



Growing Up Organic operates on traditional and unceded territory of the Algonquins: now known to many as Ottawa, and now home to many from across Turtle Island and beyond.

Grades 5-6

Composting Workshop

Mindfulness minute: If it speaks to you, take two minutes with your students before this workshop to slow down and root down with this mindfulness minute.

LESSON FOCUS AND GOALS

In this workshop, students work in groups to explore the soil. They learn to distinguish what makes healthy soil and get to identify whether it is healthy or not. They get to understand why having healthy soil is so essential and how to keep it that way.

LEARNING OBJECTIVES

Grade 5

Science and Technology: Understanding Matter and Energy

OVERALL EXPECTATIONS:

- Analyze the immediate and long-term effects of energy and resource use on society and the environment, and evaluate options for conserving energy and resources

SPECIFIC EXPECTATIONS:

- 1.2 - Assess the social and environmental impact of using processes that rely on chemical changes to produce consumer products, taking different perspectives into account (e.g., the perspectives of food manufacturers, consumers, landfill operators, people concerned about the environment), and make a case for maintaining the current level of use of the product or for reducing it
- 3.5 - Describe chemical changes in matter as changes that are irreversible

Science and Technology: Understanding Earth and Space Systems

OVERALL EXPECTATIONS:

- 1-Analyze the immediate and long-term effects of energy and resource use on society and the environment, and evaluate options for conserving energy and resources



SPECIFIC EXPECTATIONS:

1.1 - Analyze the long-term impacts on society and the environment of human uses of energy and natural resources, and suggest ways to reduce these impacts

Social Studies: People and Environments

SPECIFIC EXPECTATIONS:

B1.3 - Create a plan of action to address an environmental issue of local, provincial/territorial, and/or national significance (e.g., managing waste disposal, ...), specifying the actions to be taken by the appropriate government or governments, including Indigenous governments, as well as by citizens

B3.9 - Describe some different ways in which citizens can take action to address social and environmental issues

Grade 6

Science and Technology: Understanding Earth and Space Systems

SPECIFIC EXPECTATIONS:

2.1 - *Follow established safety procedures for outdoor activities and field work;*

2.4 - *Use appropriate science and technology vocabulary, including classification, biodiversity, natural community, interrelationships, vertebrate, invertebrate, stability, characteristics, and organism, in oral and written communication*

Mathematics: Operations

OVERALL EXPECTATIONS:

B2 - Use knowledge of numbers and operations to solve mathematical problems encountered in everyday life

SPECIFIC EXPECTATIONS:

B2.1 - Use the properties of operations, and the relationships between operations, to solve problems involving whole numbers, decimal numbers, fractions, ratios, rates, and whole number percents, including those requiring multiple steps or multiple operations





MATERIALS NEEDED

Student snack and lunch organic waste from one or two days
Kitchen scale
Dried leaves
Shredded newspaper
Spades
Waterproof markers and popsicle sticks

STRUCTURE / ACTIVITY

Before the Activity

Over the course of a few days, ask students to place all of their waste from snacks and lunches in a collection container (one for organic waste [e.g. fruit and vegetable peels], the other for non-organic waste [e.g. plastic wrappers]). Have a list of what is acceptable and what is not; do not include meat scraps, dairy products or eggs.

Part One: Food waste

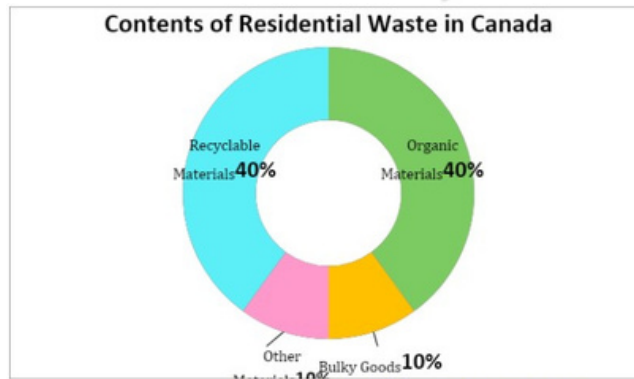
Observe the waste that has been collected over the course of the past day or two. How much organic waste is there? How much non-organic waste? Ask the class to estimate how much waste they collected from their lunches. Weigh the material collected to see which guesses were closest. Together, estimate or calculate:

How much waste would the class make in one week?

How much would all the classes make in a week? In a school year?

What are some of the negative consequences related to sending garbage to landfills? Which consequence (if any) concerns you the most? What are some of the ways we can reduce the amount of garbage we send to landfills? What can we do with the food waste we've collected? List as many ideas as possible.

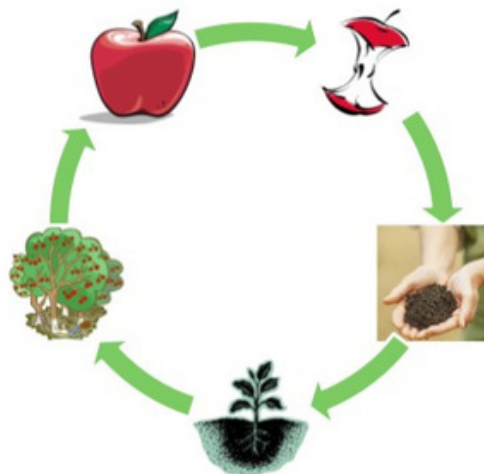
In 2019, Canada produced 2172 pounds of garbage per citizen! Compared to other countries, that's a lot! It's about twice as much as the average person in Japan. A recent study found that Canadians produce more garbage per capita than any other country on earth! Fortunately, with a little effort we can divert a lot of this waste by reusing, recycling and composting. In the average household, 40% of the waste produced is compostable!



Data source: CRC research <https://www.crcresearch.org/solutions-agenda/waste#>
 Data source: Federation of Canadian Municipalities, 2009: http://www.fcm.ca/Documents/tools/GMF/Getting_to_50_percent_en.pdf

What is compost?

Give a short introduction to the concept of composting and chemical changes in matter. How do we define the word 'decompose'? What causes things to decompose? Heat, moisture and micro-organisms work together to decompose food, releasing the nutrients which we can use to enrich our garden soil. These nutrients will be taken up by our new plants in the spring, generating more food! This creates what we call a "closed loop":





Decomposition is a chemical change. This means it cannot be reversed; you cannot turn the soil back into food scraps! Almost everything around us that was once alive is organic matter and can be composted. Some things take a short amount of time to decompose, like our lunch scraps, and other items, like a pair of leather shoes, takes a long time to break down.

What's essential to building good compost, especially if we want the outcome to be nutrient-rich compost for the garden, is providing these microorganisms with the right diet. Micro-organisms need water and air. They also need what we call "brown" organic matter, and "green" organic matter - they need about half and half.

- Leaves **Brown**
- Shredded paper **Brown**
- Fruit Scraps **Green**
- Coffee grounds **Green**

Part two: Decomposing (if time permits)

With the help of the PowerPoint Presentation, query students on how long they think it will take the following items to decompose in a landfill. This game can be structured as a competition by dividing the class into two teams and assigning points to correct answers.

- Banana peel 2 - 10 days
- Cotton rags 1 - 5 months
- Paper 2 - 5 months
- Rope 3 - 14 months
- Orange peels 6 months
- Wool socks 1 - 5 years
- Cigarette filters 1 - 12 years
- Tetra packs 5 years
- Plastic bags 10 - 20 years
- Leather shoes 25 - 40 years
- Nylon fabric 30 - 40 years
- Diapers 500 - 800 years
- Tin cans 50 - 100 years
- Aluminum cans 80 - 100 years
- Styrofoam cup non-biodegradable

(Source: Learning for a Sustainable Future, 2008)



Part Three: Compost Pockets

In small groups have students dig 12" holes in the garden and layer fruit and vegetable scraps from their respective lunches/snacks with brown materials collected from the garden or classroom (paper clippings, dried leaves).

Tips:

- Don't use meat, fat, milk or eggs because pets or animals will try to dig them up!
- Make sure food scraps are covered by at least 8 inches of soil.

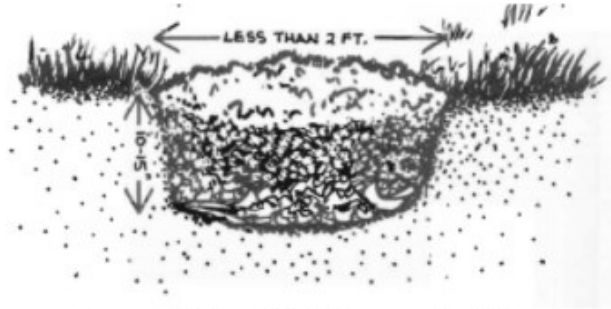


Image credit: Cornell Waste Management Institute

Use the before and after worksheets to make note of what was placed in the hole. Identify the locations of the compost pockets with markers.

Part Four: Follow-up (four weeks later)

Compare end results in one month:

- How does the compost look? How does it smell?
- What composted the fastest? What composted slowest, or not at all?
- What combination was best?

Spread the compost throughout the garden beds and mulch with a layer of leaves to put the garden to bed for the winter season.