

Worm Resources

WormWatcher bin containing:

- 500 Red Wiggler Worms
- Peat Moss, garden soil
- Newspaper, shredded
- Watermelon with rind
- Banana & peel
- Orange peel
- Small plastic toy
- Plastic food name badges

Worm Journals

Gummy worms

Clear cups

Magnifiers

Crayons

Apple

Gloves

Hand Wipes

Images of codling moth adult & larvae

Worm Watcher Bin

<https://www.biomeinabox.com>

What Worms Eat

We prepared the worm bin with a variety of foods three days in advance so the worm food preferences would be much more dramatic. Orange peel, banana peel, watermelon with the rind, gummy worms, dry leaves, and a plastic toy were positioned inside the bin and covered with about three cm of garden soil. To help us easily locate items, images of each food were inserted into plastic name badge protectors and placed in the soil near where it was buried.

Engage

Children excitedly gathered around the worm bin. Before the lid was lifted, we quickly reviewed what we had learned thus far. Children were then asked to predict what they thought red wiggler worms ate. Responses included leaves, grass, dirt, and little bugs. When asked, “How do you know they eat leaves?” one child mentioned that his family puts leaves into their compost pile and they turn into dirt. They were reminded that different species of worms eat different foods.

We then held up a banana and asked how many kids like bananas (many) and banana peels (none). We asked, “Do you think worms like bananas peels?” “Eww, that would taste yucky!” Food preference would be determined by the amount of worms feeding on the food items.

Explore

We lifted the lid and the children identified the card with the banana image. We dug into the soil and immediately heard, “They like it! There’s lots of them!” We then asked them to predict whether they would find worms near the other buried items. Each food item received a few votes. Our kindergarteners discovered that red wigglers like watermelon the best, followed by banana peel, orange peel, and gummy worms. Not one worm was found near the plastic toy or the dried leaves.

Explain

Students documented observations in their journal by circling the preferred food items. We discussed why they thought no worms were found at the plastic toy or leaves. “You aren’t supposed to eat toys.” “Watermelon tastes better than leaves.” Making inferences based on their observations gave our students a sense of ownership and pride in their discoveries. Inquiry based learning is the pathway to developing inquisitive young scientists (NRC 2000).

Elaborate

Watching the worms move and feed led to a discussion about what happens to food after eating. Students were initially hesitant to talk about pooping, but once they realized how excited we were, they enthusiastically participated. When asked what would happen if we didn't have decomposers, students said that leaves and food waste would build up into big piles. One student shared about his family's compost pile, where worms recycle their leaves, coffee, and rotten food. Another mentioned that worms help farmers because they mix up the soil and make tunnels.

When asked if worms were good or bad for the soil, all agreed that worms are good because they eat food, poop it out, and it becomes new soil for plants.

While earthworms are great for soil aeration in gardens and agricultural settings, research indicates that exotic earthworms are causing problems in northern hardwood forests (Seidl and Klepeis 2011; Scott et al. 2012). Because the worms eat the leaf litter (duff) from the forest floor, the litter layer is reduced, which can make it difficult for some spiders, salamanders, and ground nesting birds to find enough cover to safely conceal themselves or their nests. We addressed this misconception by showing the students photos of bare ground versus leaf mulched areas and explained how the habitat was changed for many organisms. The Great Lakes Worm Watch site explains the current research and concerns regarding earthworms and forest ecology (see Internet Resources) When we asked what they should do with left over night crawlers from fishing, they seemed torn. Some wanted to let them go in the park, and two students suggested they be put in their garden. University of Minnesota's Great Lakes Worm Watch researchers recommend placing them into the trash.

Evaluate

To gauge the effectiveness of these lessons, we examined each child's journal during and after each session. To our pleasure, we noted that every student was completing all the activities. We asked children whose sketches were unclear (to us) to verbally review what they had drawn prior to new lessons and again after the lesson. Reflection is an often overlooked, assessment tool that can provide valuable insight into a child's understanding of the content (Keeley 2008).

Students were asked what they used to think worms ate and what they believe worms eat now. They responded that some worms eat leaves, dirt, and different types of foods, but not toys. We were pleased that students also told us that some kinds of worms eat the leaves that spiders and salamanders like to hide under in the forest.

Students responded more confidently when explaining what they had experienced and identified (i.e. smelling, touching, magnifying, observing) as compared to restating information we had told them. The concept of earthworms eating leaves and damaging forest ecosystems, when clearly no red wigglers ate any leaves in the bins, was confusing. Having larger earthworms, *Lumbricus terrestris*, which feed primarily on dead leaves and other organic material, present for comparison in a separate bin, would have added nicely to the lesson. These worms are easily obtained at bait shops.

While reviewing the body parts that worms and children have, one student asked how worms moved so fast without using any feet. We moved to the carpet and tried to do just that. Students were challenged to hold their elbows and toes still while trying to wriggle forward. They gained an appreciation for different methods of locomotion.

References

Keeley, P. 2008. *Science formative assessment: 75 practical strategies for linking assessment, instruction, and learning*. Thousand Oaks, CA: Corwin Press.

National Research Council (NRC). 2000. *Inquiry and the national science education standards: A guide for teaching and learning*. Washington, DC: National Academies Press.

Seidl, D.E., and P. Klepeis. 2011. Human Dimensions of Earthworm Invasion in the Adirondack State Park. *Human Ecology* 39 (5): 641–655.

Scott R.L., G.J. Niemi, and R.B. Blair. 2012. Invasions of non-native earthworms related to population declines of ground-nesting songbirds across a regional extent in northern hardwood forests of North America. *Landscape Ecology*, 2012; DOI: 10.1007/s10980-012-9717-4

Internet Resources

Great Lakes Worm Watch

<http://www.nri.umn.edu/worms/forest/soil.html>