Activity Ideas:
Soils in the Environment

Supplementary Resource for Video 4: Assessment in a Playful Classroom

Grade 3
HOW TO USE 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.

To see the learning opportunities in action, look for the videos on the Science Centre’s YouTube channel: https://www.youtube.com/user/OntarioScienceCentre

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LEARNING OPPORTUNITY: VERMICOMPOSTER EXPLORATION

What it’s about:
• Students observe red wigglers in a vermicomposter to learn about their anatomy, ecology, and behaviour.

Connections/Extensions:
• Shred paper towel to add to the composter.
• For a longer term activity, work with students to construct the composter before obtaining red wiggler worms to inhabit it. Students research necessary components and design the worm home accordingly.
• Do worms have favourite foods? Design an experiment to investigate this!
• 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, which use microbes.
• How do earthworms, a non-native species, affect habitats in Ontario? Investigate this question with Great Lakes Worm Watch, a citizen science project.
• Make a homemade ant farm, and contrast ant biology and behaviour with red wigglers. Students can begin this project by researching the requirements for a classroom ant farm.

Try it outside:
• Take messy worm-related activities (harvesting castings, seed balls, worm tea) outdoors on a sunny day.
• Look for earthworms outside on a rainy day. Why do they come out when it’s wet?
• Visit a forest, and look underneath logs to see what you can find. In winter, look under the snow for critters among the rotting leaves.
Materials:

- Vermicomposter with red wiggler worms (not pictured below)
- Gloves for instructor and students (to protect hands, but also to protect the worms from cream, soap residue, etc. on hands)
- Wastebasket to discard used gloves (if disposable gloves are used)
- Each student/group gets:
  * Tray to contain mess
  * Paper plate or towel to place worms
  * Popsicle sticks to manipulate worms
  * Magnifying glass

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 (students pretending to be worm doctors, and investigating whether the worms are “happier” i.e. do 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/prompts (we placed it in a T-stand)
Learning about Worms

**Safety notes:**

- ✓ Remember that worms are living things.
- ✓ Always wear gloves at the worm table.
- ✓ Tidy up your spot when you finish, so 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?

![Diagram of worm parts: mouth, clitellum, setae, segments]

**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.

Connections/Extensions:
• If you have a longer time frame available, 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 many different kinetic sand recipes available online. Try a few. How are they similar or different? Which do you like the best, and why?

Try it outside:
• Visit a sandbox or a sandy beach, and build structures from the real thing! Make sure you have a water source nearby.
• Pile sand into a mound (or find a sandy hill), and carve channels in the sand to make marble runs.
• Many neighbourhoods in southern Toronto have sandy soil. High Park is a striking example of this. Visit a place with sandy soil, and observe the plants and animals you see living there.
Materials:

- Disposable tablecloth to cover table
- Broom and dustpan to clean up spills
- Rinse bucket for sandy hands (pictured below), plus paper towels or cloths
- Sand toys: buckets for molding, shovels, plastic animals, popsicle sticks, measuring spoons etc.
- Large clear bin to hold sand
- Homemade kinetic sand (not pictured below). 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)

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 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 (sand becomes muddy, and doesn’t hold together). 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, a great numeracy connection.

See next page for sample instructions/prompts (we placed it in a T-stand)
Play 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 the next person can have fun.

Things to try:
Try molding the sand into different shapes.
What happens?

Can you make a home for the 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.

Connections/Extensions:
• Look at 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 documenting them as they grow.
• Try sprouting herb or legume seeds into edible sprouts, and taste test different varieties.
• Investigate native and invasive species in your area. How were the invasive species introduced, and how do they spread?
• 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.
• If you use powdered clay, you will likely purchase a large bag. What other projects could it be used for?
• Many seeds are very small. Look at them up close with a magnifying glass or smartphone microscope.

Try it outside:
• Making seed balls can be messy, so this would be a great activity to take outdoors on a nice day.
• Harvest seeds from native plants in your area. What kinds of seeds do you 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).
• Throw your seed balls in a nearby natural area, or use them to plant a garden in your schoolyard.
Materials:

• 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 https://www.gardeningknowhow.com/special/children/making-seed-balls.htm

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 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 pages for sample instructions/prompts (we placed them in a T-stand)
Seed Balls

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 the seeds can sprout easily.

Place the ball on the tray to dry.

Safety notes:

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

Image credit: http://www.seedball.co.uk/