



AG IN THE CLASSROOM

Project Title: Wiggling into Ag	Grade Level: 3 - 5
Driving Question: How Can I Create a Worm Farm to Better My Garden?	
<p>Georgia Standards of Excellence:</p> <p>3rd grade:</p> <ul style="list-style-type: none"> ● S3E1. Obtain, evaluate, and communicate information about the physical attributes of rocks and soils. <p>4th grade:</p> <ul style="list-style-type: none"> ● S4L1. Obtain, evaluate, and communicate information about the roles of organisms and the flow of energy within an ecosystem. <p>5th grade:</p> <ul style="list-style-type: none"> ● S5L4. Obtain, evaluate, and communicate information about how microorganisms benefit or harm larger organisms. ● S5L1. Obtain, evaluate, and communicate information to group organisms using scientific classification procedures. 	
<p>Georgia Elementary Ag Ed Standards:</p> <p><u>AFNR-NRS: Natural Resource Systems:</u> Develop and build an understanding of the area of forestry, environmental and natural resource systems</p> <ul style="list-style-type: none"> ● 3NRS1. Examine positive and negative impact of agriculture production on the environment in your region (water, air, soil, plants, insects.) ● 3NRS3. Analyze Georgia’s renewable and nonrenewable natural resources ● 5NRS2. Describe the benefits and the importance of conservation and recycling of natural resources <p><u>AFNR-LCR: Leadership and Career Readiness:</u> Develop an understanding of leadership skills and characteristics for career readiness while exploring youth leadership opportunities and careers in agriculture as indicate by the National FFA Organization</p> <ul style="list-style-type: none"> ● 3LCR1. Develop and practice soft skills such as public speaking, eye contact, and good citizenship ● 3LCR3. Explore careers related to the Forestry & Natural Resources industry such as conservationist, environmentalist, game warden, wildlife management, hunting/fishing guides, forestry/natural resources professor, forestry/natural resources researchers, arborists 	

- 4LCR1. Develop and apply verbal and nonverbal communication skills such as public speaking/presentations

AFNR-FA: Foundations of Agriculture: Explore and communicate the importance of agriculture and its impact on daily life

- 3FA1. Describe how agriculture impacts your daily life

Guiding Background Knowledge:

Students may be familiar with **recycling** tin cans and plastic bottles so that the materials can be used again and again, but do they realize that recycling happens in natural systems as well? By bringing **vermicomposting** into your classroom, students can observe how ordinary creatures like worms become super recyclers, turning kitchen scraps into compost that can help living plants grow and thrive.

Worms live in soil all over the world. They help change bits of dead plants and animals back into **nutrients** that plants can use. Students may be interested to learn that worms recycle by eating dead **organic matter** and then turning it into **castings**—also known as worm poop—that are nutrient rich and useful to plants. Worms also help **aerate** and loosen the soil so that plants’ roots can more easily develop underground. For these reasons, worms are an integral part of a healthy **ecosystem**.

Although a farm may not be the first thing you think of when you hear the word *ecosystem*, farms are natural systems with living and nonliving components that affect each other. Healthy soil is the foundation of a productive farm. Pretty much everything we eat comes from the soil. Fruits, vegetables, and grains come from plants that grow in the soil, and dairy and meat products come from animals that eat plants that grow in the soil. So, worms are not only important for composting food scraps, but they can also play a role in making healthy soils to grow food for us to eat.

Video Suggestions:

[Ranger Nick: Raising Worms To Make Great Fertilizer](#)

[Learning about WORMS | Ranger Zak Educational Videos for Kids](#)

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

[I'VE GOT WORMS! How to Build a Worm Farm!](#)

[Vermicompost - Life in the compost bin](#)

Book Suggestions:

[Worms Eat My Garbage- Instructional Guide](#)

[Compost, By Gosh: An Adventure with Vermicomposting \(On-line book reading\)](#)

[Kyle in His Compost Pile: The Story of a Red Wiggler \(On-line book reading\)](#)

[Diary of a Worm \(On-line book reading\)](#)

Ask an Expert/Community Partner Suggestions:

[Local Farm Bureau](#)

[Local UGA Extension Agent](#)

[USDA Natural Resources Conservation Service](#)

[Local Gardening Club](#)

[Keep Carroll Beautiful - Vermicomposting](#)

[Georgia Master Gardener](#)

[GA Wigglers Worm Farm](#)

	Yucky Worms (On-line book reading) Wiggling Worms at Work (On-line book reading) Save the Scraps (On-line book reading)	
Agricultural Career Connections: Florist Landscape Designer Conservationist Extension Agent Teacher Environmental Scientist Horticulturist Garden Coordinator Farmer	Optional Materials and Resources: Lessons from National Ag in the Classroom: <ul style="list-style-type: none"> • Vermicomposting • Working Worms 	

Lesson Procedures:
Engage: <p>Ask the students what the word <i>recycling</i> means. Make a list of items they have recycled before.</p> <p>Ask the students if food can be recycled. Tell them to imagine they are in the cafeteria at their school. Have them try to think of ways they can use the leftover food being thrown away to make something else.</p> <p>Ask the students what happens to leaves in the forest during the winter. (<i>They fall to the ground.</i>) Ask them why the leaves that fall from the trees every year don't just pile up higher and higher. (<i>They break down/decompose and become part of the soil.</i>) Explain that food can be recycled in the same way plants are recycled in the environment. Tell them that they will recycle their leftovers into a special soil that will help give plants the nutrients they need. The secret is worms.</p> <p>Tell the students that they are going to build a worm farm to serve as a home for worms that will be kept in the classroom to observe and study.</p>
Explore: <p>Students will create a worm farm which will serve as a basis for investigations about ecosystems, life and nutrient cycles, and decomposition.</p>

Students will need to observe the effect worms have on soil. Discuss the importance of soil as a natural resource that is necessary to produce our food. Almost everything that we eat, much of what we wear, and many of the tools that we use originate from plants grown in soil on a farm.

Observe the characteristics of living worms. Allow the students to observe their worms moving around. They could sketch a worm, measure how long it is, record how it moves and any kind of noise made as it moves. Have the students discuss which end is the head and which is the tail. Have them give observable evidence to justify their reasoning. Encourage the students to gently pick up a worm and describe what it feels like on their hands!

Investigate worms' responses to light and touch stimulus. Have the students predict the worms' responses to a source of light and to being gently touched. Have them justify their predictions. Students can record their observations after investigating with an explanation for the worms' behaviors.

Investigate worms' responses to temperature stimulus. Have the students predict how the worms will react to a cold surface, a room-temperature surface, and a hot surface and then justify their predictions. Use differing moisture and temperature-based investigations to see how their worms respond. Have the students record their observations with an explanation for the worms' behaviors.

Students can use the gained knowledge from each of these investigations to help them build an ideal worm farm.

Test and Improve:

Maintaining a worm farm can be easy and fun, but be sure to keep the following things in mind as you tend to the worms:

- Too much moisture will cause molds and other unwanted pests to grow, which will prevent the worms from doing their job.
- The worms will have a hard time surviving if the compost is too dry. The bedding material should be moist to the touch without forming droplets when squeezed.
- If the worms are given too much food, the bin may start to stink as bacteria and other microorganisms break down the food before the worms can.
- Typically, room temperature is great for worms, but be cautious that they do not get too hot or too cold, as either situation could stun and possibly kill the worms.

Share Results:

Students will create a video showcasing their worm farm. Have students explain the factors that played into keeping the worms alive and thriving. They will also need to show any trial-and-error investigative skills they practiced in finding the ideal environment for the worms.

Reflection:

- Worms are living things that respond to stimulus and have basic needs.
- Worms eat organic matter and produce nutrient-rich castings, converting food scraps and dead plants into nutrients that help living plants grow.
- Worms aerate and loosen the soil, improving the ability of the soil to hold water and making it easier for plants to grow.
- Soil is an important natural resource that helps produce food, clothing, and materials for many of the things we use every day.

Submission Guidelines

Student Presentation:

- A video presentation must include the process of investigation to create the worm farm.
- The video must demonstrate knowledge of how worms play an important factor in our ecosystems, life and nutrient cycles, and decomposition.
- The video must incorporate how worms play into the role of farmers or agriculturalists.
- Include at least **5 photos** showing their process throughout the challenge

Rules:

- The video should be no longer than **five minutes**
- There will be **one video submission per class**
- Upload the final class presentation to the STEM Challenge portal for judging by April 28, 2023.

If you are having trouble connecting to a community partner, please email info@georgiaagexperience.org

Category	Description	Points
Time Requirement	The video must be no longer than 5 minutes	Up to 5 minutes – 5 points Over 6 minutes – 4 points Over 7 minutes – 3 points Over 8 minutes – 2 points Over 9 minutes – 1 point
Delivery	Student’s voices are clear and at an appropriate volume Video quality is acceptable to be played on a desktop computer	5 points
Orderly Progress	Video flows from beginning to end with a clear introduction, main points, and conclusion	10 points
Research Information	Video must include the process of investigation to create the worm farm.	20 points
Researched Information	Video must demonstrate knowledge of how worms play an important factor into our ecosystems, life and nutrient cycles, and decomposition.	20 points
Coverage of Subject	Video presentation must explain the factors that played into keeping the worms alive and thriving. They will also need to show any trial-and-error investigations they practiced in finding the ideal environment for the worms.	20 points
Supportive Material	Submission must include 5 photos of students throughout the challenge process	20 points
TOTAL		100 Points
BONUS	Contacting a community partner <i>Examples:</i> <ul style="list-style-type: none"> ● Local Farm Bureau Office ● Local UGA Extension Agent ● USDA Natural Resources ● Local Master Gardener Club 	5 points (for every community partner contacted)