25min Scraps to Snacks
Grade 5 Facilitator Notes

Objective: Students will learn how to start and maintain their own vermi-compost bin. Maintaining a vermi-compost bin will show students how microorganisms, energy (heat) and moisture create chemical changes that convert food scraps into rich organic soil. To solidify their understanding of worm behavior, students will play an active worm game that will help them remember the do's and don'ts of maintaining a vermi-compost bin.

Recipe Category: Soil & Composting

Cooking Time: 25 mins

Level of Difficulty: Grade 5

Recipe Ingredients:

- ☐ Food Scraps: fruit or veggie scraps (except onion, garlic, lemon and lime)
- ☐ Dried leaves or plants
- ☐ Newspaper
- ☐ Bowl of water
- ☐ Cutting board
- ☐ Knife
- ☐ Medium size plastic bin with drainage holes for air circulation.
- ☐ Red Wiggler Worms: these are the best worms for vermi-composting but they are not native to Ontario. You can order a small package online at Cathy's Crawlers or other retailer.

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Curriculum Links:

Grade	Subject Area	Ontario Curriculum Links
5	Science and Education	*Properties of and Changes in Matter* Identify the properties that make up different materials useful in everyday products and discuss the environmental impact of their use. (O) ▪ Identify the three different states of matter-solid, liquid and gas-and give example of each state(S). ▪ Identify and describe some changes to materials that are reversible and some that are not. (S) ▪ Describe changes they observe in the property of materials when materials interact with each other.
		Conservation of Energy Design and construct devices that use a form of energy to meet a specific need or want, and investigate how the energy is transferred to a specific output. (O) ▪ Formulate questions about and identify needs and problems related to protection of the natural environment, and explore possible answers and solution (eg. Investigate how local recycling efforts help conserve energy and natural resources). (S)
	Health and Physical Education	*Fundamental Movement Skills* Perform the movement skills required to participate in games, gymnastics, dance, and outdoor pursuits alone and with others. (O) ▪ Perform a combination of locomotion/ travelling movements, incorporating a variety of speeds, in relationship to objects or others. (S)

Making a Vermi-Compost Bin (20 mins - Not including time to source materials)

- Give short introduction to concept of composting and chemical changes in matter. Composting is a "closed loop" cycle. Heat, moisture and micro-organisms work together to decompose food scraps, which creates nutrient rich soil. The soil created can then be used to plant new seeds that will generate more food, thereby closing the loop. Chemical changes in nature cannot be reversed, i.e. you cannot turn the soil back into food scraps. One has to continue the cycle to reach another phase. Composting is nature's way of using waste to produce new life and food!
- To quickly learn how to make a worm bin with your class, you can search online for a simple 'how-to' video or follow the steps below:

- **Note**: before you start, ensure that you drill holes on the sides and bottom of the plastic bin to let air circulate. For a medium size bin, drill approximately 11 holes.
- On a table, display all the components of the vermi-compost bin. Get 2-3 students to tear newspaper strips and dip them in bowl of water. Press as much water out of the strips as you can and place the damp strips at the bottom of the bin to make a bed

- Use the knife and the cutting board to chop the food scraps. Explain to students that if you cut the food scraps into little pieces, the little worm's mouths will have an easier time eating their food. You can also say you are making a w*orm salad*.

- When the students are finished making the worm bed, ask each student to pick a worm from the package and place it on the newly made bed. This will help students take ownership of a worm and caring for the bin. They can name the worms if they like.
- Place the chopped up food scraps in the bin

- Place a thick layer of *dry* newspaper strips on top of the worms and food scraps to prevent flies from laying eggs. Close the bin.
- Keep the bin in a dark cool place and check on it once a week until the biology of the bin is consistent, i.e. smells like fresh soil. Go to page 4 for maintenance instructions.

Maintaining a Vermi-Compost bin: (5-10 mins per week)

Use a calendar and assign two children per week to check on the worm bin.

To check on the worm bin, remove the top layer and do the following:

- SMELL THE BIN. If it smells fresh, or like damp soil, the bin is doing very well. If the bin smells like rotten garbage, you either put too much food or not enough air is circulating the bin. If so, leave the bin uncovered and let air circulate. Take some food out if there is too much.
- TOUCH THE CONTENTS IN THE BIN. It should feel like a damp sponge; not too wet or too dry. If it's too dry, *do not* add water. Moisture from the bin is obtained from the worms breaking down food so you just need to add more food.
- 'FEED the worms a mixture of "brown" (leaves, newspapers and dried plants), as well as "greens" (fresh organic materials like vegetables, fruits, egg shells and tea bags). For a handful of worms, put a handful of food and check in a week. DO NOT FEED them any more if they have not finished their food. If all goes well, the worms will start to reproduce in a month and their food intake will increase.
- DO NOT FEED the worms meat, canned veggies, oil, processed or cooked, dairy products, onions, citrus and garlic. Do not feed them any vegetables and fruits that may be contaminated with these foods.
- IF THERE ARE FLIES OR OTHER PESTS, leave the bin uncovered or put the bin in the sun for about 20 minutes to get the flies out. Add extra layers of dry ripped newspaper on top to prevent other bugs from getting in.

THE FIRST FOUR WEEKS OF YOUR WORM BIN ARE CRUCIAL. It is during this time that the worms will settle into their new home and create a space they can function in. Once the biology of the bin is set, the worm bin will thrive with very little maintenance.

Active Worm Game: (10 mins)

To play the worm game you need space for the children to run so it's best to do it in an outdoor environment.

Use an image of a worm to go over its anatomy and discuss its behavior. Some details about worm anatomy and behavior are:

- ✓ Worms breathe through their skin. When it rains, they travel to the surface of the soil because so they can breathe more easily.
- ✓ Worms are sensitive to sunlight and can be killed by the sun's UV rays
- ✓ **Red Wiggler** worms can eat up to their full body weight each day
- ✓ A worm has no eyes but feels vibrations in the earth through its body
- ✓ Worms hibernate during the winter and are more active as the temperature rises
- ✓ Worms are most active between temperatures of 10 – 22 C
- ✓ Instead of teeth, worms use their **gizzard**, a throat like pouch, to grind up food
- ✓ Worms are **hermaphrodites.** Each worm has male *and* female reproductive organs
- ✓ Worms turn food scraps into nutrient rich castings that plants love
- ✓ If a worm loses its tail (below its **clitellum**) it can grow it back!

GAME INSTRUCTIONS

- Tell the children they will act like worms during the game.
- Show them an imaginary line on the floor. Below that line will represent the underground, where worms live. Above that line will represent the outside world where the sun and rain interact. Designate an area for their imaginary food.
- To play the game, the children will have to act quickly. The children will act based on what you are telling them is happening in the world around them (worms move slowly but to get them excited and active they will move quickly for the game).
- To start the game, state the following lines (instruct the kids on how they act in bracket):
    - Its drizzling (children should hover near the line but just below the surface of the soil)
    - It's raining heavily (children run above the line so they can breathe better)
    - It's sunny (children run back under the soil before they get sunburn)
    - There are carrots and banana peels (children run towards them and chew their food with their necks the same way worms use their gizzard to grind up food)
    - There is curry chicken and rice or onions and garlic (kids run as far away as possible)
    - It's getting cooler outside (kids slowly move towards the deep end of the soil)
    - It's winter time (kids freeze on the spot)

- It's warming up (kids start moving slowly)
- Its summer time (kids start wiggling and dancing around)

- Repeat the statements in no particular order to keep the children guessing what's next. The faster the kids respond to your commands the better their grasp of worm behavior and anatomy. If certain children did not follow the commands, it would mean they risked their lives and died! Encourage them to play dead.
- You will probably have to do a practice run at least once for them to understand the game. Afterward, you may not be able to get them to stop. Good luck!

For more information, contact:
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Serving Suggestions:

WORM ANATOMY

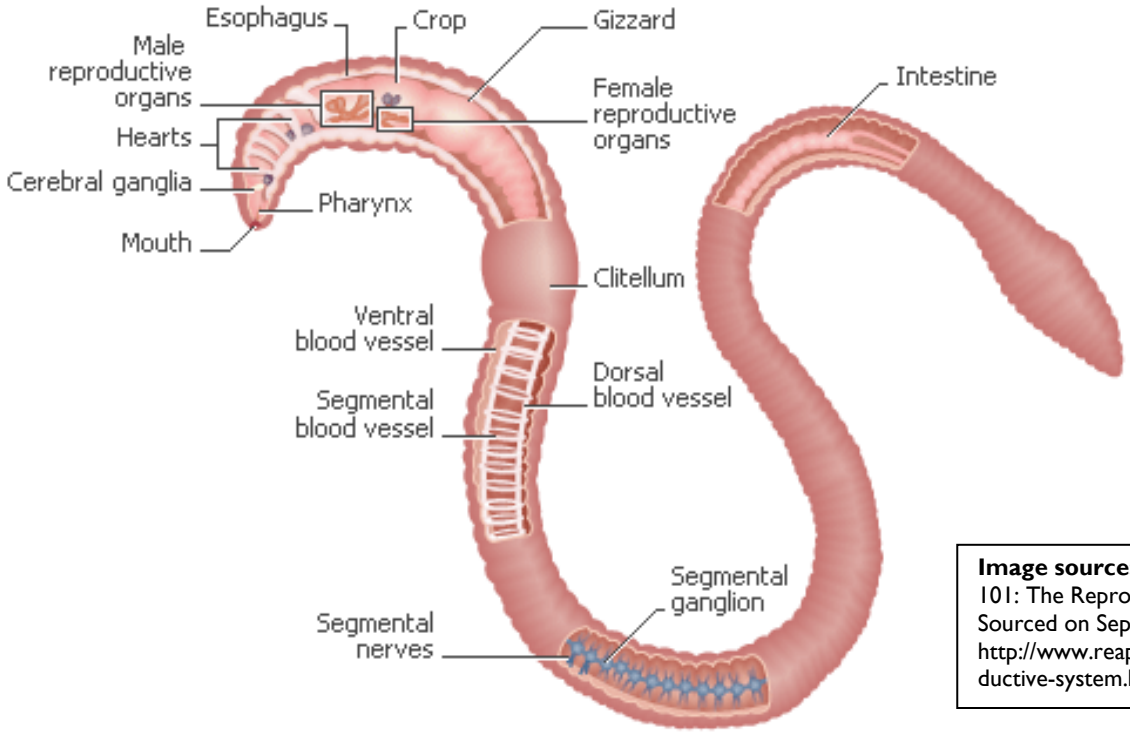

Image source: Worm Anatomy 101: The Reproductive System. Sourced on September 30th, 2010 at http://www.reaps.org/compost/reproductive-system.html

Image source: Amy Stewart. Sourced on September 30th, 2010 at http://www.amystewart.com/images.html