEAS

A pumpkin is a kind of **squash**. Zucchini, acorn squash and butternut squash are its cousins. They all grow on long **vines** that spread across the ground with big,

wide leaves.

A pumpkin starts as a flat white seed. Planted in warm soil in late spring, it sprouts two round leaves, then grows a vine. The vine makes big yellow flowers. Bees carry pollen from flower to flower, and then a little green pumpkin starts to grow behind a flower.

All summer the pumpkin grows bigger and bigger. In fall it turns orange and the vine dries up. Now it is ripe and ready to harvest. Farmers cut the thick stem with clippers and leave a handle of stem on top.

Inside a pumpkin is a hollow space filled with stringy **pulp** and many seeds. Each seed could grow a whole new pumpkin vine! God packed hundreds of new plants inside one pumpkin.

Pumpkins are food. We bake them into pie and bread and soup, and we roast the seeds for a crunchy snack. A pumpkin is a harvest gift, so we use all of it we can.

PICTURE STUDY



The Pumpkin Patch, Winslow Homer, 1878 · Watercolor on paper

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

Winslow Homer was an American painter who loved to paint children on farms. In this watercolor, farm children are busy at harvest time. The corn has been cut and stood up in bundles, and the pumpkins are ready to gather.

Look closely

- Find the boy carrying a pumpkin. Is it heavy or light? How can you tell?
- Find the pumpkins still lying in the vines. How many can you count?
- Find the tall bundles of dried cornstalks, called corn shocks.
- Find the other children sitting by the corn. What might they be doing?

Talk about it

1. Which pumpkins look ready to pick? How can you tell?
2. Why do you think the farmers grew pumpkins and corn in the same field?
3. What season is it in this picture? What clues tell you?

Safety first. Only a grown-up uses the knife to open the pumpkin. Wash hands before and after. Roast seeds with a grown-up, because the oven is hot.

HANDS-ON PROJECT

Inside a Pumpkin

You will be a pumpkin scientist. You will look inside a real pumpkin, find the seeds, count some of them and save a few to dry for planting next spring.

You will need

- A small pumpkin or pie pumpkin
- A knife (for the grown-up) and a big spoon
- Newspaper or a tray
- A bowl of water and a colander
- A paper towel and an envelope for saved seeds
- A magnifying glass

Steps

1. Cover the table with newspaper. Look at the outside of the pumpkin: find the stem, the bumpy lines (ribs) and the bottom where the flower was.
2. Your grown-up cuts a lid around the stem and lifts it off.
3. Smell inside. Reach in and feel the pulp. Is it slimy, stringy, wet or dry?
4. Scoop out the pulp and seeds with your hands or a spoon and put them in the bowl of water.
5. Swish the seeds in the water. The seeds float to the top and the pulp sinks. Scoop the seeds into the colander.
6. Count seeds into piles of ten. How many piles can you make?
7. Look at one seed with a magnifying glass. Draw it.
8. Dry a handful of seeds on a paper towel for a week, then put them in a labeled envelope to plant in late spring.
9. With your grown-up, roast the rest of the seeds or cook the pumpkin flesh into a soup or bread.

Tips

- A pie pumpkin is small, sweet and good for cooking.
- Write a guess first: how many seeds are inside? Then see how close you were.

- Visit the vegetable building at your county fair this fall to see pumpkins and squash grown by local families and children.

Check your work

- ☐ I can point to the stem, the shell, the pulp and the seeds.
- ☐ I can tell how a pumpkin grows from a seed.
- ☐ I saved seeds to plant in spring.

NATURE JOURNAL

1. Draw the pumpkin life cycle in a circle: seed, sprout, vine, yellow flower, green pumpkin, orange pumpkin, and back to seed.
2. Draw your pumpkin cut open. Label the seeds and the pulp (a grown-up can write the words).
3. Draw one pumpkin seed big, the way it looks under the magnifying glass.

From history. Pumpkins and squash were first grown in the Americas. Long ago, Native American farmers planted corn, beans and squash together in the same hill, and the Pilgrims learned to grow and cook pumpkins in their new home in New England.

COMMON MISTAKES

- Thinking pumpkins grow on trees. Show a picture of the long vine on the ground.
- Letting saved seeds stay damp. Dry them well, or they will mold in the envelope.

Make it a game • Pumpkin Parts Treasure Hunt. Your grown-up hides three paper circles marked shell, pulp and seeds around the room. Hunt for each one, bring it back, and tell where it lives inside a pumpkin. Then crawl like a long vine across the floor and say, A pumpkin is a kind of squash.

1.4 GIVING THANKS FOR FOOD

OBJECTIVES

- Tell that most of our food comes from farms.
- Name some of the people who help bring food to our table.
- Thank God for food and make a thank-you harvest basket.

Warm-up. Look at what you had for breakfast or lunch. Pick three foods. For each one ask: Did it grow on a plant, or did it come from an animal? Where do you think it was grown? (Bread from wheat, milk from cows, apples from trees.)

WATCH

Farms and Food for Kids | Learn how food comes from a farm to your table

Learn Bright · 6:42

<https://www.youtube.com/watch?v=WazK8e88axE>

WHEN TO WATCH

After the core ideas. Stop when the video shows a farm and name what is growing.

KEY TERMS

farmer

A person who grows plants or raises animals for food.

grateful

Feeling and saying thank you for a good gift.

crop

A plant that a farmer grows to harvest, like wheat, corn, apples or potatoes.

CORE IDEAS

Almost all the food we eat started on a farm. Bread came from wheat that grew in a field. Milk came from a cow. Apples grew on a tree. Potatoes grew under the ground.

Many people help bring food to our table. The **farmer** plants and harvests the **crops**. Truck drivers carry the food to the store. Store workers put it on shelves. Our family buys it and cooks it.

But the farmer cannot make a seed grow. God sends the sun and the rain and makes the seed grow into a plant. Every bite of food is a gift from God.

When someone gives us a gift, we say thank you. When we are **grateful** for our food, we thank God before we eat, and we thank the people who worked to grow and cook it.

We can also share. In harvest time, families have always shared extra food with neighbors and with people who do not have enough.

PICTURE STUDY



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

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

Jean-François Millet grew up on a farm in France and painted farm families all his life. Here, a man and his wife have been digging potatoes. At the end of the day, they hear the church bell ring far away, and they stop to pray.

Look closely

- Find the basket. What did they harvest?
- Find the tools: the fork stuck in the ground and the wheelbarrow with sacks.
- Find the church tower far away, where the bell is ringing.
- Look at the sky. What time of day is it?

Talk about it

1. What do you think the farmer and his wife are praying about?
2. Why might farmers be especially thankful at harvest time?
3. When does your family stop to say thank you to God?

HANDS-ON PROJECT

A Thank-You Harvest Basket

You will fill a basket or box with harvest foods, find out where each one grew, and give thanks. Then you will share part of your harvest with someone else.

You will need

- A basket, bowl or box
- Harvest foods from your kitchen or a store (apples, a potato, a squash, corn, carrots, a loaf of bread)
- Paper, crayons and tape
- A small bag of food to share (optional)

Steps

1. Gather five harvest foods. Lay them on the table.
2. For each food, talk about where it grew: on a tree, on a vine, under the ground or in a field.
3. Sort them: things that grew above the ground, and things that grew below the ground.
4. Draw a little tag for each food with a picture of the plant it came from. Tape the tags to the foods or the basket.
5. Arrange the foods in your basket so they look beautiful.
6. Before a family meal, set the basket on the table. Take turns naming one food and saying, "Thank You, God, for..."
7. Choose some food to share with a neighbor or a food pantry, and help carry it.

Tips

- Use the harvest basket as a centerpiece all week to remind your family to give thanks.
- Let your child lead the thank-you prayer in his or her own words.

Check your work

- ☐ I can tell where three of my foods grew.

- ☐ I can name people who help bring food to my table.
- ☐ I said thank you to God for my food.

NATURE JOURNAL

1. Draw your harvest basket full of food.
2. Draw a farmer at work in a field. What crop is the farmer growing?
3. Draw your family at the table giving thanks.

From history. In the fall of 1621, the Pilgrims in Plymouth gathered their first harvest in their new land. They had a three-day feast and gave thanks, and Wampanoag men led by Massasoit joined them. Many years later, Abraham Lincoln asked the whole country to set aside a day of Thanksgiving each fall.

COMMON MISTAKES

- Thinking food comes from the store. Trace one food all the way back from the store to the farm.
- Saying thank you only once a year. Make it a daily habit before every meal.

Make it a game • Who Brought My Dinner?. Look at a real dinner plate or a picture of food. Point to one food and name a helper who brought it to the table, such as the farmer, the driver or the cook. Act out each job in silence while your grown-up guesses. Finish by saying thank you to the helpers.

Scripture. “Who giveth food to all flesh: for his mercy endureth for ever.” (Psalms 136:25, KJV)

God feeds every living thing. At every meal we can remember that our food is a gift of His love.

UNIT 1

SEASONS AND HARVEST

Our year begins at harvest time, when apples are ripe, pumpkins sit fat and orange in the field and the leaves begin to turn. In this unit your child learns that God made four seasons, spring, summer, fall and winter, that come around again every year, and that fall is the time when farmers and gardeners gather in the food they have grown.

Each week has a short video, a great painting to look at (by Bruegel, Pissarro, Winslow Homer and Millet), and a hands-on project: a seasons wheel, an apple taste test, a look inside a real pumpkin and a thank-you harvest basket. By the end, your child will be able to name the seasons in order, tell what happens to trees in fall, show where a pumpkin keeps its seeds and say thank you to God for food.

PREREQUISITES

- Can sit and listen to a short read-aloud
- Can hold a crayon
- No gardening experience needed

MASTERY CHECKLIST

- ☐ I can name the four seasons in order.
- ☐ I can tell what trees do in the fall.
- ☐ I can tell how to know an apple is ripe.
- ☐ I can show where a pumpkin keeps its seeds.
- ☐ I can say thank you to God for my food and name a farmer's job.

LESSONS IN THIS UNIT

1.1 God's Four Seasons

2 sessions of 30 minutes

1.2 Fall Leaves and Apples

2 sessions of 30 minutes

1.3 Pumpkins and Squash

2 sessions of 30 minutes

1.4 Giving Thanks for Food

2 sessions of 30 minutes

UNIT 1 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Say the four seasons in order. Which season is it now?
2. What happens to many trees in the fall?
3. How can you tell an apple is ripe? Show how you would pick it.
4. Draw or point to where a pumpkin keeps its seeds.
5. Name a food and tell where it grew.
6. Who makes the seeds grow, and what do we say to Him?

ANSWER KEY

1. Spring, summer, fall (autumn), winter. The child names the current season.
2. Their leaves turn yellow, orange, red or brown and fall off; the tree rests through winter.
3. It has its full color, smells sweet and comes off with a gentle lift and twist.
4. Inside, in the hollow middle, held in the stringy pulp.
5. Any good answer, for example: apples grow on trees, potatoes grow under the ground, bread comes from wheat in a field.
6. God sends sun and rain and makes them grow; we say thank you.

PORTFOLIO PIECE: MY SEASONS AND HARVEST BOOK

Make a small book of five pages, stapled or tied with yarn. The first four pages show your tree in spring, summer, fall and winter. Glue a real fall leaf or a leaf rubbing on the fall page.

On the last page, draw your favorite harvest food and the plant it grew on, and write or dictate a thank-you prayer to God for it.

LOOK FOR	WHAT IT MEANS
Four seasons	Has a page for each season in the right order, with changes your child can explain.
Real nature	Includes a real leaf or leaf rubbing collected by your child.
Harvest	Shows a harvest food and correctly tells where it grew.
Thankfulness	Includes a thank-you prayer in your child's own words.

UNIT 2

ANIMALS NEAR OUR HOME

Wild animals live all around us, even in towns: squirrels in the trees, birds at the feeder, rabbits in the grass, deer at the edge of the woods, and raccoons, skunks and owls that come out at night. In this unit your child becomes a quiet, careful animal watcher.

We learn how squirrels get ready for winter, how to feed birds, how deer and rabbits are built to listen and run, and why night animals are for looking at, never touching. The big rule of the unit is **look, don't touch**: wild animals stay wild, and we watch them from a safe distance. The paintings this unit are by Dürer and the Audubons, who looked at animals very closely.

PREREQUISITES

- Knows the four seasons (Unit 1)
- Can sit quietly for a few minutes
- No animal experience needed

MASTERY CHECKLIST

- ☐ I can tell how squirrels get ready for winter.
- ☐ I can name two birds that visit a feeder and tell what they eat.
- ☐ I can tell how deer and rabbits stay safe.
- ☐ I can name three animals that come out at night.
- ☐ I can say the rule for wild animals: look, don't touch.

LESSONS IN THIS UNIT

2.1 Squirrels Gather Nuts

2 sessions of 30 minutes

2.2 Birds at the Feeder

2 sessions of 30 minutes

2.3 Deer and Rabbits

2 sessions of 30 minutes

2.4 Night Animals: Look, Don't Touch

2 sessions of 30 minutes

UNIT 2 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. What does a squirrel do in the fall to get ready for winter?
2. Name a bird that comes to a feeder. What does it eat?
3. How do a rabbit and a deer stay safe from danger?
4. You find a baby fawn alone in the grass. What do you do?
5. Name three animals that come out at night.
6. What is our rule for wild animals? What do you do if one seems sick?

ANSWER KEY

1. It gathers nuts and acorns and buries or hides them to eat in winter.
2. For example, a cardinal eats sunflower seeds; a chickadee eats seeds; a woodpecker eats suet.
3. Big ears and wide-set eyes notice danger, then they run fast (rabbits zigzag; deer leap and flash their white tails).
4. Do not touch it; walk away quietly and tell a grown-up. Its mother will come back.
5. Any three of: owl, raccoon, skunk, opossum, bat, fox.
6. Look, don't touch. Go inside and tell a grown-up.

PORTFOLIO PIECE: MY BACKYARD ANIMAL WATCH

For one week, watch for wild animals and their signs around your home or a park: squirrels, birds at your feeder, rabbits, deer tracks, nibbled plants. Each day, draw one animal or sign in your nature journal and have a grown-up write the date and what you saw.

At the end of the week, tell your family about your favorite animal and the safety rule for wild animals.

LOOK FOR	WHAT IT MEANS
Faithful watching	Looked for animals on at least five days of the week.
Careful drawing	Drawings show real details your child noticed (a tail, a beak, a track).
Animal facts	Can tell one true fact about each animal drawn.
Safety	Watched from a distance and can say the rule: look, don't touch.

2.1 SQUIRRELS GATHER NUTS

OBJECTIVES

- Tell how squirrels gather and hide food for winter.
- Name the parts of a squirrel that help it climb and eat nuts.
- Watch a real squirrel and draw what it does.

Warm-up. Hide five acorns, nuts or buttons around the room while your child closes his or her eyes. Can your child find them all? Now talk: Was it easy or hard? A squirrel hides hundreds of nuts every fall and has to find them again in winter!

WATCH

How Do Squirrels Find the Food they Hide? | How Animals Prepare for Winter | SciShow Kids

SciShow Kids · 3:36

<https://www.youtube.com/watch?v=6ckDOcVvz-k>

WHEN TO WATCH

After the core ideas. Pause when the squirrel buries a nut and ask: how will it find this again?

KEY TERMS

gather

To collect things and bring them together, like a squirrel collecting nuts.

acorn

The nut of an oak tree. Squirrels love to eat acorns.

store

To save something to use later.

CORE IDEAS

In the fall, squirrels are very busy. They **gather** nuts, **acorns** and seeds while there is plenty of food. In winter, food is hard to find, so they **store** it now.

Gray squirrels dig little holes and bury one nut in each hole, all over the yard and the woods. Then they cover it up and pat it down. They use their wonderful noses and their memory to find the nuts again later.

God designed the squirrel just right for its life. Sharp claws grip the bark so it can run up and down trees. A big fluffy tail helps it balance on thin branches and keeps it warm like a blanket. Strong front teeth crack hard nutshells, and those teeth keep growing all its life.

Squirrels do not find every nut they bury. Some forgotten acorns sprout in spring and grow into new oak trees. So squirrels help plant the forest!

Squirrels are wild animals. We can watch them and enjoy them, but we never try to catch or pet them. They can bite and scratch when they are scared.

PICTURE STUDY



Two Squirrels, Albrecht Dürer, 1512 · Watercolor and gouache on vellum · Private collection

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

Albrecht Dürer was a great German artist who lived 500 years ago. He loved to paint animals from life, so carefully that you can almost count the hairs. These are red squirrels, the kind that lived near his home.

Look closely

- Find the squirrel that is eating. What is it holding in its paws?
- Look at the tails. How do they curl?
- Find the ears. Do you see the little tufts of fur on top?
- Look closely at the fur. How did Dürer make it look soft?

Talk about it

1. How does a squirrel hold its food?
2. What do you think the squirrel will do with the nut it does not eat?
3. How is this squirrel like the squirrels in your yard? How is it different?

Safety first. Watch squirrels from a distance. Never try to touch, catch or hand-feed a wild squirrel, and tell a grown-up if one seems hurt.

HANDS-ON PROJECT

Be a Squirrel Watcher

You will watch a real squirrel for five minutes, like a scientist, and keep track of what it does. If no squirrels live near you, watch the video again or visit a park.

You will need

- A window or a park bench
- Your nature journal and a pencil
- A timer
- Binoculars (optional)

Steps

1. Find a spot where squirrels come: near oak trees, a park or a bird feeder.
2. Sit very still and quiet. Squirrels are easily scared by noise and quick moves.
3. Set the timer for five minutes.
4. Each time the squirrel does something, make a mark: running, climbing, digging, eating, or sitting still.
5. Look at its tail. What does it do with its tail when it runs or stops?
6. When the timer rings, count your marks. What did the squirrel do most?
7. Draw the squirrel doing its favorite thing.

Tips

- Early morning is a busy time for squirrels.
- If a squirrel flicks its tail and chatters, it might be warning other squirrels about you. Stay still.

Check your work

- ☐ I watched a squirrel quietly for five minutes.
- ☐ I can tell what the squirrel did most.
- ☐ I can tell why squirrels bury nuts in the fall.

NATURE JOURNAL

1. Draw a squirrel burying a nut. Draw the nut under the ground.

2. Collect an acorn or a nut. Draw it big, with its cap.
3. Draw an oak tree growing from a forgotten acorn.

From history. Dürer painted his two red squirrels in 1512, long before cameras. To make his animal pictures, he watched living animals for a long time and painted every hair with a tiny brush. People still study his animal pictures today to learn how to look closely.

COMMON MISTAKES

- Running toward a squirrel to see it better. Teach the opposite: be still and let it come closer.
- Thinking squirrels sleep all winter. Gray squirrels stay awake and eat the food they stored.

Make it a game • Squirrel Stash Dash. Be the squirrel. Your grown-up gives you ten buttons or beans as acorns. Scamper around the room and hide them, telling out loud where each one goes. Then have your grown-up guess the hiding spots while you hold up your claws, grip like a climber, and nibble like a squirrel.

2.2 BIRDS AT THE FEEDER

OBJECTIVES

- Name two or three birds that visit feeders in winter and tell what they eat.
- Tell how a bird's beak fits the food it eats.
- Make a simple bird feeder and watch who comes.

Warm-up. Sit by a window for three minutes and listen. Do you hear any birds? Count how many birds you see. What colors are they? Are they big or small? Are they in a tree, on the ground or in the sky?

WATCH

Make Your Own Recycled Bird Feeders - #sciencegoals

SciShow Kids · 4:04

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

WHEN TO WATCH

Before the hands-on project. Watch how the children make their feeders.

BACKUP VIDEO

All About Cardinals: Backyard Bird Series - FreeSchool

Free School · 2:17

<https://www.youtube.com/watch?v=dvrAF2XWizo>

With the picture study, to see and hear real cardinals.

KEY TERMS

beak

A bird's hard mouth. Birds use their beaks to eat, drink and build nests.

feeder

A place where people put seeds or food for wild birds.

cardinal

A songbird with a pointed crest on its head. The male is bright red; the female is brown with red edges.

CORE IDEAS

Many birds stay near our homes all winter. Cardinals, chickadees, blue jays, juncos, sparrows and woodpeckers can all visit a backyard **feeder**.

When snow covers the ground, it is hard for birds to find seeds and bugs. A feeder full of seeds helps them. Birds also need water to drink and bushes or trees to hide in.

Every bird has a **beak** made for the food it eats. A **cardinal** has a thick, strong beak for cracking seeds. A woodpecker has a sharp beak like a chisel to dig bugs out of bark. A robin has a thin beak for grabbing worms.

Birds like different seeds. Black-oil sunflower seeds feed almost everyone. Little birds like millet. Woodpeckers love suet, a block of fat and seeds.

Feeding birds is a promise. Once you start in winter, keep your feeder full, and keep it clean so the birds stay healthy. Put it near a bush where birds can hide, but not right beside a hiding place for cats.

PICTURE STUDY



Cardinal Grosbeak (Northern Cardinal), John James Audubon, 1833 · Hand-colored engraving by Robert Havell from *The Birds of America* · National Gallery of Art, Washington

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

John James Audubon traveled all over America to paint every bird he could find. He painted each bird life-size. Here is a pair of cardinals, the red father bird and the brown mother bird.

Look closely

- Find the red bird and the brown bird. Which is the father and which is the mother?
- Find the pointed crest on top of each head.
- Look at the beaks. Are they thin or thick? What could they crack?
- Find the black mask around the red bird's beak.

Talk about it

1. Why do you think the mother bird is brown instead of bright red?
2. What would you put in a feeder to invite a cardinal?
3. Have you ever seen a cardinal? Where was it?

HANDS-ON PROJECT

A Pinecone Bird Feeder

You will make a bird feeder from a pinecone, hang it outside, and watch which birds come to eat.

You will need

- A large, open pinecone
- Sunflower butter or vegetable shortening (or peanut butter if no one in your home has an allergy)
- Birdseed in a shallow pan
- String or yarn
- A butter knife or craft stick
- Your nature journal

Steps

1. Tie a long string around the top of the pinecone, near the stem, for hanging.
2. Lay newspaper on the table. Use the craft stick to spread sunflower butter or shortening into the spaces of the pinecone.
3. Roll the sticky pinecone in the birdseed. Press the seeds in all over.
4. With a grown-up, hang the feeder outside on a branch you can see from a window, near a bush where birds can hide.
5. Wait a day or two. Birds need time to find a new feeder.
6. Watch the feeder for five minutes each day. Draw a tally mark for each bird you see.
7. Try to name the birds with a bird book or a picture card. Is there a red cardinal? A little gray chickadee?
8. Make a new pinecone when the seeds are gone.

Tips

- Put out a shallow dish of fresh water too, and change it often.
- Move slowly near the window. Birds can see you moving inside.

Check your work

- ☐ I made a pinecone feeder and hung it outside.
- ☐ I can name at least one bird that came to eat.
- ☐ I can tell how a cardinal's beak helps it eat seeds.

NATURE JOURNAL

1. Draw your pinecone feeder hanging on its branch, with a bird eating from it.
2. Draw three beaks: a thick seed-cracking beak, a sharp woodpecker beak and a thin worm-catching beak.
3. Keep a bird count chart for a week: draw a little bird for each one you see each day.

From history. Audubon's *The Birds of America* was printed between 1827 and 1838. Its pages were huge, so that even big birds could be painted life-size. Each picture was engraved on copper, printed, and colored by hand with watercolor paint.

COMMON MISTAKES

- Giving up on the feeder after one day. Birds may take several days to find it.
- Throwing out bread. Bread fills birds up without feeding them well; seeds are much better.

Make it a game • Beak Pick-Up Contest. Pick a pretend beak: tweezers, a spoon or a clothespin. Your grown-up scatters seeds, cotton balls and rice on a tray. Try to pick up each food with your beak. Say which beak fits which food and which bird would have it. Cardinals crack seeds, so a strong beak wins that round.

Scripture. “Behold the fowls of the air: for they sow not, neither do they reap, nor gather into barns; yet your heavenly Father feedeth them. Are ye not much better than they?” (Matthew 6:26, KJV)

Jesus told us to look at the birds. God feeds them, and He cares for us even more. When we fill a feeder, we get to help Him care for His birds.

2.3 DEER AND RABBITS

OBJECTIVES

- Tell how deer and rabbits are built to hear danger and run away.
- Tell what deer and rabbits eat, including food from our gardens.
- Tell why we leave a baby fawn or baby bunny alone.

Warm-up. Play “Rabbit Ears.” Your child sits very still with eyes closed and cups hands behind the ears like big rabbit ears. You make a tiny sound somewhere in the room (a crinkle, a tap). Your child points to where the sound came from. Try it without the cupped hands. Which way was easier?

WATCH

Facts about Bunnies for Kids

Homeschool Pop • 6:22

https://www.youtube.com/watch?v=XxSS1QGC_S0

WHEN TO WATCH

After the core ideas. Listen for what rabbits eat.

BACKUP VIDEO

Don't Be a Fawn-Napper!

Virginia Department of Wildlife Resources • 1:25

<https://www.youtube.com/watch?v=YLwqu34qECw>

With the safety talk, to hear a wildlife expert explain why we leave fawns alone.

KEY TERMS

fawn

A baby deer. It has white spots on its back to help it hide.

browse

To nibble leaves, twigs and buds from bushes and trees, the way deer eat.

prey

An animal that other animals hunt for food. Rabbits and deer are prey animals.

CORE IDEAS

Deer and rabbits are gentle plant-eaters. Rabbits nibble grass, clover and garden lettuce. Deer **browse** on leaves, twigs, acorns and, if they can reach them, our garden plants and flowers.

Because foxes, coyotes, hawks and owls hunt them, deer and rabbits are **prey** animals. God made them to notice danger quickly. Their big ears turn to catch the smallest sound. Their eyes are on the sides of their heads, so they can see almost all the way around.

When they sense danger, they run! A cottontail rabbit zigzags away and shows its white puffy tail. A white-tailed deer lifts its white tail like a flag to warn the others and bounds away in big leaps.

In spring, a mother deer has a baby called a **fawn**. The fawn has white spots that look like sunlight on the ground, so it can hide by lying very still in the grass. The mother leaves it alone while she eats, and comes back to feed it. A nest of baby bunnies is also left alone most of the day.

If you find a fawn or a nest of baby bunnies, do not touch them. They are not lost. Their mother is nearby and will come back when people go away. Tell a grown-up and walk away quietly.

PICTURE STUDY



Young Hare, Albrecht Dürer, 1502 · Watercolor and gouache on paper · Albertina, Vienna

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

This is one of the most famous animal paintings in the world. Dürer painted a young hare, a big cousin of the rabbit, so carefully that it looks alive. Look for the tiny window reflected in its eye!

Look closely

- Find the long ears. Which way are they pointing?
- Find the eye. Can you see the little window shining in it?
- Find the whiskers and the big back feet.
- Look at the fur. How many colors of brown can you find?

Talk about it

1. Does the hare look calm or ready to run? Why do you think so?
2. How do the long ears and big feet help a hare stay safe?
3. How do you think Dürer painted such tiny hairs?

Safety first. Never touch or pick up a fawn or a baby rabbit. Watch deer from far away; a deer can kick. Check for ticks after walking in tall grass or the woods.

HANDS-ON PROJECT

A Safe Garden Fence

Rabbits and deer love to eat garden plants. You will build a model garden and design a fence to keep hungry visitors out, the way real gardeners do.

You will need

- A shoebox lid or a paper plate
- Play dough or clay
- Craft sticks, toothpicks or twigs
- Yarn or string
- Green paper or real leaves
- A toy rabbit or a drawn paper rabbit and deer

Steps

1. Make a little garden in the shoebox lid: press in green paper leaves or real leaves for lettuce and beans.
2. Talk about it: Would a rabbit like to eat this? What about a deer?
3. Stand craft sticks or twigs all around the garden, pushed into balls of play dough so they stand up.
4. Wrap yarn around the posts, low and close together. That stops a rabbit, which is small and squeezes through gaps.
5. Now think about the deer. Deer can jump very high. Add taller sticks and more yarn up high.
6. Test it with your toy rabbit and deer. Can they get in?
7. Tell your grown-up how real gardeners keep rabbits and deer out: fences, netting and covers over the plants.

Tips

- Real rabbit fences go a little under the ground too, because rabbits can dig.
- Remember that deer and rabbits are not bad; they are just hungry. We protect our garden and let them eat in the wild places.

Check your work

- ☐ I can tell how a rabbit and a deer get away from danger.
- ☐ I built a fence that keeps a rabbit and a deer out.
- ☐ I can tell what to do if I find a fawn: leave it alone and tell a grown-up.

NATURE JOURNAL

1. Draw a rabbit with its big ears and puffy tail.
2. Draw a fawn hiding in the grass with its white spots.
3. Look for signs of deer or rabbits: nibbled plants, little round droppings, or tracks in mud or snow. Draw what you find (and do not touch droppings).

From history. Dürer painted his *Young Hare* in 1502. It is painted in watercolor, which fades in light, so the museum in Vienna keeps the real painting in the dark and shows it only once in a while.

COMMON MISTAKES

- Thinking a fawn alone is lost. Its mother leaves it on purpose so it can hide.
- Calling every rabbit a bunny pet. Wild cottontails are wild and should never be caught.

Make it a game • Deer Ears, Rabbit Hops. Cup your hands behind your ears like a deer and stay very still. When your grown-up whispers a tiny sound or snaps a finger, bound away like a rabbit to a safe spot. Then tell your grown-up what deer and rabbits eat, and guard a pretend garden by pointing out what they might nibble.

2.4 NIGHT ANIMALS: LOOK, DON'T TOUCH

OBJECTIVES

- Name animals that come out at night: owls, raccoons, skunks and opossums.
- Tell how owls are made to hunt at night.
- Say and practice the safety rules for wild animals.

Warm-up. Turn off the lights and close the curtains so the room is dim. Sit still for one minute. What can you hear? What can you see? Slowly your eyes get used to the dark. Night animals have eyes and ears that work even better in the dark.

WATCH

All About Owls for Kids: Backyard Bird Series - FreeSchool

Free School • 3:43

<https://www.youtube.com/watch?v=m0XgSrdYQRY>

WHEN TO WATCH

After the core ideas. Listen for the owl calls and hoot along.

BACKUP VIDEO

Raccoon | Amazing Animals | Nat Geo Kids

Nat Geo Kids • 1:46

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

With the picture study, to see raccoons climb and wash their food.

KEY TERMS

nocturnal

Awake and busy at night, asleep in the day. Owls and raccoons are nocturnal.

den

A wild animal's home, like a hollow tree or a hole under a log.

rabies

A serious sickness some wild animals can carry. It spreads by a bite, so we never touch wild animals.

CORE IDEAS

When we go to bed, some animals wake up! Animals that are busy at night are called **nocturnal**. Owls, raccoons, skunks, opossums, bats and foxes are nocturnal animals near our homes.

God made the owl for the night. Its huge eyes see in dim light. Its ears are so sharp it can hear a mouse moving under the leaves. Its soft feathers let it fly without a sound. An owl can turn its head far around to look behind it.

A raccoon has a black mask and a striped tail. Its front paws are like little hands that feel for food in the water. A skunk is black with a white stripe; if it is scared, it sprays a very stinky smell. An opossum may pretend to be asleep (“play possum”) to stay safe.

During the day, night animals sleep in a **den**: a hollow tree, a hole under a shed or a pile of brush. If you see a raccoon, skunk or fox out in the daytime acting strange, it may be sick. Go inside and tell a grown-up.

Wild animals can carry a sickness called **rabies**, and they bite when scared. So the rule is **look, don’t touch**: never pet, feed or chase a wild animal, and keep garbage cans closed so they are not tempted to come close.

PICTURE STUDY



Raccoon, John James Audubon and John Woodhouse Audubon, about 1846 · Hand-colored lithograph from *The Viviparous Quadrupeds of North America* · Missouri Historical Society
Image: [Wikimedia Commons](#), public domain

After painting the birds of America, John James Audubon and his son John Woodhouse Audubon painted America's four-footed animals too. John Woodhouse painted this raccoon.

Look closely

- Find the black mask around the raccoon's eyes.
- Count the dark rings on its tail.
- Find its paws. How are they like hands?
- Where is the raccoon? Why do you think it likes trees?

Talk about it

1. How do a raccoon's paws help it find food at night?
2. Why should we never try to pet a raccoon?
3. What could your family do so raccoons do not get into your garbage?

Safety first. Never touch, feed or chase a wild animal. A raccoon, skunk, fox or bat out in the daytime, or acting strange, may be sick: go inside and tell a grown-up right away. Wash hands after being outdoors, and keep pet food and garbage put away at night.

HANDS-ON PROJECT

A Night-Animal Safety Book

You will make a little book about night animals and the safety rules that keep you and the animals safe.

You will need

- Four sheets of paper, folded and stapled into a book
- Black or dark blue paper (optional) and white or yellow crayon
- Crayons

Steps

1. On the cover, draw a moon and stars and write (or have your grown-up write) “Night Animals.”
2. Page 1: Draw an owl in a tree with big round eyes. Say one thing that helps it at night.
3. Page 2: Draw a raccoon with its black mask and ringed tail.
4. Page 3: Draw a skunk with its white stripe. Draw it far away, because we keep our distance!
5. Page 4: Draw yourself looking at an animal from far away. Write the rule: Look, don’t touch.
6. On the back, draw a grown-up and write: “If an animal seems sick, tell a grown-up.”
7. Read your book to someone in your family.

Tips

- Draw on dark paper with white and yellow crayons to make your pages look like night.
- On a warm evening, step outside with a grown-up and listen for owls or other night sounds.

Check your work

- ☐ I can name three night animals.
- ☐ I can tell how an owl is made to hunt at night.

- I can say the rule: look, don't touch, and tell a grown-up.

NATURE JOURNAL

1. Draw an owl's face with its big eyes and beak.
2. Draw what a raccoon might do at night in a backyard.
3. Listen outside at dusk with a grown-up. Draw or write one sound you heard.

From history. John James Audubon began *The Viviparous Quadrapeds of North America* when he was an old man, and his sons John Woodhouse and Victor helped him finish it. It has 150 pictures of America's mammals, from squirrels and rabbits to raccoons and bears.

COMMON MISTAKES

- Thinking a cute, friendly-looking wild animal is safe to pet. Wild animals are never pets.
- Leaving pet food or garbage out at night, which invites raccoons and skunks close to the house.

Make it a game • Night Animal Charades. Your grown-up whispers owl, raccoon, skunk or opossum, and you act it out without talking while the lights are dim. Swoop silently like an owl with big eyes, wash hands like a raccoon, and so on. Then guess back. After each one, say together: look, don't touch.

Scripture. "Thou makest darkness, and it is night: wherein all the beasts of the forest do creep forth." (Psalms 104:20, KJV)

God made the night as well as the day, and He made some creatures to be busy while we sleep. Even in the dark, His creatures are in His care.

UNIT 2

ANIMALS NEAR OUR HOME

Wild animals live all around us, even in towns: squirrels in the trees, birds at the feeder, rabbits in the grass, deer at the edge of the woods, and raccoons, skunks and owls that come out at night. In this unit your child becomes a quiet, careful animal watcher.

We learn how squirrels get ready for winter, how to feed birds, how deer and rabbits are built to listen and run, and why night animals are for looking at, never touching. The big rule of the unit is **look, don't touch**: wild animals stay wild, and we watch them from a safe distance. The paintings this unit are by Dürer and the Audubons, who looked at animals very closely.

PREREQUISITES

- Knows the four seasons (Unit 1)
- Can sit quietly for a few minutes
- No animal experience needed

MASTERY CHECKLIST

- ☐ I can tell how squirrels get ready for winter.
- ☐ I can name two birds that visit a feeder and tell what they eat.
- ☐ I can tell how deer and rabbits stay safe.
- ☐ I can name three animals that come out at night.
- ☐ I can say the rule for wild animals: look, don't touch.

LESSONS IN THIS UNIT

2.1 Squirrels Gather Nuts

2 sessions of 30 minutes

2.2 Birds at the Feeder

2 sessions of 30 minutes

2.3 Deer and Rabbits

2 sessions of 30 minutes

2.4 Night Animals: Look, Don't Touch

2 sessions of 30 minutes

UNIT 2 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. What does a squirrel do in the fall to get ready for winter?
2. Name a bird that comes to a feeder. What does it eat?
3. How do a rabbit and a deer stay safe from danger?
4. You find a baby fawn alone in the grass. What do you do?
5. Name three animals that come out at night.
6. What is our rule for wild animals? What do you do if one seems sick?

ANSWER KEY

1. It gathers nuts and acorns and buries or hides them to eat in winter.
2. For example, a cardinal eats sunflower seeds; a chickadee eats seeds; a woodpecker eats suet.
3. Big ears and wide-set eyes notice danger, then they run fast (rabbits zigzag; deer leap and flash their white tails).
4. Do not touch it; walk away quietly and tell a grown-up. Its mother will come back.
5. Any three of: owl, raccoon, skunk, opossum, bat, fox.
6. Look, don't touch. Go inside and tell a grown-up.

PORTFOLIO PIECE: MY BACKYARD ANIMAL WATCH

For one week, watch for wild animals and their signs around your home or a park: squirrels, birds at your feeder, rabbits, deer tracks, nibbled plants. Each day, draw one animal or sign in your nature journal and have a grown-up write the date and what you saw.

At the end of the week, tell your family about your favorite animal and the safety rule for wild animals.

LOOK FOR	WHAT IT MEANS
Faithful watching	Looked for animals on at least five days of the week.
Careful drawing	Drawings show real details your child noticed (a tail, a beak, a track).
Animal facts	Can tell one true fact about each animal drawn.
Safety	Watched from a distance and can say the rule: look, don't touch.

UNIT 3

DIRT AND WORMS

Every garden starts with soil. In this unit your child gets happily dirty, learning that the soil under our feet is not just “dirt” but a living, crumbly mix of tiny rock bits, old leaves, air, water and many small creatures. We look at soil, feel it, smell it and even shake it in a jar.

We meet the earthworm, the gardener’s best helper; we watch fallen leaves begin to turn into new soil; and we squish sand, clay and mud to feel how different soils behave. The pictures this unit, by Dürer, Audubon, Van Gogh and Constable, help us notice the ground that most people walk right over.

PREREQUISITES

- Knows that leaves fall in autumn (Unit 1)
- Willing to get hands dirty (gloves are fine)
- No gardening experience needed

MASTERY CHECKLIST

- ☐ I can tell what soil is made of.
- ☐ I can tell how earthworms help the soil.
- ☐ I can tell what happens to fallen leaves over time.
- ☐ I can tell how sand, clay and mud feel different.
- ☐ I wash my hands after working with soil.

LESSONS IN THIS UNIT

3.1 What Is Soil?

2 sessions of 30 minutes

3.2 Earthworms

2 sessions of 30 minutes

3.3 Leaves Turn into Soil

2 sessions of 30 minutes

3.4 Sand, Clay and Mud

2 sessions of 30 minutes

UNIT 3 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. What is soil made of? Name two things.
2. How does an earthworm help the garden?
3. What happens to fallen leaves after a long time?
4. Name a decomposer.
5. Feel these two soils. Which is sand and which is clay? How do you know?
6. What do you do after working with soil?

ANSWER KEY

1. Any two of: tiny bits of rock, old leaves and plants (humus), air, water, living things like worms.
2. It makes tunnels for air and water, pulls leaves into the soil, and leaves castings that feed plants.
3. They decompose (rot) and become new soil.
4. A worm, roly-poly, beetle, mushroom, mold or tiny germ.
5. Sand is gritty and falls apart; clay is smooth and sticky and holds together.
6. Wash my hands with soap.

PORTFOLIO PIECE: MY SOIL SCIENTIST BOOK

Make a small book about soil with your journal drawings and real samples. Include a page showing the layers of your soil jar, a page about earthworms, a before-and-after page from your leaf jar, and a page with a little sand and a little garden soil taped in small zip bags.

Show your book to your family and tell what you learned about soil.

LOOK FOR	WHAT IT MEANS
Soil jar	Shows the layers in the soil jar and names at least two of them.
Worms	Draws a worm with segments and tells one way worms help soil.
Leaves to soil	Shows how the leaf jar changed over time.
Soil types	Can tell sand from clay by feel and explain which drains faster.

3.1 WHAT IS SOIL?

OBJECTIVES

- Tell that soil is made of tiny bits of rock, old plants, air, water and living things.
- Use eyes, hands and nose to observe soil safely.
- Find the layers in a shaken soil jar.

Warm-up. Go outside with a cup and a spoon and scoop a little soil from the garden or a park (ask first!). Pour it on a white paper plate. Is it dark or light? Wet or dry? Do you see anything that is not soil, like a pebble, a root or a bug?

WATCH

What's the Dirt on ... Dirt?

[SciShow Kids](#) · 3:43

<https://www.youtube.com/watch?v=if29mjcd5bc>

WHEN TO WATCH

After the warm-up, before the core ideas.

BACKUP VIDEO

Where Does Soil Come From?

[SciShow Kids](#) · 5:29

<https://www.youtube.com/watch?v=5b9o7yM7YGE>

Later in the week, to learn how rocks slowly become soil.

KEY TERMS

soil

The top layer of the ground where plants grow. It is made of tiny rock bits, old plant parts, air, water and living things.

humus

The dark, crumbly part of soil made from old leaves and plants that have broken down. It feeds plants.

observe

To look, listen, feel and smell very carefully, like a scientist.

CORE IDEAS

Soil is the top layer of the ground. It is where plants send their roots down and get water and food. Without soil, we could not grow gardens or farms.

Soil is a mix. Part of it is tiny bits of rock, broken down over a long, long time by rain, ice and roots. Part of it is old leaves, roots and stems that have rotted into dark, crumbly **humus**.

Soil also has spaces in it, filled with air and water. Roots need both! If soil is packed down hard, there is no room for air and water.

Good soil is alive. A handful of garden soil holds worms, beetles, roly-polies and many tiny living things too small to see. They all help make the soil rich.

Scientists **observe** soil with their senses. We look at it with a magnifying glass, feel it between our fingers and smell it. Healthy garden soil smells fresh and earthy, like the woods after rain. We never taste soil, and we wash our hands when we are done.

PICTURE STUDY



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

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

Most people never look closely at a patch of weeds and grass. Albrecht Dürer did! More than 500 years ago he dug up a clump of field grass and painted every blade and leaf, right down to the dark soil at the bottom.

Look closely

- Find the dark soil at the bottom. What color is it?
- Find the roots and stems coming up out of the soil.
- Find the dandelion leaves with their jagged edges.
- Count how many different kinds of plants you can find.

Talk about it

1. Why do you think the soil at the bottom looks wet and dark?
2. What do the plants get from the soil?
3. If you lay on the grass and looked this closely, what might you find?

Safety first. Wear gloves if you like, never put soil in your mouth, and wash your hands with soap after touching soil. Ask a grown-up before digging, and avoid soil near roads or where pets go.

HANDS-ON PROJECT

A Soil Shake Jar

You will shake soil and water together in a jar and let it settle. The soil will sort itself into layers so you can see what it is made of.

You will need

- A clear jar with a tight lid (a pint or quart jar)
- A few big spoonfuls of garden soil
- Water
- A magnifying glass
- A white paper plate

Steps

1. Spread a spoonful of soil on the white plate. Look at it with the magnifying glass. Find bits of rock, bits of old leaves and roots, and maybe a tiny creature.
2. Rub a little soil between your fingers. Is it gritty, smooth or sticky?
3. Smell it. Does it smell earthy and fresh?
4. Fill the jar about one-third full of soil.
5. Add water until the jar is almost full. Put the lid on tight.
6. Shake, shake, shake for one minute!
7. Set the jar on a shelf and do not touch it. Look again after one hour and after one day.
8. Find the layers: heavy pebbles and sand at the bottom, finer soil on top, cloudy water above, and bits of old leaves floating on top.

Tips

- Try two jars with soil from two different places and compare them.
- Mark the layers on the outside of the jar with a dry-erase marker or tape.

Check your work

- ☐ I looked at, felt and smelled soil like a scientist.
- ☐ I can point to the layers in my jar.

- ☐ I can tell two things soil is made of.

NATURE JOURNAL

1. Draw your soil jar and color each layer the way it looks.
2. Draw what you saw in your soil with the magnifying glass.
3. Make a soil smear: rub a little damp soil on your journal page with your finger. Is it brown, black, gray or red?

COMMON MISTAKES

- Shaking the jar again before it settles. Patience lets the layers form.
- Calling all soil the same. Soil from a garden, a sandbox and a ditch can look and feel very different.

Make it a game • Soil Detective Senses. Put a scoop of soil on a paper plate. Use your eyes to find three things, your hands to feel if it is damp or dry, and your nose to sniff it. Say what each sense tells you. Find a tiny piece of old plant or a rock bit and announce what it is.

Scripture. “Or speak to the earth, and it shall teach thee” (Job 12:8, KJV)

God’s creation is full of lessons for anyone who looks closely. Even a handful of soil can teach us about His care and wisdom.

3.2 EARTHWORMS

OBJECTIVES

- Tell how an earthworm's body helps it live in the soil.
- Tell how earthworms help gardens.
- Observe a real earthworm gently and return it to the soil.

Warm-up. Go on a worm hunt after a rain, or gently turn over a log, a board or a flat stone in a damp place (with a grown-up). Did you find an earthworm? Where was it hiding? Put the log back carefully the way you found it.

WATCH

[Worms Are Wonderful](#) | [Amazing Animals](#) | [Backyard Science](#) | [SciShow Kids](#)

[SciShow Kids](#) · 4:34

https://www.youtube.com/watch?v=l-zc_1vjLnI

WHEN TO WATCH

After the core ideas. Watch how the worm stretches and squeezes to move.

KEY TERMS

earthworm

A long, soft animal with no legs that lives in the soil and eats dead leaves and bits of soil.

segment

One of the many little rings that make up a worm's body.

castings

Worm droppings. They are full of plant food and make soil rich.

CORE IDEAS

An **earthworm** has no legs, no eyes and no bones. Its long body is made of many little rings called **segments**. It moves by stretching out long and thin, then squeezing up short and fat. Tiny bristles on its body grip the soil.

Earthworms cannot see, but they can feel light, and they stay away from it. They breathe through their moist skin, so they need damp soil. That is why they come up

when rain soaks the ground.

Earthworms are a gardener's best friends. As they tunnel, they make little paths for air and water to reach plant roots. They pull dead leaves down into the soil and eat them.

What comes out of the worm is called **castings**. Castings are rich plant food. A garden with lots of worms is usually a healthy garden.

Worms are small creatures that God made, and we treat them kindly. Hold a worm gently in a damp, cupped hand, keep it out of hot sun, and put it back in the soil soon.

PICTURE STUDY



American Robin, John James Audubon, 1832 · Hand-colored engraving by Robert Havell from *The Birds of America* · National Gallery of Art, Washington
Image: [Wikimedia Commons](#), public domain

Robins are one of the first birds children learn to know. They hop across lawns in spring, tilt their heads and pull up earthworms. Audubon painted a robin family in their tree.

Look closely

- Find the robins' orange-red breasts.
- Find the nest. What do you think it is made of?
- Look at the robins' beaks. Are they thick like a cardinal's or thin and pointed?
- Count the robins in the picture.

Talk about it

1. How does a thin, pointed beak help a robin pull worms out of the ground?
2. Why do robins look for worms after a rain or on a wet lawn?
3. Robins use mud to build their nests. Where would they find mud?

Safety first. Wash hands after holding worms. Handle worms gently with damp hands, and return them to the soil. Turn logs and stones with a grown-up, and lift them toward you so anything underneath can move away.

HANDS-ON PROJECT

A Worm Watching Jar

You will make a see-through home for a few earthworms for a few days, watch them tunnel and mix the soil, and then let them go back to the garden.

You will need

- A large clear jar or plastic bottle with the top cut off (grown-up cuts)
- Damp garden soil and some sand
- A few dead leaves and a little vegetable peel
- Dark paper and tape
- A spray bottle of water
- Two to four earthworms you find yourself

Steps

1. Put a layer of damp soil in the jar, then a thin layer of sand, then soil, then sand, like stripes.
2. Lay a few dead leaves and a small piece of vegetable peel on top.
3. Gently place your earthworms on top. Watch how they dig down.
4. Spray the top with water so the soil stays damp but not soggy.
5. Wrap dark paper around the outside of the jar and tape it. Worms like the dark.
6. Keep the jar in a cool place, not in the sun.
7. Each day, take off the paper for a minute and look. Do you see tunnels? Are the sand and soil getting mixed?
8. After three or four days, take the worms back to where you found them and say goodbye.

Tips

- Make the jar in the evening; worms are most active in the dark.
- Never let the soil dry out, and never put the jar in the sun.

Check your work

- ☐ I can tell how a worm moves.

- ☐ I saw worm tunnels and mixed-up layers in my jar.
- ☐ I returned the worms to the soil gently.

NATURE JOURNAL

1. Draw an earthworm long and thin, then short and fat. Draw its segments.
2. Draw your worm jar from the side and show the tunnels.
3. After a rain, count the worms you see on a short walk and write the number.

COMMON MISTAKES

- Holding a worm in a dry, hot hand. Wet your hands first and keep the worm cool and shaded.
- Thinking a worm cut in half becomes two worms. That is not true; be gentle so worms are never hurt.

Make it a game • Be the Wiggly Worm. Wiggle across the floor like an earthworm, with no legs and a long squishy body. Count your segments by scrunching on a pretend ring each time. Then hand your grown-up a pretend scoop of castings and say how worms help gardens: they loosen soil and feed it.

3.3 LEAVES TURN INTO SOIL

OBJECTIVES

- Tell that fallen leaves slowly break down and become new soil.
- Name helpers that break down leaves: worms, bugs, fungi and tiny living things.
- Start a small leaf pile or compost jar and watch it change.

Warm-up. Collect three leaves from the ground: a fresh one that just fell, an old brown crunchy one, and one from the very bottom of a damp leaf pile. Lay them side by side. Which is the oldest? What is happening to it? (Look for holes, softness and dark spots.)

WATCH

How Compost Is Made: A Field Trip!

SciShow Kids · 6:43

<https://www.youtube.com/watch?v=26lO95Xt5WU>

WHEN TO WATCH

After the core ideas. Look for the steam rising from the warm compost pile.

BACKUP VIDEO

Leaf composting: From Leaves to Soil in 231 Days

E Fleming · 2:32

<https://www.youtube.com/watch?v=BRVvtlf2ubw>

After you start your leaf jar, to see a whole year of leaves turning into soil in two minutes.

KEY TERMS

decompose

To rot and break down into tiny pieces that become part of the soil.

compost

Old leaves, grass and food scraps that have broken down into rich, dark soil for the garden.

decomposer

A living thing, like a worm, a bug, a mushroom or a tiny germ, that breaks down dead plants.

CORE IDEAS

Every fall, trees drop millions of leaves. Where do they all go? They do not pile up forever. Slowly, they **decompose**, which means they rot and break into tiny pieces that become part of the soil.

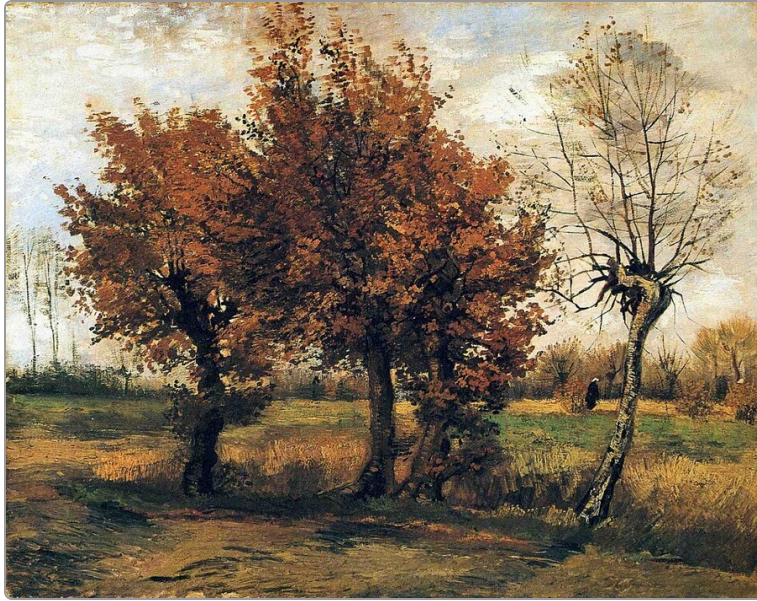
Many helpers do this work. Worms and roly-polies chew the leaves. Mushrooms and molds grow on them and soften them. Tiny living things too small to see eat them too. These helpers are called **decomposers**.

Decomposers need water and air to work. A damp leaf pile breaks down faster than a dry one. A pile in the shade, kept moist and stirred, turns into soil in a year or two.

Gardeners help this happen on purpose by making **compost**. They pile up leaves, grass clippings and fruit and vegetable peels. In time, the pile becomes dark, crumbly, sweet-smelling compost that makes plants grow strong.

God made a world where nothing is wasted. Last year's leaves feed this year's flowers. When we compost, we are working the way His creation works.

PICTURE STUDY



Autumn Landscape with Four Trees, Vincent van Gogh, 1885 · Oil on canvas · Kröller-Müller Museum, Otterlo, Netherlands

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

Before he became famous for bright colors, Vincent van Gogh painted the quiet countryside of Holland where his father was a pastor. Here, four trees glow gold in the fall.

Look closely

- Find the four trees. What color are their leaves?
- Look at the ground under the trees. Can you find fallen leaves?
- Find the water. What does it reflect?
- Look at the sky. What time of day might it be?

Talk about it

1. What will happen to these trees' leaves when they fall?
2. Who will help turn the fallen leaves into soil?
3. How would this picture look in winter? In spring?

Safety first. Wear gloves when handling a leaf pile or compost and wash hands afterward. Do not touch or eat mushrooms you find growing on leaves.

HANDS-ON PROJECT

A Leaf-to-Soil Jar

You will fill a jar with leaves, soil and water and watch the leaves begin to decompose over the next few weeks.

You will need

- A large clear jar or plastic container with a few small air holes in the lid (grown-up pokes holes)
- Fallen leaves, torn into pieces
- A few handfuls of garden soil
- A spray bottle of water
- A worm or two (optional)
- Tape and a marker

Steps

1. Tear the leaves into small pieces. Small pieces break down faster.
2. Put a layer of soil in the bottom of the jar.
3. Add a layer of torn leaves, then more soil, then more leaves.
4. Spray it with water until it is damp like a wrung-out sponge.
5. Add a worm if you like. Put on the lid with air holes.
6. Put a strip of tape on the jar and mark the top of the pile with today's date.
7. Keep the jar in a shady spot. Each week, spray it if it is dry and look closely.
8. Look for changes: dark spots, fuzzy mold, softer leaves, a pile that sinks lower. Mark the new top on the tape.

Tips

- A few bits of fruit or vegetable peel help it decompose faster.
- When your jar is done, sprinkle the new soil around a plant.

Check your work

- ☐ I made a leaf-to-soil jar.
- ☐ I can name two decomposers.

- ☐ I can tell what fallen leaves turn into.

NATURE JOURNAL

1. Draw your three leaves from the warm-up in a row: fresh, old and very old.
2. Draw your leaf jar on the first day. Draw it again in two weeks and compare.
3. Look under a damp pile of leaves outside. Draw any decomposers you find (worms, roly-polies, mushrooms) without touching the mushrooms.
4. Make a simple soil poster: one big picture (leaves turning into soil, or a worm in rich soil) and a few big words, like “Leaves Feed the Soil.” Many conservation districts hold a yearly poster contest that starts in kindergarten; ask your local soil and water conservation district.

From history. George Washington Carver was a great American plant scientist who taught at Tuskegee Institute in Alabama. He taught poor farmers that they did not need to buy expensive fertilizer: they could make their tired soil rich again by composting leaves, swamp muck and kitchen scraps.

COMMON MISTAKES

- Letting the jar dry out. Decomposers stop working when it is dry.
- Expecting soil in a day. Leaves take months to break down; patience is part of gardening.

Make it a game • Leaf Pile Makeover. Pile paper leaves on the floor. Your grown-up names a helper: worm, bug, fungus. Each time, tuck some leaves into a bag, getting the pile smaller and smaller. When the leaves are gone, hold up the bag and say, New soil! Name every helper you remember.

3.4 SAND, CLAY AND MUD

OBJECTIVES

- Tell how sand and clay feel different.
- Show how water runs through sand fast and through clay slowly.
- Tell which soil plants like best: a crumbly mix with humus.

Warm-up. Set out three little bowls: dry sand, a lump of clay (from a craft store or a clay bank) and garden soil. With eyes closed, feel each one. Which is gritty? Which is sticky and smooth? Which is crumbly? Guess which is which.

WATCH

Why Different Soils Feel Different

[SciShow Kids](https://www.youtube.com/watch?v=qJ9fJU1X9mA) · 6:51

<https://www.youtube.com/watch?v=qJ9fJU1X9mA>

WHEN TO WATCH

After the warm-up. Pause and feel your own sand and clay when the video does.

KEY TERMS

sand

Soil made of big grains you can see and feel. It is gritty, and water runs through it fast.

clay

Soil made of very tiny bits. It is sticky when wet, hard when dry, and holds water a long time.

mud

Soil mixed with lots of water.

CORE IDEAS

Not all soil is the same. Some soil has big grains, some has tiny grains, and most has a mix.

Sand has big grains you can see. It feels gritty and does not stick together. Water rushes right through sand, so sandy soil dries out fast.

Clay has very tiny bits, too small to see. Wet clay is sticky and smooth, and you can roll it into a snake. Dry clay gets hard as a brick. Water soaks into clay very slowly and stays a long time, so clay soil can get soggy.

Add lots of water to any soil, and you get **mud**! Mud is fun to squish, but plant roots in soggy mud cannot get the air they need.

Most plants like a mix in between: some sand, some clay and lots of dark humus. That soil is crumbly, holds some water and lets air in. Gardeners add compost to sandy soil and to clay soil to make them better.

PICTURE STUDY



The Hay Wain, John Constable, 1821 · Oil on canvas · The National Gallery, London

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

John Constable loved the English countryside where he grew up. In this famous painting, a farm cart called a wain splashes through a shallow stream by a cottage on a summer day.

Look closely

- Find the wooden cart in the water. How many horses pull it?
- Look at the edge of the stream. Do you see muddy banks?
- Find the cottage and the little dog by the water.
- Find the green field far away, where people are making hay.

Talk about it

1. Why do you think the cart is driving through the water?
2. What would the bottom of the stream feel like under your feet: sand, clay or mud?
3. Why might the farmer cool the horses and wet the wooden wheels in the stream on a hot day?

Safety first. Wash hands after playing with soil and mud. Use craft clay or clean garden soil, not mud from ditches or near roads.

HANDS-ON PROJECT

Sand, Clay and Garden Soil Test

You will pour water through sand, clay and garden soil and see which one lets the water through fastest and which one holds it best. Then you will make mud and try to roll it into a ball.

You will need

- Three clear plastic cups with small holes poked in the bottom (grown-up pokes)
- Three more clear cups or jars to catch the water
- Sand, clay soil (or craft clay crumbled with water) and garden soil
- A measuring cup of water
- A timer

Steps

1. Fill one holey cup half full of sand, one with clay and one with garden soil. Label them.
2. Set each holey cup on top of an empty cup.
3. Guess: Which one will let the water through fastest?
4. Pour the same amount of water into each cup, one at a time. Start the timer.
5. Watch the water drip into the bottom cups. Which drips fast? Which drips slowly or hardly at all?
6. After five minutes, compare how much water came through each one.
7. Now take a handful of each wet soil and squeeze it into a ball. Does the sand fall apart? Does the clay hold together like dough? Does the garden soil crumble gently?
8. Talk about it: Which soil would a plant like best? Why?

Tips

- Use the same amount of each soil and water so the test is fair.
- Roll the wet clay into a snake or a little pot. Clay is what potters use!

Check your work

- ☐ I can tell which soil let water through fastest (sand) and slowest (clay).
- ☐ I can tell how sand and clay feel.
- ☐ I can tell which soil plants like best.

NATURE JOURNAL

1. Draw your three cups and color how much water came through each one.
2. Look at a few grains of sand with a magnifying glass. Draw them big.
3. Make a little pinch pot or a worm out of clay. Draw it in your journal.

From history. For thousands of years, people have built with soil. Clay has been shaped into pots and baked into bricks, and in dry places people made houses of adobe, a mix of mud and straw dried in the sun. Some adobe buildings in the American Southwest are hundreds of years old.

COMMON MISTAKES

- Using different amounts of water in each cup. A fair test uses the same amount every time.
- Thinking soggy soil is good for plants. Roots need air as well as water.

Make it a game • Sand, Clay or Mud?. Close your eyes while your grown-up places a pinch of sand, a pinch of clay or a bit of mud in your palm. Wiggle your fingers and guess which one it is. Say whether it feels gritty, sticky or squishy. Switch places and see if you can fool your grown-up.

UNIT 3

DIRT AND WORMS

Every garden starts with soil. In this unit your child gets happily dirty, learning that the soil under our feet is not just “dirt” but a living, crumbly mix of tiny rock bits, old leaves, air, water and many small creatures. We look at soil, feel it, smell it and even shake it in a jar.

We meet the earthworm, the gardener’s best helper; we watch fallen leaves begin to turn into new soil; and we squish sand, clay and mud to feel how different soils behave. The pictures this unit, by Dürer, Audubon, Van Gogh and Constable, help us notice the ground that most people walk right over.

PREREQUISITES

- Knows that leaves fall in autumn (Unit 1)
- Willing to get hands dirty (gloves are fine)
- No gardening experience needed

MASTERY CHECKLIST

- ☐ I can tell what soil is made of.
- ☐ I can tell how earthworms help the soil.
- ☐ I can tell what happens to fallen leaves over time.
- ☐ I can tell how sand, clay and mud feel different.
- ☐ I wash my hands after working with soil.

LESSONS IN THIS UNIT

3.1 What Is Soil?

2 sessions of 30 minutes

3.2 Earthworms

2 sessions of 30 minutes

3.3 Leaves Turn into Soil

2 sessions of 30 minutes

3.4 Sand, Clay and Mud

2 sessions of 30 minutes

UNIT 3 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. What is soil made of? Name two things.
2. How does an earthworm help the garden?
3. What happens to fallen leaves after a long time?
4. Name a decomposer.
5. Feel these two soils. Which is sand and which is clay? How do you know?
6. What do you do after working with soil?

ANSWER KEY

1. Any two of: tiny bits of rock, old leaves and plants (humus), air, water, living things like worms.
2. It makes tunnels for air and water, pulls leaves into the soil, and leaves castings that feed plants.
3. They decompose (rot) and become new soil.
4. A worm, roly-poly, beetle, mushroom, mold or tiny germ.
5. Sand is gritty and falls apart; clay is smooth and sticky and holds together.
6. Wash my hands with soap.

PORTFOLIO PIECE: MY SOIL SCIENTIST BOOK

Make a small book about soil with your journal drawings and real samples. Include a page showing the layers of your soil jar, a page about earthworms, a before-and-after page from your leaf jar, and a page with a little sand and a little garden soil taped in small zip bags.

Show your book to your family and tell what you learned about soil.

LOOK FOR	WHAT IT MEANS
Soil jar	Shows the layers in the soil jar and names at least two of them.
Worms	Draws a worm with segments and tells one way worms help soil.
Leaves to soil	Shows how the leaf jar changed over time.
Soil types	Can tell sand from clay by feel and explain which drains faster.

UNIT 4

PETS

Many children dream of having a pet, and caring for one is a big, good job. In this unit your child learns what every pet needs, food, water, a safe home, cleaning and kindness, and meets four favorite pets: goldfish, hamsters, guinea pigs, and the cats and dogs we see every day.

No pet is needed for this unit. Families without a pet can visit a pet store, a shelter or a friend's pet, or plan a pretend pet home. The most important lesson is the same for everyone: animals are God's creatures, they depend on us, and we treat them gently and faithfully every single day. The paintings this unit, by Landseer, Berré, an unknown Elizabethan painter and Briton Rivière, show people and their animals long ago.

PREREQUISITES

- Knows the rule for wild animals: look, don't touch (Unit 2)
- Can follow a few simple steps
- No pet needed

MASTERY CHECKLIST

- ☐ I can name five things every pet needs.
- ☐ I can tell how to feed a goldfish and keep its water clean.
- ☐ I can tell how a hamster and a guinea pig are different.
- ☐ I can show how to meet a dog or cat safely and gently.
- ☐ I wash my hands after touching an animal.

LESSONS IN THIS UNIT

4.1 What Every Pet Needs

2 sessions of 30 minutes

4.2 Goldfish

2 sessions of 30 minutes

4.3 Hamsters and Guinea Pigs

2 sessions of 30 minutes

4.4 Safe and Kind with Cats and Dogs

2 sessions of 30 minutes

UNIT 4 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Name five things every pet needs.
2. How much food do you give a goldfish?
3. Tell one way a hamster and a guinea pig are different.
4. Show how to hold a guinea pig safely.
5. Show what you do before you pet a dog you meet on a walk.
6. A strange dog runs toward you. Show what you do.

ANSWER KEY

1. Food, fresh water, a safe home (shelter), cleaning, exercise or play, love; also a vet when sick.
2. Just a tiny pinch, only what it can eat in about two minutes, once or twice a day.
3. For example: hamsters are awake at night and often live alone; guinea pigs are bigger, awake in the day, live in pairs and eat lots of hay.
4. Sit on the floor; one hand under the chest, one under the bottom; hold gently, never squeeze.
5. Ask the owner, then hold out a hand low to sniff, then pet the side or back gently.
6. Be a tree: stand still, fold hands, look at feet, stay quiet; then tell a grown-up.

PORTFOLIO PIECE: MY PET CARE WEEK

For one week, do a real pet-care job every day: feed your pet, fill the water, help clean a cage or tank, or brush a dog or cat. If you have no pet, help care for a neighbor's or relative's pet with an adult, or set up a pretend pet with a stuffed animal and a daily care chart.

Check off each day on your pet care chart and draw a picture of yourself doing your favorite job.

LOOK FOR	WHAT IT MEANS
Faithful care	Did the pet job every day for a week with few or no reminders.
Needs	Can name what the pet needs and why.
Gentleness	Handled the animal (or toy) gently and safely.
Clean hands	Washed hands after each pet job.

4.1 WHAT EVERY PET NEEDS

OBJECTIVES

- Name what every pet needs: food, water, shelter, cleaning, exercise and love.
- Tell that pets depend on people every day.
- Match pets to the homes and foods they need.

Warm-up. Ask: What do you need every day to be healthy and happy? (Food, water, a bed, a home, a bath, play, people who love you.) Write or draw the list. Then ask: What do you think a pet needs? Is it the same list?

WATCH

Learn How To Care For Pets! | Caitie's Classroom Field Trip | Animal Video for Kids

Super Simple Play with Caitie! · 5:58

<https://www.youtube.com/watch?v=iLrW05LHMzI>

WHEN TO WATCH

After the warm-up. Watch for each thing the pets need and hold up a finger for each one.

BACKUP VIDEO

What do pets need?

RSPCAEducation · 3:38

<https://www.youtube.com/watch?v=FOLP8p0jSoA>

Later in the week, to review the five needs of a pet.

KEY TERMS

pet

An animal that lives with people and is cared for by them.

shelter

A safe home that keeps an animal warm, dry and protected.

responsible

Doing your job faithfully, even when no one reminds you.

CORE IDEAS

A **pet** is an animal that lives with a family. Wild animals take care of themselves, but a pet cannot. It depends on its people for everything.

Every pet needs **food** made for its kind of animal and **fresh water** every day.

Every pet needs a safe **shelter**: a tank, a cage, a bed or a house that is the right size, warm, dry and clean. Cleaning it is part of the job.

Every pet needs **exercise and play**, and gentle, kind attention. Many pets also need a visit to the animal doctor, called a veterinarian or vet.

Taking care of a pet means being **responsible**. A pet gets hungry every day, even on busy days and holidays. God gave people the job of caring for animals, and a good pet owner does it faithfully and kindly.

PICTURE STUDY



Dignity and Impudence, Sir Edwin Landseer, 1839 · Oil on canvas · Tate Britain, London

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

Edwin Landseer was an English painter who loved dogs more than almost anything. He painted them so well that people said he could show what a dog was thinking. Here, a big bloodhound and a little terrier share a kennel.

Look closely

- Find the big dog. How does he look: calm, sleepy or wise?
- Find the little dog. How does he look?
- Find the kennel, the dogs' shelter. What is it made of?
- Look at the big dog's long ears and droopy face.

Talk about it

1. Why do you think the painter named the big dog "Dignity" and the little dog "Impudence" (cheekiness)?
2. What does a dog's kennel give it? What else does a dog need?
3. Do you think these two dogs are friends? Why?

Safety first. Always ask the owner before touching any pet, and wash hands with soap after touching animals, their food or their cages.

HANDS-ON PROJECT

A Pet Care Chart

You will choose a pet (your own, a friend's or one you would like someday) and make a chart of everything it needs each day and each week.

You will need

- A large sheet of paper
- Crayons or markers
- Pictures of pets cut from magazines or printed (optional)
- Glue

Steps

1. Choose one pet: a dog, cat, fish, hamster, guinea pig or bird.
2. Draw your pet in the middle of the paper.
3. Around it, draw five boxes: Food, Water, Home, Clean, Play and Love.
4. In each box, draw what your pet needs. (A dog: dog food, a water bowl, a bed, a bath and brushing, a walk and a hug.)
5. At the bottom, make a row for each day of the week.
6. Talk with your grown-up: Which jobs happen every day? Which happen once a week?
7. Hang the chart up. If you have a pet, check off each job when you do it this week.

Tips

- If you do not have a pet, visit a pet store or shelter and ask a worker what that animal needs.
- Use pictures instead of words so you can read your chart yourself.

Check your work

- ☐ I can name five things every pet needs.
- ☐ I made a chart for one pet.
- ☐ I can tell which pet jobs happen every day.

NATURE JOURNAL

1. Draw a pet you know and its home.
2. Draw what your pet eats and drinks.
3. Draw yourself doing one pet-care job.

From history. Sir Edwin Landseer painted *Dignity and Impudence* in 1839. The big bloodhound and the little terrier belonged to a friend of his. Queen Victoria loved Landseer's animal paintings and asked him to paint her own dogs.

COMMON MISTAKES

- Thinking a pet only needs care when we feel like it. Pets need care every day.
- Giving pets people food. Many people foods, like chocolate and grapes, can make pets very sick.

Make it a game • Pet Needs Pickup. Spread out six cards or paper scraps marked food, water, shelter, cleaning, exercise and love. Your grown-up says a pet and you hold up the card that shows what it needs, then act it out: pour water, pet softly, walk the leash. Say why pets depend on people every day.

Scripture. "A righteous man regardeth the life of his beast" (Proverbs 12:10, KJV)

A good person pays attention to what his animals need and cares for them kindly. Caring for a pet is a way to obey God.

4.2 GOLDFISH

OBJECTIVES

- Tell how a goldfish breathes, swims and eats.
- Tell what a goldfish needs: a big tank with clean water, a filter and the right food.
- Practice feeding a fish just a little.

Warm-up. Visit a fish tank (at home, a pet store, a doctor's office or a video). Watch one fish for two minutes. How does it move? Which fins does it use? Does its mouth open and close? Where does it like to swim: top, middle or bottom?

WATCH

Goldfish Beginner Care Guide | Basic Care For Goldfish

The Nerdy Fish Girl · 4:55

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

WHEN TO WATCH

After the core ideas. A grown-up may want to watch it first; it is a real care guide.

KEY TERMS

gills

The parts on the side of a fish's head that take air out of the water so the fish can breathe.

fins

The thin, flat parts a fish uses to swim, steer and stop.

filter

A machine in a tank that cleans the water.

CORE IDEAS

A goldfish lives its whole life in water. It breathes with **gills** on the sides of its head, which take air out of the water. It swims by swishing its tail and steers with its **fins**.

Goldfish need much more room than people think. A tiny round bowl is too small. A goldfish needs a big tank with a **filter** to keep the water clean, because goldfish make a lot of waste. Goldfish can grow big and live more than ten years!

Tap water must be treated with special drops from the pet store before fish go in. Some of the water is changed every week to keep it fresh.

Feed a goldfish only a little: a small pinch of fish food once or twice a day, only what it can eat in about two minutes. Too much food makes the water dirty and the fish sick.

Fish cannot be cuddled, but they can know you! Many goldfish swim to the front of the tank when their person comes to feed them.

PICTURE STUDY



Fancy Goldfish, Unknown Japanese painter, 1800s · Ink and color on silk

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

In Japan, people have raised and loved goldfish for hundreds of years. An unknown Japanese artist painted these fancy goldfish with soft colors and a fine brush, so carefully that you can see the tiny scales.

Look closely

- Find the goldfish's eye and mouth.
- Find the fins. Which fin is on top of its back?
- Look at the long tail. How did the artist make it look thin and see-through?
- Find the second goldfish. What part of it can you see?

Talk about it

1. How does a goldfish use its tail and fins to swim?
2. This goldfish has a round body and long fins. Do you think it swims fast or slowly?
3. What would this goldfish need to stay healthy in a tank?

Safety first. Wash hands before and after putting hands in a fish tank. Only a grown-up handles the tank's electric filter, heater or light, and the water-treatment drops.

HANDS-ON PROJECT

A Goldfish Home and Feeding Practice

You will design a good home for a goldfish on paper, then practice measuring out just the right pinch of food.

You will need

- A large sheet of paper or the inside of a cereal box
- Crayons or markers
- Orange paper for goldfish
- Glue
- A few cereal flakes or crumbs and a small dish (for feeding practice)

Steps

1. Draw a big rectangle tank, much bigger than your goldfish. Color it blue for water.
2. Draw a filter in one corner with bubbles coming out, to keep the water clean.
3. Add smooth gravel on the bottom and a plant or two.
4. Cut out two orange goldfish and glue them in the tank. Give them lots of room to swim.
5. Practice feeding: pinch a tiny bit of cereal crumbs between your thumb and finger. That is about the right amount for one feeding.
6. Compare a tiny pinch to a whole handful. Talk about why too much food is bad for fish.
7. If you have a real fish, feed it its tiny pinch with a grown-up and watch it eat. Count to about 120 (two minutes).

Tips

- Visit a pet store and look at the filters and water-test kits.
- If you have a fish tank, help your grown-up with the weekly water change by holding the clean bucket.

Check your work

- ☐ I can tell how a goldfish breathes.

- ☐ I can name three things a goldfish needs.
- ☐ I can show how much food to give: just a tiny pinch.

NATURE JOURNAL

1. Draw a goldfish and label its gills, fins, tail and eye.
2. Watch a fish swim and draw arrows showing the way it moves.
3. Draw a fish tank that is a good home and a bowl that is too small. Put a smile by the good home.

From history. Goldfish were first kept long ago in China, where people noticed orange and gold fish among wild carp and began raising them in ponds and bowls. The fish later came to Japan, where fish keepers raised fancy kinds with round bodies and long, flowing tails, like the one in our picture.

COMMON MISTAKES

- Feeding a fish too much. Fish do not need a full belly all the time; a tiny pinch is plenty.
- Keeping a goldfish in a tiny bowl. Goldfish need a big filtered tank.

Make it a game • Goldfish Swim and Gulp. Be a goldfish. Wave your hands like fins and swim around the room. Open and close your mouth to gulp like gills taking in water. Your grown-up sprinkles pretend food, a pinch of paper, and you eat only a tiny bit. Then tell what your tank needs: clean water and a filter.

4.3 HAMSTERS AND GUINEA PIGS

OBJECTIVES

- Tell how hamsters and guinea pigs are alike and different.
- Tell what each needs to eat and how it likes to live.
- Show how to hold a small pet safely, sitting on the floor.

Warm-up. Look at pictures of a hamster and a guinea pig side by side (or visit a pet store). Which is bigger? Which has a tail? Which has big cheek pouches? Make two piles of words: hamster words and guinea pig words.

WATCH

Guinea Pigs for Kids | Learn all about these cute, tailless rodents

[Learn Bright](#) · 6:24

<https://www.youtube.com/watch?v=Vuls7o9uJ3A>

WHEN TO WATCH

After the core ideas about guinea pigs.

Note: Made for older children too. It mentions in passing that guinea pigs eat some of their own droppings to get more nutrients (a normal habit) and that people raise them in South America; both are true and brief.

BACKUP VIDEO

Hamsters for Kids | Learn fun facts all about these cute mammals

[Learn Bright](#) · 6:48

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

After the core ideas about hamsters, later in the week.

KEY TERMS

rodent

A small animal with front teeth that never stop growing, like a hamster, guinea pig or mouse.

nocturnal

Awake at night and asleep in the day.
Hamsters are mostly awake at night.

hay

Dried grass. Guinea pigs need to eat hay every day.

CORE IDEAS

Hamsters and guinea pigs are both **rodents**. Their front teeth keep growing all their lives, so they need to chew on hay, wooden chews or hard food to keep their teeth short.

A **hamster** is small and round and sleeps most of the day. It is **nocturnal**, so it runs on its wheel and digs at night. It stuffs food in its cheek pouches and hides it in its bed. Many hamsters, like the golden Syrian hamster, must live alone, because they fight with other hamsters.

A **guinea pig** is bigger, has no tail, and is awake in the day. Guinea pigs are friendly and like to live with another guinea pig. When they are happy or hungry, they squeak, “Wheek, wheek!”

Guinea pigs need to eat **hay** all day long, plus fresh vegetables and guinea pig pellets. They cannot make their own vitamin C, so they need foods like bell pepper. Hamsters eat hamster food mix with small bits of fresh vegetables.

Small pets are easily hurt. Hold them sitting on the floor, with one hand under the chest and one hand under the bottom. Never squeeze, never drop, and never wake a sleeping hamster; it may be scared and bite.

PICTURE STUDY



Three Unknown Elizabethan Children, Unknown English painter, about 1580 · Oil on panel · National Portrait Gallery, London

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

This painting is more than 440 years old. It is one of the oldest paintings in the world that shows a guinea pig! Guinea pigs came to England from South America, and they were a rare and special pet.

Look closely

- Find the guinea pig. Who is holding it?
- Look at how she holds it. Is she squeezing it or holding it gently?
- Find the other animal in the painting.
- Look at the children's clothes. How are they different from yours?

Talk about it

1. Why do you think the children wanted their pets in the painting?
2. How should you hold a guinea pig so it feels safe?
3. What would this guinea pig need to eat every day?

Safety first. Hold small pets while sitting on the floor so they cannot fall far. Never squeeze them. Let a grown-up help you, and wash your hands after touching a pet or cleaning its cage.

HANDS-ON PROJECT

Plan a Small Pet Home

You will build a model home for a hamster or a guinea pig with everything it needs, then visit a real one if you can.

You will need

- A shoebox
- Shredded paper or tissue (for bedding)
- A bottle cap (for a food dish) and a small cardboard tube (for a tunnel)
- A small box with a door cut out (for a hideout)
- A bit of real hay or dry grass
- Crayons and tape

Steps

1. Choose: a hamster home or a guinea pig home.
2. Fill the bottom of the shoebox with shredded paper bedding. Hamsters love deep bedding to dig in.
3. Add a hideout box so your pet has a dark, safe place to sleep.
4. Add a bottle-cap food dish and draw a water bottle on the side.
5. For a hamster, draw or make a running wheel. For a guinea pig, add a pile of hay.
6. Add a cardboard tube tunnel and something to chew.
7. Show your grown-up each part and tell what it is for.
8. If you can, visit a pet store or a friend's pet and compare your model with a real home.

Tips

- Real cages need to be much bigger than a shoebox. Small pets need room to run.
- Ask a pet store worker if you can watch them hold a guinea pig the right way.

Check your work

- ☐ My pet home has bedding, a hideout, food, water and something to chew.

- ☐ I can tell one way hamsters and guinea pigs are different.
- ☐ I can show how to hold a small pet safely.

NATURE JOURNAL

1. Draw a hamster and a guinea pig side by side. Circle the bigger one.
2. Draw a hamster stuffing its cheeks with food.
3. Draw the foods a guinea pig needs: hay, vegetables and pellets.

From history. Guinea pigs are not pigs, and they do not come from Guinea! They were first raised by people in the mountains of South America long ago. Spanish sailors brought them to Europe in the 1500s, where they became popular pets.

COMMON MISTAKES

- Waking a sleeping hamster to play. Wait for evening when it wakes up on its own.
- Holding a small pet while standing up. A fall can hurt it badly; always sit on the floor.

Make it a game • Hamster or Guinea Pig? Your grown-up hides behind a pillow and acts like a hamster stuffing its cheeks, or a guinea pig munching hay and squeaking. Guess which pet it is. Then switch. Say one thing both pets share, like fur and teeth that keep growing, and one thing each likes to eat.

4.4 SAFE AND KIND WITH CATS AND DOGS

OBJECTIVES

- Show the safe way to meet a dog: ask, offer a hand, then pet gently.
- Tell how a cat or dog shows it is happy or wants to be left alone.
- Practice what to do if a strange dog comes near: stand still like a tree.

Warm-up. Play “Happy or Leave Me Alone?” Show pictures (or act them out): a dog wagging loosely with a soft face, a dog with stiff body and showing teeth, a cat purring with slow blinks, a cat with ears flat and tail swishing. For each one, your child says “happy” or “leave me alone.”

WATCH

Dog Safety for Children | Woodgreen Pets Charity

Woodgreen Pets Charity • 6:05

<https://www.youtube.com/watch?v=CgEC7kBjujk>

WHEN TO WATCH

After the core ideas. Practice each safety rule with a stuffed toy dog as you watch.

KEY TERMS

body language

The way an animal shows how it feels with its ears, eyes, tail and body.

gentle

Soft, slow and careful, so an animal is not hurt or scared.

permission

Being told “yes, you may.” Always get permission before petting a dog or cat.

CORE IDEAS

Cats and dogs are wonderful friends, but they are animals with teeth and claws. They can bite or scratch if they are scared, hurt or bothered. We keep them and ourselves safe by being **gentle** and following the rules.

Rule one: always ask the owner for **permission** before petting a dog or cat. If the owner says yes, hold out your hand low and let the dog sniff it. Then pet its side or

back softly, not the top of its head.

Animals talk with **body language**. A happy dog has a loose, wiggly body and a soft face. A dog that is stiff, growling or showing teeth wants space. A happy cat purrs and rubs against you. A cat with flat ears, a swishing tail or a puffed-up body wants to be left alone.

Leave pets alone when they are eating, sleeping, or taking care of babies. Never pull a tail or ears, never hug a dog around the neck, and never put your face close to a dog's face.

If a dog you do not know comes near you, **be a tree**: stand still, fold your hands in front of you, look at your feet and stay quiet until it goes away. Do not run or scream. Tell a grown-up.

PICTURE STUDY



Sympathy, Briton Rivière, about 1877 · Oil on canvas · Tate Britain, London

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

Briton Rivière was an English painter who loved to paint dogs and the people who loved them. In this painting a little girl is sad, perhaps because she has been sent to sit on the stairs. Her dog has come to sit with her.

Look closely

- Find the girl. How do you think she feels? How can you tell?
- Find the dog. Where is it looking?
- Look at how close the dog is sitting. What is it doing?
- Find the stairs and the carpet. Where are they?

Talk about it

1. Why do you think the painter called this picture *Sympathy*?
2. How can a dog or cat be a good friend to its family?
3. How can we be kind to our pets in return?

Safety first. Always ask the owner before petting any dog or cat. Never bother an animal that is eating or sleeping. If a dog or cat bites or scratches you, tell a grown-up right away and wash the spot with soap and water. Wash hands after petting animals.

HANDS-ON PROJECT

Practice Meeting a Dog and a Cat

You will practice the safe way to meet a dog and a cat with a stuffed animal, then (if you can) with a calm real pet and its owner.

You will need

- A stuffed toy dog and a stuffed toy cat
- A grown-up to play the owner
- A calm, friendly real pet and its owner (optional)

Steps

1. Your grown-up holds the toy dog like an owner on a walk.
2. Walk up slowly. Stop a little way away and ask, “May I pet your dog?”
3. When the owner says yes, hold your hand out low with your fingers curled. Let the dog sniff.
4. Pet the dog’s side or back with slow, soft strokes. Count to three, then stop and let the dog decide if it wants more.
5. Now practice “be a tree”: your grown-up makes the toy dog run toward you. Stand still, fold your hands, look at your feet and stay quiet.
6. Practice with the toy cat: sit on the floor and let the cat come to you. Stroke its cheeks and back gently. Stop if its tail swishes.
7. If you can, visit a calm, friendly pet with its owner and practice the real thing. Then wash your hands.

Tips

- Practice the rules several times this week until they are a habit.
- Talk about pets your child sees on walks, and practice asking permission every time.

Check your work

- ☐ I ask permission before petting a dog or cat.
- ☐ I can show how to let a dog sniff my hand and pet it gently.
- ☐ I can be a tree if a strange dog comes near.

NATURE JOURNAL

1. Draw a happy dog with a wagging tail and a soft face.
2. Draw a cat that wants to be left alone: ears back, tail swishing.
3. Draw yourself being a tree: standing still, hands folded, looking at your feet.

From history. People and dogs have worked together for thousands of years. Dogs have herded sheep, guarded farms, pulled carts and helped hunters, and cats have kept barns and houses free of mice. On farms long ago, a good dog and a good cat were part of every family's work.

COMMON MISTAKES

- Running up to a dog to hug it. Walk slowly, ask first, and never hug a dog around the neck.
- Petting a cat that is twitching its tail. Watch the body language and stop when the cat says "enough."

Make it a game • Ask First Dog Greeting. Your grown-up is the dog, sitting still. Practice the steps in order: ask the owner, hold out a hand low, then pet gently on the back. Next, your grown-up shows a happy wag or a stiff, tucked-tail leave-me-alone. Say which is which. Take turns being the dog.

UNIT 4

PETS

Many children dream of having a pet, and caring for one is a big, good job. In this unit your child learns what every pet needs, food, water, a safe home, cleaning and kindness, and meets four favorite pets: goldfish, hamsters, guinea pigs, and the cats and dogs we see every day.

No pet is needed for this unit. Families without a pet can visit a pet store, a shelter or a friend's pet, or plan a pretend pet home. The most important lesson is the same for everyone: animals are God's creatures, they depend on us, and we treat them gently and faithfully every single day. The paintings this unit, by Landseer, Berré, an unknown Elizabethan painter and Briton Rivière, show people and their animals long ago.

PREREQUISITES

- Knows the rule for wild animals: look, don't touch (Unit 2)
- Can follow a few simple steps
- No pet needed

MASTERY CHECKLIST

- ☐ I can name five things every pet needs.
- ☐ I can tell how to feed a goldfish and keep its water clean.
- ☐ I can tell how a hamster and a guinea pig are different.
- ☐ I can show how to meet a dog or cat safely and gently.
- ☐ I wash my hands after touching an animal.

LESSONS IN THIS UNIT

4.1 What Every Pet Needs

2 sessions of 30 minutes

4.2 Goldfish

2 sessions of 30 minutes

4.3 Hamsters and Guinea Pigs

2 sessions of 30 minutes

4.4 Safe and Kind with Cats and Dogs

2 sessions of 30 minutes

UNIT 4 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Name five things every pet needs.
2. How much food do you give a goldfish?
3. Tell one way a hamster and a guinea pig are different.
4. Show how to hold a guinea pig safely.
5. Show what you do before you pet a dog you meet on a walk.
6. A strange dog runs toward you. Show what you do.

ANSWER KEY

1. Food, fresh water, a safe home (shelter), cleaning, exercise or play, love; also a vet when sick.
2. Just a tiny pinch, only what it can eat in about two minutes, once or twice a day.
3. For example: hamsters are awake at night and often live alone; guinea pigs are bigger, awake in the day, live in pairs and eat lots of hay.
4. Sit on the floor; one hand under the chest, one under the bottom; hold gently, never squeeze.
5. Ask the owner, then hold out a hand low to sniff, then pet the side or back gently.
6. Be a tree: stand still, fold hands, look at feet, stay quiet; then tell a grown-up.

PORTFOLIO PIECE: MY PET CARE WEEK

For one week, do a real pet-care job every day: feed your pet, fill the water, help clean a cage or tank, or brush a dog or cat. If you have no pet, help care for a neighbor’s or relative’s pet with an adult, or set up a pretend pet with a stuffed animal and a daily care chart.

Check off each day on your pet care chart and draw a picture of yourself doing your favorite job.

LOOK FOR	WHAT IT MEANS
Faithful care	Did the pet job every day for a week with few or no reminders.
Needs	Can name what the pet needs and why.
Gentleness	Handled the animal (or toy) gently and safely.
Clean hands	Washed hands after each pet job.

UNIT 5

SEEDS AND SPROUTS

Late winter is the perfect time to wake up some seeds indoors. In this unit your child opens a seed to find the tiny baby plant inside, watches a bean sprout in a bag on the window, tests what happens to plants without sun or water, and learns the parts of a plant: roots, stem, leaves, flowers, fruit and seeds.

Every week has something to watch grow, so the nature journal becomes a growth diary. The paintings this unit, by Van Gogh, Millet and the botanical artists of Köhler's plant book, show seeds, sowing, rain and a whole plant from root to flower. Running through it all is the wonder that God put a whole plant, "whose seed is in itself," inside something small enough to hold between two fingers.

PREREQUISITES

- Knows that plants grow from soil (Unit 3)
- Can water gently with a spray bottle
- No gardening experience needed

MASTERY CHECKLIST

- ☐ I can find the seed coat, the seed leaves and the baby plant inside a bean.
- ☐ I can tell what a seed needs to sprout: water, air and warmth.
- ☐ I can tell why plants need sunlight and water.
- ☐ I can name the parts of a plant: roots, stem, leaves, flower, fruit and seeds.
- ☐ I checked on my growing seeds and drew what I saw.

LESSONS IN THIS UNIT

5.1 What Is Inside a Seed?

2 sessions of 30 minutes

5.2 A Bean in a Bag

2 sessions of 30 minutes

5.3 Sun and Water

2 sessions of 30 minutes

5.4 Parts of a Plant

2 sessions of 30 minutes

UNIT 5 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Point to the parts of this soaked bean: the seed coat, the seed leaves and the baby plant.
2. What does a seed need to sprout?
3. When a bean sprouts, which grows first, the root or the shoot? Which way does each grow?
4. What happened to the plant in the dark? And the plant with no water?
5. Point to the roots, stem, leaves and flower on a plant. What does the root do?
6. Name a food that is a root, a leaf and a fruit.

ANSWER KEY

1. Seed coat is the outer skin; the two halves are the seed leaves (stored food); the tiny plant is tucked at one end.
2. Water, air and warmth.
3. The root grows first and grows down; the shoot grows up toward the light.
4. The plant in the dark grew pale, thin and weak; the plant with no water wilted and drooped.
5. Roots hold the plant in the soil and drink water.
6. For example: carrot (root), lettuce (leaf), apple or tomato (fruit).

PORTFOLIO PIECE: MY BEAN PLANT GROWTH LOG

Plant one of your sprouted beans in a cup of potting soil on a sunny windowsill. Water it when the top of the soil feels dry. Each week for four weeks, measure it with a ruler, and draw it in your journal with the date and its height.

At the end, label the roots (from your bag drawings), stem, leaves and any flowers on your last drawing, and show your plant and your log to your family.

LOOK FOR	WHAT IT MEANS
Faithful care	Watered the bean plant when needed, without reminders, for four weeks.
Growth log	Has a drawing and a measurement for each week, with dates.
Plant parts	Labels roots, stem and leaves correctly.
Telling back	Can tell what the plant needed to grow: light, water, air and soil.

5.1 WHAT IS INSIDE A SEED?

OBJECTIVES

- Name the three parts of a bean seed: seed coat, seed leaves and baby plant.
- Tell that a seed holds a tiny plant and its packed lunch.
- Sort seeds by size, shape and color.

Warm-up. Pour a little pile of mixed seeds and dry beans on a plate: beans, peas, sunflower seeds, popcorn kernels, pumpkin seeds from Unit 1, apple seeds. Sort them by size, by color, or by shape. Which is the biggest? The smallest? Do they all look alike?

WATCH

What's Inside a Bean? - #sciencegoals

SciShow Kids · 3:35

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

WHEN TO WATCH

After the core ideas, before you open your own beans.

BACKUP VIDEO

Look Inside a Seed at Home (PK - 2nd Grade)

Fort Worth Museum of Science and History · 5:37

<https://www.youtube.com/watch?v=IRXnfx4x3vY>

During the project, if you would like a museum teacher to show the steps.

KEY TERMS

seed

The part of a plant that can grow into a new plant.

seed coat

The hard skin on the outside of a seed that protects it.

embryo

The tiny baby plant inside a seed.

CORE IDEAS

A **seed** looks like a little stone, but it is alive! Inside every seed is a tiny baby plant, waiting to grow.

On the outside is the **seed coat**, a tough skin that keeps the seed safe and dry, like a coat keeps you warm.

Inside a bean are two big halves called **seed leaves**. They are packed with food, like a lunch box. The baby plant will eat that food when it first starts to grow, before it has green leaves of its own.

Tucked between the seed leaves is the **embryo**, the baby plant. With a magnifying glass you can see its tiny root and its two tiny folded leaves.

Seeds come in every size: a coconut is a seed, and so is a speck of a poppy seed. Each kind of seed grows into its own kind of plant. A bean seed always grows a bean plant, just as God planned.

PICTURE STUDY



Sunflowers, Vincent van Gogh, 1888 · Oil on canvas · The National Gallery, London

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

Vincent van Gogh painted sunflowers again and again. He painted them fresh and open, and also old and drying, when their big centers are full of seeds. This is one of his most famous paintings.

Look closely

- Find a sunflower with a big brown center. That center is full of seeds!
- Find a sunflower that is still a bud.
- Find a sunflower that is drying, with its petals falling off.
- How many sunflowers can you count?

Talk about it

1. How many seeds do you think are in one sunflower center?
2. What would happen if you planted one of those seeds?
3. Which sunflower do you like best: the young one, the open one or the old one full of seeds? Why?

HANDS-ON PROJECT

Open a Bean Seed

You will soak dry beans overnight to soften them, then open one up and find the baby plant inside with a magnifying glass.

You will need

- Large dry beans (lima beans work best) from the grocery store
- A cup of water
- A paper towel
- A magnifying glass
- Your nature journal and a pencil

Steps

1. The night before, put five or six beans in a cup of water to soak.
2. In the morning, look at the beans. Are they bigger? Feel them. Are they softer?
3. Compare a soaked bean with a dry bean. What changed?
4. Gently rub a soaked bean with your thumb. The seed coat will slip off like a skin. That is the seed coat!
5. Use your thumbnail to gently split the bean open along its edge, into two halves. Those are the seed leaves.
6. Look closely at one half with the magnifying glass. Find the tiny baby plant tucked at one end, with a little root and tiny leaves.
7. Open another bean and find its baby plant too.
8. Draw your opened bean and label the seed coat, the seed leaves and the baby plant.

Tips

- Soak a few extra beans; some baby plants break when you open them.
- Save some soaked beans for next week's bean-in-a-bag project.

Check your work

- ☐ I found the seed coat, the seed leaves and the baby plant.

- ☐ I can tell what the seed leaves are for: food for the baby plant.
- ☐ I drew and labeled my bean.

NATURE JOURNAL

1. Draw your opened bean big and label its parts.
2. Draw five different seeds from the warm-up, from smallest to biggest.
3. Draw a soaked bean next to a dry bean. Which is bigger?

From history. Seeds can rest for a very long time and still grow. Gardeners often save seeds in envelopes from one year to the next, and some seeds kept dry and cool can still sprout after many years. That is why farmers and gardeners have always saved their best seeds carefully for next spring.

COMMON MISTAKES

- Trying to open a dry bean. Soak it overnight first so it opens easily.
- Thinking seeds are not alive because they do not move. A seed is alive but resting, waiting for water and warmth.

Make it a game • Bean Seed Pieces. Hold a bean seed or draw one on paper. Point to the seed coat, the seed leaves and the baby plant. Then play hide the baby: tuck a toy inside a cloth wrapped like a seed coat and say it is the baby plant with its packed lunch. Take turns unwrapping.

Scripture. “And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so.” (Genesis 1:11, KJV)

On the third day, God made plants with seeds inside them, so each plant could make more plants of its own kind. Every bean you open shows His plan.

5.2 A BEAN IN A BAG

OBJECTIVES

- Tell what a seed needs to sprout: water, air and warmth.
- Watch a bean sprout and see that the root grows first, then the shoot.
- Measure and draw a sprout as it grows.

Warm-up. Ask: Last week we found a baby plant inside a bean. How can we wake it up? Make a list of guesses. (Water? Sun? Soil? Warmth?) Keep your list; at the end of the week, see which guesses were right.

WATCH

Grow a Bean in a Bag

CalFresh Healthy Living, UC in SLO and SB Counties • 4:33

<https://www.youtube.com/watch?v=TNe0WRfIQOk>

WHEN TO WATCH

Before the project. Watch once, then follow along to make your bag.

BACKUP VIDEO

Bean Time-Lapse - 25 days | Soil cross section

GPhase • 3:10

<https://www.youtube.com/watch?v=w77zPAtVTuI>

After your bean sprouts, to watch a bean grow under the soil for 25 days in 3 minutes.

KEY TERMS

sprout

When a seed starts to grow; also, the young plant that comes out.

root

The part of a plant that grows down into the soil to drink water and hold the plant in place.

shoot

The part of a young plant that grows up toward the light.

CORE IDEAS

A seed can rest for a long time. To wake up and **sprout**, it needs three things: water, air and warmth. A seed does not need light or soil to sprout, because it carries its own food inside.

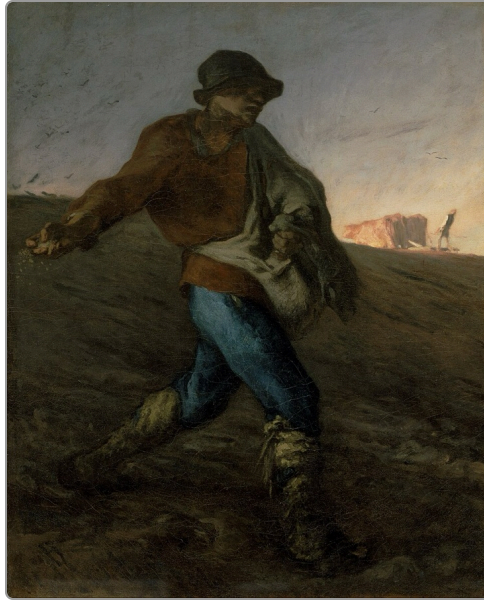
First the seed drinks water and swells up. The seed coat splits open.

Next, a little white **root** pokes out and grows *down*. Even if you turn the seed upside down, the root turns and grows down. God made roots to know which way is down!

Then the **shoot** grows *up*, carrying the first leaves toward the light. When the leaves turn green in the sunlight, the young plant can start making its own food.

Different seeds take different times. Beans often sprout in three to seven days when they are warm and damp. A gardener checks every day and keeps the seeds damp, but not soaking wet.

PICTURE STUDY



The Sower, Jean-François Millet, 1850 · Oil on canvas · Museum of Fine Arts, Boston

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

Jean-François Millet grew up on a farm in France and saw men sowing grain every fall and spring. Here a sower walks down the field throwing seeds by hand. Millet made him look strong and important, because growing food is important work.

Look closely

- Find the sower's bag. What is inside it?
- Look at his arm. Which way is he throwing the seeds?
- Find the farmer and the oxen working on the hill far behind.
- Look at the sky. What time of day is it?

Talk about it

1. Why does the field need to be plowed before the seeds are thrown?
2. What will the seeds need to sprout after they land in the soil?
3. Why might hungry birds be a problem for the sower?

HANDS-ON PROJECT

A Bean in a Bag

You will put bean seeds in a clear bag with a wet paper towel and tape it to a window, so you can watch the roots and shoots grow every day.

You will need

- A zip-top sandwich bag
- A paper towel
- Three or four dry beans (soaked overnight)
- Water in a spray bottle
- Tape and a marker
- A ruler

Steps

1. Fold the paper towel to fit inside the bag.
2. Spray the paper towel until it is damp all over, but not dripping.
3. Put the towel in the bag. Lay the beans on the towel in a row, about one-third of the way up from the bottom.
4. Zip the bag almost closed, leaving a little gap for air.
5. Write your name and today's date on the bag.
6. Tape the bag to a window that gets light but is not too cold.
7. Look at your beans every day. Spray the towel if it starts to dry out.
8. When you see a root, measure it with a ruler and draw it in your journal.
Keep drawing every few days as the root and shoot grow.
9. When the shoot has leaves, you can plant your bean sprout in a cup of soil.

Tips

- Turn one bean sideways or upside down and watch the root turn to grow down.
- If a bean gets fuzzy mold, take it out and keep the others.

Check your work

- ☐ I can tell what a seed needs to sprout.
- ☐ I saw the root come out first, then the shoot.
- ☐ I drew my bean as it grew.

NATURE JOURNAL

1. Make a sprout diary: draw your beans on Day 1, Day 3, Day 5 and Day 7.
2. Measure your longest root and write how long it is.
3. Draw an arrow showing which way the root grows and which way the shoot grows.

From history. For thousands of years, farmers sowed grain by hand, walking up and down the field and scattering seed from a bag, just like Millet's sower. Later, inventors built seed drills, machines that drop seeds into neat rows at the right depth.

COMMON MISTAKES

- Letting the paper towel dry out. Check every day.
- Soaking the towel so much that water pools in the bag. Too much water and no air can make seeds rot.

Make it a game • Sprout Stretch. Curl up small like a seed on the floor. Your grown-up calls out water, air and warmth, and you do one action for each: sip, breathe, rub your arms. Then grow. Push a root down first by wiggling your toes, and then reach a shoot up toward the ceiling.

5.3 SUN AND WATER

OBJECTIVES

- Tell that green plants need sunlight and water to grow.
- Do a test: one plant with light and water, one without light, and one without water.
- Tell what happens to plants that get too little or too much water.

Warm-up. Look at a houseplant or a plant near a window. Which way are its leaves facing? Turn the pot halfway around and look again in two days. (The leaves will turn back toward the window!)

WATCH

What Happened to Our Plants? | Science Project for Kids

SciShow Kids · 3:54

<https://www.youtube.com/watch?v=8kTt4xHHLzk>

WHEN TO WATCH

After the core ideas, before you set up your plant test.

BACKUP VIDEO

Do Plants Need Water and Sunlight to Grow? Let's Investigate! | MightyOwl Science | 2nd Grade

MightyOwl · 7:48

<https://www.youtube.com/watch?v=Gskasi4-O3E>

Later in the week, to see another plant test from start to finish.

KEY TERMS

sunlight

Light from the sun. Green plants use it to make their food.

wilt

When a plant droops because it does not have enough water.

experiment

A careful test to find out what happens.

CORE IDEAS

A seed has its own food to sprout. But once a plant has green leaves, it must make its own food, and to do that it needs **sunlight**, water and air.

Green leaves catch sunlight like little solar panels. With light, water from the roots and air from all around, the leaves make sugar to feed the whole plant. That is why leaves spread out wide and turn toward the light.

A plant kept in the dark grows tall, thin and pale yellow as it stretches to find light. It cannot make food, and it grows weak.

Plants drink water through their roots. Without water, a plant will **wilt** and droop. With water, it stands up again. But too much water is a problem too: soggy soil has no air, and the roots can rot.

God sends sunshine and rain to make plants grow. A good gardener helps by putting plants where they get the light they need and by watering just right.

PICTURE STUDY



Wheat Field in Rain, Vincent van Gogh, 1889 · Oil on canvas · Philadelphia Museum of Art

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

Van Gogh could see a walled wheat field from his window in the south of France. He painted it many times, in sun and in storm. Here, a spring rain is falling on the young green wheat.

Look closely

- Find the rain. What kind of lines did Van Gogh use for it?
- Find the young wheat. Is it green or golden?
- Find the wall around the field.
- Is the sun shining in this picture? How can you tell?

Talk about it

1. How will the rain help the young wheat grow?
2. What else will the wheat need after the rain stops?
3. What would happen to this field if it never rained?

HANDS-ON PROJECT

The Sun and Water Test

You will grow three cups of the same seeds the same way, then give each cup something different, to see what plants need. This is an experiment!

You will need

- Three small cups with drainage holes, filled with potting mix
- Fast-growing seeds (beans, peas, radishes or grass seed)
- A tray to catch water
- A cardboard box or a dark closet
- Labels and a marker
- A spray bottle or small watering can

Steps

1. Plant the same number of seeds in each cup. Water all three and put them in a sunny window until the sprouts are up.
2. Label the cups: “Sun and water,” “No sun” and “No water.”
3. Cup 1 stays in the sunny window and gets watered when the soil is dry.
4. Cup 2 goes into a dark box or closet. Water it like Cup 1.
5. Cup 3 stays in the sunny window, but gets no water.
6. Guess: Which plant will grow best? Draw your guess.
7. Look at the three cups every two days for two weeks. Draw what you see.
8. At the end, compare. Which one grew tall and green? Which one is pale? Which one wilted?
9. Rescue your plants: give Cup 2 light and Cup 3 water, and see if they get better.

Tips

- Keep everything the same except one thing for each cup. That is what makes a fair test.
- Do not wait too long to rescue the plants, or they may not recover.

Check your work

- ☐ I can tell what happened to the plant with no sun.
- ☐ I can tell what happened to the plant with no water.
- ☐ I can tell two things green plants need to grow.

NATURE JOURNAL

1. Draw your three cups side by side at the end of the test. Color them carefully: green, pale or droopy.
2. Draw a plant leaning toward a window with an arrow to the sun.
3. Keep a weather chart for a week: draw a sun, a cloud or raindrops each day.

COMMON MISTAKES

- Giving the plants different amounts of water. Change only one thing in each cup.
- Thinking more water is always better. Water when the top of the soil feels dry.

Make it a game • Sun and Water Guess. Line up three toy plants or cups. Say which one gets sun and water, which gets no sun and which gets no water. Your grown-up asks which will droop. Act it out: stand tall for the happy plant, flop for the one without water, and sag in the dark corner for the one without sun.

Scripture. “Who covereth the heaven with clouds, who prepareth rain for the earth, who maketh grass to grow upon the mountains.” (Psalms 147:8, KJV)

God sends the clouds and the rain, and He makes the grass grow. When we water our plants, we are doing in a small way what God does for the whole earth.

5.4 PARTS OF A PLANT

OBJECTIVES

- Name the parts of a plant: roots, stem, leaves, flower, fruit and seeds.
- Tell what each part does.
- Find the parts on a real plant and on the vegetables we eat.

Warm-up. With a grown-up, gently pull up a whole weed or dandelion, roots and all (or buy a small plant in a pot and tip it out). Shake off the soil and lay it on newspaper. Point to each part you can find. What is under the ground? What is above?

WATCH

Parts of Plants for Kids | Learn all about plant parts and their functions

Learn Bright · 7:26

<https://www.youtube.com/watch?v=A-xScqCN0GA>

WHEN TO WATCH

After the core ideas. Point to each part on your own plant as the video names it.

KEY TERMS

stem

The part of a plant that holds it up and carries water from the roots to the leaves.

leaf

The flat green part of a plant that uses sunlight to make food.

flower

The part of a plant that makes seeds.
Bees visit flowers.

CORE IDEAS

A plant has parts, and each part has a job, like the parts of your body.

The **roots** grow under the ground. They hold the plant tight in the soil and drink up water. The **stem** holds the plant up tall and carries the water up to the leaves, like a straw.

The **leaves** catch sunlight and make food for the plant. Leaves come in many shapes: round, pointed, jagged, long and thin.

The **flower** is where seeds are made. Bees and butterflies visit flowers and carry pollen from one to another. Then the flower grows into a **fruit**, which holds the **seeds** inside.

We eat every part of plants! Carrots are roots. Celery is a stem. Lettuce is leaves. Broccoli is flower buds. Apples and tomatoes are fruits. Beans and corn are seeds.

PICTURE STUDY



Dandelion, Botanical illustrators of *Köhler's Medizinal-Pflanzen*, 1887 · Chromolithograph · From *Köhler's Medizinal-Pflanzen*, Germany
Image: [Wikimedia Commons](#), public domain

Long ago, before photographs, botanists hired artists to draw plants exactly, from root to seed, so people could learn to know them. This chart of a dandelion comes from a German plant book printed in 1887.

Look closely

- Find the long root at the bottom. What color is it?
- Find the leaves with their jagged edges, like teeth.
- Find the yellow flower and the fluffy white ball of seeds.
- Find the little drawings of one tiny seed with its parachute.

Talk about it

1. Which part of the dandelion drinks water?
2. How do the fluffy seeds travel to new places?
3. Why do you think the artist drew the whole plant, even the root?

Safety first. Wash hands after pulling plants and handling soil. Only pull weeds a grown-up says are okay, and do not eat any part of a plant unless a grown-up says it is food.

HANDS-ON PROJECT

Eat the Parts of a Plant

You will make a plant-parts snack plate with a root, a stem, a leaf, a flower, a fruit and a seed that you can eat, and build a plant picture from them.

You will need

- A carrot (root)
- A celery stick (stem)
- A lettuce or spinach leaf (leaf)
- Broccoli florets (flower)
- A few grapes, cherry tomatoes or apple slices (fruit)
- Sunflower seeds or peas (seeds)
- A large plate

Steps

1. Wash all the vegetables and fruits with your grown-up.
2. Hold up each food and guess: Is it a root, stem, leaf, flower, fruit or seed?
3. On a big plate, build a plant: carrot roots at the bottom, a celery stem going up, lettuce leaves on the sides, a broccoli flower on top.
4. Put the fruit beside the flower, and sprinkle seeds inside the fruit.
5. Point to each part and say its job: roots drink, stems carry, leaves make food, flowers make seeds.
6. Eat your plant!

Tips

- A grown-up cuts the carrot and celery into sticks.
- Look at the celery end: you may see little dots where water travels up the stem.

Check your work

- ☐ I can name six parts of a plant.
- ☐ I can tell the job of the roots, stem and leaves.

- ☐ I can name a food that is a root and a food that is a seed.

NATURE JOURNAL

1. Draw a whole plant with roots, stem, leaves, flower and seeds. Label each part (a grown-up can help write).
2. Draw the weed or plant you pulled up, roots and all.
3. Draw three leaves with different shapes.

From history. Old botany books like Köhler's were made to help doctors, pharmacists and students know plants exactly. Each plant was drawn whole, with its root, leaves, flowers and seeds, and then the tiny parts were drawn again much bigger, so nothing was missed.

COMMON MISTAKES

- Forgetting the roots because they are hidden. Pull up a weed to see them.
- Thinking fruits are only sweet. A tomato, a pumpkin and a cucumber are all fruits because they hold seeds.

Make it a game • Plant Parts Body Game. Be a plant. Wiggle your toes as roots, stand straight as a stem, wave your hands as leaves, and cup your hands over your head as a flower. Your grown-up calls a part and you strike that pose. Last round, name the fruit and seeds, and say what each part does.

UNIT 5

SEEDS AND SPROUTS

Late winter is the perfect time to wake up some seeds indoors. In this unit your child opens a seed to find the tiny baby plant inside, watches a bean sprout in a bag on the window, tests what happens to plants without sun or water, and learns the parts of a plant: roots, stem, leaves, flowers, fruit and seeds.

Every week has something to watch grow, so the nature journal becomes a growth diary. The paintings this unit, by Van Gogh, Millet and the botanical artists of Köhler's plant book, show seeds, sowing, rain and a whole plant from root to flower. Running through it all is the wonder that God put a whole plant, "whose seed is in itself," inside something small enough to hold between two fingers.

PREREQUISITES

- Knows that plants grow from soil (Unit 3)
- Can water gently with a spray bottle
- No gardening experience needed

MASTERY CHECKLIST

- ☐ I can find the seed coat, the seed leaves and the baby plant inside a bean.
- ☐ I can tell what a seed needs to sprout: water, air and warmth.
- ☐ I can tell why plants need sunlight and water.
- ☐ I can name the parts of a plant: roots, stem, leaves, flower, fruit and seeds.
- ☐ I checked on my growing seeds and drew what I saw.

LESSONS IN THIS UNIT

5.1 What Is Inside a Seed?

2 sessions of 30 minutes

5.2 A Bean in a Bag

2 sessions of 30 minutes

5.3 Sun and Water

2 sessions of 30 minutes

5.4 Parts of a Plant

2 sessions of 30 minutes

UNIT 5 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Point to the parts of this soaked bean: the seed coat, the seed leaves and the baby plant.
2. What does a seed need to sprout?
3. When a bean sprouts, which grows first, the root or the shoot? Which way does each grow?
4. What happened to the plant in the dark? And the plant with no water?
5. Point to the roots, stem, leaves and flower on a plant. What does the root do?
6. Name a food that is a root, a leaf and a fruit.

ANSWER KEY

1. Seed coat is the outer skin; the two halves are the seed leaves (stored food); the tiny plant is tucked at one end.
2. Water, air and warmth.
3. The root grows first and grows down; the shoot grows up toward the light.
4. The plant in the dark grew pale, thin and weak; the plant with no water wilted and drooped.
5. Roots hold the plant in the soil and drink water.
6. For example: carrot (root), lettuce (leaf), apple or tomato (fruit).

PORTFOLIO PIECE: MY BEAN PLANT GROWTH LOG

Plant one of your sprouted beans in a cup of potting soil on a sunny windowsill. Water it when the top of the soil feels dry. Each week for four weeks, measure it with a ruler, and draw it in your journal with the date and its height.

At the end, label the roots (from your bag drawings), stem, leaves and any flowers on your last drawing, and show your plant and your log to your family.

LOOK FOR	WHAT IT MEANS
Faithful care	Watered the bean plant when needed, without reminders, for four weeks.
Growth log	Has a drawing and a measurement for each week, with dates.
Plant parts	Labels roots, stem and leaves correctly.
Telling back	Can tell what the plant needed to grow: light, water, air and soil.

UNIT 6

ON THE FARM

Early spring is a busy time on a farm: chicks peep, calves are born, and bees fly out to the first blossoms. In this unit your child learns what farm animals give us, eggs, milk, wool, honey and hard work, and meets three of the most important: chickens, cows and honeybees.

No farm is needed. Visit a farm, a petting zoo or the animal barns at your county fair if you can; otherwise the videos, the paintings (by Rosa Bonheur, Hondecoeter, Julien Dupré and Bruegel) and the projects bring the farm to your table. Along the way we learn that farm animals need care every single day, and that a good farmer is kind to his animals.

PREREQUISITES

- Knows what every pet needs (Unit 4)
- Knows that most food comes from farms (Unit 1)
- No farm or animals needed

MASTERY CHECKLIST

- ☐ I can match farm animals to what they give us.
- ☐ I can tell what a hen needs and how eggs are gathered.
- ☐ I can tell what cows eat and what we make from milk.
- ☐ I can name the queen, workers and drones and tell how bees make honey.
- ☐ I wash my hands after touching farm animals.

LESSONS IN THIS UNIT

6.1 What Farm Animals Give Us

2 sessions of 30 minutes

6.2 Chickens and Eggs

2 sessions of 30 minutes

6.3 Cows and Milk

2 sessions of 30 minutes

6.4 Bees and Honey

2 sessions of 30 minutes

UNIT 6 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. What does a chicken give us? A cow? A sheep? A bee?
2. Name three things a hen needs.
3. What do cows eat? What is a cow doing when she chews her cud?
4. Show how you made butter. What did you start with?
5. Name the three kinds of honeybees. Who lays the eggs?
6. A bee lands on your arm. What do you do?

ANSWER KEY

1. Eggs; milk (and butter, cheese); wool; honey (and beeswax).
2. Any three of: food, fresh water, grit, a coop, a nest box, a roost, a door closed at night.
3. Grass and hay; she is chewing food she brought back up from her stomach to chew again.
4. Cream in a jar, shaken until butter and buttermilk separate.
5. Queen, workers and drones; the queen lays the eggs.
6. Stay calm and still until it flies away; tell a grown-up if stung.

PORTFOLIO PIECE: MY FARM CHORE CHART AND SHOW-AND-TELL

Make a picture chore chart for one farm animal (chickens, a cow or a beehive). Draw the morning and evening chores: feeding, water, gathering eggs, milking or checking the hive. Add a picture of what the animal gives us.

Then give a short show-and-tell, the way 4-H Cloverbuds share display projects at a county fair: stand up, hold your chart, say your name and your animal, and tell your family two things you learned.

LOOK FOR	WHAT IT MEANS
Daily needs	Shows food, water and shelter for the animal.
Chores	Shows at least two chores in the right part of the day.
Animal gift	Correctly shows what the animal gives us.
Show-and-tell	Stood up and told two true things about the animal in a clear voice.

6.1 WHAT FARM ANIMALS GIVE US

OBJECTIVES

- Name six farm animals and what each gives us.
- Tell that farm animals need food, water, shelter and care every day.
- Find farm foods and things in our own home.

Warm-up. Kitchen hunt! Find things in your home that came from a farm animal: an egg, a glass of milk, butter, cheese, a jar of honey, a wool sweater or wool socks. Lay them out. Guess which animal gave each one.

WATCH

Farm Animals for Kids | Learn all about these fun animals!

Learn Bright · 6:15

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

WHEN TO WATCH

After the warm-up. Name each animal before the video does.

KEY TERMS

livestock

Animals raised on a farm, like cows, sheep, pigs, goats and chickens.

wool

The soft, curly coat of a sheep. It is cut off each spring and spun into yarn.

barn

A big farm building where animals, hay and tools are kept.

CORE IDEAS

Farm animals are called **livestock**. God gave them to people to help us, and in return we care for them.

Chickens give us eggs. **Cows** and **goats** give us milk, and from milk we make butter, cheese, yogurt and ice cream. **Sheep** give us **wool** for warm sweaters and blankets.

Bees give us honey and beeswax, and they help fruit grow. **Horses** and oxen have pulled plows and wagons for thousands of years, and many farms still use horses for work and riding.

Farm animals need care every day, in rain, snow and heat: food, fresh water, a clean **barn** or shelter, and a farmer who watches to see that they are healthy.

A farmer's day starts early, because the animals are hungry! Feeding the animals, gathering eggs and milking cows are called **chores**, and they are done faithfully every morning and evening.

PICTURE STUDY



Ploughing in the Nivernais, Rosa Bonheur, 1849 · Oil on canvas · Musée d'Orsay, Paris

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

Rosa Bonheur was a French painter who loved animals and studied them on farms and at markets. Here, strong oxen pull plows to turn over a field in the fall, getting it ready for planting.

Look closely

- Count the oxen. How many pull each plow?
- Find the farmers walking with the oxen.
- Look at the earth behind the plows. What has happened to it?
- Look at the oxen's muscles and horns. How strong do they look?

Talk about it

1. What job are the oxen doing for the farmer?
2. What do you think the farmer gives the oxen in return?
3. What machine does this job on most farms today?

Safety first. On a farm, stay with a grown-up and never go into a pen or field alone. Wash hands with soap after touching animals or fences. Big animals can step on toes, so let the farmer show you where to stand.

HANDS-ON PROJECT

Farm Animal Matching Board

You will make a matching board that shows each farm animal and the gift it gives us.

You will need

- A large piece of paper or poster board
- Crayons or markers
- Pictures of farm animals and farm foods (drawn, printed or cut from magazines)
- Glue and yarn (optional)

Steps

1. Draw or glue six farm animals down the left side: chicken, cow, sheep, goat, bee and horse.
2. Draw or glue what they give us down the right side, in a mixed-up order: eggs, milk, wool, cheese, honey and a plow.
3. Draw a line (or glue a piece of yarn) from each animal to its gift.
4. Add a farmer in the middle. What does the farmer give the animals? Draw food, water and a barn.
5. Tell your grown-up about each animal and its gift.
6. If you can, visit a farm, a petting zoo or the animal barns at your county fair and find the real animals.

Tips

- Some animals give more than one thing: a goat gives milk and cheese, a sheep gives wool, and some give milk too.
- At many county fairs, older 4-H members show their animals in the barns, and younger Cloverbuds bring simple display projects. Visiting the barns is a great field trip; check your county extension office or fair book for the dates.

Check your work

- ☐ I matched six farm animals to their gifts.

- ☐ I can tell what a farmer gives the animals.
- ☐ I can name a farm chore.

NATURE JOURNAL

1. Draw your favorite farm animal and the gift it gives us.
2. Draw a red barn with animals inside.
3. Draw a farmer doing a morning chore.

From history. Rosa Bonheur studied animals so seriously that she visited farms, horse fairs and cattle markets to sketch them from life. *Ploughing in the Nivernais* was painted for the French government in 1849 and made her famous.

COMMON MISTAKES

- Thinking milk comes from the store. Trace it back: store, truck, dairy, cow.
- Forgetting that farm animals need care on weekends and holidays too.

Make it a game • Farm Animal Gift Match. Your grown-up names a farm animal and you show what it gives us: pretend to milk a cow, gather an egg from a hen, or hold wool from a sheep. Then trade, and you name an animal for your grown-up to act out. Say that every animal needs food, water, shelter and care.

Scripture. “He causeth the grass to grow for the cattle, and herb for the service of man: that he may bring forth food out of the earth;” (Psalms 104:14, KJV)

God grows grass for the cows and plants for people. The farm is a picture of His care for every creature.

6.2 CHICKENS AND EGGS

OBJECTIVES

- Tell what a hen needs: food, water, a coop, a nest box and a roost.
- Tell how eggs are gathered and kept clean.
- Look closely at an egg, inside and out.

Warm-up. Hold a raw egg gently (over a bowl!). Feel its shape. Is it smooth or bumpy? Is it the same at both ends? Shine a flashlight on it in a dark room. Can you see light through the shell?

WATCH

Free-range Eggs with George the Farmer

George the Farmer · 8:40

<https://www.youtube.com/watch?v=Jji4RiTfPc>

WHEN TO WATCH

After the core ideas. Watch for the hens' nest boxes and how the eggs are collected.

Note: Filmed on an Australian egg farm. A simple cartoon body outline appears briefly when a scientist talks about why eggs are healthy food.

KEY TERMS

hen

A grown-up mother chicken. Hens lay eggs.

coop

A little house where chickens sleep safely at night.

nest box

A cozy box with straw where a hen lays her eggs.

CORE IDEAS

A **hen** can lay an egg almost every day in spring and summer. She lays it in a **nest box** filled with straw. In winter, when days are short, hens lay fewer eggs.

Chickens eat chicken feed made of grain, and they love to scratch in the dirt for bugs, worms and seeds. They also need fresh water every day and little bits of grit (tiny stones) to help grind their food.

At night chickens go into their **coop** and sleep sitting on a pole called a roost. The farmer closes the door to keep them safe from foxes, raccoons and owls.

Gathering eggs is a daily chore. The farmer takes them gently from the nest boxes, carries them in a basket, cleans off any dirt and keeps them cool.

An egg has a hard shell, a clear white and a yellow yolk. Chickens can carry germs, so we always wash our hands after touching chickens or eggs.

PICTURE STUDY



A Cock, Hens and Chicks, Melchior d'Hondecoeter, about 1670 · Oil on canvas · The National Gallery, London

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

Melchior d'Hondecoeter was a Dutch painter who painted almost nothing but birds, especially farmyard chickens, ducks and peacocks. People called him the “Raphael of birds.”

Look closely

- Find the rooster. How is he different from the hens?
- Find the chicks. How many can you count?
- Find the fluffy white hen. Her feathers are very different from the others!
- Find the pigeon on the basket and the little bird flying.

Talk about it

1. How does the mother hen take care of her chicks?
2. What do you think these chickens are looking for on the ground?
3. Where would these chickens go to sleep at night?

Safety first. Wash hands with soap after touching chickens, eggs, feeders or the coop. Never eat raw eggs. Hold chickens only with a grown-up, gently, with both hands around the wings.

HANDS-ON PROJECT

An Egg Up Close

You will look at an egg like a scientist, outside and inside, and draw what you find.

You will need

- Two eggs (one raw, one hard-boiled)
- A clear bowl
- A magnifying glass
- A flashlight
- Your nature journal

Steps

1. Look at the raw egg's shell with the magnifying glass. Can you see tiny dots? Those are pores that let air in.
2. Shine the flashlight on the egg in a dark room.
3. With a grown-up, crack the raw egg gently into the clear bowl. Find the yolk (yellow) and the white (clear).
4. Look for the little white twisty cords that hold the yolk in the middle.
5. Peel the hard-boiled egg. Feel the thin skin just inside the shell.
6. Cut the boiled egg in half with your grown-up. How has the inside changed from the raw egg?
7. Draw both eggs and label the shell, the white and the yolk.
8. Wash your hands with soap.

Tips

- Use the raw egg to bake something together afterward.
- If you visit a farm, ask if you may help gather eggs.

Check your work

- ☐ I can point to the shell, the white and the yolk.
- ☐ I can tell what a hen needs.

- ☐ I washed my hands after touching eggs.

NATURE JOURNAL

1. Draw an egg cracked open with its yolk and white.
2. Draw a hen sitting in a nest box full of straw.
3. Draw a chicken coop with a roost, a nest box, a feeder and a water dish.

From history. Many young children start learning about animals with chickens. 4-H Cloverbuds, for children about ages 5 to 8, is non-competitive: Cloverbuds usually do not show animals, but they can bring a display-only show-and-tell project to the county fair and receive a participation ribbon. Check your county extension office to see what your area offers.

COMMON MISTAKES

- Squeezing an egg too hard. Hold it gently in an open hand.
- Forgetting to close the coop at night. Chickens need to be locked in safely every evening.

Make it a game • Be a Hen. Walk like a hen with flapping wings and bobbing head. Visit each place she needs: a bowl for food, a cup for water, a pillow for the nest box, and a chair for the roost. Your grown-up asks, Where does the hen sleep? Then gently gather a pretend egg and keep it clean.

6.3 COWS AND MILK

OBJECTIVES

- Tell what cows eat and how they chew their cud.
- Tell that a mother cow makes milk after she has a calf, and that dairy cows are milked every day.
- Make butter from cream.

Warm-up. Pour a glass of milk. Look at it, smell it and taste it. Then name everything you can think of that is made from milk. (Butter, cheese, yogurt, ice cream, cream cheese, sour cream...)

WATCH

Dairy from Cows with George the Farmer

George the Farmer · 7:22

https://www.youtube.com/watch?v=zaWW2wA_jQY

WHEN TO WATCH

After the core ideas. Watch for the milking machines and the milk truck.

BACKUP VIDEO

Where Does Milk Come From? | Milking Cows & Farm Adventures for Kids | Fun Farm Videos

Farm Kids Club · 5:23

<https://www.youtube.com/watch?v=-tRXc2W0thQ>

Later in the week, for another visit to a dairy farm.

KEY TERMS

dairy

A farm where cows are kept for milk; also, foods made from milk.

calf

A baby cow.

cud

Food a cow brings back up from its stomach to chew again.

CORE IDEAS

Cows eat grass in the pasture and hay in the winter. A cow eats a lot! God made the cow with a special stomach that has four parts to digest tough grass.

A cow swallows grass quickly, then later brings it back up to chew again. This is called chewing the **cud**. When you see a cow lying down and chewing slowly, she is chewing her cud.

A mother cow makes milk after she has a baby **calf**. On a **dairy** farm, cows are milked every day, usually twice: morning and evening. Long ago, farmers milked by hand into a pail; today most use milking machines.

The milk is cooled right away and carried in a truck to a dairy plant. There it is heated to make it safe, then put into cartons and bottles, or made into butter, cheese and yogurt.

Cows need fresh water (lots of it), good food, a clean barn and a kind farmer. Dairy farmers work every day of the year, because cows must be milked even on Christmas!

PICTURE STUDY



The White Cow, Julien Dupré, about 1890 · Oil on canvas

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

Julien Dupré was a French painter who spent his life painting farm workers: haymakers, shepherds and milkmaids. Here, a farm woman milks a big white cow in the farmyard on a sunny day.

Look closely

- Find the pail. What is going into it?
- Find the rope on the cow's head. Why might the farmer tie her?
- Look at the cow. Is she calm or restless?
- Find the other woman in the doorway of the house.

Talk about it

1. Why do you think the cow stands still to be milked?
2. What will happen to the milk after the pail is full?
3. How is milking different on a farm today?

Safety first. On a farm, stay with a grown-up and stay out of pens. Never stand behind a cow or a horse, because they can kick. Wash hands after touching animals. Shake the butter jar with a tight lid.

HANDS-ON PROJECT

Shake Your Own Butter

Long ago, farm children helped make butter by churning cream. You will make butter by shaking cream in a jar.

You will need

- A small carton of heavy whipping cream
- A clean jar with a tight lid
- A pinch of salt (optional)
- Crackers or bread
- A bowl of cold water

Steps

1. Let the cream sit out for about 20 minutes so it is cool, not cold.
2. Fill the jar about halfway with cream. Screw the lid on tight.
3. Shake, shake, shake! Take turns with your family. Sing a song while you shake.
4. After a few minutes, the cream gets thick like whipped cream. Keep shaking!
5. Suddenly you will hear something sloshing. A lump of yellow butter has formed in a thin liquid called buttermilk.
6. Pour off the buttermilk (you can drink it or bake with it).
7. Rinse the butter in a bowl of cold water and press it with a spoon. Add a pinch of salt if you like.
8. Spread your butter on crackers and taste it. Say thank you to God and to the cows!

Tips

- Put a clean marble in the jar to make it go faster (a grown-up removes it before eating).
- Keep your butter in the refrigerator.

Check your work

- ☐ I made butter from cream.

- ☐ I can tell what cows eat.
- ☐ I can name three foods made from milk.

NATURE JOURNAL

1. Draw a cow in a pasture, chewing her cud.
2. Draw the steps from cow to butter: cow, milk, cream, jar, butter.
3. Draw your favorite food made from milk.

From history. Before refrigerators, farm families kept milk and butter cool in a springhouse built over a cold spring or stream. Children often had the job of churning butter in a tall wooden churn, pushing a stick called a dasher up and down for a long time.

COMMON MISTAKES

- Opening the jar too early. Keep shaking until you hear the butter slosh.
- Thinking all cows give milk all the time. A cow gives milk after she has a calf.

Make it a game • Cow Chew and Milk Race. Be a cow. Munch on pretend grass, swallow, then bring it back up and chew again like a cud. Then pretend a mother cow has her calf and show how a farmer milks every day. Hold up a jar and say that dairy cows are milked daily. Count how many chews you can do in a breath.

6.4 BEES AND HONEY

OBJECTIVES

- Name the three kinds of honeybees: queen, workers and drones.
- Tell how bees make honey from flower nectar.
- Tell how bees help flowers make fruit, and the safety rules around bees.

Warm-up. Taste a little honey on a spoon (children over one year only). Look at it in the light. What color is it? Is it runny or thick? Smell a flower. Ask: How do you think bees turn flowers into honey?

WATCH

How Do Bees Make Honey? | The Science of Food! | SciShow Kids

SciShow Kids · 6:02

<https://www.youtube.com/watch?v=A4YlpGQiD3w>

WHEN TO WATCH

After the core ideas. Pause when the bees fan their wings and tell why.

BACKUP VIDEO

Visit An Urban Beehive & Make Honey | Caitie's Classroom Field Trip | Bees Video for Kids

Super Simple Play with Caitie! · 6:30

<https://www.youtube.com/watch?v=Ft08l9w6lPI>

Later in the week, to visit a beehive with a real beekeeper.

KEY TERMS

hive

The home of a family of honeybees.

nectar

A sweet juice inside flowers. Bees turn it into honey.

honeycomb

Six-sided wax rooms that bees build to store honey and raise baby bees.

CORE IDEAS

Honeybees live together in a big family in a **hive**. There is one **queen bee**, who lays all the eggs. There are thousands of **worker bees**, who do all the work. And there are some **drones**, the boy bees, who do not gather food.

Worker bees fly to flowers and sip sweet **nectar** with their long tongues. They also gather yellow pollen on their back legs to feed the baby bees.

Back at the hive, the bees put the nectar into the **honeycomb**, little six-sided rooms made of wax. They fan their wings to dry the nectar until it turns thick and sweet. That is honey! Then they cap each room with wax.

As bees fly from flower to flower, pollen sticks to their fuzzy bodies and rubs off on the next flower. This helps the flowers grow into apples, cherries, pumpkins and many other fruits.

A beekeeper wears a veil and uses a smoker to calm the bees. The beekeeper takes only the extra honey and leaves plenty for the bees to eat in winter. If a bee lands on you, stay calm and still, and it will fly away.

PICTURE STUDY



The Beekeepers, Pieter Bruegel the Elder, about 1568 · Pen and ink on paper · Kupferstichkabinett, Berlin

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

Long ago, bees lived in hives woven from straw, shaped like upside-down baskets. These were called skeps. Pieter Bruegel drew these beekeepers more than 450 years ago.

Look closely

- Find the straw hives, called skeps. How many can you count?
- Look at the beekeepers' faces. What are they wearing?
- Find the beekeeper carrying a skep. Where might he be taking it?
- Find the boy up in the tree.

Talk about it

1. Why do you think the beekeepers cover their faces?
2. How are these straw hives different from the wooden boxes beekeepers use today?
3. What would you wear to visit a beehive?

Safety first. Never touch a beehive or swat at bees. Visit hives only with an adult beekeeper and protective gear. Tell a grown-up right away if you are stung, and especially if anyone has a bee allergy. Never give honey to a baby under one year old.

HANDS-ON PROJECT

A Honey Tasting and Bee Dance

You will taste honey, look at real honeycomb or a picture of it, and act out how bees gather nectar and make honey.

You will need

- Two or three kinds of honey (for example, clover and wildflower), or one kind
- A small piece of comb honey (optional) or a picture of honeycomb
- Spoons and crackers
- Yellow and black paper, or a yellow shirt (optional)
- Paper flowers and small cups

Steps

1. Look at the honeycomb with a magnifying glass. Count the sides of one wax room. (Six!)
2. Taste each honey on a cracker. Which is lighter? Which is darker? Which tastes stronger?
3. Talk about it: honey tastes different depending on which flowers the bees visited.
4. Set paper flowers around the room with a little cup on each.
5. Be a worker bee: buzz from flower to flower, pretending to sip nectar and gather pollen.
6. Fly back to the “hive” (a corner of the room) and pretend to put the nectar in the honeycomb. Fan your arms like wings to dry it into honey!
7. Draw a honeycomb in your journal and color some rooms gold with honey.

Tips

- Look for a local beekeeper at a farmers’ market. Many love to answer questions.
- Plant a few flowers bees love, like clover, sunflowers or lavender, in Unit 7.

Check your work

- ☐ I can name the queen, workers and drones.
- ☐ I can tell how bees make honey from nectar.
- ☐ I can tell what to do if a bee lands on me: stay calm and still.

NATURE JOURNAL

1. Draw a worker bee with its wings, six legs and pollen on its back legs.
2. Draw a honeycomb with six-sided rooms.
3. Watch flowers outside on a warm day (from a few steps away). Draw any bee you see.

From history. For hundreds of years, beekeepers kept bees in straw skeps, but they often had to destroy the skep to get the honey. In 1851 an American pastor, Lorenzo Langstroth, invented a wooden hive with frames that lift out, so beekeepers can take honey without harming the bees. Most beekeepers still use his kind of hive today.

COMMON MISTAKES

- Swatting at bees. That frightens them; stay calm and still instead.
- Thinking all bees make honey. Honeybees do; bumblebees make only a little, and many other bees make none.

Make it a game • Queen, Worker, Drone. Pick a role. The queen sits on a cushion and lays pretend eggs. The workers fly out, collect nectar from paper flowers and carry it back. The drone buzzes around. Your grown-up calls a name and you act it out. Then wiggle in a bee dance to show where the flowers are.

Scripture. “a land flowing with milk and honey” (Exodus 3:8, KJV)

God promised His people a good land full of milk and honey, two of the gifts we learned about this unit. Milk and honey were signs of His rich blessing.

UNIT 6

ON THE FARM

Early spring is a busy time on a farm: chicks peep, calves are born, and bees fly out to the first blossoms. In this unit your child learns what farm animals give us, eggs, milk, wool, honey and hard work, and meets three of the most important: chickens, cows and honeybees.

No farm is needed. Visit a farm, a petting zoo or the animal barns at your county fair if you can; otherwise the videos, the paintings (by Rosa Bonheur, Hondecoeter, Julien Dupré and Bruegel) and the projects bring the farm to your table. Along the way we learn that farm animals need care every single day, and that a good farmer is kind to his animals.

PREREQUISITES

- Knows what every pet needs (Unit 4)
- Knows that most food comes from farms (Unit 1)
- No farm or animals needed

MASTERY CHECKLIST

- ☐ I can match farm animals to what they give us.
- ☐ I can tell what a hen needs and how eggs are gathered.
- ☐ I can tell what cows eat and what we make from milk.
- ☐ I can name the queen, workers and drones and tell how bees make honey.
- ☐ I wash my hands after touching farm animals.

LESSONS IN THIS UNIT

6.1 What Farm Animals Give Us

2 sessions of 30 minutes

6.2 Chickens and Eggs

2 sessions of 30 minutes

6.3 Cows and Milk

2 sessions of 30 minutes

6.4 Bees and Honey

2 sessions of 30 minutes

UNIT 6 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. What does a chicken give us? A cow? A sheep? A bee?
2. Name three things a hen needs.
3. What do cows eat? What is a cow doing when she chews her cud?
4. Show how you made butter. What did you start with?
5. Name the three kinds of honeybees. Who lays the eggs?
6. A bee lands on your arm. What do you do?

ANSWER KEY

1. Eggs; milk (and butter, cheese); wool; honey (and beeswax).
2. Any three of: food, fresh water, grit, a coop, a nest box, a roost, a door closed at night.
3. Grass and hay; she is chewing food she brought back up from her stomach to chew again.
4. Cream in a jar, shaken until butter and buttermilk separate.
5. Queen, workers and drones; the queen lays the eggs.
6. Stay calm and still until it flies away; tell a grown-up if stung.

PORTFOLIO PIECE: MY FARM CHORE CHART AND SHOW-AND-TELL

Make a picture chore chart for one farm animal (chickens, a cow or a beehive). Draw the morning and evening chores: feeding, water, gathering eggs, milking or checking the hive. Add a picture of what the animal gives us.

Then give a short show-and-tell, the way 4-H Cloverbuds share display projects at a county fair: stand up, hold your chart, say your name and your animal, and tell your family two things you learned.

LOOK FOR	WHAT IT MEANS
Daily needs	Shows food, water and shelter for the animal.
Chores	Shows at least two chores in the right part of the day.
Animal gift	Correctly shows what the animal gives us.
Show-and-tell	Stood up and told two true things about the animal in a clear voice.

UNIT 7

LET'S PLANT!

Spring is here, and it is time to plant! In this unit your child plants seeds in cups on the windowsill, learns to water “just right,” sows a real garden bed (or a big pot) of radishes and sunflowers, and follows wheat from a farmer’s field all the way to a loaf of bread.

Every lesson ends with something growing. Keep a simple picture record in the nature journal, with a dated drawing or photo each week, just as young 4-H members keep records of their projects. The paintings this unit, by Carl Larsson, Renoir, Monet and Millet, show windowsill pots, a girl watering flowers, a family garden and a wheat harvest.

PREREQUISITES

- Knows what a seed needs to sprout (Unit 5)
- Knows that plants need sun and water (Unit 5)
- Can use a spray bottle or small watering can

MASTERY CHECKLIST

- ☐ I can plant a seed at the right depth in a cup with a drainage hole.
- ☐ I can test the soil with my finger to know when to water.
- ☐ I can plant radish and sunflower seeds in a garden bed or big pot.
- ☐ I can tell the steps from wheat seed to bread.
- ☐ I kept a picture record of my plants.

LESSONS IN THIS UNIT

7.1 A Seed in a Cup

2 sessions of 30 minutes

7.2 Watering Just Right

2 sessions of 30 minutes

7.3 A Garden Bed of Radishes and Sunflowers

2 sessions of 30 minutes

7.4 Wheat in a Field Becomes Bread

2 sessions of 30 minutes

UNIT 7 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Why does a pot need a hole in the bottom?
2. Show the finger test. When do you water?
3. What happens if you give a plant too much water? Too little?
4. How deep do you plant a big seed? A tiny seed?
5. Why do we plant sunflowers at the back of the garden?
6. Tell the steps from wheat to bread.

ANSWER KEY

1. So extra water can drain out and the roots do not sit in water and rot.
2. Push a finger into the soil to the first knuckle; water when it feels dry.
3. Too much: roots cannot breathe, leaves yellow, the plant may die. Too little: it wilts and droops.
4. A big seed about a finger-joint deep (two or three times its size); a tiny seed just pressed into the top.
5. They grow very tall and would shade the small plants.
6. Plant, grow, harvest (combine), mill into flour, mix dough and bake.

PORTFOLIO PIECE: MY GARDEN PICTURE RECORD

Keep a picture record of your radishes and sunflowers (or your cup garden) for four weeks. Each week, draw or photograph your plants, and have a grown-up write the date, how tall the tallest plant is, and one thing you did (watered, thinned, pulled a weed).

Put the pages together in a folder with a cover that shows your name and your plants. This is the same kind of picture record a young 4-H Cloverbud might bring to a county fair as a display.

LOOK FOR	WHAT IT MEANS
Weekly record	Has a dated drawing or photo for each of four weeks.
Measuring	Shows a height for the tallest plant each week.
Faithful care	Watered with the finger test and helped thin or weed.
Telling back	Can tell what the plants needed and how they changed.

7.1 A SEED IN A CUP

OBJECTIVES

- Plant a seed in a cup of potting mix at the right depth.
- Tell why a pot needs a drainage hole.
- Label and care for a windowsill plant.

Warm-up. Look at a seed packet together. Find the picture of the plant, the name, and the little words about how deep to plant and how many days until the seeds sprout. A seed packet is a set of directions from the farmer who grew the seeds!

WATCH

Grow Your Own Plants! - #sciencegoals

SciShow Kids · 5:31

<https://www.youtube.com/watch?v=Lly75dEbXE8>

WHEN TO WATCH

Before the hands-on project. Watch how the seeds go into the soil.

BACKUP VIDEO

Watch a Seed Sprout! | Squeaks Grows a Garden! | SciShow Kids

SciShow Kids · 5:33

<https://www.youtube.com/watch?v=-rJdVQNY6TY>

After your seeds are planted, to watch a seed sprout.

KEY TERMS

potting mix

Light, fluffy soil made for growing plants in pots.

drainage hole

A hole in the bottom of a pot that lets extra water run out.

seedling

A very young plant that has just sprouted.

CORE IDEAS

Plants in pots need **potting mix**, a light, fluffy soil that holds water but lets air reach the roots. Garden dirt in a cup gets packed and hard.

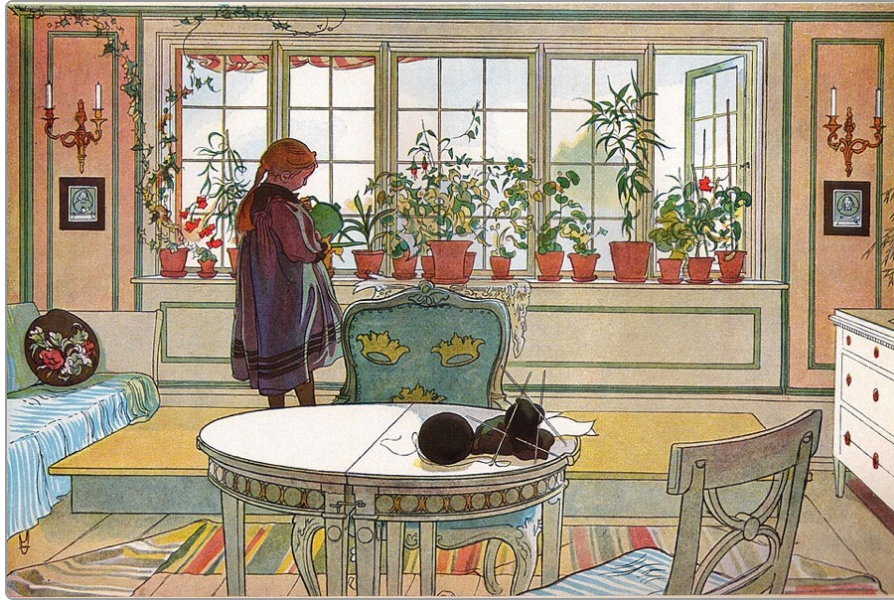
Every pot needs a **drainage hole** in the bottom. Extra water runs out, so the roots do not sit in a puddle and rot. Put a saucer under the pot to catch the water.

Plant a seed about two or three times as deep as the seed is big. A big bean goes in about as deep as the first bump on your finger. Tiny seeds like lettuce are just sprinkled on top and pressed in.

Cover the seed, pat the soil gently, and water it. Put it in a warm, sunny window. Soon a little **seedling** will poke up, often still wearing its seed coat like a hat.

Write a label with the plant's name and the date, and stick it in the pot. Gardeners always label, so they remember what they planted and when.

PICTURE STUDY



The Flower Window, Carl Larsson, 1894 · Watercolor · Nationalmuseum, Stockholm

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

Carl Larsson was a Swedish painter who painted his own home and family again and again. Here one of his daughters waters the long row of potted plants in the sunny window.

Look closely

- Find the girl. What is she holding?
- Count the red clay pots on the windowsill.
- Find where the sunlight comes in.
- Which plant looks tallest? Which plants have flowers?

Talk about it

1. Why do you think the plants are kept by the window?
2. How does the girl know which plants need water?
3. Which window in your home would make a good plant window?

Safety first. Wash hands after handling potting mix. A grown-up pokes drainage holes in cups with a sharp tool.

HANDS-ON PROJECT

My Windowsill Cup Garden

You will plant three cups: beans, sunflowers and marigolds or lettuce. You will label them, put them in a sunny window and care for them every day.

You will need

- Three clear plastic or paper cups with a drainage hole poked in each (grown-up pokes)
- Potting mix
- A tray or saucers
- Seeds: beans, sunflowers, and marigolds or lettuce
- Craft sticks and a marker for labels
- A spray bottle or small watering can

Steps

1. Fill each cup with potting mix up to about a finger's width from the top. Pat it gently; do not pack it hard.
2. Read the seed packet with your grown-up: how deep should each seed go?
3. Poke a hole with your finger for each big seed (beans and sunflowers): about as deep as your first finger joint. Drop in two seeds.
4. For tiny seeds, sprinkle a few on top and press them in lightly with your fingertip.
5. Cover the seeds and pat the soil gently.
6. Write a label for each cup with the plant name and today's date.
7. Water slowly until a little water comes out of the drainage hole.
8. Set the cups on a tray in a sunny window.
9. Check every day. Draw your cups each week in your journal.
10. When your sprouts are up, give a one-minute "show your sprout" talk: hold up your cup, say your name and your plant's name, and tell three things about it (when you planted it, what it needs, how it has changed).

Tips

- Clear cups let you see the roots growing along the sides.
- If both seeds sprout in one cup, snip the smaller one with scissors so the strongest one has room.
- Plant one extra cup to give away. When it is big and healthy, give it to a neighbor or grandparent with a card that tells how to care for it.

Check your work

- ☐ My cups have drainage holes and labels.
- ☐ I planted big seeds deeper and tiny seeds shallow.
- ☐ I can tell why the cup needs a hole.
- ☐ I gave a one-minute talk about my sprout.

NATURE JOURNAL

1. Draw your three cups with their labels. Add the date.
2. Draw a seedling wearing its seed coat like a hat.
3. Draw the roots you can see through the side of a clear cup.

From history. Carl Larsson's paintings of his family's home, gathered in a book called *Ett hem (A Home)* in 1899, showed bright rooms with plants on the windowsills. Many families copied his cheerful style.

COMMON MISTAKES

- Planting seeds too deep. Follow the seed packet.
- Using a cup with no drainage hole. Water collects at the bottom and the roots rot.

Make it a game • Planting Depth Practice. Fill a cup with pretend or real potting mix. Your grown-up holds up a seed and says how deep it goes. Poke your finger in to the right depth, drop the seed, and cover it gently. Then ask why the cup needs a hole at the bottom, and point to where the extra water leaves.

7.2 WATERING JUST RIGHT

OBJECTIVES

- Use the finger test to know when a plant needs water.
- Water slowly at the soil, not on the leaves.
- Tell what too much and too little water do to a plant.

Warm-up. Fill two cups with potting mix: one dry and one damp. Poke your finger in each, down to the first knuckle. How do they feel? Which one needs water? That is the finger test!

WATCH

How To Water Seedlings And Small Pots - Garden Quickie Episode 22

The Ripe Tomato Farms • 3:07

<https://www.youtube.com/watch?v=4uUMV3Vu0Cc>

WHEN TO WATCH

After the core ideas. Watch how the gardener checks the soil before watering.

Note: Made for grown-up gardeners. He shows watering seedling trays from below; watering slowly from above until it drains, as in this lesson, also works. He jokingly calls damping off “death and destruction.”

KEY TERMS

finger test

Poking your finger into the soil to feel if it is dry or damp.

overwatering

Giving a plant so much water that the roots cannot breathe.

wilting

When a plant droops because it is thirsty.

CORE IDEAS

Plants need water, but not too much and not too little. Watering “just right” is one of the most important jobs a gardener has.

Use the **finger test**. Push a finger into the soil up to the first knuckle. If it feels dry, it is time to water. If it feels damp, wait.

Water slowly at the bottom of the plant, on the soil, until a little water comes out of the drainage hole. Then stop. Water poured on the leaves does not reach the roots and can make leaves sick.

Too little water causes **wilting**: the plant droops and the leaves go limp. Too much water, called **overwatering**, fills all the air spaces in the soil, and the roots cannot breathe. The leaves turn yellow, and the plant can die even though it is wet.

Tiny seedlings like a gentle spray. Big plants like a long, slow drink less often. In hot, sunny weather plants need water more often than on cool, cloudy days.

PICTURE STUDY



A Girl with a Watering Can, Pierre-Auguste Renoir, 1876 · Oil on canvas · National Gallery of Art, Washington

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

Pierre-Auguste Renoir was a French painter who loved sunlight, flowers and children. This little girl stands in a garden path with her own watering can, ready to help.

Look closely

- Find the watering can. What color is it? Is it big or small?
- Find the flowers. What colors can you see?
- Find the garden path under her feet.
- Look at the light. Does it feel like a sunny day?

Talk about it

1. Which flowers do you think she will water first?
2. How would she know if a flower needs water?
3. Why is a small watering can good for a child?

HANDS-ON PROJECT

A Week of Watering Just Right

You will be in charge of watering your cup garden for a week. You will use the finger test every day and keep a watering chart.

You will need

- Your cup garden from Lesson 7.1 (or any potted plant)
- A small watering can or a cup with a spout
- A watering chart: a paper with seven boxes for the days of the week
- A blue crayon and a brown crayon

Steps

1. Every morning, do the finger test on each cup.
2. If the soil is dry, color that day's box blue and water the cup slowly until a little water comes out the bottom.
3. If the soil is damp, color that day's box brown and do not water.
4. Pour onto the soil, not on the leaves.
5. Empty the saucer if water is sitting in it an hour later.
6. At the end of the week, count: how many days did you water? How many days did you wait?
7. Look at your plants. Are they standing up straight and green?

Tips

- Lift the cup. A dry cup is light; a watered cup is heavy. That is another way to check!
- Keep the watering can filled and waiting, so the water is not icy cold.

Check your work

- ☐ I did the finger test every day.
- ☐ I watered only when the soil was dry.
- ☐ I can tell what happens with too much or too little water.

NATURE JOURNAL

1. Draw your watering chart and color the days you watered.
2. Draw a thirsty, wilted plant and a happy, watered plant.
3. Draw yourself watering your plants.

COMMON MISTAKES

- Watering a little every hour instead of deeply when the soil is dry.
- Watering the leaves instead of the soil.

Make it a game • Finger Test Detective. Poke your finger into the soil of a pot up to your first knuckle. Is it damp or dry? Your grown-up hides a toy watering can behind a plant. If the soil is dry, you water it slowly at the soil, not the leaves. If it is wet, you say, Not today!

Scripture. “I have planted, Apollos watered; but God gave the increase.” (1 Corinthians 3:6, KJV)

Paul said that people can plant and water, but only God makes things grow. We do our part faithfully, and we thank God for the growing.

7.3 A GARDEN BED OF RADISHES AND SUNFLOWERS

OBJECTIVES

- Prepare a small garden bed or big pot by loosening the soil and adding compost.
- Sow radish seeds in a row and sunflower seeds in a sunny spot.
- Tell how long radishes and sunflowers take to grow.

Warm-up. Walk around your yard (or look at a balcony or step) and find the sunniest spot. Visit it in the morning, at lunch and after school. Is it sunny all day? Vegetables and sunflowers need at least six hours of sun.

WATCH

Let's Plant a Garden! | Squeaks Grows a Garden! | SciShow Kids

SciShow Kids · 4:40

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

WHEN TO WATCH

Before you plant. Watch how the garden bed is made ready.

BACKUP VIDEO

Growing Radishes from Sowing to Harvest

GrowVeg · 5:54

<https://www.youtube.com/watch?v=v-j5holM8Es>

For the grown-up before planting, and to watch together when the radishes are growing.

KEY TERMS

garden bed

A patch of loose, rich soil set aside for growing plants.

row

A straight line of seeds or plants.

thinning

Pulling out some tiny seedlings so the others have room to grow.

CORE IDEAS

A **garden bed** is a patch of soil made ready for planting. Gardeners pull out the weeds, loosen the soil with a fork or trowel, and mix in compost to feed the plants.

Radishes are one of the fastest vegetables. Sow the little round seeds about half an inch deep and about an inch apart in a **row**. They sprout in a few days and are ready to eat in about four weeks!

Sunflowers grow tall, so they go at the back or the north side of the garden, where they will not shade the small plants. Plant the seeds about an inch deep after the last spring frost, when the soil is warm.

When the seedlings come up crowded together, gardeners do **thinning**: they pull out some so the rest have room. Radishes need about two inches of space each to grow round.

No yard? Plant radishes in a wide pot at least six inches deep, and one sunflower in a big bucket with drainage holes on a sunny step or balcony.

PICTURE STUDY



The Artist's Garden at Vétheuil, Claude Monet, 1881 · Oil on canvas · National Gallery of Art, Washington

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

Claude Monet was a French painter who loved gardens so much that he planted his own and painted it over and over. This is the garden at his family's home, with sunflowers taller than his little son.

Look closely

- Find the sunflowers. Are they taller or shorter than the child?
- Find the child on the path. How big is he next to the flowers?
- Find the pots at the bottom of the steps.
- Follow the path up to the house.

Talk about it

1. Why do you think the sunflowers are planted along the sides of the path?
2. How many weeks of sun and water do you think these sunflowers needed to grow so tall?
3. What would you plant beside a path at your house?

Safety first. Wear gloves and closed shoes. A grown-up handles the garden fork and any sharp tools; children use a small trowel. Wash hands after gardening.

HANDS-ON PROJECT

Plant a Radish Row and a Sunflower Spot

You will get a small garden bed or a big pot ready, sow a row of radishes and a few sunflowers, and keep a picture record as they grow.

You will need

- A small garden bed, or a wide pot and a large bucket with drainage holes
- Compost or bagged garden soil
- Radish seeds and sunflower seeds
- A child-size trowel and gloves
- A ruler or a stick marked with inches
- Craft sticks or plant labels
- A watering can

Steps

1. With your grown-up, pull out weeds and loosen the soil with the trowel. Break up big clumps.
2. Spread a little compost on top and mix it in.
3. Make a straight row for radishes: lay a stick on the soil and press it down to make a shallow groove about half an inch deep.
4. Drop radish seeds along the groove, about one inch apart. Cover them and pat gently.
5. At the back (the side where they will not shade the radishes), poke three holes an inch deep and a foot apart. Put two sunflower seeds in each hole and cover them.
6. Label the radish row and the sunflower spot with the names and the date.
7. Water gently with the watering can so the seeds do not wash away.
8. Check every day. Keep the soil damp until the seeds sprout.
9. When the seedlings come up, thin the radishes so they are about two inches apart. Keep the strongest sunflower in each spot.

10. Each week, draw or photograph your garden and measure the tallest sunflower.

Tips

- Plant a few radish seeds every week or two for radishes all spring.
- Mark the row clearly so no one steps on it before the seeds come up.

Check your work

- ☐ I helped get the soil ready with compost.
- ☐ I planted radishes in a row and sunflowers at the back.
- ☐ I am keeping a picture record of my garden every week.

NATURE JOURNAL

1. Draw a map of your garden bed or pots: where are the radishes and the sunflowers?
2. Every week, draw your sunflower and write how tall it is.
3. Draw a radish plant with its round red root under the soil.

From history. Many county fairs have youth classes for sunflowers and garden vegetables, and young gardeners often start with easy plants like radishes and sunflowers. For children about ages 5 to 8, 4-H Cloverbuds is non-competitive: Cloverbuds bring display-only projects and receive participation ribbons. Check your county fair book or extension office to see what your fair offers.

COMMON MISTAKES

- Sowing seeds too thick. Space them out, and thin seedlings so each has room.
- Planting sunflowers in front where they shade the small plants.

Make it a game • Row and Sunny Spot Walk. Lay a string across the floor as a garden row. Walk beside it and plant pretend radish seeds, one step apart. Then find the sunniest spot in your house for the sunflower and stand there tall. Your grown-up asks how we loosen the soil first. Show it with your fingers.

Scripture. “And the LORD God took the man, and put him into the garden of Eden to dress it and to keep it.” (Genesis 2:15, KJV)

The very first job God gave to people was to care for a garden. When you dig, plant and water, you are doing that first good work.

7.4 WHEAT IN A FIELD BECOMES BREAD

OBJECTIVES

- Tell the steps from wheat seed to bread: plant, grow, harvest, mill, bake.
- Find the grain in a head of wheat.
- Grind grain and bake simple bread with a grown-up.

Warm-up. Look at a slice of bread. Ask: What is bread made of? (Flour.) What is flour made of? (Wheat.) Where does wheat come from? (A farmer's field.) Draw an arrow from field to flour to bread.

WATCH

Learn about wheat with George the Farmer

George the Farmer · 6:54

<https://www.youtube.com/watch?v=CWVrNNy6kRs>

WHEN TO WATCH

After the core ideas. Watch for the combine harvester cutting the wheat.

BACKUP VIDEO

Baked Bread: how flour is made

Eat Happy Project · 2:49

<https://www.youtube.com/watch?v=y8vLjPctrcU>

Before you bake, to see how grain is ground into flour.

KEY TERMS

wheat

A tall grass grown on farms. Its seeds, called grain, are ground into flour.

grain

The small, hard seeds of plants like wheat, oats and corn.

mill

A place or machine that grinds grain into flour.

CORE IDEAS

Wheat is a kind of grass. Farmers plant whole fields of it. In many places, wheat is planted in the fall, rests under the snow in winter, and grows tall and green

in spring.

At the top of each stem is a head with rows of seeds called **grain**. In summer the wheat turns golden and dry. Now it is ripe!

The farmer harvests the wheat with a big machine called a combine. It cuts the stems, shakes out the grain, and pours it into a truck. Long ago, people cut wheat by hand and beat it to get the grain out.

The grain goes to a **mill**, where it is ground between big rollers or stones into fine, soft flour.

At home or at a bakery, flour is mixed with water, yeast and a little salt to make dough. The dough rises, is baked in the oven, and becomes bread! One little grain planted in the field grows a plant with many grains, enough to make bread to share.

PICTURE STUDY



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

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

After the wheat harvest, poor families were allowed to walk through the field and pick up the stalks the harvesters had dropped. This was called gleaning. Millet painted three gleaners bending to gather every bit of grain.

Look closely

- Find the three women. What are they picking up?
- Find the big stacks of wheat far away.
- Find the man on a horse in the distance. He is watching over the harvest.
- Look at the women's hands. Are they working fast or slowly?

Talk about it

1. Why do you think the women gather even the little leftover stalks?
2. What will they make from the grain they gather?
3. How can a farmer share his harvest with people who need food?

Safety first. Only a grown-up uses the oven. Wash hands before mixing dough.

HANDS-ON PROJECT

From Grain to Bread

You will look at real wheat, grind a little grain into flour, and bake a simple loaf or rolls with your grown-up.

You will need

- Wheat berries (whole wheat grain from a health-food store) or a dried wheat stalk from a craft store
- A mortar and pestle, or two smooth stones
- A simple bread recipe and its ingredients: flour, yeast, warm water, salt and a little sugar or honey
- A bowl, a spoon and a baking pan
- A magnifying glass

Steps

1. Look at a wheat stalk or wheat berries with the magnifying glass. Find the little grains.
2. Rub a wheat head between your hands to get the grains out. Blow gently to send the light chaff away.
3. Put a spoonful of grain in the mortar (or between two stones) and grind, grind, grind. Look: a little flour!
4. Feel your flour and store-bought flour. Which is finer? A mill does this work for us.
5. Now bake! With your grown-up, mix flour, yeast, warm water, salt and a little honey into a dough.
6. Knead the dough: push, fold and turn, for about five minutes.
7. Cover the bowl and let the dough rise in a warm place until it is about twice as big.
8. Shape it into rolls or a loaf. Your grown-up bakes it.
9. Before you eat, say thank you to God for the farmer, the field and the bread.

Tips

- Share some of your bread with a neighbor, the way gleaning shared the harvest.
- If you plant a few wheat berries in a pot, they will sprout into grass in about a week.

Check your work

- ☐ I can tell the steps from seed to bread.
- ☐ I found grain in a head of wheat and ground it into flour.
- ☐ I helped make bread and said thank you.

NATURE JOURNAL

1. Draw the steps from wheat to bread in five boxes: plant, grow, harvest, mill, bake.
2. Draw a head of wheat with its grains.
3. Draw your bread and the people you shared it with.

From history. In the Bible, a young widow named Ruth gleaned barley in the fields of a kind farmer named Boaz. He told his workers to leave extra grain on purpose so she would have enough. Millet's painting shows that the custom of gleaning lasted thousands of years.

COMMON MISTAKES

- Thinking flour is a plant. Flour is ground-up grain from the wheat plant.
- Using hot water with yeast. Warm water, like a bath, wakes the yeast; hot water kills it.

Make it a game • Grain to Bread Charades. Act out the steps in order while your grown-up guesses: plant the seed, grow tall in the sun, harvest with a swoosh of your arms, mill by turning a pretend crank, and bake by pulling bread from the oven. Then say the five words together and eat a bite of bread.

Scripture. "For the earth bringeth forth fruit of herself; first the blade, then the ear, after that the full corn in the ear." (Mark 4:28, KJV)

Jesus described wheat growing step by step: first a green blade, then a head, then full grain. In Bible times "corn" meant grain like wheat. God makes it grow, little by little.

UNIT 7

LET'S PLANT!

Spring is here, and it is time to plant! In this unit your child plants seeds in cups on the windowsill, learns to water “just right,” sows a real garden bed (or a big pot) of radishes and sunflowers, and follows wheat from a farmer’s field all the way to a loaf of bread.

Every lesson ends with something growing. Keep a simple picture record in the nature journal, with a dated drawing or photo each week, just as young 4-H members keep records of their projects. The paintings this unit, by Carl Larsson, Renoir, Monet and Millet, show windowsill pots, a girl watering flowers, a family garden and a wheat harvest.

PREREQUISITES

- Knows what a seed needs to sprout (Unit 5)
- Knows that plants need sun and water (Unit 5)
- Can use a spray bottle or small watering can

MASTERY CHECKLIST

- ☐ I can plant a seed at the right depth in a cup with a drainage hole.
- ☐ I can test the soil with my finger to know when to water.
- ☐ I can plant radish and sunflower seeds in a garden bed or big pot.
- ☐ I can tell the steps from wheat seed to bread.
- ☐ I kept a picture record of my plants.

LESSONS IN THIS UNIT

7.1 A Seed in a Cup

2 sessions of 30 minutes

7.2 Watering Just Right

2 sessions of 30 minutes

7.3 A Garden Bed of Radishes and Sunflowers

2 sessions of 30 minutes

7.4 Wheat in a Field Becomes Bread

2 sessions of 30 minutes

UNIT 7 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Why does a pot need a hole in the bottom?
2. Show the finger test. When do you water?
3. What happens if you give a plant too much water? Too little?
4. How deep do you plant a big seed? A tiny seed?
5. Why do we plant sunflowers at the back of the garden?
6. Tell the steps from wheat to bread.

ANSWER KEY

1. So extra water can drain out and the roots do not sit in water and rot.
2. Push a finger into the soil to the first knuckle; water when it feels dry.
3. Too much: roots cannot breathe, leaves yellow, the plant may die. Too little: it wilts and droops.
4. A big seed about a finger-joint deep (two or three times its size); a tiny seed just pressed into the top.
5. They grow very tall and would shade the small plants.
6. Plant, grow, harvest (combine), mill into flour, mix dough and bake.

PORTFOLIO PIECE: MY GARDEN PICTURE RECORD

Keep a picture record of your radishes and sunflowers (or your cup garden) for four weeks. Each week, draw or photograph your plants, and have a grown-up write the date, how tall the tallest plant is, and one thing you did (watered, thinned, pulled a weed).

Put the pages together in a folder with a cover that shows your name and your plants. This is the same kind of picture record a young 4-H Cloverbud might bring to a county fair as a display.

LOOK FOR	WHAT IT MEANS
Weekly record	Has a dated drawing or photo for each of four weeks.
Measuring	Shows a height for the tallest plant each week.
Faithful care	Watered with the finger test and helped thin or weed.
Telling back	Can tell what the plants needed and how they changed.

UNIT 8

GARDEN HELPERS AND GARDEN TROUBLES

As the garden grows, visitors arrive. Some are helpers, like ladybugs, bees and earthworms. Some are troubles, like hungry caterpillars, slugs and mold. In this last unit your child becomes a garden detective, learning to tell helpers from troublemakers and to protect plants gently, with hands, boards and barriers rather than sprays.

We also meet mushrooms and molds, which help turn old leaves into soil but can harm seedlings, and we learn the most important mushroom rule of all: **never eat a wild mushroom**. The year ends with a joyful first harvest, a simple show-and-tell exhibit like the ones children bring to a county fair, and a prayer of thanks. The pictures, by Jan van Kessel, Maria Sibylla Merian, Robert Hooke and Jules Bastien-Lepage, show insects, caterpillars, mold and a harvest field.

PREREQUISITES

- Has seeds or plants growing (Unit 7)
- Knows what decomposers do (Unit 3)
- Can use a magnifying glass

MASTERY CHECKLIST

- ☐ I can name three garden helpers and tell how one helps.
- ☐ I can find signs of caterpillars and slugs and protect plants gently.
- ☐ I can tell that mold and mushrooms are fungi and that I never eat a wild mushroom.
- ☐ I can tell when a radish is ready and harvest it.
- ☐ I can show a small harvest exhibit and give thanks.

LESSONS IN THIS UNIT

8.1 Ladybugs and Good Bugs

2 sessions of 30 minutes

8.2 Hungry Caterpillars and Slugs

2 sessions of 30 minutes

8.3 Mold and Mushrooms

2 sessions of 30 minutes

8.4 Our First Harvest

2 sessions of 30 minutes

UNIT 8 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Name three garden helpers. How does a ladybug help?
2. You see a shiny trail on a leaf. Who was there? How can you protect the plant?
3. What does a caterpillar turn into?
4. Are mushrooms and mold plants? What is the mushroom rule?
5. How do you know a radish is ready to pick?
6. Show your exhibit plate. Why did you choose these three?

ANSWER KEY

1. For example: ladybugs, bees, earthworms, spiders, ground beetles. Ladybugs (and their larvae) eat aphids.
2. A slug or snail. Use a board trap and move them away, water in the morning, or use a copper ring.
3. A butterfly or a moth (after a chrysalis or cocoon).
4. No, they are fungi. Never eat a wild mushroom; look, tell a grown-up, wash hands.
5. Its round top is about as wide as a thumb or a quarter, about three to four weeks after planting.
6. They match in size, shape and color, are clean, have no cracks or bites, and are labeled.

PORTFOLIO PIECE: MY GARDENING YEAR SHOW-AND-TELL

Set up a small table display of your year, the way children show projects at a county fair: your nature journal open to favorite pages, your seasons wheel or seasons book, your bean growth log, your garden picture record, and your harvest plate (or a photo of it).

Invite family or friends. Stand by your display and tell them three things you learned this year and one thing you want to grow next year. End by thanking God for the harvest.

LOOK FOR	WHAT IT MEANS
Display	Set out at least four projects from the year neatly, with a name card.
Harvest	Includes a harvest plate or photo of three matching vegetables, labeled.
Telling	Told three true things learned this year in a clear voice.
Thankfulness	Gave thanks for the year’s growing and harvest.

8.1 LADYBUGS AND GOOD BUGS

OBJECTIVES

- Name garden helpers: ladybugs, bees, earthworms, spiders and ground beetles.
- Tell how ladybugs and their larvae eat aphids.
- Go on a garden bug hunt and draw what you find.

Warm-up. Show your child a ladybug (a real one, a picture or a toy). Count its spots. Ask: Is this bug a friend or a troublemaker in the garden? Make a guess, and find out this week!

WATCH

Ladybug larvae eating aphids|Trisha Shirey|Central Texas Gardener

Austin PBS · 3:48

<https://www.youtube.com/watch?v=exjuH-Wpc6Q>

WHEN TO WATCH

After the core ideas. Watch the ladybug larvae, which look like tiny alligators, eat the aphids.

Note: A short segment from a public-television gardening show, made for adults; the close-up of the ladybug larvae is the part to watch.

KEY TERMS

aphid

A tiny soft bug that sucks juice from plant stems and leaves. Too many aphids hurt plants.

helper

A creature that helps the garden, by eating pests, pollinating flowers or making soil.

larva

The young stage of an insect, before it becomes an adult. A ladybug larva looks like a tiny spiny alligator.

CORE IDEAS

Not every bug is a pest! Most bugs in the garden are harmless, and many are **helpers**. A wise gardener learns to tell them apart.

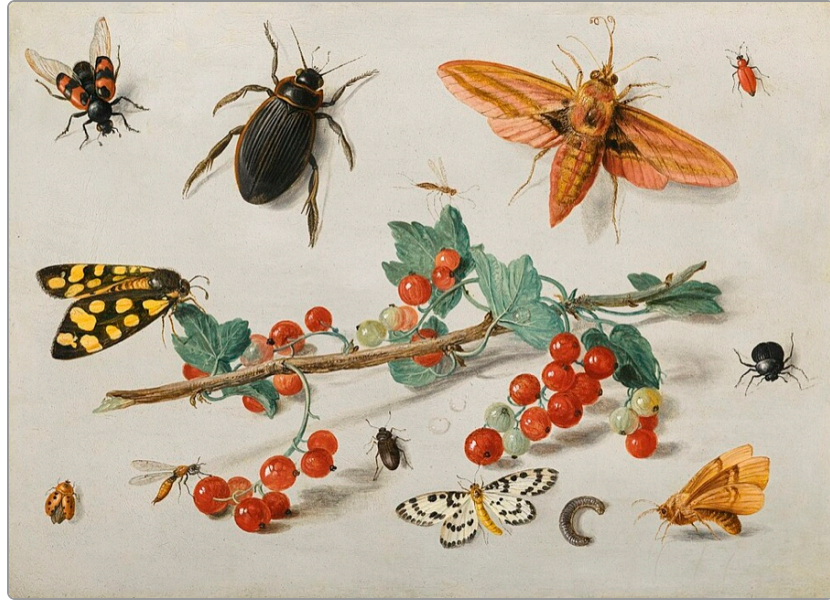
Ladybugs are garden heroes. They eat **aphids**, tiny soft bugs that suck plant juice. One ladybug can eat many aphids every day.

Young ladybugs do not look like ladybugs at all. A ladybug **larva** is long, dark and spiny, with orange spots, like a tiny alligator. It eats even more aphids than the grown-up! Later it rests as a pupa and comes out as a round, spotted ladybug.

Other helpers: **bees** and butterflies carry pollen so flowers make fruit; **earthworms** make the soil rich; **spiders**, ground beetles and praying mantises catch pest insects.

We protect helpers by not spraying poison in the garden, by growing flowers they like, and by letting them do their work. God made each creature with a place in His world.

PICTURE STUDY



A Sprig of Redcurrants with Insects, Jan van Kessel the Elder, 1657 · Oil on copper

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

Jan van Kessel was a Flemish painter who loved to paint insects as carefully as jewels. He painted them on small copper plates, so the colors shine. Can you find the ladybug?

Look closely

- Find the little red ladybug. Where is it?
- Find the moths. Which one has yellow spots?
- Find the curled-up millipede. What shape is it?
- Count the insects. How many legs does a beetle have?

Talk about it

1. Which of these creatures might help a garden? Which might nibble the fruit?
2. Why do you think the painter put the insects next to the berries?
3. What bugs have you seen in your garden or yard?

Safety first. Look at bugs with your eyes and a magnifying glass. Do not touch bees, wasps, or hairy or brightly colored caterpillars. Ladybugs can be held gently on a finger and let go. Wash hands after the bug hunt.

HANDS-ON PROJECT

A Garden Bug Hunt

You will search your garden, yard or a park for small creatures, sort them into helpers and troublemakers, and draw them in your journal.

You will need

- A magnifying glass
- A clear cup or bug viewer (optional)
- A white paper plate
- Your nature journal and colored pencils
- A picture card of garden helpers (draw one, or use a library book)

Steps

1. Go outside on a warm, sunny day. Walk slowly and look closely at leaves, stems and flowers.
2. Look under leaves for tiny green or black aphids. Are there ladybugs or ladybug larvae nearby?
3. Gently tap a plant over the white plate. What falls off? Look with the magnifying glass.
4. Lift a board or stone (toward you, with a grown-up) and look for ground beetles, worms and roly-polies. Put it back gently.
5. Watch flowers from a step away for bees and butterflies.
6. Draw each creature you find in your journal.
7. Sort your drawings: helper, troublemaker or not sure. Look them up with your grown-up.
8. Let every creature go where you found it.

Tips

- Morning and late afternoon are good times for a bug hunt.
- Plant a few flowers like marigolds, zinnias or dill to invite helpers to your garden.

Check your work

- ☐ I found and drew at least three small creatures.
- ☐ I can name three garden helpers.
- ☐ I can tell how a ladybug helps the garden.

NATURE JOURNAL

1. Draw a ladybug and a ladybug larva side by side.
2. Draw the bugs from your bug hunt and circle the helpers.
3. Draw a bee visiting a flower.

From history. Long ago, farmers in Europe noticed that these little spotted beetles saved their crops from pests, and they named them after Mary, “Our Lady,” calling them “Our Lady’s birds.” That is where the names ladybird and ladybug come from.

COMMON MISTAKES

- Squashing every bug. Most bugs are harmless or helpful; find out first.
- Not recognizing a ladybug larva and thinking it is a pest. Learn its alligator shape.

Make it a game • Garden Helper Freeze. Your grown-up names a garden helper: ladybug, bee, earthworm, spider or ground beetle. Show what it does with your body and freeze. Then be a ladybug and munch the aphids, which are tiny green dots on paper, until every one is gone. Say, Ladybugs help.

8.2 HUNGRY CATERpillARS AND SLUGS

OBJECTIVES

- Find signs of caterpillars and slugs: holes in leaves, droppings and slime trails.
- Tell how caterpillars grow into butterflies or moths.
- Protect plants gently by hand-picking, boards and barriers.

Warm-up. Look at a few leaves from the garden or a park. Find one with holes, one with chewed edges and one with a shiny silvery trail. Ask: Who do you think did this? These are clues for a garden detective!

WATCH

Snails, Slugs, and Slime! | Animal Science for Kids

SciShow Kids · 3:41

<https://www.youtube.com/watch?v=c8ma6vDvXAM>

WHEN TO WATCH

After the core ideas. Look closely at how the slug moves on its slime.

KEY TERMS

caterpillar

The young, worm-like stage of a butterfly or moth. Caterpillars eat leaves.

slug

A soft, slimy creature like a snail with no shell. Slugs eat tender plants at night.

pest

A creature that harms the plants we are growing.

CORE IDEAS

A **caterpillar** is a baby butterfly or moth. It hatches from a tiny egg on a leaf and starts eating right away. It eats and grows, eats and grows, then makes a chrysalis or cocoon and turns into a butterfly or moth.

Most caterpillars do little harm. But some, like the green cabbage worm and the big tomato hornworm, can eat a whole plant if there are many. Look for holes in leaves

and little dark droppings.

Slugs and snails glide on a trail of slime. They hide in damp, shady places in the day and come out at night or after rain to eat seedlings and lettuce. A shiny trail is the clue that a slug was there.

A gardener protects plants gently. Wearing gloves, pick off caterpillars and move them far away from the garden. Lay a flat board on the ground at night; in the morning, slugs hide under it and you can carry them away. A ring of copper tape around a pot helps keep slugs out.

When a creature eats our garden, it is a **pest** to us, but it is still one of God's creatures with a place in His world. We protect our plants without poison, and we leave the wild places for the wild creatures.

PICTURE STUDY



Tulip with Caterpillar and Butterfly, Maria Sibylla Merian, 1679 · Hand-colored engraving from *The Wondrous Transformation of Caterpillars* · Published in Nuremberg, Germany

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

Maria Sibylla Merian was a German artist and scientist who raised caterpillars at home to watch them change. She drew each caterpillar on the plant it ate, together with its pupa and the butterfly or moth it became.

Look closely

- Find the caterpillar. What is it doing?
- Find the pupa, the resting stage. Where is it?
- Find the butterfly. How is it different from the caterpillar?
- Look at the tulip. Can you find any places where it has been nibbled?

Talk about it

1. Why did Merian draw the caterpillar on a plant?
2. What will the caterpillar turn into?
3. If you found this caterpillar in your garden, what would you do?

Safety first. Wear gloves to pick up caterpillars and slugs. Do not touch hairy, spiny or brightly colored caterpillars; some can sting. Wash hands after handling slugs, snails or garden creatures.

HANDS-ON PROJECT

Garden Detective: Protect a Plant

You will look for clues of hungry garden visitors, set a slug board, and protect one plant with a gentle barrier.

You will need

- Garden gloves
- A flat board or a piece of cardboard
- A flashlight
- A bucket or container with a lid
- Copper tape (from a garden store) or a cut plastic bottle collar
- A magnifying glass and your nature journal

Steps

1. Walk through your garden or pots with your magnifying glass. Look for holes in leaves, chewed edges, little droppings and shiny slime trails.
2. Look under leaves (especially cabbage, broccoli or tomato leaves) for caterpillars and tiny eggs. Draw what you find.
3. In the evening, lay a flat board on damp ground near your plants.
4. With a grown-up, go out after dark with a flashlight. Do you see slugs or snails eating?
5. In the morning, lift the board. Wearing gloves, put any slugs you find in the bucket and carry them far away from the garden, to a wild area.
6. Pick off caterpillars with gloves and move them away from the garden too.
7. Protect one young plant: put a ring of copper tape around its pot, or slide a clear bottle collar over it and push it into the soil.
8. Check your plants every day this week. Did the damage stop?

Tips

- Water in the morning, not the evening, so the garden is drier at night when slugs come out.

- Leave a few plants like parsley or dill for butterfly caterpillars; you may get to watch them grow.

Check your work

- ☐ I found clues of caterpillars or slugs.
- ☐ I set a slug board and checked it.
- ☐ I protected a plant without poison.

NATURE JOURNAL

1. Draw a leaf with holes and the caterpillar that made them.
2. Draw a slug and its slime trail.
3. Draw the life of a butterfly in a circle: egg, caterpillar, chrysalis, butterfly.

From history. When Maria Sibylla Merian was a girl, many people believed that caterpillars and moths simply appeared out of mud or rotten food. By raising them carefully and drawing every stage, she helped show that each caterpillar hatches from an egg and changes into its own kind of moth or butterfly.

COMMON MISTAKES

- Blaming bugs for every hole. Look for clues first: slime means slugs; droppings mean caterpillars.
- Touching fuzzy or spiny caterpillars with bare hands.

Make it a game • Plant Detective Clues. Draw a leaf on paper with a few holes, then add a squiggly slime trail. Look at it like a detective and say which creature did it: a caterpillar or a slug. Then curl up as a caterpillar, wrap yourself in a blanket as a cocoon, and burst out as a butterfly.

8.3 MOLD AND MUSHROOMS

OBJECTIVES

- Tell that molds and mushrooms are fungi, not plants.
- Tell how fungi help (they break down dead leaves) and how they can harm (they make seedlings and food go bad).
- Say the mushroom rule: never eat a wild mushroom.

Warm-up. Look at a slice of bread or a piece of fruit that has been left in a closed bag for a week (prepared ahead by a grown-up). Look through the bag with a magnifying glass; do not open it. What do you see? What colors is the fuzz?

WATCH

All About Fungi

Next Generation Science • 3:16

<https://www.youtube.com/watch?v=UCgKHOo0nU4>

WHEN TO WATCH

After the core ideas. Point to the mushrooms, the fuzzy mold on the bread, and the shelf fungi growing on old logs.

BACKUP VIDEO

How Does Mold Grow? | Science for Kids

Okie Dokie Odie • 4:30

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

During the mold-bag project, to see how mold grows.

KEY TERMS

fungus

A living thing that is not a plant or an animal, like a mushroom or mold. More than one are called fungi.

mold

A fuzzy fungus that grows on old food, damp places and sometimes on plants.

spores

Tiny specks, too small to see, that fungi use to make new fungi, like seeds.

CORE IDEAS

Mushrooms and molds are **fungi**. They are not plants, because they are not green and cannot make food from sunlight. They feed on dead leaves, old wood and old food.

A mushroom is only a small part of the fungus. Most of it is hidden underground or inside the log, like long white threads. The mushroom pops up to spread its **spores**, tiny specks that float away on the air like dust.

Fungi are important helpers. They break down fallen leaves and logs and turn them into soil, just as we saw in Unit 3. Some fungi even help plant roots drink.

But **mold** can cause trouble too. It makes bread and fruit go bad. In the garden, mold can grow on seedlings in soil that stays too wet, and they fall over. A white powder on squash leaves is a fungus too. Good air, sun and careful watering help prevent it.

The most important rule: **never eat a wild mushroom**, and never touch your mouth after touching one. Some wild mushrooms are deadly poison, and even experts can be fooled. If you find a mushroom, look with your eyes, tell a grown-up, and wash your hands.

PICTURE STUDY



*Blue Mould under the Microscope (Scheme 12), Robert Hooke, 1665 · Engraving from *Micrographia* · Published in London by the Royal Society*
Image: [Wikimedia Commons](#), public domain

Robert Hooke was an English scientist who built his own microscope more than 350 years ago. He looked at a fuzzy blue spot of mold on the cover of a book and was amazed: up close, it looked like a little forest of stalks with round heads!

Look closely

- Find the tiny stalks. What is on top of each one?
- Some heads are round and smooth, and some look fluffy. Can you find both?
- Look at the bottom picture. What does it look like to you?
- Remember: the whole top picture is smaller than a speck of dust in real life!

Talk about it

1. What do you think the round heads hold? (Hint: tiny spores.)
2. Why do you think mold grows on food that is left too long?
3. What would you like to look at under a microscope?

Safety first. Never eat or taste a wild mushroom or berry. Do not open a bag of moldy food or breathe in mold; keep it sealed and throw the whole bag away when you are done. Wash hands after touching soil, mushrooms or anything moldy.

HANDS-ON PROJECT

The Mold Bag Experiment

You will watch mold grow on bread in sealed bags, to see what molds need, and then go on a mushroom walk to look (but not touch).

You will need

- Two slices of bread
- Two zip-top bags
- A spray bottle of water
- Tape and a marker
- A magnifying glass
- Your nature journal

Steps

1. Wipe one slice of bread lightly across a table or floor to pick up invisible spores. Do the same with the second slice.
2. Spray one slice with a little water. Leave the other slice dry.
3. Put each slice in its own bag and seal it. Tape the bags shut. Label them “wet” and “dry.”
4. Put both bags in a warm, dark cupboard.
5. Look at the bags every two days, through the plastic only. Never open them.
6. Draw what you see. Which bag gets moldy first? What colors appear?
7. After two weeks, throw both sealed bags away without opening them.
8. Go on a mushroom walk after a rain with a grown-up. Find mushrooms on logs, in grass or in mulch. Draw them. Look, don’t touch, and never taste.

Tips

- The wet bread grows mold faster, because fungi need water. That is why seedlings in soggy soil can get moldy.
- Use homemade or bakery bread if you can; it molds faster than store bread with preservatives.

Check your work

- ☐ I can tell that mold and mushrooms are fungi.
- ☐ I saw that mold grows faster where it is wet.
- ☐ I can say the rule: never eat a wild mushroom.

NATURE JOURNAL

1. Draw your two bread bags on the last day. Color the mold the way it looks.
2. Draw a mushroom you found on a walk. Write where it was growing.
3. Draw a mushroom with its hidden white threads under the ground.

From history. Robert Hooke's book *Micrographia* (1665) was one of the first books to show what things look like under a microscope. In it he drew a flea, a fly's eye, the cells of cork (he gave cells their name) and this blue mould. People were astonished to see a hidden world too small for their eyes.

COMMON MISTAKES

- Opening the mold bags to look closer. Keep them sealed; mold spores are not good to breathe.
- Thinking a mushroom is safe because it looks like one from the store. Never eat a wild mushroom.

Make it a game • Fungus Friend or Foe. Say what mold and mushrooms are: fungi, not plants. Your grown-up holds up two cards, a helper that breaks down dead leaves and a bad one that spoils food or seedlings. Point to the right card when you hear each fact. Look at moldy things only with your eyes, never touch.

8.4 OUR FIRST HARVEST

OBJECTIVES

- Tell how to know when radishes (and other vegetables) are ready to pick.
- Harvest, wash and share the first vegetables of the garden.
- Make a small show-and-tell exhibit of three matching radishes, like a county fair.

Warm-up. Look at your radish row (or your cup garden). Gently brush the soil away from the top of one radish. Can you see a round red shoulder? How big is it? Compare it with a coin or your thumb.

WATCH

Ivan Inspects Harvesting A Garden | Fun and Educational Videos for Kids and Toddlers

Ivan The Inspector - Educational Videos for Kids • 11:03

<https://www.youtube.com/watch?v=Bd6zgWz6lUo>

WHEN TO WATCH

After the core ideas, before you harvest.

BACKUP VIDEO

I Grew Radish From Seed to Harvest (31 days in 3 minutes)

RapidLapse • 3:25

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

Any time, to watch radishes grow from seed to harvest in a few minutes.

KEY TERMS

harvest

To pick or dig up food when it is ripe and ready.

exhibit

Something you set out neatly for others to look at, like vegetables at a fair.

matching

Alike in size, shape and color.

CORE IDEAS

The best part of gardening is the **harvest**! Radishes are ready about three to four weeks after planting, when their round red tops are about as wide as your thumb or a quarter. If you wait too long, they get hard, cracked and hot-tasting.

To harvest a radish, hold the leaves close to the soil and pull straight up. Shake off the soil, rinse it in cool water and trim off the leaves.

Other first harvests: lettuce leaves can be picked from the outside while the plant keeps growing; peas are ready when the pods are plump. Sunflowers bloom later in summer.

At county fairs, older children enter plates of vegetables that judges compare. Judges look for vegetables that are **matching** in size and shape, clean, with no cracks or bites, and neatly labeled. Young children in 4-H Cloverbuds bring display-only exhibits that are not judged against each other. Either way, making an **exhibit** teaches us to look closely and do our best work.

When we harvest food we grew, we remember who made it grow. We thank God for the sun and rain, and we share what we have grown.

PICTURE STUDY



October (Potato Harvest), Jules Bastien-Lepage, 1878 · Oil on canvas · National Gallery of Victoria, Melbourne

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

Jules Bastien-Lepage grew up in a farming village in France and painted his neighbors at work. In this painting, two women are harvesting potatoes on a cool fall day.

Look closely

- Find the basket of potatoes. Where is the woman pouring them?
- Find the woman kneeling in the dirt. What is she doing?
- Look at the potatoes on the ground. How many can you count?
- Find the other workers far away in the field.

Talk about it

1. How do you think the women know the potatoes are ready to dig?
2. Why is a harvest hard work?
3. How do you feel when you pick something you grew yourself?

Safety first. Wash vegetables before eating. Only eat plants a grown-up says are food. A grown-up uses the knife to trim tops.

HANDS-ON PROJECT

Harvest Day and a Show-and-Tell Exhibit

You will harvest your radishes (or lettuce, or bean plants), choose three that match for a little exhibit, share the rest, and give thanks.

You will need

- Your radish row or garden pots
- A basket or bowl
- A bowl of cool water and a soft brush
- A white paper plate
- An index card and a marker for a label
- Your nature journal

Steps

1. Check the radishes: brush away a little soil and look for round tops about as wide as your thumb.
2. Hold the leaves close to the soil and pull straight up. Put the radishes in your basket.
3. Rinse them gently in cool water. Do not scrub hard; you could scratch the skin.
4. Lay all the radishes in a row. Choose three that match: the same size, the same shape, the same bright color, with no cracks or bites.
5. With a grown-up, trim the leaves of your three radishes to the same short length.
6. Set them neatly on the white plate. Make a label card with the name of the vegetable, your name and the date.
7. Give a show-and-tell: stand by your plate and tell your family what you grew, how you cared for it, and why you chose these three.
8. Wash, slice and taste the rest of the harvest. Share some with someone.
9. Before you eat, say a prayer of thanks for your first harvest.

Tips

- 4-H Cloverbuds (about ages 5 to 8) is non-competitive: children bring display-only show-and-tell projects to the county fair and receive a participation ribbon. Check your county extension office or fair book to see what your fair offers.
- If radishes are not ready, use lettuce leaves, pea pods or even three matched bean plants in cups.

Check your work

- ☐ I harvested food I grew myself.
- ☐ I chose three matching vegetables and made a neat, labeled plate.
- ☐ I told about my harvest and said thank you to God.

NATURE JOURNAL

1. Draw your three matching radishes on their plate with the label.
2. Draw a radish plant: leaves above the soil, red root below.
3. Draw your favorite moment from this whole gardening year.

From history. County fairs began in America in the early 1800s, when farmers gathered to show their best crops and animals and learn from one another. 4-H clubs, started in the early 1900s to teach young people farming and homemaking, still bring thousands of children's projects to county fairs every summer, from the youngest Cloverbuds' display projects to older members' judged exhibits.

COMMON MISTAKES

- Leaving radishes in the ground too long. Check every few days once they are four weeks old.
- Choosing the three biggest radishes. For an exhibit, choose three that match each other best.

Make it a game • Ready to Pick?. Set out two pretend radishes, one tiny and one fat with a red top peeking out. Point to the one that is ready and say how you know. Then pretend to pull it, wash it and share it with a family member. Finish by telling your grown-up about your favorite part of the garden.

UNIT 8

GARDEN HELPERS AND GARDEN TROUBLES

As the garden grows, visitors arrive. Some are helpers, like ladybugs, bees and earthworms. Some are troubles, like hungry caterpillars, slugs and mold. In this last unit your child becomes a garden detective, learning to tell helpers from troublemakers and to protect plants gently, with hands, boards and barriers rather than sprays.

We also meet mushrooms and molds, which help turn old leaves into soil but can harm seedlings, and we learn the most important mushroom rule of all: **never eat a wild mushroom**. The year ends with a joyful first harvest, a simple show-and-tell exhibit like the ones children bring to a county fair, and a prayer of thanks. The pictures, by Jan van Kessel, Maria Sibylla Merian, Robert Hooke and Jules Bastien-Lepage, show insects, caterpillars, mold and a harvest field.

PREREQUISITES

- Has seeds or plants growing (Unit 7)
- Knows what decomposers do (Unit 3)
- Can use a magnifying glass

MASTERY CHECKLIST

- ☐ I can name three garden helpers and tell how one helps.
- ☐ I can find signs of caterpillars and slugs and protect plants gently.
- ☐ I can tell that mold and mushrooms are fungi and that I never eat a wild mushroom.
- ☐ I can tell when a radish is ready and harvest it.
- ☐ I can show a small harvest exhibit and give thanks.

LESSONS IN THIS UNIT

8.1 Ladybugs and Good Bugs

2 sessions of 30 minutes

8.2 Hungry Caterpillars and Slugs

2 sessions of 30 minutes

8.3 Mold and Mushrooms

2 sessions of 30 minutes

8.4 Our First Harvest

2 sessions of 30 minutes

UNIT 8 REVIEW

A parent asks these questions aloud. Your child may answer by telling, pointing or drawing. There are no points; just notice what your child knows and what to review.

1. Name three garden helpers. How does a ladybug help?
2. You see a shiny trail on a leaf. Who was there? How can you protect the plant?
3. What does a caterpillar turn into?
4. Are mushrooms and mold plants? What is the mushroom rule?
5. How do you know a radish is ready to pick?
6. Show your exhibit plate. Why did you choose these three?

ANSWER KEY

1. For example: ladybugs, bees, earthworms, spiders, ground beetles. Ladybugs (and their larvae) eat aphids.
2. A slug or snail. Use a board trap and move them away, water in the morning, or use a copper ring.
3. A butterfly or a moth (after a chrysalis or cocoon).
4. No, they are fungi. Never eat a wild mushroom; look, tell a grown-up, wash hands.
5. Its round top is about as wide as a thumb or a quarter, about three to four weeks after planting.
6. They match in size, shape and color, are clean, have no cracks or bites, and are labeled.

PORTFOLIO PIECE: MY GARDENING YEAR SHOW-AND-TELL

Set up a small table display of your year, the way children show projects at a county fair: your nature journal open to favorite pages, your seasons wheel or seasons book, your bean growth log, your garden picture record, and your harvest plate (or a photo of it).

Invite family or friends. Stand by your display and tell them three things you learned this year and one thing you want to grow next year. End by thanking God for the harvest.

LOOK FOR	WHAT IT MEANS
Display	Set out at least four projects from the year neatly, with a name card.
Harvest	Includes a harvest plate or photo of three matching vegetables, labeled.
Telling	Told three true things learned this year in a clear voice.
Thankfulness	Gave thanks for the year’s growing and harvest.