

Reading Comprehension: “The Chicken and the Worm”

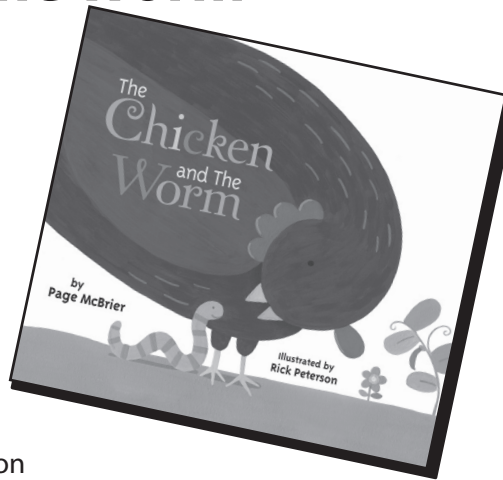
LESSON

1

Objectives

The students will:

- Practice different decoding strategies for emergent readers.
- Apply steps in reading comprehension.
- Describe how worms help people and the planet.



Procedure

1. Introduce the topic of worms.

Ask your class the following question

- What do you know about worms?

Take any answers the students provide and write them down. Some students may say they don't like worms, or are afraid of them. Ask the students what makes them feel this way.

Move and Learn!

When talking about worms, children will say that worms wiggle. Encourage your students to move as a worm would move. Invite them to wiggle and squirm and try to move across the floor. This kinesthetic learning activity makes the lesson all the more memorable to children.

Now ask the students

- What would you like to know about worms?
- Do you have any questions about them and how they live?

Again, write down each response. You will use them in step four.

Tell the class that you will be reading a book called “The Chicken and the Worm.”



2. Apply a picture reading strategy.

Hold up “The Chicken and the Worm” for the class to see. Tell the students that first they will look only at the pictures in the book. Go through page by page, asking students to tell you what they think is happening.

Ask students what they can guess about the worm (e.g., Can you guess how large a worm is?, Can you guess where a worm lives?). The students will have many creative ideas about what is happening in the story based on the pictures alone.

National Standards Addressed



COMMON CORE LANGUAGE ARTS

Informational Text

RI.K.1. With prompting and support, ask and answer questions about key details in a text.

RI.K.2. With prompting and support, identify the main topic and retell key details of a text.

RI.K.7. With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).

RI.K.10. Actively engage in group reading activities with purpose and understanding.

Procedure (continued)

After having gone through the book interpreting only the pictures, recap for the students what information they have discerned about worms so far.

3. Read the text aloud as the next step in comprehending the book.

Read the entire story to the children. Then go back to each page and re-read the text aloud. Pause between pages to ask students what information they have learned from the text. Ask them if what they guessed from the pictures matches the information the words provide. If a page provides information they didn't know before, ask students to restate what the new information is (e.g., What things do worms eat? Tea bags, watermelon, grapes, but not hamburgers; Do worms have babies? Yes, they grow in cocoons; How do worms help plants grow? – When worms dig tunnels they loosen the soil which helps give plants room to grow.).

4. Ask students to recap what information they have learned about worms.

After you have finished reading the text, ask students what they liked about the book. Ask them to identify information they were surprised to learn about worms.

With your students, refer back to the list of comments made in step one. Were the students correct or incorrect about the things they previously thought about worms? Did they find out answers to any questions they previously had about worms?

Links To Heifer International

Worms Helping People

Did you ever consider how important worms are to people? Worms are some of the many animal gifts that Heifer International provides to families. Why? Because worms are treasures. Worms help provide inexpensive organic fertilizer to farmers. By using organic fertilizer (instead of chemical fertilizer), farmers can protect the health of the soil so that many future generations will be able to continue using the land to grow crops. The term for raising and using worm by-products as fertilizer is vermiculture. See www.heifer.org for more information about how Heifer International project partners use vermiculture.



Standards (continued)

Speaking and Listening

SL.K.2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details.



NEXT GENERATION SCIENCE STANDARDS

LS1.C Organization for matter and energy flow in organisms

Animals obtain food they need from plants or other animals. Plants need water and light.

ESS2.E Biogeology

Plants and animals can change their local environment.

ESS3.A Natural resources

Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.



Animals and their Environments

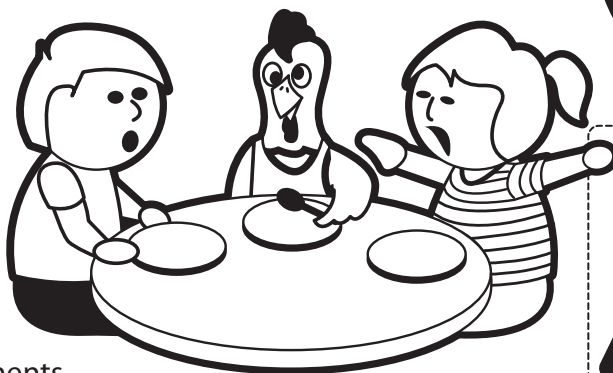
Where Do Chickens and Worms Live?

LESSON 2

Objectives

The students will:

- Define the word “environment.”
- Describe how different animals live in different environments.
- Discover that the physical features of animals are matched to their environments.



National Standards Addressed



NEXT GENERATION SCIENCE STANDARDS

LS1.A Structure and function

All organisms have external parts that they use to perform daily functions.

LS4.C Adaptation

Living things can survive only where their needs are met. If some places are too hot or too cold or have too little water or food, plants and animals may not be able to live there.

LS4.D Biodiversity and humans

A range of different organisms lives in different places.



COMMON CORE LANGUAGE ARTS

Informational Text

RI.K.2. With prompting and support, identify the main topic and retell key details of a text.

Procedure

1. **Discuss animal environments.** Show the students the book “The Chicken and the Worm” and flip through the pages. Ask the students to remind you what this book was about. Be sure to ask:
 - Where does the worm live? What is the worm’s home like?
 - Where does the chicken live? What is the chicken’s home like?

Explain that the word “environment” describes the surroundings (the place) where an animal or plant lives. Tell the class that you are going to talk more about the chicken’s environment and the worm’s environment. Flip to the pages in the book that show where the chicken and worm live. Read the text on those pages aloud. Ask students to describe the environment of the chicken and of the worm. Students can gather information from the text and from clues in the pictures.

Students should be able to come up with a simple description of the environment (e.g., The chicken lives in a coop. The coop is on a farm. The chicken sleeps in a nest.) (e.g., The worm lives in a wooden bin. There are strips of newspaper in the bin. Other worms live underground in the dirt.).

Then ask the students to think about their own environments. Remind students that people are animals, too. Ask them:

- Where do you live? What is your home like?

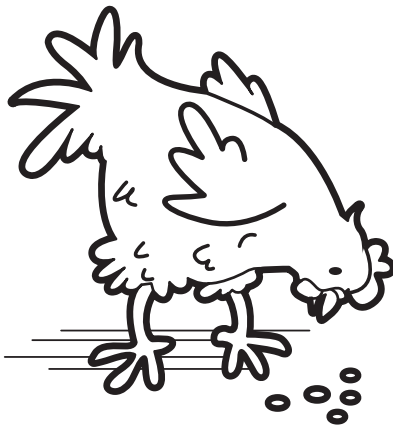
Explain that in answering these questions, they are describing their own environments.

2. **Discuss how animals are built to match their environments.**

Ask the students to show you how worms move. Then ask them to show you how chickens move. Refer to the pictures in “The Chicken and the Worm” to help students get ideas.

Procedure (continued)

- Ask the students if they can imagine a chicken that could only move like a worm – could it move around to find enough food?
- What about a worm that had to move like a chicken – could it hide itself deep in the dirt?



Discuss how it is a good thing that a chicken has legs and a beak that it can use to wander around and get food. Also discuss how a worm's body is well built for burrowing through the dirt. Emphasize that animals' bodies are different from each other because each type of animal has special body characteristics that help them live in their specific environments.

Move and Learn!

Have students pretend to be chickens. Put butcher paper on the ground and shelled sunflower seeds (or other small food items) around the paper. Have the students try to pick up the seeds using their mouths. They may be able to do it, but it isn't easy. Ask them why it is easier for chickens to do this (because they have beaks, their bodies are structured so their heads can reach the ground easily, etc.). Chickens are built to find and eat food on the ground.

Links To Heifer International

Animals and Their Environments

This lesson is a very gentle introduction for young learners about how animals live in certain types of environments and how animals are built to match their environments. This starts children thinking about the biology of the animal – how and why animals look different from each other. It also starts the child on a journey of becoming aware of the importance of environments, and how much each organism relies on its environment. Making people aware of the need to maintain a healthy environment is an issue that is central to the work of Heifer International.



Standards (continued)

Speaking and Listening

SL.K.1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

- Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).
- Continue a conversation through multiple exchanges.

Language

L.K.4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.



Animals Helping People

How do Chickens and Worms Help People?

LESSON 3

Objectives

The students will:

- Recognize how livestock animals help humans.
- Practice writing letters of the alphabet.

Materials

- One copy of "Animal Helpers" per student (assemble books before class).



Procedure

1. Identify how chickens and worms help people. Flip through "The Chicken and the Worm" and ask the students:

- How do chickens help people?
- How do worms help people?

Be sure to read aloud the pages that discuss these points:

- Chickens lay eggs.
- Chicken and worm manure help plants grow.
- Chickens and worms help loosen the soil so plants can grow.

Turn to the page that says "You've got that right!" (Page 33) This shows the chicken and the worm celebrating how useful they are. Read that page aloud, as well as the following pages in the book: "Who knew worms could be so special?" and "Who knew chickens could be so important?" Ask the students why the chicken and the worm are celebrating — do you think they are doing important things? Raise the point that people would have a harder time growing plants without help from chickens and worms.

2. Identify other animals that help people. Ask your students to name other animals that help people. Discuss how animals, especially farm animals, help people. After brainstorming ways in which animals assist people, hand out copies of the activity book, "Animal Helpers," to each student.

The "Animal Helpers" activity books are simple word books that show how farm animals help people. Students should trace the dotted lines to write the names of the animals. This helps them learn to recognize and write letters of the alphabet. Encourage the students to color the pages.

National Standards Addressed

NEXT GENERATION SCIENCE STANDARDS

LS1.A Structure and function

All organisms have external parts that they use to perform daily functions.

LS4.D Biodiversity and humans

A range of different organisms lives in different places.

ESS3.A Natural resources

Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do

COMMON CORE LANGUAGE ARTS

Informational Text

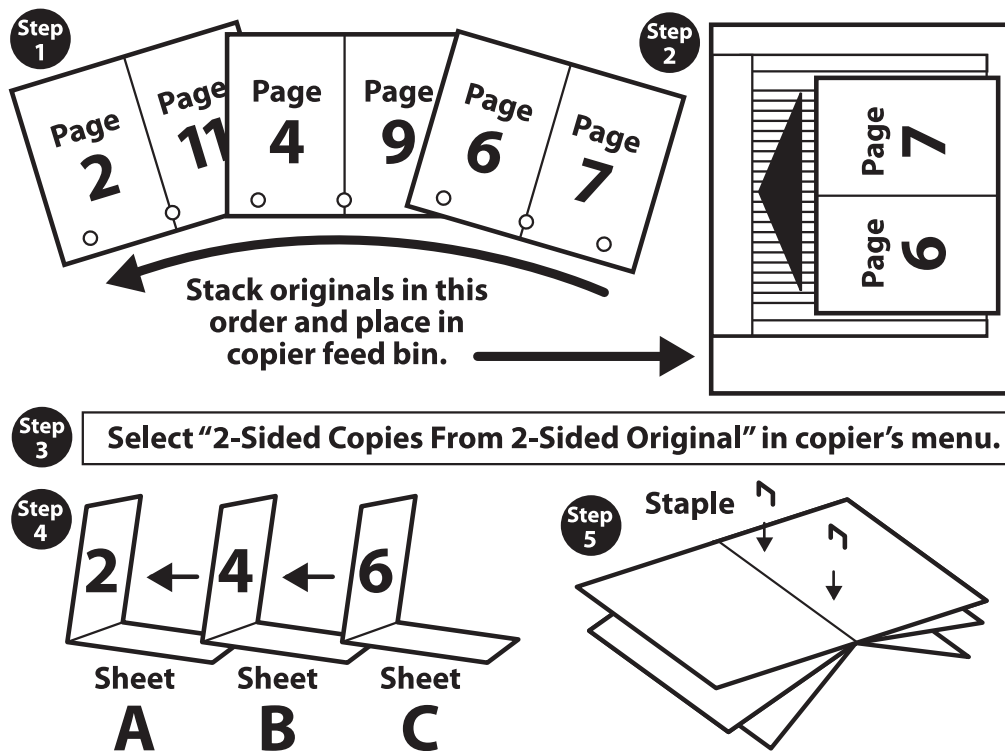
RI.K.1. With prompting and support, ask and answer questions about key details in a text.

RI.K.3. With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.

Links To Heifer International

Animals Helping People

Livestock animals are a central part of Heifer International's work to help families raise their standard of living. This lesson teaches that animals can be extremely helpful to people, even an animal that seems as insignificant as a worm. As a result, the children grow in their understanding of how animals help people. To learn more stories about children whose families have benefited from receiving livestock animals, see www.heifer.org.



Standards (continued)

Speaking and Listening

SL.K.1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

- Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).
- Continue a conversation through multiple exchanges.

Writing

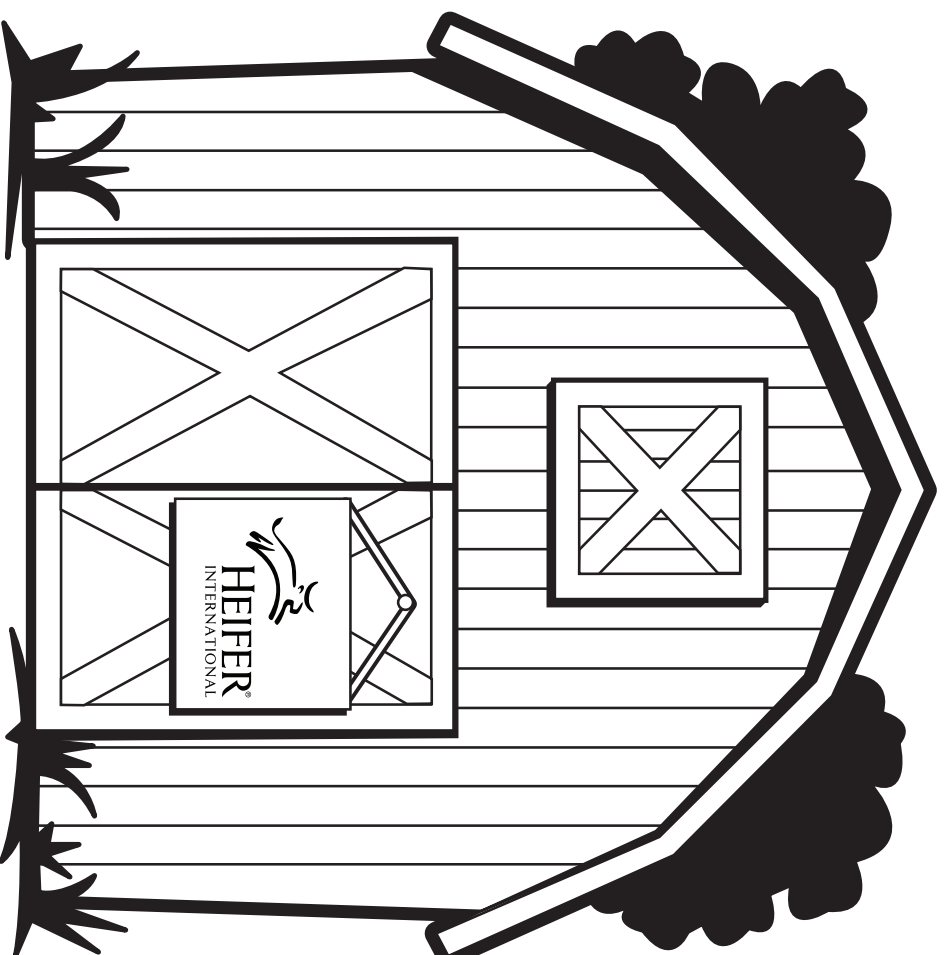
L.K.1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

- Print many upper- and lowercase letters.



C3 SOCIAL STUDIES

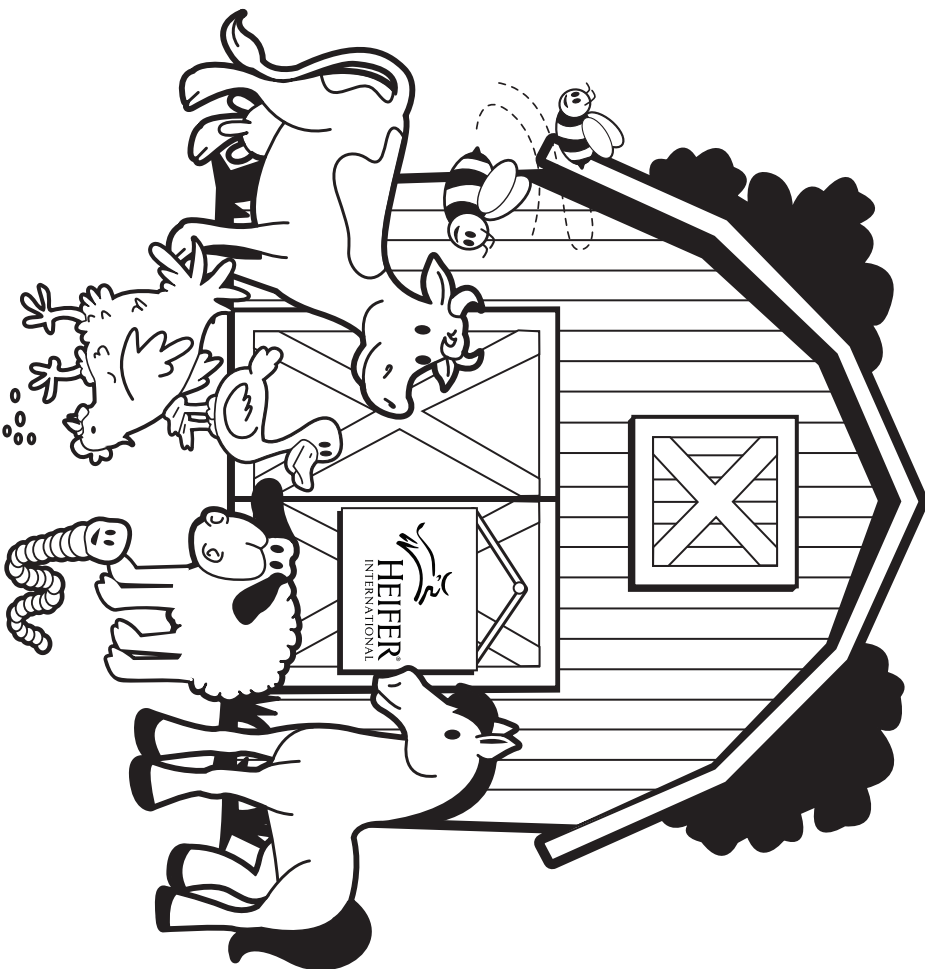
D2.Geo.4.K-2. Explain how weather, climate, and other environmental characteristics affect people's lives in a place or region.



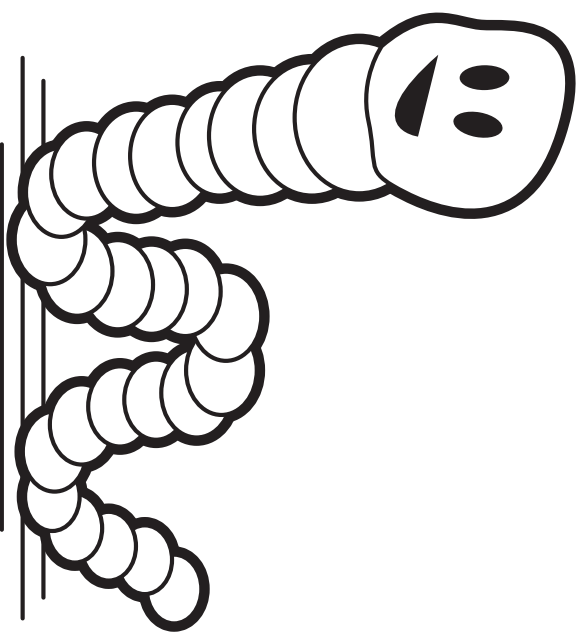
Animal Helpers



Thank you,
animal
helpers!



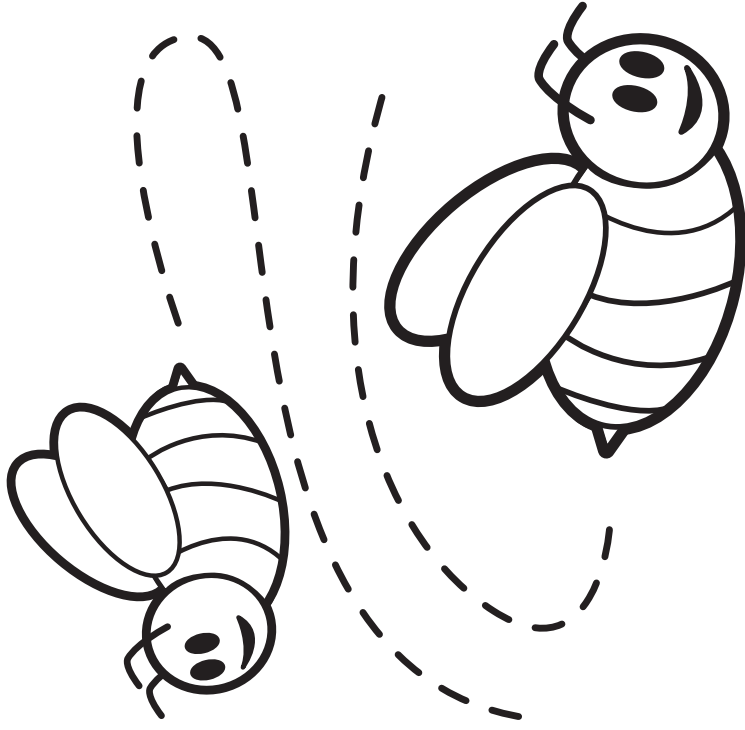
W o r m



A w o r m

helps plants grow.

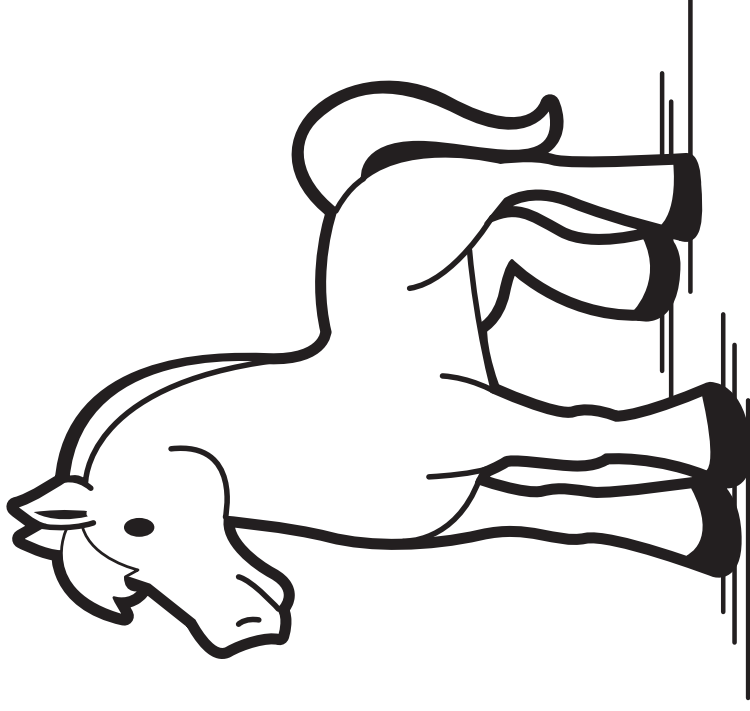
bee



A bee

makes honey.

horse



A horse

pulls a wagon.

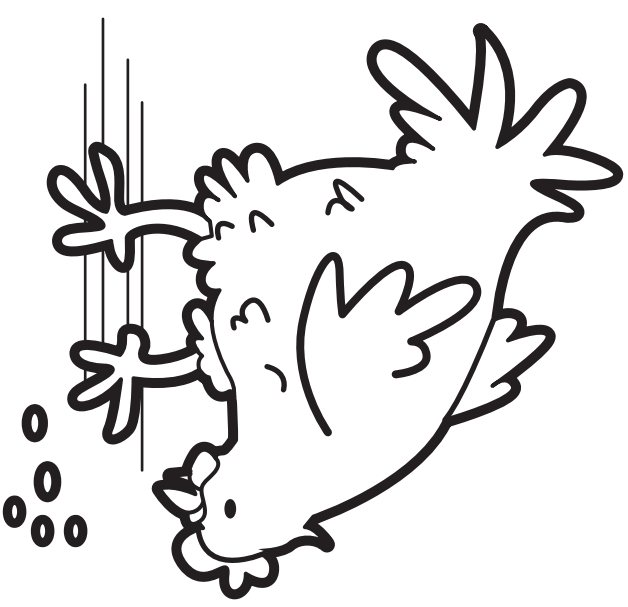
c o w



A c o w

gives milk.

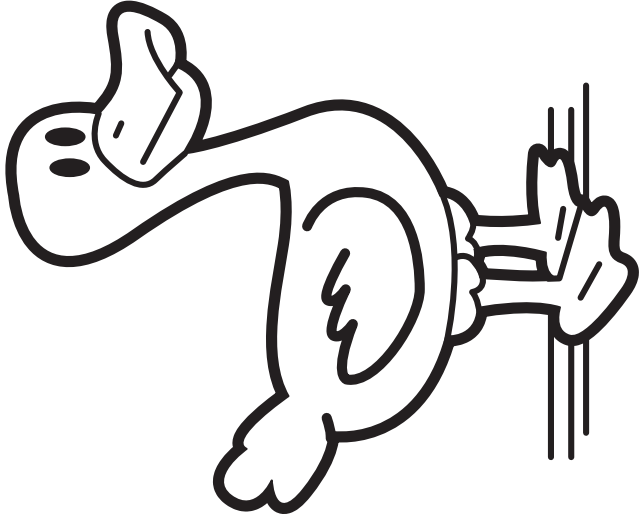
c h i c k e n



A c h i c k e n

lays eggs.

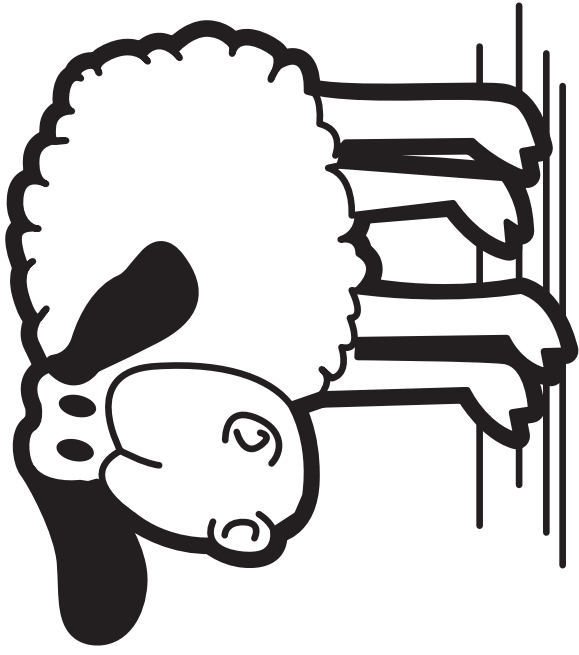
duck



A duck

lays eggs.

sheep



A sheep
gives wool.

Building a Worm Bin

LESSON 4

Objectives

The students will:

- Learn about a simple organism (a worm) and its environment.
- Follow directions in feeding worms.
- Observe stages of a worm's life cycle.
- Discuss how worms affect plant life.



Materials

- Materials for a worm bin (see pages 4-7).
- "How to Build and Maintain a Worm Bin."

Procedure

1. **Discuss how animals help people.** Ask students for ideas on how animals help people. In particular, ask them how worms help people. (Worms help plants grow and people eat plants.) Worms help plants grow by:

- Eating food waste.
- Recycling the food waste into nutrients (fertilizer) for the soil.
- Digging holes in the ground to spread air and water through the soil.

Tell the students that worms help turn our leftover food into nutrient-filled soil. After the worms digest the food scraps, they leave their manure, called "castings," in the soil. Their castings are filled with nutrients that can help plants grow. Without worms, the soil would not be as healthy and plants would have more difficulty growing. Without plants, animals and people wouldn't have food to eat.

Tell your students you are going to build a home for worms, and keep the worms as helpers in your classroom. The worms will recycle food waste into fertilizer for a garden.

2. **Build a worm bin.** Building a worm bin is simple and fun! It's also a fantastic way to teach kids about basic issues in life science. A worm bin is a clean and contained activity that you can easily do indoors. Through it all, students learn to be respectful of the earth and to care for the environment.



National Standards Addressed



NEXT GENERATION SCIENCE STANDARDS

ESS2.E Biogeology
Plants and animals can change their local environment.

ESS3.A Natural resources
Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

ESS3.C Human impacts on Earth systems
Things people do can affect the environment but they can make choices to reduce their impacts.

LS1.A Structure and function
All organisms have external parts that they use to perform daily functions.

LS1.C Organization for matter and energy flow in organisms
Animals obtain food they need from plants or other animals. Plants need water

Procedure (continued)

Follow the instructions on pages 4-7 and 4-8 on how to build a worm bin. You will need to use red wiggler worms. You can buy them through Internet sites and have them sent to you through the mail.

It will take four to six months before you can harvest your first worm castings (the material used as fertilizer). You can use the worm castings in a school garden or in a container garden in your classroom or distribute them to the students to take home and use in their home gardens.

- 3. Observing your worms.** Use your worm bin to teach students how to make scientific observations about living organisms. Some activities you can do include:
- Measure the worms when you first get them, and over the next few weeks. Keep a chart to see how the worms grow. After more babies are born from cocoons, measure the adults and the babies to see the contrast in size.
 - Keep an eye out for cocoons. When you find some, carefully take them out of the worm bin to measure them and make drawings of them. Discuss how there are approximately three eggs inside each cocoon, and each egg holds a baby worm. Carefully return the cocoons to the soil.
 - Observe how worms move. Take a worm out of the bin and put it on a moist paper towel. Watch it move. Have students suggest different words to describe their movement. Put the worm back into the bin after a few minutes to keep it healthy.
 - Observe worms and dirt. Take a moist paper towel and make a narrow, winding trail of soil on it. Place a worm on the towel and see whether or not it follows the soil trail. Ask the students to consider why it does this or not. Put the worm back into the bin when you are done.
 - Observe how worms react to dark. Place a worm on a moist paper towel. Cover part of the towel with a dark piece of paper. Does the dark area attract the worm or not? Put the worm back into the bin when you are done.
 - Observe how worms react to light. Place a worm on a moist paper towel. Darken the room. Shine a flashlight from one direction onto the worm. How does the worm react to the flashlight? Return the worm to the bin.
 - Observe how worms react to cold. Place a worm on a moist paper towel. Place one ice cube near the worm. As it melts, the cold spreads on the paper towel. How does the worm react to the cold water? Place the worm back into the bin.
- 4. Teaching with your worm bin.** Here are ideas you can discuss with your students as you create the worm bin, take care of the worms over several months and harvest the worm castings to use as fertilizer.

Standards (continued)

and light.

LS1.D Information Processing

Animals sense and communicate information and respond to inputs with behaviors that help them grow and survive.

LS4.C Adaptation

Living things can survive only where their needs are met. If some places are too hot or too cold or have too little water or food, plants and animals may not be able to live there.



COMMON CORE LANGUAGE ARTS

Speaking and Listening

SL.K.1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

- Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).
- Continue a conversation through multiple exchanges.

Writing

W.K.3. Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a



Procedure (continued)

- What is the worm's environment like? How does the worm's body match well with its home?
- How do plants get food (nutrients) from the soil?
- What are the basic needs of the worm (e.g., air, water and food)? Any animal's environment must meet its basic needs or it will not be able to survive. How does the worm bin meet the worm's basic needs?
- Keep a record of observations about the bin. What changes do you see in the appearance and volume of the bedding? (See "How to Build and Maintain a Worm Bin" under the "Changes You'll See in the Bin" section for more information.)
- How many weeks does it take after you release the worms into the bin for you to see cocoons? Take the cocoons out of the bin and make drawings of them, then put them back into the bin. What observations can you make about the cocoons?
- Plants also have basic needs. Identify the needs of plants and discuss how some environments can meet these needs and how other environments cannot.
- Taking care of the soil: Soil, worms and people all need healthy nutrients (food) to survive. Soil can turn healthy or sick depending on what goes into it. Identify some human activities that make the soil healthy or sick.
- Recycling: Composting with a worm bin is a great way to recycle! Worms take your food scraps and turn them into something very useful. What are some other great ways to recycle?

reaction to what happened.

+ **−** **COMMON**
× **÷** **CORE MATH**

Measurement and Data

K.MD.1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.



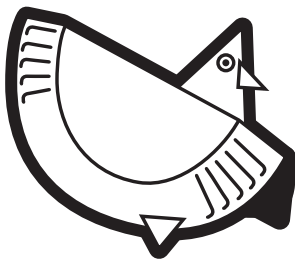
C3 SOCIAL STUDIES

D2.Geo.4.K-2. Explain how weather, climate, and other environmental characteristics affect people's lives in a place or region.

Extension Activities

These are activities that are fun and educational.

Paper Plate Chicken



1. Take a paper plate. Write each student's name on the top side of the plate. Then use paint to decorate the bottom side of the plate. Encourage students to use a pattern to decorate the plate.
2. Let the plate dry, then fold it in half so painted side is on the outside.
3. Cut a large triangle out of one color of construction paper. Cut three smaller triangles out of a different color of construction paper.
4. Glue or staple the large triangle to one side of the folded edge of the paper plate. This will be the head. Draw an eye or glue a googly eye on each side of the head.
5. Glue one smaller triangle to the head. This will be the beak.
6. Glue the two other small triangles to the bottom of the rounded edge of the paper plate.
These will be the feet.
7. Your paper plate chicken should be able to stand up on its own.



Painting with Worms

Materials:

- Cooked spaghetti noodles
- Various colors of paint
- Shallow bowls to pour paint in
- Black or brown construction paper (to represent soil)

This is a great fine motor activity for young children. The noodles represent the worms, and the children can wiggle the noodles on the paper to represent the movement of the worms. This activity fires up a child’s imagination to consider what it might be like to be a worm underground.

Cook enough noodles so each child has a small handful to work with. Cover the floor with newspaper and have the students wear smocks or clothes they can get paint on. Put ¼ inch of paint in a bowl, using separate bowls for each color. Have the children dip a noodle into the paint, then place the noodle on the paper and wiggle it around to imitate the movement of a worm. Have children use a new noodle for different colors of paint. Don’t let the children eat the noodles or the paint!

Songs to Sing and Learn

Use some well-known tunes to sing a repetitive chorus combined with statements that students come up with about new things they have learned about worms. Have students move like worms while they sing. For example:

“Mister Worm”

(sung to the tune of “Frère Jaques”)

Refrain:

Mister Worm

Mister Worm

How are you?

How are you?

Verses (make up verses based on facts that students offer):

Worms like to wiggle

Worms like to wiggle

Yes they do

Yes they do

Worms eat newspaper

Worms eat newspaper

Yes they do

Yes they do

Worms eat food scraps

Worms eat food scraps

Yes they do

Yes they do

Worms breathe through skin

Worms breathe through skin

Yes they do

Yes they do

Worm poop helps plants grow

Worm poop helps plants grow

Yes it does

Yes it does

Worms don’t eat junk food

Worms don’t eat junk food

No they don’t

No they don’t

Babies come from cocoons

Babies come from cocoons

Yes they do

Yes they do

Worms have mouths

Worms have mouths

Yes they do

Yes they do

Worms don’t have eyes

Worms don’t have eyes

No they don’t

No they don’t

Links To Heifer International

Vermiculture Projects

Garden projects are great ways to grow organic food, provide ways for families to supplement their incomes and food supplies, and provide training in entrepreneurial skills for youth. Since garden projects do not require large areas of land, they can be carried out in urban areas as well. Heifer International supports garden projects across the U.S. and around the world, including many in high-density urban areas where youth have little other opportunity to spend time close to nature.



Children's Questions about Worms

Here are some questions that kindergarten kids had after observing worms:

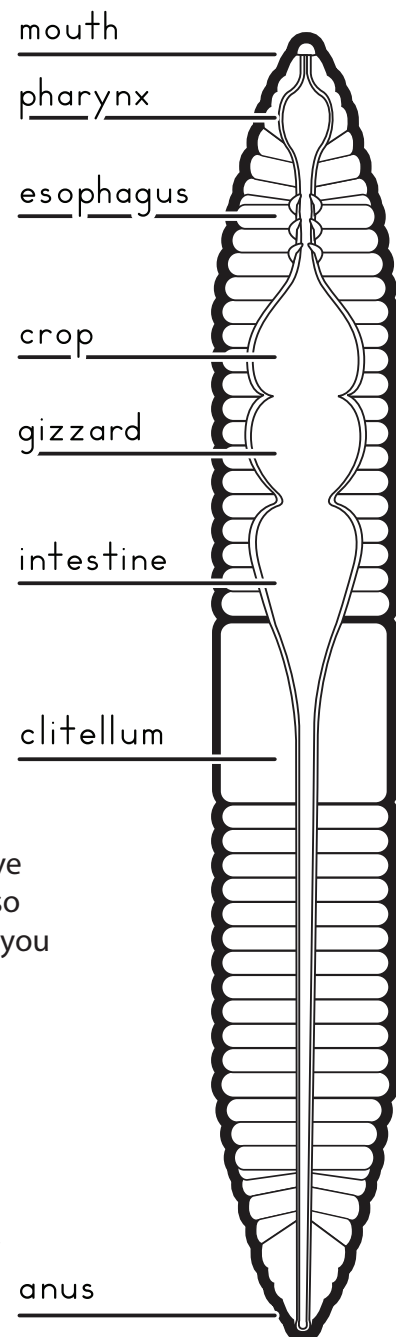
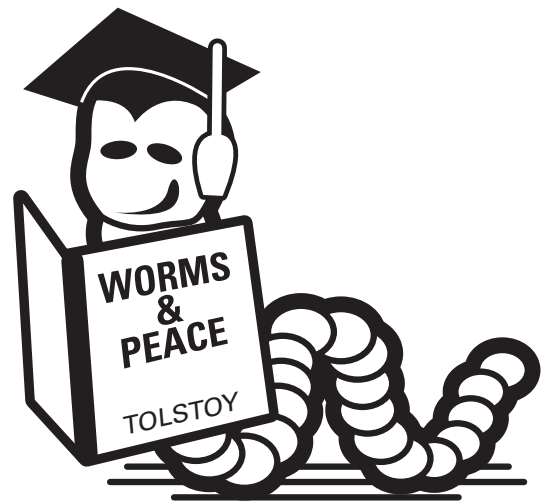
- **What do worms like to eat?**
Worms like to eat food scraps. Some of their favorites are fruit and vegetable peels, apple cores, and eggshells. They also like to eat shredded newspaper.
- **Do worms have legs?**
Worms do not have arms or legs, but they do have bristles on their body that they use to grip the soil when pulling themselves forward.
- **Why can't you hold worms for a long time?**
If you hold a worm too long in the open air, its skin could dry out. Then it wouldn't be able to breathe and it would die. So take a worm out to look at it for a minute, but then put it back in the soil!
- **What are worm castings?**
Worm castings are worm manure (poop). After worms eat their food, they poop out what they cannot use, and this is called worm castings, or worm poop.
- **Why do worms have their mouths where they wiggle?**
Worms have two ends; we can call them a head and a tail end. The mouth is at the head end. Every part of the worm's body is the wiggly part. The worm wiggles around to find food to put into its mouth to eat!
- **Do baby worms like to crawl?**
Worms don't crawl like human babies. Instead they wiggle. All worms wiggle in order to move. They wiggle to get closer to their food to eat, and to get away from other animals that might want to eat them!
- **Why do worms always have to wiggle?**
Wiggling is the way worms move from place to place. If you didn't have feet or legs, you'd probably have to wiggle to get somewhere, too. Can you think of other animals that wiggle to move? They probably don't have feet, either.
- **Why do the babies come out of the same cocoon?**
To make baby worms, the parent worm lays three or four eggs inside of a cocoon. The eggs stay in the cocoon for protection while the babies are growing. When they are ready to come out, the baby worms come out of the eggs and break through the cocoons.
- **What do worms drink?**
Worms drink water. In fact, that's all they need to drink. And they don't need very much. Worms get all the water they need from the soil and from the food scraps you put in their bin.

WORM FACTS

- There are over 2,700 species of worms.
- Worms do not have arms or legs.
- Worms do have a head (anterior) end and a tail (posterior) end.
- Worms do not have eyes, but they can sense light from their anterior end.
- Worms breathe through their skin. Their skin must stay moist or else they won't be able to breathe through it, and they will die. But worms can't get too wet or they will drown.
- Worms are hermaphrodites. This means every worm has both male and female reproductive organs. But they still need to find a mate in order to reproduce. All worms carry eggs, and they exchange sperm in order to fertilize the eggs.
- Worms lay their eggs in a cocoon and release the cocoon into the soil or bedding. Baby worms hatch from the eggs in the cocoon.
- One pound of red wigglers consists of about 800 to 1200 worms.

How the Worm Turns (The Worm's Digestive System)

- I have a mouth, but no teeth!
- I push the pharynx (throat) out of my mouth to grab food, then I pull it all back inside me. I wet the food with saliva.
- I push the food down the esophagus and into my crop. The crop works as a storage area for my food.
- Inside my crop I have a gizzard. The gizzard muscles use stones I have swallowed to grind up the food into small particles. The stones are so small that they are hard for humans to see. They come from the soil you added into the bin and work much like teeth to tear up the food.
- The food travels into my intestine. Here, digestive liquids break the food particles down even further. The nutrients from the food then enter my bloodstream.
- The parts of the food that my body can't use then go through my anus and come out as poop, otherwise known as worm castings. My worm castings still have lots and lots of nutrients in them.



How to Build and Maintain a Worm Bin

These are directions for building a worm bin that can hold one pound of worms. You can always build a larger bin for more worms, or build multiple bins.

The Bin

Buy a bin to keep your worms in. The bin should be:

- Plastic and come with a tight-fitting lid.
- Opaque (not see-through), because worms do not like light.
- 8-14 inches deep.
- Surface area (the area of the lid) should be at least one square foot per pound of worms.

Drill air holes into your bin.

- Drill $\frac{1}{4}$ inch holes in the lid evenly spaced, about five inches apart.
- Drill $\frac{1}{4}$ inch holes at the top of the sides of the bin (do not fill the bin above these holes).
- Drill $\frac{1}{4}$ inch holes one inch from the bottom of the bin. Space these holes about five inches apart. These holes allow for excess water to drain out in case your students put too much water in the bin.

The Bedding

Use shredded newspaper (no colored inks or glossy paper):

- Tear newspapers into strips approximately one inch wide and six inches long.
- Put the newspapers in a large plastic garbage bag, slowly add water one cupful at a time. Stop when the newspapers are wet, but not soaking. Let the newspapers sit in the water overnight. By the next day, the moisture of the newspapers should be like that of a wrung-out sponge.
- Put the newspapers into the bin.
- Add two handfuls of soil from outside (do not use potting soil!) and mix it in. The outdoor soil adds grit to the bedding that the worms will use to grind up their food.
- Fluff up the bedding to allow air flow. This prevents the bedding from sticking together and allows the worms to crawl through it easily.

Maintenance of the Bedding

- The bedding must always remain moist. Mist it with water at least once a week so that the moisture is like that of a wrung-out sponge.
- Fluff the bedding every so often to maintain airflow.
- Make sure the air holes in the bin are not blocked.
- Add fresh bedding every three months or so. Always keep at least a one-inch layer of fresh bedding over the worms and the food.

The Worms: Red Wigglers

Not any worms will do! For a worm bin, you will want to use red wiggler worms. These are different from the earthworms you will find in your garden.

You can find and purchase red wigglers on the Internet. Expect to pay approximately \$40 per pound of red wigglers. The company will mail you your worms. When your worms arrive, make the bedding and place it into the bin. Then release the worms into the bin. It is fun to watch them wiggle down into the bedding, exploring their new home.

Why Not Earthworms?

Red wigglers (*Eisenia fetida*) are better suited to worm bins than earthworms. Red wigglers are smaller, and thus content to live in smaller quarters. Earthworms are larger and need more space than a worm bin provides. Also, red wigglers enjoy room temperatures, but earthworms prefer colder temperatures that you find outside deep in the soil. Finally, red wigglers reproduce quickly, and thus can turn the food scraps into fertilizer faster than earthworms.

Feeding Your Worms

What kind of food? Worms need healthy, nutritious food. They are really quite easy to please – feed them primarily vegetable and fruit scraps cut into small pieces (approximately four cm x four cm). Have your students help you decide what food is okay to put into the bin, and what is not. Be sure to bury food scraps under a few inches of soil to avoid attracting insects to the bin.

Here are some don'ts when it comes to feeding worms:

- Do not leave the food on top of the bedding. Always bury it under a few inches of the bedding. Also, put the food in different places in the bin, not just in one area.
- Worms are vegetarians - no meat and no fish.
- Worms don't eat dairy foods.
- Avoid oily foods.
- Don't feed them junk food!
- Feed them only limited amounts of citrus.
- Don't put in rotten food – just fresh food.
- Don't put in big chunks of food – break it down into smaller pieces.

How much food?

One pound of worms will eat about ½ pound of food scraps per day, or 3-4 pounds per week. Just watch carefully how much food is left in your bin. If you are feeding the worms too much, there will be rotting food scraps in your bin. Remove the rotting food and feed them a little less.

Over time, as the worms have babies, you will have more mouths to feed in your worm bin. Thus, you will have to provide slightly more food.

WARNING! If you put in more food than the worms can consume, the food will rot and the result will be an inhospitable environment for the worms. If you notice large amounts of rotting food that are not being consumed, decrease the amount of food you are putting in the bin.

The Worm Café

A WORM'S FAVORITE FOODS

- | | | |
|----------------------------|----------------------------|---|
| • Apple peelings and cores | • Coffee filters | • Potato peelings |
| • Beans | • Cornmeal | • Tea leaves and tea bags (remove any staples) |
| • Banana peels | • Eggshells | |
| • Biscuits | • Flowers | |
| • Carrots | • Lettuce | |
| • Cabbage | • Melon rinds | |
| • Celery | • Oatmeal | |
| • Cereal (not sweetened) | • Onion peels | |
| • Coffee grounds | • Paper napkins and towels | |
| | • Pizza crust | |

Be sure not to use too much acidic food.

- Grapefruit
- Lemon rinds
- Orange rinds
- Tomatoes

Where to Keep the Bin

The plastic bin is highly portable. You can move it to different places, but store it at room temperature and out of direct sunlight. You can store this bin under a desk, in a closet, on a shelf – lots of places! Remember, you will have to feed the worms at least once a week, so keep it accessible.

Changes You'll See in the Bin

Over the next few months, some changes you will see include:

- After six weeks, the bedding should look darker, and it should take up less volume. (At this point you need to add new bedding. Do not remove old bedding - leave it in place.)
- You will see cocoons that the worms have laid. These cocoons contain eggs.
- It will take four to six months before you will get your first harvest of worm castings.

Harvesting the Castings

How do the worms create fertilizer? The worms digest the food scraps that you put into the bin, their bodies use what they can and the waste comes out as worm castings. These worm castings are the valuable fertilizer that adds rich nutrients to the soil. Plants, in turn, use these nutrients to grow.

You will need to harvest your worm castings every three to four months. There are multiple ways to harvest the worm castings, but this is the simplest:

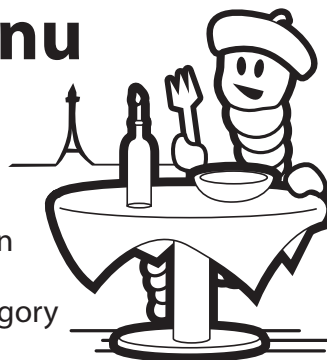
- Most of the uneaten food, bedding and worms will be in the top 1/3 layer of the bin. Remove this top 1/3 layer (including the worms) and put it aside momentarily.
- Remove the rest of the material from the bin. This is primarily the worm castings that you use as fertilizer.
- Put the top 1/3 of the materials (including the worms) back into the bin.
- Restock your bin with more moist bedding and some handfuls of soil from your garden.
- Some worms may get into your worm castings pile. Try to return most of them into the worm bin.

Creating a Worm Menu

Objectives

The students will:

- Categorize food items by what can be eaten by worms and what cannot be eaten by worms.
- Create visual representations of each category



Materials

- List of acceptable food items for worms
- For collage: scissors, glue sticks, paper a variety of grocery store ads, magazines (especially food oriented magazines), and/or catalogs.
- "The Chicken and The Worm" book

NOTE: When you have a worm bin in your classroom, you will frequently hear "Can the worms eat this?" This is one way to help students decide for themselves. If you do not have a worm bin, this activity is great for categorizing!

Procedure

1. Read "The Chicken and the Worm" together with your students.

Remind the students that the chicken and the worm in the story listed several types of foods they liked to eat (pages 22 and 23). Tell students that you will be making a menu for your worms (even though worms can't read!).

2.) Discuss with students the types of food that will appear in a worm menu. Allow students to think of examples.

- Vegetables (carrots, celery, beans, corn cobs, all leafy greens, squash)
- Fruits (melons, apples, banana peels, strawberries, peaches, etc.)
- Grains (rice, oatmeal, pasta)
- Other food and/bedding (dead flowers, brown leaves, tea bags, coffee filters, shredded newspaper, eggshells)

Also discuss things that would NOT appear on a worm menu. Again, allow students to think of examples.

- Meat (hamburgers, chicken nuggets, hot dogs)
- Junk Food (honey buns, candy, brownies, potato chips)
- Dairy (milk, cheese, yogurt)
- Non-food items (plastic, shiny paper, aluminum foil, paper clips, rubber bands)

Note: The following items are acceptable in small quantities: Citrus (very acidic and the peels can be poisonous in excess); Coffee grounds (also acidic); Potatoes, onions, garlic (these all get consumed slowly and may cause unwanted smells).

LESSON 5

National Standards Addressed



Literature

RL.K.1. With prompting and support, ask and answer questions about key details in a text.

Informational Text

RI.K.10. Actively engage in group reading activities with purpose and understanding.

Writing

W.K.8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Speaking & Listening

SL.K.5. Add drawings or other visual displays to descriptions as desired to provide additional detail.

SL.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

Language



3.) **Search for images for your menu.** After your students have brainstormed about foods that can and cannot be fed to worms in your worm bin, provide the students with scissors, glue sticks and paper. Allow them to search through magazines and newspapers (grocery store advertising circulars are excellent for this activity) and select images from which to create their worm menu.

4.) **Allow students to share and discuss the menus they have created.** Post your menu near your worm bin. With the visual reminders, your students may need less help selecting appropriate foods for the worms in your bin.

Links To Heifer International

Training and Education

It is important to make sure that our animals, no matter how big or how small, are taken care of properly. Heifer International believes that training and education are critical to ensuring that animals are well cared for. Training about appropriate food, shelter, and other requirements is provided to farmers before they can receive livestock. Knowledge and understanding is important to the self-reliance of participants and their projects. For more information about Heifer's livestock training, visit www.heifer.org.



Standards (continued)

L.K.5. With guidance and support from adults, explore word relationships and nuances in word meanings. (Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent, Identify real-life connections between words and their use (e.g., note places at school that are colorful).



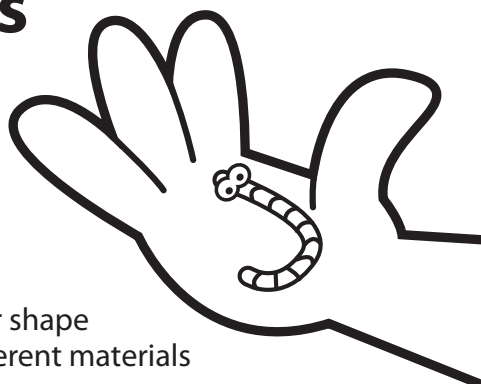
NEXT GENERATION SCIENCE STANDARDS

LS1.C Organization for matter and energy flow in organisms
Animals obtain food they need from plants or other animals. Plants need water and light.

LS4.C Adaptation
Living things can survive only where their needs are met. If some places are too hot or too cold or have too little water or food, plants and animals may not be able to live there.



Worm Letters



Objectives

The students will:

- Identify letters by their shape
- Form letters using different materials

Materials

- "Worm Letters" worksheet
- Pipe cleaners cut to varying lengths OR Clay/ Play dough
- "The Chicken and The Worm" book
(Optional: Worm Bin)

Procedure

1. **Show the students worms.** Picture-walk through the pages of "The Chicken and The Worm" book and look together at the illustrations of the worm. Point out the different shapes the worm makes throughout the book. Pages 9, 11, 23 and 29 show the worm(s) in a variety of shapes.

If you have a worm bin, remove a few worms and hold them in your palms or place them on a damp paper towel, so that students can observe them. As the worms move, direct the students to observe the shapes the worms make with their bodies. Ask the students if they can identify the letter shapes that the worms are making.

2. **Model your own worm letters using pipe cleaners (or play dough) to represent worms.** Afterwards, students will create their own letter shapes from these "worms." Demonstrate bending the pipe cleaners (or play dough) into a letter shape. Describe your process and then show your finished product to the students.
3. **Distribute materials to the students.** Make sure each student has many pipe cleaners of a variety of lengths from which to choose. (With play dough, students can roll "worms" and then adjust the sizes as needed.) Depending on the abilities of your students, you may decide to let them choose which letters they would like to create, or you may want to dictate letters to them. NOTE: It may be easier for some students to create letters on papers that are pre-printed with large letters, simply placing their pipe cleaners or play dough on top of the printed image. For more advanced students, you may encourage them to create simple words or to spell their names, using the letters they create.

National Standards Addressed



Speaking & Listening

SL.K.5. Add drawings or other visual displays to descriptions as desired to provide additional detail.

Language

L.K.1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. (Print many upper- and lowercase letters, Use frequently occurring nouns and verbs).



Geometry

K.G.2. Correctly name shapes regardless of their orientations or overall size.

K.G.5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.



4. **Match worm letters with printed letters.** Distribute a copy of the “Worm Letters” worksheet to each student. The students should draw a line from each worm to the letter it most closely resembles.

Standards (continued)

Links To Heifer International

Education

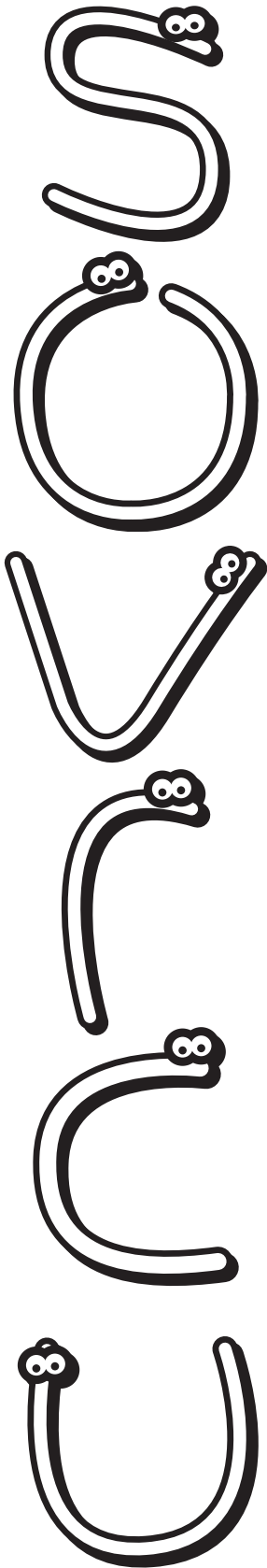
While your students are learning about worm letters, children around the globe who once headed to the fields to do backbreaking work are now getting a change to learn their letters. Many of Heifer International’s project participants are able to generate extra income from the animals they receive. This extra income can be used to purchase food, medicine, and improve infrastructure within a community. In Tanzania, a family that began selling their camel’s milk was able to send their children to school. For other success stories, visit www.heifer.org/stories.



Match the Worm to the Letter Shape

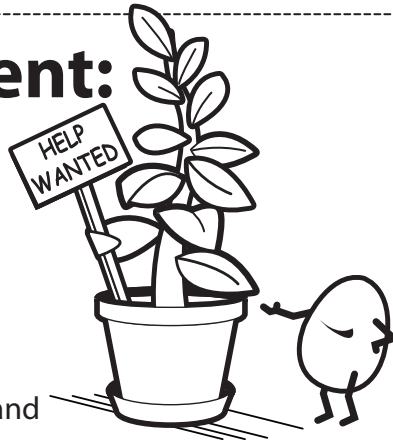
Draw a line connecting the worm shape and matching letter.

Student's Name



c
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Science Experiment: How do eggs help plants?



Objectives

The students will:

- Compare growth of plants, with and without an organic fertilizer
- Form a hypothesis about the growth of a plant
- Use the scientific method to test a hypothesis

Materials

- "The Chicken and The Worm" book
- Small flower pots or other container for planting
- Seeds (some quick sprouting seeds include marigold, zinnia, or cosmos, but you can choose others)
- Potting soil
- Ruler
- Water
- Eggshells
- Plastic zipper bags
- Rolling pin or small mallet (or other object for crushing eggshells)

NOTE: To avoid food-related illness, be sure to wash eggshells thoroughly or only use eggshells from boiled eggs. Be sure to allow the eggshells to dry completely.

Procedure

- 1. Read or review "The Chicken and The Worm" book.** Ask students to pay particular attention to the ways chickens can help people and the environment. (Answers may include: Provide food as meat or from eggs. Eat bugs. Peck the ground to loosen soil. Manure fertilizes soil.)
- 2. Show students the eggshells.** Ask students to identify what you are holding (eggshells). Talk about the characteristics and function of eggshells: Eggshells are hard and very strong. They protect the chicks while they are growing, until they are ready to hatch. Eggshells are hard because they contain calcium. Calcium is a mineral that helps to make our teeth and bones hard and strong, too.
- 3. Pose a question to the students.** "Do you think plants need calcium so they can grow tall and strong, like we do? How could

LESSON 7

National Standards Addressed



Literature

RL.K.1. With prompting and support, ask and answer questions about key details in a text.

Informational Text

RI.K.10. Actively engage in group reading activities with purpose and understanding.

Language

L.K.6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts.



Measurements & Data

K.MD.1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.MD.2. Directly compare two objects with a measurable attribute in common, to see which



we find out?" Explain to the students that together you will conduct an experiment to determine what happens when eggshells are added to the soil in which a plant is growing. Encourage students to create a hypothesis and record it. For example, "Seeds planted in soil with eggshells grow taller."

4. **Crush eggshells.** Place eggshells inside several plastic bags (so that each child may have a turn smashing the eggshells). Allow the students to use a rolling pin or a small mallet to crush the eggshells into tiny particles. (Fine, nearly powdery consistency is the goal.)
5. **Prepare your flower pots.** You and your students will need to create some "control" pots and some "experimental" pots. Create at least 5 of each (you can vary the number, based on your class size, if you wish). In the "control" pots, simply fill the pot with potting soil. In the experimental pots, fill the pot with potting soil and then add a generous amount of your eggshell powder. Be sure to mix the eggshell powder into the soil.
6. **Plant seeds.** Follow the directions on your seed packets as to number of seeds to plant, depth, and amount of water needed. Place near a good source of sunlight.
7. **Make observations.** Each day, check on the growth of your plants. Have the seeds sprouted? How much have the seedlings grown? Use a ruler to measure the height of the plant. Are there leaves? Flowers? Encourage the students to draw pictures of the plants and record their height.
8. **Check your hypothesis.** After a few weeks (depending on the type of seeds you grow), remind students about their hypotheses. Were their predictions correct?
9. **Discuss the importance.** Children can be helpers in the environment to make sure plants and animals are healthy and growing well. Using eggshells to improve the nutrients in the soil is an easy and safe way to use food waste.

Links To Heifer International

Improving the Environment

Eggshells are an example of a renewable product that can be used as a natural fertilizer. Instead of tossing them out as waste, farmers can use eggshells, which contain many nutrients, in their gardens to help their plants grow tall and strong. Heifer International project participants around the world use a number of soil-enriching agricultural practices to improve the environment as well as their crop yields! For more information on these practices, visit www.heifer.org.



Standards (continued)

object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

Geometry

K.G.1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.



NEXT GENERATION SCIENCE STANDARDS

ESS2.E Biogeology

Plants and animals can change their local environment.

ESS3.A Natural resources

Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

ESS3.C Human impacts on Earth systems

Things people do can affect the environment but they can make choices to reduce their impacts.

LS1.C Organization for matter and energy flow in organisms

Animals obtain food they need from plants or other animals. Plants need water and light.

LS4.C Adaptation

Living things can survive only where their needs are met. If some places are too hot or too cold or have too little water or food, plants and animals may not be able to live there.

Where is my worm? Where is my chicken?

LESSON 8

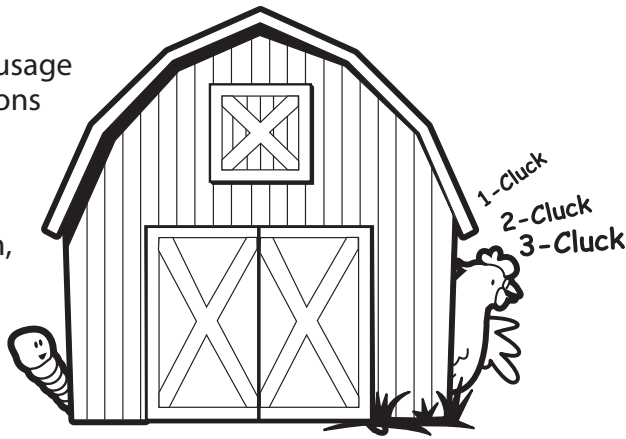
Objectives

The students will:

- Demonstrate proper usage of common prepositions
- Follow oral directions

Materials

- Copies of the Chicken, Worm and Barn coloring page
- Crayons or markers
- Scissors
- Tape or sticky tack



Procedure

- 1. Make your chicken, worm, and barn.** Pass out copies of the Chicken, Worm and Barn coloring page. Invite students to color each picture any way they choose. Then direct them to use their scissors to cut out the images, along the dotted lines around them. They have now created their “game pieces.” You can now play the following games:
- 2. The Farmer Says.** In the style of “Simon Says” give your students directions using the chicken, the worm, and the barn game pieces. For example, the farmer says, “Place your chicken **ON** the barn.” Use your creativity to create the directions using other prepositions. Here are some other ideas:
 - Place the worm **BELOW** the barn.
 - Place the chicken **WITH** the worm.
 - Move the worm **FAR AWAY** from the chicken.
 - Place the chicken **BESIDE** the barn.
- 3. Chicken and Worm Hide and Seek.** Ask students to close their eyes (or put heads on their desks/tables). “Hide” your chicken or worm somewhere in the room. Don’t make the animal completely hidden—ideas might be on a pencil sharpener, peeking out of a chart pocket, etc. After you’ve placed your chicken or worm, invite children to open their eyes and look for the animal. Students must **TELL** you where they find the chicken or the worm, not only point at it. For example, “The worm is **IN** the pencil cup.” You may then select a student to hide their chicken or worm. Repeat for several rounds (or until students are disinterested in continuing).

National Standards Addressed



Language

L.K.1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. (Use the most frequently occurring prepositions (e.g., to, from, in, out, on, off, for, of, by, with), Produce and expand complete sentences in shared language activities).

L.K.5. With guidance and support from adults, explore word relationships and nuances in word meanings (Identify real-life connections between words and their use (e.g., note places at school that are colorful).

L.K.6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts.

Links To Heifer International

Diversity of Livestock

Chickens and worms are just two of the many types of livestock used by Heifer International. Heifer has worked with more than 35 species of animals, including chicks, goats, rabbits, and even honeybees! These animals can mean the difference between a life of poverty and a life of independence. For more information on the types of livestock that Heifer provides to people around the world, visit www.heifer.org.



Standards (continued)

Speaking and Listening

SL.K.1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

SL.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

Foundation Skills

RF.K.2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes).



Name _____

Directions: Color the barn, the worm and the chicken. Use scissors to cut on the dotted square around the animals and the barn.

