

Worm Bin Wonders

THEME: GROWING AND ACCESSING HEALTHY FOOD

3RD
GRADE

55
MIN.

FALL

ESSENTIAL QUESTION

How do decomposers play an important role in growing food?

LEARNING OBJECTIVES

- ✓ Students will be able to identify parts of the worm anatomy.
- ✓ Students will be able to construct a worm bin.

CONCEPTS

anatomy decomposition digestion
gizzard worm castings

Engaging the Classroom Teacher

- Ask teachers want beforehand whether they want a worm bin established for their class.
- Ask whether students are responsible enough to drill or whether you should pre-drill the holes.
- During Action Steps 3 and 4, suggest that the teacher support students who are exploring worms while you help students set up the worm bin.

LESSON DESCRIPTION

In this lesson, students learn about the decomposition of food waste by observing worms, identifying parts of their anatomy, and working collaboratively to build a worm bin.

MATERIALS

- 10-gallon opaque plastic storage bin
- Old newspaper
- Spray bottle filled with water
- 1 pound of Red Wiggler worms (if you have a friend with a worm bin, ask for some starter worms. If not, you can often purchase Red Wigglers in garden centers or even buy them online.)
- Quart container of garden soil
- Food scraps
- Cordless power drill with drill bit
- Paper towel for each student
- Permanent marker
- Worm Anatomy Poster (p. 338)
- Worm Anatomy Challenge Cards and Worm Anatomy Checklist (pp. 339-340)
- Chart paper (optional)
- Magnifying glasses (optional)
- Coffee stirrers for moving worms (optional)

PREPARATION

- › If you are new to worm composting, research how to build and maintain a worm bin prior to teaching this lesson.
- › Collect approximately one quart of raw fruit or vegetable food scraps, perhaps from lunch or snack.
- › Use a permanent marker to mark and space out dots to drill holes along your bin's lid and the top third of the sides. Make sure there are enough dots so that each student can drill one hole.
- › Dampen paper towels to hand out to groups

observing worms.

- › Draw a KWL chart on the board or chart paper (see example).
- › Photocopy or display Worm Anatomy Poster. If you have access to a laminating machine, laminate copies for students to use as they're observing worms.

WHAT WE . . .		
Know	Want to Know	Learned

WORM FACTS

Worms . . .

- › Have no eyes but can sense light and move away from it
- › Can eat half their weight in food each day
- › Have both male and female organs
- › Don't have lungs, so they breathe through their skin
- › Will die if their skin dries out
- › Secrete a liquid that makes burrowing underground easier and keeps them moist
- › Have tiny hairs called setae on each body segment that help them move through the soil
- › Can likely regenerate their tail if it's cut off close to the end, but they can't grow back major organs such as the heart or clitella if cut in half
- › Are cold-blooded, so are the same temperature as their environment
- › Have an average lifespan of two years but can live up to eight years

ACTION STEPS

1. Connecting to Prior Knowledge: Ask, *What do you typically do with food scraps?* Discuss whether students throw them in the trash, or whether they use compost bins. Ask, *Do you know that worms are excellent at recycling?* See if students can explain how. Ask students to share with a partner what they know and what they want to know about worms. Display a KWL chart on the board, and as students share with the class, fill in the "Know" and "Want to know" columns of the chart, taking the opportunity to dispel any myths and/or flag any questions that arise for later research. You don't need to be a worm expert! **(5 min.)**

2. Explain Worm Bin Setup: Explain that today you'll be building a worm bin that the class can use to process its food waste into excellent compost for the garden. Show the class the materials you'll use for creating the worm habitat. Explain, *Shredded newspaper is the worms' bedding, but they eat it too! We use the spray bottle to keep the newspaper nice and moist, like a wrung-out sponge. They can't have it too wet or too dry because worms breathe through their skin and can actually drown! We add soil from the garden because it helps their digestion. We'll also add food scraps, making sure that we bury it under the bedding so that we don't also attract fruit flies and other pests. Worms aren't crazy about food like onions and citrus. Do you know that worms can eat half their weight in food in a day?* **(5 min.)**

3. Explain Worm Observation: Explain that you're going to pass out worms for students to observe at their tables, while other students

begin work on the worm bin. Then groups will switch tasks. Ask, *How should we treat the worms?* Discuss being gentle. Say, *Let's remember to be observers. So we're mostly using our eyes to observe different parts of the worms. See how many body parts you can recognize.* To give students a purpose while they are observing the worms, pass out the Worm Anatomy Checklist, telling them their challenge is to observe every body part on the list. You can frame this as though they are doctors performing an annual checkup! Display or pass out copies of the Worm Anatomy Poster as well. Tell students that as they're observing, they should also think of new questions they have for the KWL chart. Pass out a small handful of worms on dampened paper towels to half your students to observe. **(5 min.)**

4. Setting Up Worm Bin: While half your students are observing worms, have the other half finely shredding newspaper and call them up one at a time to drill a hole into the bin (with help from an adult!), add their shredded newspaper, and spray with water. Be sure that each student only sprays a couple times. Remind students that we don't want our worms to drown! If you already have an established worm bin, this rotation can be about students maintaining the worm bin with fresh bedding, food, and hydration. **(15 min.)**

5. Finishing Worm Bin: Once groups have both observed worms and helped establish the worm bin, have the class watch as one student adds the worms beneath the bedding, another student sprinkles the container of soil, and another buries the food scraps under the bedding. If the teacher has popsicle sticks or another method to randomly generate student volunteers, use them! Have all students wash

their hands, clean the workspace, and return to their seats. **(10 min.)**

6. Worm Anatomy Challenge: Show students a diagram of a worm, and ask them to share body parts they found. Then explain that there are still other body parts inside that we can't see. Shuffle the Worm Body Part Cards, and hand them out to groups of students. Challenge students to arrange the cards in the order of a worm's body parts (head at one end, then crop, gizzard, intestine, and anus at the other end). Now use this model to explain how worm digestion works: *Soil and organic matter, like decaying plants and food scraps, are ingested by the worm, temporarily stored in the crop, and then get broken down with help from the grit, or small stones, in the gizzard. They travel through the intestines and are excreted as rich, beautiful compost full of good nutrients.* When students have the cards in the correct order, have them wiggle the cards together as one worm! **(10 min.)**

7. Reviewing Responsibilities: If this class is keeping the worm bin in their room, explain to students that they'll be responsible for keeping their worms healthy, happy, and fed each week. Explain the role of the Worm Lifeguard who rotates each week. Say, *You'll want to check your worms' bedding and spray water if it's too dry, or add more newspaper if it's too wet. Start by feeding them once a week, but be sure to observe how much they've eaten since you last fed them, and adjust the amount accordingly.* **(5 min.)**

REFLECTION

Have students discuss the following questions in small groups, then share with the class: (5 min.)

Social and emotional learning

- *What worked well in making our worm bin as a class? What could we have done better?*
- *Ask yourself: Did I take turns and help my classmates during the activity?*
- *What's one way you helped a classmate today?*

Check for understanding

- *What's one new thing you learned about worms today? (Add responses to L column of KWL)*
- *How do worms digest their food?*
- *How do worms help us grow our food?!*
- *How will you be taking care of your worms each week?*
- *What do you think we will see when we observe the worm bin in one week?*

ADAPTATIONS

Literacy Extensions: Have students create a how-to brochure of how to care for the worm bin. Students can also keep a weekly log in which they take notes on what they observe.

Song: Teach students the song “Gusano (I am a Worm)” by the Bungee Jumpin’ Cows.

Thought Experiment: Explain to students that there are over 1 million worms in the size of a football field. Ask them to imagine what our earth would be like without earthworms tunneling in the soil and decomposing organic matter into rich worm castings. Have students draw a picture of what our world would be like without worms.

ACADEMIC CONNECTIONS

Next Generation Science Standards, Life Science Disciplinary Core Idea

NGSS LS.4.D

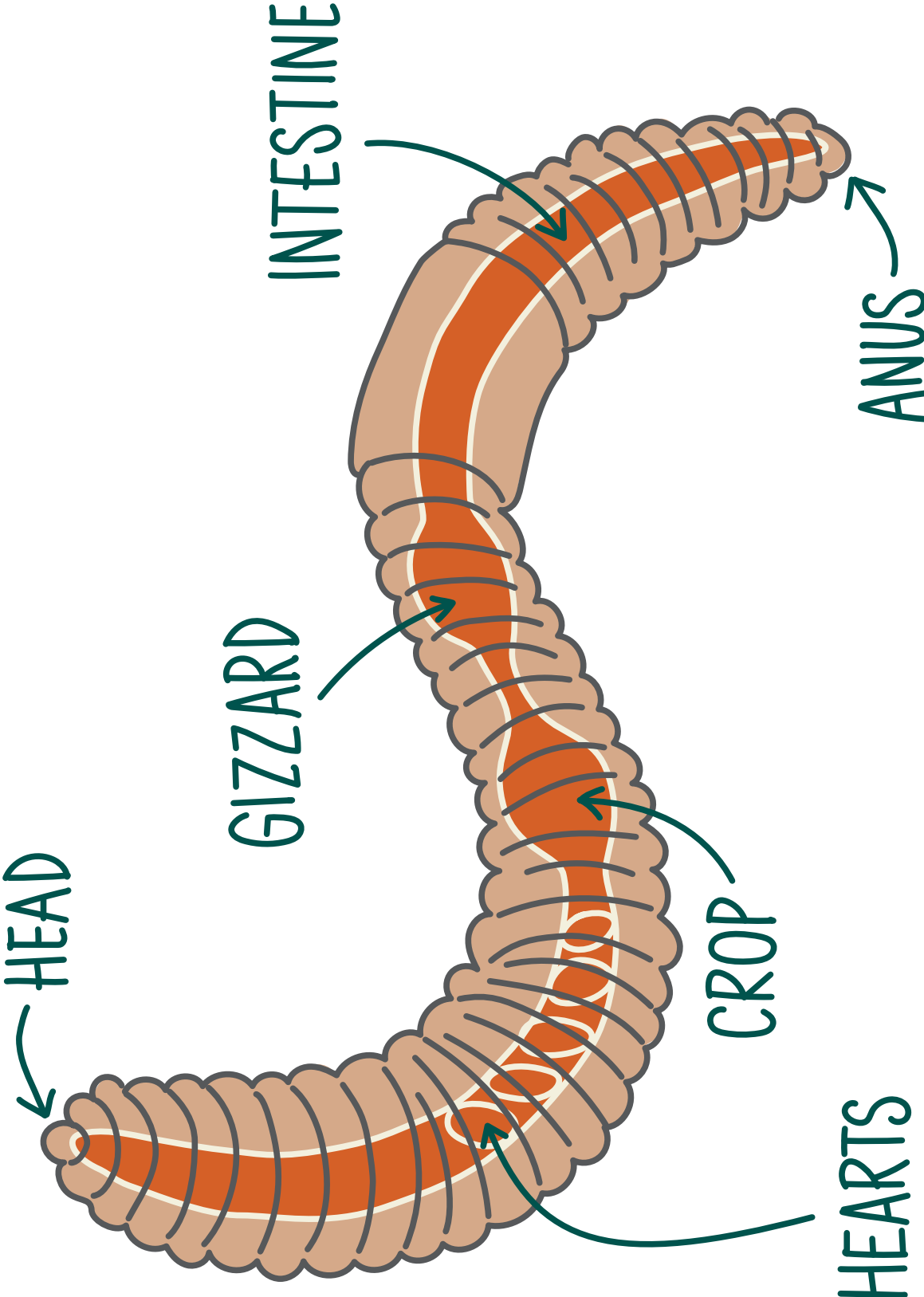
Populations live in a variety of habitats, and change in those habitats affects the organisms living there.

English Language Arts Common Core State Standards

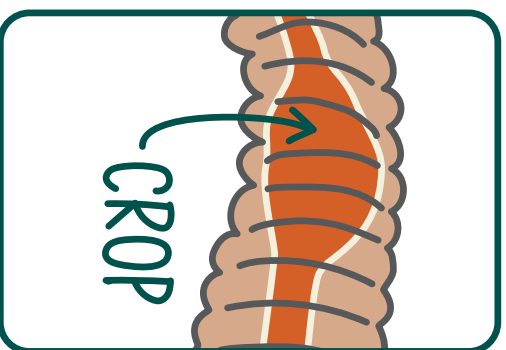
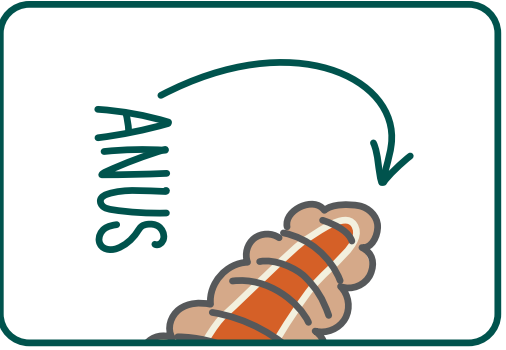
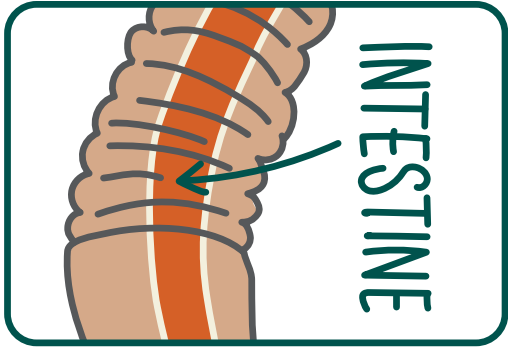
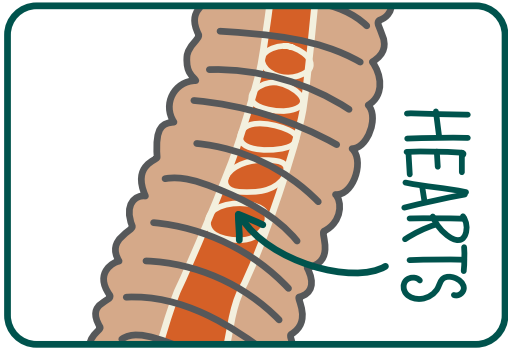
CCSS.ELA-LITERACY.SL.3.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts*, building on others’ ideas and expressing their own clearly.

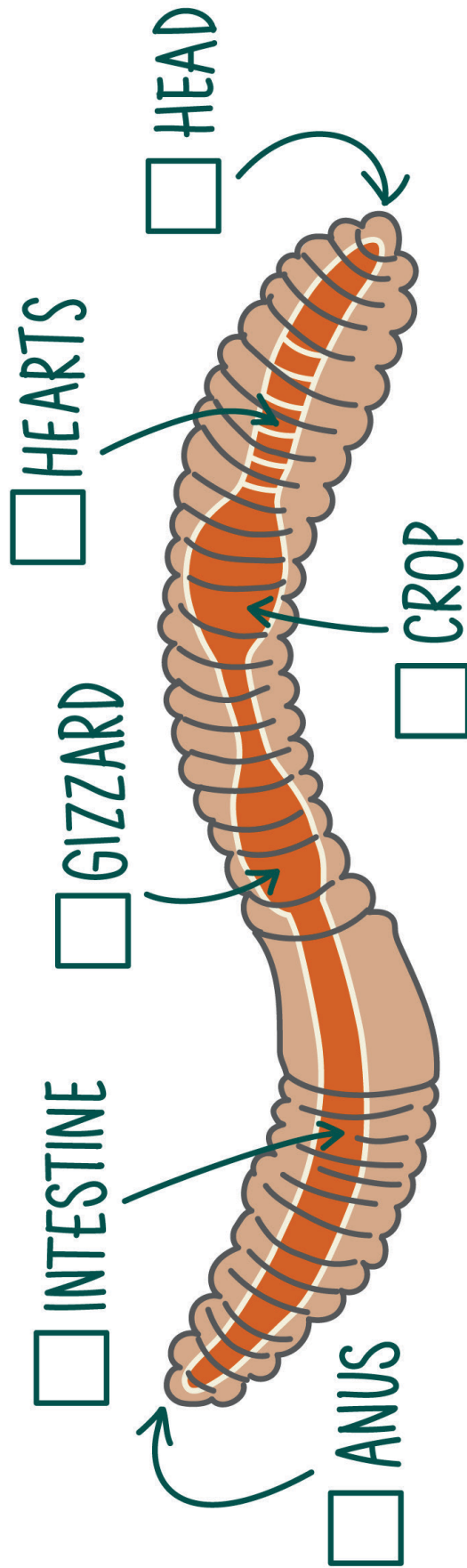
Worm Anatomy Poster



Worm Anatomy Challenge Cards



Worm Anatomy Checklist

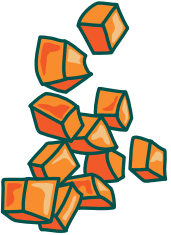




WORM LIFE GUARD CHORE CHART

STEP 1: Feed worms about a cup of food

- Raw fruit and veg
- Small pieces decompose quickly

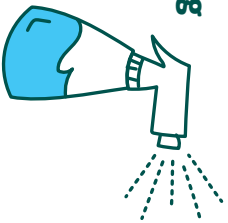


STEP 2: Cover food with bedding



STEP 3: Check the moisture of the bedding

- If very dry, spray lightly
- If wet, add more bedding



WEEK	NAME(S)