

Grade
03

ACTIVITY IDEAS

SOILS IN THE ENVIRONMENT

SUPPLEMENTARY RESOURCE FOR VIDEO 4: ASSESSMENT IN A PLAYFUL CLASSROOM



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About this guide:

This document is a companion guide to the Ontario Science Centre's video series on [play-based learning](#), produced in partnership with the Ontario Ministry of Education.



**“Play is a vehicle for learning
and lies at the core of
innovation and creativity.”**

– Ontario Ministry of Education

LEARNING OPPORTUNITY: VERMICOMPOSTER EXPLORATION



What it's about:

- Students observe red wigglers in a vermicomposter to learn about their anatomy, ecology and behaviour.

Materials:

- A vermicomposter with red wiggler worms
- Gloves for instructor and students (to protect hands, but also to protect the worms from cream, soap residue, etc., on hands)
- For each student/group:
 - ◆ A tray to contain the mess
 - ◆ A paper plate or towel to place worms
 - ◆ Popsicle sticks to manipulate worms
 - ◆ A magnifying glass

Try it outside:

- Take this activity outdoors on a sunny day to avoid making a mess inside.
- Have students look for earthworms outside on a rainy day. Why do they come out when it's wet?
- Visit a forest and have students look underneath logs to see what they can find. In winter, look under the snow for critters among the rotting leaves.

Connections/Extensions:

- Add shredded paper towel to the composter and have students observe what happens.
- For a longer term activity, work with students to construct the composter before obtaining red wiggler worms to inhabit it. Students should research necessary components and design the worm home accordingly.
- Do worms have favourite foods? Have students design an experiment to investigate this!
- Students can harvest worm castings and use them to make seed balls or worm casting "tea" for plants (look online for free instructions for these projects).
- Does worm casting tea visibly improve plant health? Design an experiment to investigate.
- Compare worm composting to other forms of composting that use microbes.



LEARNING OPPORTUNITY: VERMICOMPOSTER EXPLORATION



Connections/Extensions continued:

- How do earthworms, a non-native species, affect habitats in Ontario? Investigate this question as a class with [Great Lakes Worm Watch](#), a citizen science project.
- Make a homemade ant farm as a class, and contrast ant biology and behaviour with red wigglers. Students can begin this project by researching the requirements for a classroom ant farm.



Observations from prototyping:

- Students were intrigued by the worms. When they could choose between several activities, the worm station filled up immediately.
- We set the tone for appropriate behaviour by asking students about good things to keep in mind when working with living things.
- We observed some interesting investigation and dramatic play. For example, students pretended to be worm doctors and investigated whether the worms were “happier” (i.e., did they move more) when paired with a “friend.”
- Even when students are careful, this investigation is stressful for the worms. If this investigation is conducted regularly, consider rotating between two composters so worms have adequate recovery time.



See next page for sample instructions and prompts.

Optional: Print the instructions and place them in a T-stand.

LEARNING ABOUT WORMS

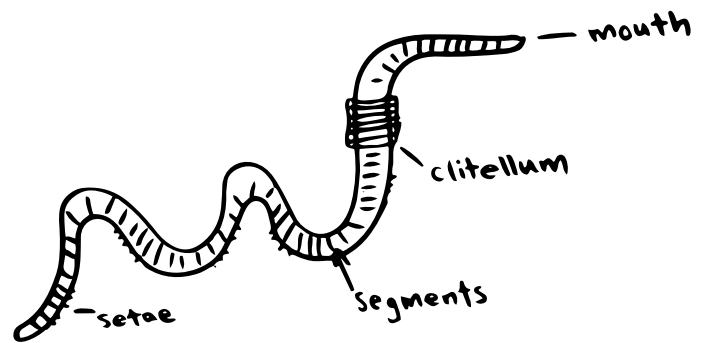
Observe parts of a worm

Safety notes:

- ✓ Remember that worms are living things.
- ✓ Always wear gloves at the worm table.
- ✓ Tidy up your spot when you finish so that the next person can have fun too.

Place a worm on your plate. Use the magnifying glass to study it carefully.

Can you find these parts?



Don't forget to put everything away when you're done.

LEARNING OPPORTUNITY: KINETIC SAND

What it's about:

- In this open-ended activity, students are provided with materials for moulding and manipulating sand and toy animals to encourage dramatic play.

Materials:

- A disposable tablecloth to cover the work surface
- A rinse bucket for sandy hands, plus paper towels or cloths
- Sand toys, such as buckets for moulding, shovels, plastic animals, popsicle sticks, measuring spoons, etc.
- A large, clear bin to hold sand
- Homemade kinetic sand. We used:
 - ◆ 20 lb. of play sand (available at hardware stores)
 - ◆ ~ 2 boxes of cornstarch
 - ◆ A few tablespoons of dish soap
 - ◆ A few tablespoons of white glue
 - ◆ A few tablespoons of vinegar to discourage bacterial growth
 - ◆ Enough water to hold it all together (start with a small amount)

Try it outside:

- Have students pile sand into a mound, or go outside with your class to find a sandy hill where they can carve channels into the sand to make marble runs.
- Visit a sandbox or a sandy beach, and have students build structures from the real thing! Make sure there is a water source nearby.
- Visit a place with sandy soil with your class, and observe the plants and animals you see living there.

Connections/Extensions:

- If you have time, involve students in making the kinetic sand.
- The sand recipe contains cornstarch and water. If you have time over multiple days or lessons, consider making [oobleck](#) first with students (a non-Newtonian fluid made from cornstarch and water).
- There are many different kinetic sand recipes available online. Try a few and ask students which they prefer, and why. How are the recipes similar or different?



LEARNING OPPORTUNITY: KINETIC SAND



Observations from prototyping:

- Spilled sand is easily cleaned from the floor with a broom.
- Some instructions recommend making a cornstarch/water mixture first, then adding sand. We found it easier to mix the dry ingredients first, then add the wet ingredients.
- We purchased coloured play sand because it came in smaller bags. The blue colour was appealing, but natural coloured play sand costs significantly less.
- When mixing the sand, it is easy to add too much water, causing the sand to become muddy and crumble. We solved this problem by leaving the sand uncovered for a weekend to allow for evaporation.
- Wet sand will take on a musty smell over time. If you wish to reuse it, allow water to evaporate from the mixture before storing, then re-hydrate later.
- Some students spontaneously added water to the sand mixture. This made the activity messier, but more interesting.
- We observed elaborate fantasy play scenarios with Grade 3 students. We also observed them using measuring spoons to measure particular quantities of sand, which is a great numeracy connection.



See next page for sample instructions and prompts.

Optional: Print the instructions and place them in a T-stand.

KINETIC SAND

Play and experiment with sand

Safety notes:

- ✓ Always keep the sand in the big bin.
- ✓ When you're finished, rinse your hands in the bin of clean water.
- ✓ Tidy your spot when you finish so that the next person can have fun too.

Things to try:

Try moulding the sand into different shapes. What happens?

Can you make a home for the toy animals?

Don't forget to put everything away when you're done!

LEARNING OPPORTUNITY: SEED BALLS

What it's about:

- Students mix clay, worm castings and untreated native seeds to make small spheres. Seed balls are “planted” by throwing them into a natural area.
- The clay protects seeds from herbivorous animals, and the castings provide nutrients for the sprouting seeds. When it rains, the mixture softens and the seeds sprout.

Materials:

- Large bowls for mixing
- A rinse bucket for dirty hands, plus paper towels or cloths
- 2 parts worm castings or potting soil
- 5 parts pottery clay (kiln-fire clay, not air-dry clay)
- Water as needed
- 1-2 parts untreated seeds of your choice
- Recipe adapted from [Gardening Know How](#)
 - Latex or gardening gloves (optional)



Try it outside:

- Making seed balls can be messy, so this would be a great activity to take outdoors on a nice day.
- Have students harvest seeds from native plants in your area. What kinds of seeds do they think would be best for this purpose? Decide as a group how to demonstrate respect for living things in this context (e.g., how many seeds should you take vs. how many you leave).
- Have students throw their seed balls in a nearby natural area, or use them to plant a garden in the schoolyard.



Connections/Extensions:

- Discuss different types of seeds and how they travel (by wind, by water, by explosive propulsion, by sticking to fur, through the stomach of an animal, etc.).
- Experiment with germinating different types of seeds indoors and have students document their progress as they grow.
- Have students try sprouting herb or legume seeds into edible sprouts, and then encourage them to taste test different varieties.
- Investigate native and invasive species in your area as a class. How were the invasive species introduced, and how do they spread?

LEARNING OPPORTUNITY: SEED BALLS



Connections/Extensions continued:

- If you use worm castings in your seed balls (instead of potting mix), caring for red wiggler worms will be a long-term related project for the class.
- If you use powdered clay, consider using the bag it came in for a different class project.
- Many seeds are very small. Have students look at them up close with a magnifying glass or smartphone microscope.

Observations from prototyping:

- Many recipes recommend clay powder. We felt mixing the clay would be complicated, so we purchased moist packaged clay from an art supply store. We bought pottery clay for firing in a kiln, not air-dry clay.
- We needed students to work with minimal supervision, so we pre-measured the components into bowls and had students mix and roll them into balls. For richer numeracy connections, involve students in the measuring aspect.
- It was helpful to pre-roll a few balls to give students an idea of the optimal size.
- The clay hardens when exposed to air for a few hours. Store the clay in a sealed package until you are ready to use it.
- Take care not to add too many seeds to the seed balls so that the young seedlings don't have too much competition. (In a gardening context, one would over-plant and then thin out the crowded seedlings).

See next two pages for sample instructions and prompts.

Optional: Print the instructions and place them in a T-stand.



SEED BALLS



Make a seed ball to throw and grow later

How to make a seed ball:

Take a small pinch of clay from your bowl. Use your fingers to knead some soil into the clay. (The seeds have already been added to the soil.)

Roll the mixture into small balls. Each ball should be the same size as the circle so that the seeds can sprout easily.



Place the ball on the tray to dry.

Safety notes:

- ✓ Try to keep the soil and clay in the mixing bowl.
- ✓ When you're finished, rinse your hands in the bin of clean water.
- ✓ Tidy your spot when you finish so that the next person can have fun too.

SEED BALLS



What is a seed ball?

Seed balls are a fun way to plant flowers in nature.

How do you plant a seed ball? Throw it in a meadow or ravine!

The clay protects the seeds from animals, and the compost provides nutrients. When it rains, the clay softens and the seed sprouts.