



# Throwing a Rotten Apple Party! Full Activity Guide

**Objective:** To use the metaphor of *throwing a party* to introduce students to how composting works, how it benefits our soil and the idea that soil is a habitat for billions of organisms



**Recipe Category:** Soil & Composting



**Cooking Time:** Anywhere from 20mins to full day



**Level of Difficulty:** Grades K-3



## Recipe Ingredients

### General & Set-up: (all ages)

- Apple table cloths
- Apple party banner
- Apples!
- Apple cutters
- Green bin if they don't have composting
- Teacher resource photocopies

### Introduction: (all ages)

- Soil Samples: regular dirt from outside, half finished compost and finished compost
- Apple and knife for “the earth as an apple”

### Drawing Activity: (K- grade 3)

- Colouring pencils and paper (can use their own)

### Story Time: (K- grade 3)

- Story book &/or Michaels Story board

### How Does Composting Work? (K- grade 4)

- Rotting apple photo

- Decomposer props: scarves, winter hats, sunglasses, egg flip, tools, skull caps, shower caps, flower necklaces, name tags
- CD and CD player

**What do we put in the composter? (all ages)**

- Flip Chart or chalk or whiteboard marker to list items (will likely use school's)

**Nitrogen and Carbon Balancing Act: (grade 3+)**

- Worldwide Guide to Healthy Eating... For Compost Piles!
- Composting handout

**Composting Game Show: (all ages)**

- Game Show picture cards
- Green bin, recycle bin

**Compost Bin Game: (K- grade 3)**

- Picture cards (same as Game Show)



*These are pretty much the same, so don't do both.*

**Reviewing FoodShare's compost area: (all ages)**

- Compost Thermometer sheet and thermometer
- Tools – garden tool kit, aerator, shovel, gloves, buckets

**Reviewing Worm Bin in class: (all ages)**

- Worm bin
- Thermometer & Compost Thermometer Sheet
- Some compost tools



### Curriculum Links:

Grade	Subject Area	Ontario Curriculum Links
K	Science and Technology	Awareness of the natural and man-made environment, understanding of and care for the natural world.
1	Science and Technology	<p><i>Understanding Life Systems –</i></p> <ul style="list-style-type: none"> <li>Asses the roles of humans in maintaining a healthy environment.</li> </ul> <p><i>Understanding Structures and Mechanisms –</i></p> <ul style="list-style-type: none"> <li>Assess the impact on people and then environment of objects and structures and the materials used in them.</li> <li>Investigate structures that are built for a specific purpose to see how their design and materials suit the purpose.</li> </ul>
2	Science and Technology	<p><i>Understanding Life Systems –</i></p> <ul style="list-style-type: none"> <li>Asses the ways in which animals have an impact on our society and the environment.</li> <li>Investigate the similarities and differences in the characteristics of various animals.</li> </ul> <p><i>Understanding Matter and Energy –</i></p> <ul style="list-style-type: none"> <li>Assess ways in which the uses of liquids and solids can have an impact on society and the environment.</li> </ul>
3	Science and Technology	<p><i>Understanding Life Systems –</i></p> <ul style="list-style-type: none"> <li>Assess ways in which human activity has an impact on plants and plant habitats.</li> </ul> <p><i>Understanding Earth and Space Systems –</i></p> <ul style="list-style-type: none"> <li>Assess the impact of soils on society and the environment, and of society and the environment on soils. Investigate the composition and characteristics of different soils.</li> <li>Demonstrate an understanding of the composition of soils, the different types of soils, and the relationship between soils and other living things.</li> </ul>

## **Introduction: (5-10 minutes)**

Firstly, ask who likes going to parties...

- Ask the class for their definitions of *composting*. If they have no idea, ask them about *recycling* first and then relate it back to composting.
- Compare how composting is kind of like a party for microorganisms in the soil – but really it's a *habitat*, where they all live together.
- The end result of composting is beautiful worm castings (worm poo!). This stuff looks like dirt, but really is a super-duper, nutrient-rich medium for growing healthy plants and food.
- *Show soil samples and discuss the differences between them.*

## **Why we ♥ composting:**

- Recycling of food scraps reduces garbage that would have otherwise gone to the landfills (*giant piles of garbage kept at 'dumps' and then buried – gross!*)
- Returning nutrients to the soil so our plants will grow bigger and better and our food will be extra healthy
- Composting is a great way to '*close the food cycle*'. Reusing food scraps to make more food!
- It's an easy and fun way to contribute to a healthy environment
- Worms make great class pets! (*Maybe check with the teacher before saying this*)

## **The earth as an apple**

(from <http://www.alabamaitc.org/fall00/earth.html>)

Consider the earth as an apple. Get an apple and do the following sequence, or read the activity slowly and imagine or draw each action.

- Slice an apple into quarters.
- Set aside three of the quarters. These represent the oceans of the world.
- The fourth quarter roughly represents the total land area left.
- Slice this land quarter in half, giving you two 1/8th world pieces.
- Set aside one piece. This is land inhospitable to people (polar areas, deserts, swamps, very high or rocky mountainous areas.)
- The other 1/8th piece is the land area where people live, but does not necessarily grow the foods needed for life.

- Now slice this 1/8th piece into four sections, giving you four 1/32nd pieces.
- Set aside three of these pieces. These are areas too rocky, too wet, too cold, too steep, or with soil too poor to produce food. They also include the areas of land that could produce food but are buried under cities, highways, suburban developments, shopping centers, and other structures that people have built.
- This leaves a 1/32nd slice of the earth. Carefully peel this slice. This tiny bit of peeling represents the surface, the very thin skin of the earth's crust upon which humankind depends. Less than five feet deep, it is a fixed amount of food-producing land.
- When we see the small amount of land that produces our food, it's easy to see that protecting land resources are important. Advanced agricultural technology has enabled the world to feed many of its people. But, with a fixed land resource base and an ever-increasing number of people trying to feed themselves from the fixed base, each person's portion becomes smaller and smaller and more important to the individual person. We must protect the environmental quality of our air, water, and land.
- Remember: It takes 100 years to make 1 inch of topsoil. The water we have on earth today is all the water we'll ever have.
- Earth's water is composed of 97.2% salt water, 2.15% ice, 0.63% ground water, 0.02% surface water (lakes, rivers)
- Only the last two provide our useable water.

## **Rotten Apple Activity List:**

*(Choose from the following activities, depending on age of students and time available)*

### **Drawing Activity: (10mins)**

- Ask the students to draw what they *think* a Rotten Apple Party might look like.
  - Who is there with the rotten apples? What do rotting apples look like? What are they doing? Is it a big or a small party?
- Once drawn, ask a couple of students to discuss or explain their rotten apple party.

### **Story Time: (15mins)**

- Read a compost-themed and discuss the themes in the book, or
- Take Michael's Story board and share an interactive story

### **How does composting work? (10 minutes)**

- Explain decomposition and *show the photo of a rotting apple on the tree*. Where did the rest of the apple go?
  - *Bacteria, fungi, worms, molds, and other animals work hard to break it down, some of it gets lost as water*
- What happens when we throw our apple cores into the garbage? Has anyone ever heard of *recycling* food waste? What does this mean? *(They should have caught onto the concept of composting food scraps by now)*

## **Welcome to the Rotten Apple Party!**

*Today you're going to be learning some craazy words that your parents probably don't even know!* Call on five volunteers – these students will help as visual aids for explaining the different bacteria and organisms present at different temperatures/stages of composting

When composting it's helpful to remember that a compost bin is a habitat – a home to thousands of micro and macro organisms that need food, water and air.

To help us better understand composting, and how to support the habitat we like to think of it as a party – A Rotten Apple Party!

If you've got all the right elements you'll be able get a good turn out of 'guests' and have a healthy, and happening compost bin.

### **To begin:**

Ask participants what it takes to make a good party – the right space, the right food, the right 'beverages', and the right people or in this case organisms. If our 'Rotten Apple Party' has the right elements we'll have a productive compost bin, generating a good amount of heat and helping to quickly breakdown garden waste, food scraps, etc.

For this part of the workshop you can make it as festive as you like, setting the space up as a party, with some apples, water, etc. to share with workshop participants or simply leave the set up to people's imaginations

Begin a discussion around definitions of decomposition and the recycling of food and garden waste

- **Location:** The first thing we need to consider when composting, or when having a party is where to host it. What type of bin will you use? Will it be a three bin system, a heap, one cell, etc? It's always important to keep in mind the volume of waste that will be processed, the best location for accessing the bin, retaining heat, etc. A key element of good composting is allowing room for air flow – and to keep the 'party goers' happy you'll need to turn the pile every few days.
- **Food:** When we have a party, we usually want to offer a nice balance of foods, in the case of a 'Rotten Apple Party' the variety of organisms in our compost bins need a balance of a 1:3 ratio of green and brown materials. (See handout for more details) so to make it a successful 'turnout' you always want to make sure there is a good variety being offered.
  - When your food is put in the compost bin it is eaten by millions of microorganisms and decomposers, such as worms, beetles and millipedes, and then the nutrients (good stuff) in our food is excreted

by all of these organisms and released back into the soil.

- **Beverages:** Beyond having the right food, these organisms also require a certain amount of moisture, and the ideal bin will have the consistency of a wrung out sponge, moist to the touch, but without pooling liquids.
- **Guests:** Call on five volunteers – these students will help as visual aids for explaining the different bacteria and organisms present at different temperatures/stages. Use the Compost Thermometer for a visual.

**Psychrophiles** – present in lower temperatures, less than 20°C, first bacteria to arrive on the composting scene/at the party

- *Have student wear a scarf/winter hat and a name tag*
- *The Psychophilic, or lower temperature phase, is where the bacteria invade the compost pile and begin to burn carbon, releasing heat and nutrients. As the temperature begins to rise, the next gang of bacteria arrives...*

**Mesophiles** – mid temperature 20-30°C, most decomposition is ‘mesophilic’

- *Have student put on sunglasses and carry tools and a name tag*
- *The Mesophilic, or moderate-temperature phase, lasts for a couple of days. Mesophiles love food scraps, especially inside your compost bin. Mesophiles work really hard to consume just about everything in site, generating enough heat to raise the temperature even higher...*

**Thermophiles** – present at temperatures of 40-70°C – strong enough to boil an egg, destroy weed seeds and diseases too.

- *Give students an egg flip and name tags*
- *The Thermophilic, or high-temperature phase, can last from a few days to several months. Thermophiles arrive on site when the compost bin is hot!*

**Worms and Fungi** – work along side Mesophiles when things cool back down a little.

- *Hand out shower caps, flower necklaces and name tags (Fun Guy)*
- *Hand out skull caps, apple core pictures and name tags (worm)*

- The cooling and maturation phase may take several months. You won't see worms and Thermophiles side by side – because the worms will cook in such hot temperatures!

The time it takes to reach maximum temperatures really depends on the type of scraps you use, the amount of moisture (water), the size of the compost heap and the amount it was aerated and agitated (mixed up to allow air to get inside).

### **What do we put in the composter? (10 minutes)**

- Who here would like to eat in a *worm restaurant*? What types of foods would they serve you in a worm restaurant? What do worms like to eat? Let's find out...
- Brainstorm what goes in and what stays out of the compost bin and list them on the board or flip chart paper.
- The composter as a habitat – we need to support the decomposers by giving them food (our food scraps), water and air (by turning regularly)

YES PLEASE	NO THANKS
Most fruit scraps, peels and cores	Citrus fruits ( <i>too acidic</i> ) Hot peppers ( <i>too spicy</i> ) Onions and garlic ( <i>too stinky and prevents bacterial growth essential for worms to feed</i> )
Most fresh or cooked vegetables	Liquids other than a spray of water to keep moist
Coffee grounds, filters and tea bags (minus the staple holding on the string)	Dairy products ( <i>take too long to break down and might get smelly</i> )
Straw and newspaper	Processed foods ( <i>are designed to last longer and contains unnatural ingredients so they don't break down easily</i> )
Egg Shells	Diseased plants or weeds ( <i>will infect the rest</i> )
Leaves, grass, wood chips, straw, and garden trimmings	Meats, bones, meat alternatives, and egg ( <i>takes a long time to break down and will be smelly</i> )
Small amounts of stale bread	Greasy or oily foods
Nut shells	Packaging, cans or cartons ( <i>won't break down</i> )
Shredding cardboard/ paper	

## Nitrogen and Carbon balancing act:

- *Who here can tell me what the four food groups are?* Well compost bins have their own guide to a healthy diet too! It's only two groups though, Green and Brown.
- The compost bin needs to have the right balance of Nitrogen (green) and Carbon (brown) in order to be healthy... and if the compost is healthy, the worms and micro organisms are happy too!
  - *Getting the balance between green (Nitrogen) and brown (Carbon) materials is kind of the same as us getting our four food groups for a healthy, balanced diet.*
- Compost bins need twice as much green materials as brown. This is a *ratio* of two to one. So if you put in one cup of dried leaves, you need to put in two cups of apple cores.
- Hand out the *World Wide Guide to Healthy Eating... For Compost Piles* sheet. Have the students copy down each item in the correct column.
- The back of the sheet could be used to create a poster, showing green and brown compost scraps.

<b>NITROGEN-RICH (“Green Material”)</b>	<b>CARBON-RICH (“Brown Material”)</b>
Fruit peels and cores	Woodchips and sawdust
Fresh or cooked vegetables	Shredded yard waste
Green leaves	Pine and fir needles
Egg shells	Straw and hay
Grass clippings	Dry grass and dry leaves
Coffee grounds, filters and tea bags	Nut shells
Garden trimmings	Stale bread
	Shredded cardboard or paper

## Composting Game Show: (15mins)

- Divide a board or pin board into four sections, ‘garbage’, ‘recycling’, ‘compost’ and ‘home’, with a picture representing each category for younger students.
- Take the picture cards of various food and non-food items
- As a class, the list of items has to be sorted into each category.

- The class can be divided into teams for this activity too. Music for *thinking time* would be fun and make it more like a game show.

### **Composter Game (10mins):**

Choose 2-4 students to stand holding hands to form a bridge (*picture the old London Bridge is falling down game*) – they are the compost bin.

- Hand out picture cards of each of the types of food that either belong in or out of the compost bin to the rest of the class.
- One by one, the class has to try and enter the compost bin (*students stand in the bin while the class decides*).
- As a class, they must vote to either let them stay in the compost bin, or toss them out into the garbage/recycle bin (*another designated area*).

### **When on site at FoodShare, review the compost area (10 minutes)**

- Review what goes in the compost – lasagna layering
- Introduce students to the different tools
  - Aerator/shovel – to improve the worm’s access to oxygen in the air
  - Compost Thermometer – to track the temperature (\*note: this could still be done at the small, classroom compost bin level, student could graph the results)
  - Scrap Bucket – to collect the food scraps to feed the worms
  - Biodegradable liners – to line the scrap bucket
  - Spatula – to scrape out your bucket if you are not using a liner
- Show students how the bin system works
- See and hold some worms

### **When in class, review the worm bin (10 minutes)**

It’s fun to make the students guess what ‘special guest’ you’ve brought along in the Rubbermaid container.

- The type of composting where worms are used is called *Vermicomposting*. Practice saying it as a group. Temperatures don’t get as high in this type of composting; the poor worm would fry otherwise!
- Let students know that worms are very fragile creatures. They don’t like bright lights and too much noise.

- *So this is an opportunity to show how quiet they can be.*
- *The more they can shield the light from the worms, the better. Make a cave with your hands.*
- Ask students to guess the names of the worms in the bin (*Red Wigglers*). We use Red Wigglers because they are good at eating a lot, despite their small size, they can eat up to their own body weight each day!
  - *Imagine how much food that would be if you were eating your own body weight each day...*
- Red Wigglers are also good because they like to live near the surface of the soil, making them perfect for shallow indoor-compost containers.
- Talk a bit about the anatomy of a worm.
  - *They have 5 hearts, they listen through vibrations and breath through their moist skin.*
- Have the students sit in a circle and pass a couple of the worms around so they can touch and hold it.
- Show the students some of the tools people use to maintain compost bins outside.
- Measure the temperature of the bin and discuss ‘*Who’s at the party?*’

### **Wrap up & Discussion:**

- After washing hands, perform a **Great Big Crunch** together.
- Remember back to the Rotten Apple Party – who was there?
  - Who arrived first?
  - Who arrived next (and did most of the work)?
  - Who made the party hot?
- Why do we love composting so much? What would happen to our food scraps if we *didn’t* compost?
- Why are Red Wigglers so great for small container composting?
- Would you like to have a compost bin at your school?...

## **+Follow Up Classroom Activities: (for the teacher)**

- Older students could create their own **worm restaurant menu**, using the knowledge learned from this workshop to decorate the classroom (remember to feed the worms a “balanced diet” of green and brown material!).
- **N:C Ratio activity: (20mins) for older students** If you happen to have a set of old balancing scales lying around, you could use weights of a ratio of two to one (e.g. 20g and 10g weights, 400g and 200g cans etc) to demonstrate the balancing act between nitrogen-rich and carbon-rich items in a healthy compost bin.
  - You will need to label the cans or weights with sticky labels or pictures of the above items. Use the 10g or 200g cans for Nitrogen, and the 20g or 400g cans for Carbon. Students have to use double the Nitrogen to balance out the Carbon items.
- For an EarthCARE **word search**, go to EarthCARE Canada [http://www.earthcarecanada.com/Library/EarthCARE\\_puzzle.pdf](http://www.earthcarecanada.com/Library/EarthCARE_puzzle.pdf)
- For a fun way to explore climate change, listen to the **Climate Crisis Jam** at <http://www.climatecrisisjam.org/>
- Perform your own **herb garden experiment**. Plant an herb variety (e.g. parsley) into two containers, one with regular soil and one with soil and compost (1:1). Which grows better if given the same amount of water? Track the plants’ growth and leaves and record on a graph.
- **“Worms Eat Our Garbage”** by Mary Appelhof, Mary Frances Fenton and Barbara Loss Harris: (See attached print outs)
  - *My Worm Story* creative writing activity, page 19
  - *My Day as a Worm* creative writing activity, page 24
  - *Favourite Worm Food* soil investigation, page 28
  - *Watch Your Step* worm bin checklist, page 61
  - *Watch it Rot* food decomposition experiment, page 78
  - *Worm Bin Animals* vermicompost investigation activity & quiz, page 85/6
- **Introduce the compost thermometer**
  - Show the Compost Thermometer Sheet (see attached)
  - Explain that if the class monitors their own compost bin, they can monitor ‘who’s at the party’. Students could decorate their bin with pictures of the microorganisms at each temperature.