

# Lesson Activity Bank

Lesson Title: Reduce, Reuse, Recycle, & Rot

## Rationale:

Americans have come to depend on readily available convenience products. This is especially evident in the school lunch room. It has been estimated that on average a school-age child using a disposable lunch generates 67 pounds of waste per school year. Most parents pack lunch items in single-use plastic bags, aluminum foil, or wax paper, or they purchase single-serving items that come in their own disposable package. Although these products are convenient their environmental cost is high.

## Goals:

- Environmental Literacy Scope & Sequence benchmark: Social and natural systems may not function as well if parts are missing, damaged, mismatched, or misconnected.
- Key systems concepts and supporting concepts: parts and objects (abiotic factors, biotic factors, group), interactions and relationships (cause and effect, ecosystem, population, reciprocity, structure), subsystems (community, economics), inputs and outputs (resources, waste)

## Teacher Resources:

Community POWER – [www.rethinkrecycling.com](http://www.rethinkrecycling.com)

Minnesota Pollution Control Agency – [www.pca.state.mn.us](http://www.pca.state.mn.us)

Waste Free Lunches – [www.wastefreelunches.org](http://www.wastefreelunches.org)

EPA Waste Free Lunch page – [www.epa.gov/epaoswer/education/lunch.htm](http://www.epa.gov/epaoswer/education/lunch.htm)

Global Stewards – [www.globalstewards.org/lunch.htm](http://www.globalstewards.org/lunch.htm)

Carver County Environmental Center – [www.co.carver.mn.us/departments/LWS/env-svc/envirocenter.asp](http://www.co.carver.mn.us/departments/LWS/env-svc/envirocenter.asp)

Food waste statistics

*Just a Dream* by Chris Van Allsburg

*The Wartville Wizard* by Don Madden

*Shelburne Farms Project Seasons* by Deborah Parrella

*50 Simple Things Kids Can Do to Save the Earth* by The EarthWorks Group

*Earth Book for Kids* by Linda Schwartz

## Accommodations for Learners:

Buddies

Books in native languages about waste

Read along tapes

Group work

Parent supervisors/volunteers

Allow more time

Shorter lengths of assignments

### Field Trip/Guests:

Visit a dump or landfill

Visit your school's cafeteria or custodian after lunch to see how much food waste is being thrown away each day

Visit or bring in a speaker from a coop to learn about different foods and packaging and how to reduce them

Invite an organic farmer to your classroom to teach students about alternative eating

Learn about composting or start your classroom's own compost pile

### Student Reading/Literature:

Textbooks (Social Studies/Science)

National Geographic

Websites

Storybooks on food waste reduction:

- *Just a Dream* by Chris Van Allsburg
- *The Wartville Wizard* by Don Madden

### Oral Language:

Students tell stories and experiences

Sing

Poetry

Daily P.A. announcements

### Written Language:

Letters to the principal or school board

Letters to the editor

Poems

Songs

Campaigns

Stories

Journal Entries

### Social Skills:

Group work

Pair share

Presentations

Debates

### Social Studies:

What is organic waste?

How does it affect our environment?

How has technology changed the amount of food waste we produce?

How does our population affect food waste?

What are the statistics of food waste in the United States per person? Per family? Per school?

What can we do to affect the amount of food waste produced?

How can we reduce food waste?  
What are different kinds of organic waste?

Art:

Posters

Collages

Brochures

Book illustrations

Draw pictures about what the world would look like if we continue to pile up our trash in landfills

Music:

*Put on Your Green Shoes* CD by Various Artists

*Mother Earth* CD by Tom Chapin

Songs about our world/the United States/communities

Songs about nature

Songs about food

Science:

Environmental effects

What are the different kinds of organic waste?

How does this affect our ozone layer?

How does this affect our water?

Medical repercussions

How much organic or food waste do we put in our world?

Math:

Statistics

Computing averages

Reading charts/graphs

Physical Education/Movement Health:

Does organic waste affect our physical and mental health? Why or why not?

What are the effects of organic waste entering the natural system?

How can organic wastes affect an animal's health and survival?

Technology:

Go to websites on organic or food waste

Watch videos

Assessment:

Peer assessment review

Read journals

Reflect on lesson plans and make modifications

Use a rubric

Observe students and record actions

Tests

KWL chart understanding

Have students explain and respond

Follow-up activity #1

### **Start a compost pile**

Take the students outside to a compost bin that you have purchased or constructed. There are many examples of compost bins at the Carver County Environmental Center in Chaska. “In the United States, we throw away a lot of food. Part of keeping the amount of food waste down is by not throwing as much food away. Who remembers where all that food and trash goes if we don’t use it or recycle it?” *Into the landfill* “Families in America throw away about 14% of the food they buy – that usually adds up to around \$590 of food every year! A good way to keep all that wasted food out of the landfills is to *compost* it. What does it mean to *compost*?” The process of combining leftover food scraps and garden waste that decays to produce a rich fertilizer for growing plants and flowers. “Composting is just natural recycling. Food waste – as well as most paper, lawn clippings, and flowers – are *biodegradable*. What does that mean?” Capable of being broken down by the action of bacteria and other microorganisms into products that will not harm the environment. “That means that when you compost these things, the bacteria, fungi, and insects in the soil work together to break down the materials. As the material breaks down, its look changes too. Finished compost is dark and crumbly, fresh-smelling, and no longer looks like what you originally put in the bin. Compost is cool because it helps to improve soil. This is especially important for gardening in areas that doesn’t have the best soil. And what did we learn this morning about the soil?” *It needs nutrients, sun, and moisture to grow healthy plants.* “In sandy soils, compost acts like a sponge, retaining water and nutrients where it can be reached by plant roots. In clay soils, compost makes the ground more porous, creating tiny holes and passageways that help the soil drain more quickly. Compost can be used to fill in low spots or in potted plants too. If you use it as mulch, it can help protect the soil from erosion and drying due to the wind and sun. Today we’re going to start our own composting pile. This is where we can put all of the food scraps and paper that we use during the week. In a few weeks, I’ll use our compost for fertilizer around the school grounds or at home. Composting is more than just dumping biodegradables into a bin. There’s a recipe to follow so you get the best results. The key ingredients are ‘greens,’ ‘browns,’ water, and air. There are little critters called *microbes* that live in the compost pile. Like all living things, these microbes need water and air to live. Water allows the microbes in your compost pile to grow and travel around in the pile to decompose materials. ‘Greens’ – such as food, leaves, and grass – provide nitrogen and act as a source of protein for the microbes. ‘Browns’ – like straw, twigs, dried plants, and newspaper – are a source of carbon, and provide energy for the microbes. It is important that each week, we turn the pile with a shovel or a pitchfork to provide fresh air to the microbes. It also helps to control the smell – you have to remember that we’re dealing with rotting food here. It’s easy to build or buy a compost bucket. We’ve already got one here. The first thing we have to do is lay a base. We start with a layer of browns.” Have the students help you lay down 4-6” of twigs and other coarse carbons on the bottom of the pile for good air circulation. Add layers by alternating greens and browns. The layers should be 4-6” thick. “We need

to remember to add water as we go. The compost pile should be moist – kind of like a sponge with all the water rung out. If we squeeze the compost with our hands, a few drops of water should appear between your fingers.” Have each student test the compost for dampness. “After the first time, we won’t have to add more water. It will get wet from dew and rain. As the stuff begins to decompose, we have to turn the pile so that the water gets mixed in evenly and the microbes don’t run out of air or water.”

Follow-up activity #2

### **Trash Audit #2**

This lunch audit will be conducted using the same process as the first one, although the students and the teachers will conduct the second one without a CCHS staff members present. They should record their observations, and a representative from CCHS will follow-up with a call to ensure that a second audit was completed and to collect the numbers.

Follow-up activity #3

### **Edible Landfills**

Materials needed: Large plastic cups, Kellogg’s Cereal Straws, Rice Krispies, Cheerios, Lucky Charms, Frosted Mini-Wheats, Fruit Loops, milk, spoons

Preparation: Draw a large picture of a cross-section of a landfill on the board (I drew a cup and then drew the layers in). Label each layer inside the landfill, as well as the layers of dirt and clay outside the landfill. This will better help students to follow along as you narrate the building of a landfill. Fill bowls with each different kind of cereal (one kind of cereal per bowl, one bowl of each kind of cereal per table – for this program I needed 18 bowls). Use large mixing bowls for the lucky charms, since students will need the most of these. Break the cereal straws in half. Students will break them again in order to fit them into the cups.

1. “Where does all the trash go once you’ve thrown it away?” *A landfill, which is a hole in the ground where refuse is placed for decomposition.* “For hundreds of years, people have used garbage dumps to get rid of their trash. Yesterday’s garbage dump was nothing more than a pit or field just outside of town where people left their garbage. People tossed all sorts of waste into these dumps. The dumps were breeding grounds for diseases and pests such as flies, mosquitoes, and rats. Rainwater pushed filthy, and sometimes poisonous, liquids from the dump into nearby streams and groundwater supplies that people used for drinking, bathing, and clothes washing. Later, some towns covered the trash heap with dirt to contain the dumped waste. This helped, but it was little more than a cover-up for unsanitary dumping. Today, we still bury our garbage, although not in the open dumps of yesterday. About 55 percent of our garbage is hauled off in garbage trucks and packed into landfills—making landfilling America’s number one way of getting rid of its trash. The other 45 percent is either recycled or burned.”

2. “What happens when all the landfills are full?” *There is no place for the trash – i.e. floating trash barges, trash in space, trash in the ocean, etc.* “The number of people on this world is growing very fast. Does anyone know what the population of the whole world is?” *About 6.6 billion people – and growing faster by the minute!* “Eventually there won’t be enough room on the Earth to hold all the people and all the trash that they produce. That’s why it’s important for us to find ways to reduce the amount of trash we

create and recycle as much as we possibly can. If we don't do it now, the big, beautiful world we live in might become nothing more than a giant junkyard."

3. Pass out the large plastic cups to each student, asking them to leave them on the table until directed otherwise. As the students are adding cereal, it is a good idea to "build a landfill" yourself so that students can see approximately how much of each cereal they should add. "We are going to be making our snack as well as learning about how landfills are built and maintained. Take a look at the board. What I've drawn up there is a side-view of a landfill. A landfill is basically a large hole in the ground. When the hole is dug, a layer of clay is put down to help protect the soil and groundwater from run-off (leachate) and gas that may result from the landfill. Next comes the plastic liner (geomembrane). What do you think our plastic liner will be?" (The cup) "The plastic liner prevents leachate and gas from entering the groundwater. Break one cereal straw in half and place it in the bottom of the cup. This is a leachate pipe, which pumps liquid from the landfill to be properly treated or disposed of. Before we begin adding more layers, remember to share all the cereal on your table with the other people around you. The cereal that is on your table is all you get for this activity, so don't use it all at once – some items repeat a couple times in the landfill. Next, a layer of sand and pebbles is laid down. Add a small handful of rice krispies to the bottom of the cup. Sand and pebbles work as a filter and allow the leachate to drain to the collection pipe system below. Add a scoop of cheerios to signify a layer of soil. There are several layers of soil, so be sure to reserve enough for each. Soil separates the trash from the filter layers. Put a large handful of lucky charms in next, to signify the trash. Trash is compacted in one-day units. Break another cereal straw in half and place on top of the trash. This is a methane pipe. Decomposing trash gives off methane gas, which is both explosive and has high ozone-damaging potential. These pipes capture methane gas and dispose of it. Add another layer of cheerios. Waste is covered daily by soil to reduce odor, litter, and scavengers. Place the clay layer (frosted mini wheats) on top of the layer of soil. Once a landfill is filled to capacity, closure begins. Clay on top of the landfill helps keep rainwater out, slowing down additional leachate formation." A second plastic liner is added after the clay layer; however, we do not put this layer in the cup. I mention it to the students, but there is no way to add a faux plastic liner. The second liner helps keep rainwater out and methane gas from escaping the landfill. "Put another layer of cheerios on top of the clay. Another layer of soil protects the landfill, supports vegetation, and provides additional moisture retention. Finally, put a layer of fruit loops on top to represent grass and flowers."

4. "Take a look through the glass at the side of our landfill. You should see nice, straight layers that look a lot like the picture that I've drawn on the board. However, the landfill doesn't stay looking this way forever. Nature eventually will take its toll on the landfill, and one of the most dangerous factors is rain. Let's take a look at what rain will do to a landfill." Pour milk over your landfill as an example. The cereals will mix and the milk will turn colors. "When it rains, all the liquids in the landfill mix together. This can be very dangerous because that water - called *leachate* - is filled with pollutants. It can leak out of the landfill and get into the groundwater, which can be harmful to crops, plants, animals, and the rivers and springs that are filled from underground."