This activity, and more like it, can be found in 4-H Canada's **Steeped in Soil Activity Book**.

Learn more at **4-h-canada.ca/steepedinsoil**

# ACTIVITY: Wonder Worms!

Worms are little but mighty! They create holes, allowing more air and water to get into the soil. They break down organic material, and their castings (manure) have nutrients that are useful to plant and keep our soils healthy. But which type of soil do worms prefer?

## Experiment Ethics: Taking care of these squirmy creatures!

It is important to treat animals involved in our experiments and activities with respect. Worms should be kept in a dark, cool, humid environment until the experiment begins. Wash hands before handling the worms, and handle them gently. When you're done the experiment, put the worms outside in a compost pile or garden soil. And finish by washing your hands again.

## Materials:

- Box with a lid so that it is dark inside when closed
  - The corners of the box will be filled with soil. A smaller box will need less of each type of soil; a larger box will need more soil.
- Soils
  - Sand
  - Potting soil
  - Gravel
  - Crushed dead leaves
- Spray bottle of water
- Four bowls
- Worms—sourced from outside or a bait shop

## Instructions:[ix]

**1.** As this is a messy experiment so it's best to do this outside or on a table with a plastic table cover.

**2.** In the box you're using, take the sand and put enough into the box so that it fills the corner and is deep enough that an earthworm can burrow down into it, but won't touch the other types of soil when you add them in next.

**3.** Then pour out the sand into a bowl and measure the amount (for example, 500 mL). Measure out the same amount of the three other soils, so that you have the same amount of each type.

**4.** Taking the sand again, spray it with water, counting each spray, and mix in the water until the sand feels wet, but there aren't puddles of water at the bottom of the bowl. Record the number of sprays it took to get it wet enough.

**5.** Take the wet sand and put it back into one of the corners of the box.

**6.** Repeat step 4-5 for the gravel, potting soil, and dead leaves, using the same number of squirts of water for each of these that you used for the sand, and noting which corner each of the different types goes into. Remember, the soils shouldn't be touching each other.

It's not just worms that are active in our soils! Insects, fungi, and bacteria are hard at work to break down plant material, and introduce nutrients back into the soil. Check out the Innovative Farmers Association of Ontario and Soils Conservation Council of Canada's **#SoilYourUndies** experiment to see what happens when you bury a pair of cotton underwear in soil for a couple of months.

Get more information about the experiment here:

👉 **www.soilcc.ca/soilsweek/2017/Soil-Your-Undies-Protocol.pdf**

## Take this further by checking out these experiments:

Which food do worms like? 👉 **www.sciencebuddies.org/science-fair-projects/project-ideas/Zoo_p064/zoology/earthworm-behavior-food?from=Blog#procedure**

How do worms improve the soil? 👉 **www.nuffieldfoundation.org/practical-biology/investigating-response-worms-soil-improvers**

**7.** Add in the other three types of soil, into different corners, noting where each one goes.

**8.** Put the prepared box in a cool area, or outside—not in direct sunlight.

**9.** Add the worms to the middle of the box, equal distance from the four different soils in the corner.

**10.** Observe the worms—their behaviour and where they go—for a couple of minutes, and then put on the lid.

**11.** Leave the worms in the covered box for 24 hours. Take off the lid and go carefully through each pile of soil to look for the earthworms, moving the soil to another container or an empty part of the box if needed.

**12.** Keep track of how many earthworms you find in each soil. Record the total number of earthworms you found in each soil.

## Discussion:

- Where did the worms initially go? Where did they move to after a couple of minutes?
- Which soils had the most earthworms burrowed into them?
- Which soils had the least number of earthworms?
- What type of soil do you think earthworms like best? Why do you think they like that type of soil the best? It is important to remember that just because an earthworm is found in one of the soils, it doesn't mean that soil is a good, nutritional environment for worms. What other factors, besides a soil containing food, might cause an earthworm to go into the soil that it did?
- How would the earthworms respond if you used different mixtures of soil? Try it and see!
- If worms make our soils healthier, how do we make our soils a healthier home for worms?

SUSTAINABLE DEVELOPMENT GOALS

15 LIFE ON LAND

Soil supports almost all living things. What are some things that you could do to improve the soil environment for organisms like worms, or fungus? Do some research and create a plan for your backyard or garden!