

# Get in the Loop!



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# Get in the Loop!

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# Welcome to the “Get in the Loop!” Teaching Kit

This kit provides a fun, hands-on way to help students learn about the 3Rs: **Reduce, Reuse and Recycle.**

This kit contains two copies of the colorful **Get in the Loop!** poster, which illustrates how we can easily incorporate the 3Rs into our daily lives. It depicts people engaging in environmentally-friendly activities throughout the community, including while shopping, at work, at play, in the home and, of course, at school. On the back of the poster you will find information about waste reduction and recycling issues in Alberta, as well as short activities to reinforce the concepts shown on the front. The information and activities on the poster back are also enclosed as individual copy sheets that can be photocopied and distributed to students.

The **Teacher’s Guide** contains 11 classroom activities that have been designed to help students understand concepts introduced in **Alberta’s grade 4 science curriculum, Waste in our World.** Each activity begins with a reference to related Specific Learner Expectations from Alberta’s grade 4 curriculum. The kit is designed to be flexible, and learner expectation connections are simply suggestions. Please use these activities to help explain whichever expectation best fits your lesson plans. Most activities in the kit may be completed in one class. Some require additional time such as tracking waste reduction activities or the amount of waste generated over a one-week period. The Teacher’s Guide contains a list of Internet, reading and visual resources that may further your students’ understanding of the topics discussed in this package.

While some teaching aids discuss more than 3Rs related to waste management, the **Get in the Loop!** package focuses only on **reduce, reuse and recycle.** The **Get in the Loop!** package emphasizes waste reduction as the first and most important of the 3Rs. The best way to deal with the problem of waste production is by consuming fewer products to begin with. If a purchase is absolutely necessary, the next best option is to reuse it. We should really consider the first two Rs before we practice the third R and make that trip to the recycling depot. This **Get in the Loop!** package has been designed to help you, the teacher, get this very important point across to the students. Note: the 4th R, Recover, is more an industrial process of recovering energy from waste products, so this kit focuses on the 3Rs that individuals can directly influence.

We hope this teaching package helps you and your students “**get in the loop!**”

## ACTIVITY ONE

# Nature's Recyclers

**Learner Expectation #1:** Identify plant and animal wastes and describe how they are recycled in nature.

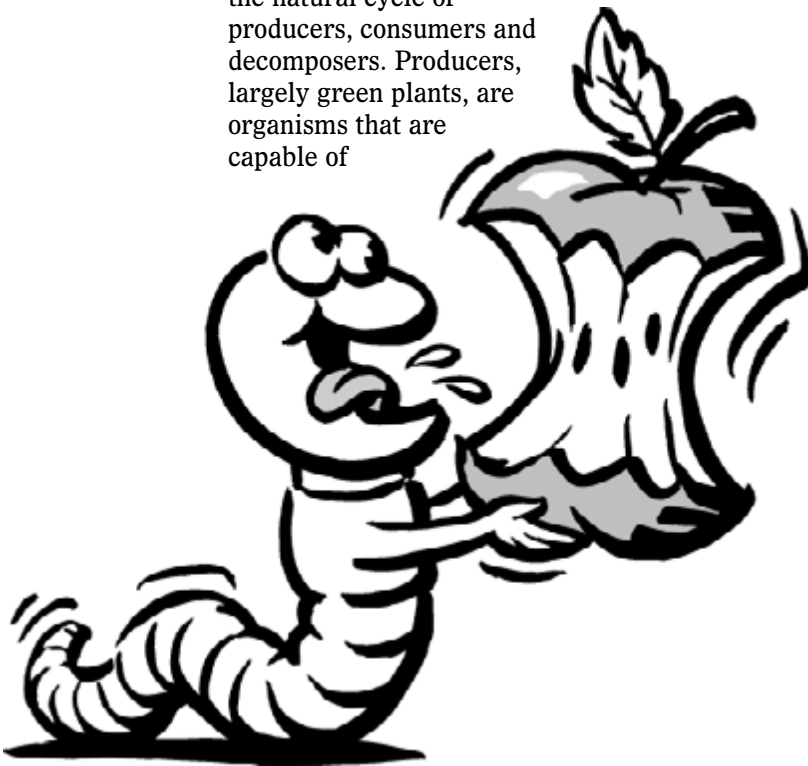
**Learner Expectation #4:** Distinguish between wastes that are readily biodegradable and those that are not.

### Purpose

To teach students how waste is recycled by organisms in nature and to help them understand the terms producer, decomposer and consumer. Students will also observe plant and animal wastes found in nature and will discuss how these wastes are naturally recycled. Through this discussion students will learn about decomposition and the difference between biodegradable and non-biodegradable waste.

### Background

When a living thing dies in nature it is broken down by organisms and returned to the earth in the form of valuable nutrients. These nutrients, in turn, help other living things grow. This is the natural cycle. When students understand this concept, they may find it easier to understand how humans are a part of the natural cycle of producers, consumers and decomposers. Producers, largely green plants, are organisms that are capable of



producing their own food. Consumers, such as humans, are animals that cannot produce their own food and, therefore, must rely on other organisms as a source of food. Decomposers are organisms, like worms and fungi, which break down plant and animal wastes.

Biodegradable wastes are those that can be broken down by natural processes. Besides plant and animal wastes, some products that are made from natural products are also biodegradable, such as newspaper and paper plates. Non-biodegradable wastes are items that cannot be broken down by natural processes. Things like pop cans and glass jars are not appealing to or easily digested by microorganisms and, therefore, are non-biodegradable. The right amount of moisture and oxygen are also necessary for the decomposition of biodegradable wastes. For example, in a landfill, organic wastes typically take a long time to biodegrade as the oxygen and moisture required for decomposition is limited.

### Materials

- Paper
- Pen/pencil

### Procedure

1. Take students on a nature walk and have them identify examples of plant and animal wastes.
2. Have students look for examples of producers, consumers and decomposers that are present in the ecosystem. Ask them to write these observations down in their notebooks.
3. Have the students look for signs of recycling in nature. This includes anything that involves the use of waste produced by any living thing. For example, are there partially decomposed leaves on the ground? How are these leaves recycled? Hint, what does the very top layer of soil under a tree look like (part plant, part humus)?
4. When the students return to the classroom, have them draw a food chain based on what they observed on their walk and identify each organism as a producer, consumer or decomposer. Finally, ask the students to

## ACTIVITY ONE



discuss how their observations of nature can teach us how to deal with the problem of garbage that people face today.

### Optional

If an outdoor walk is not possible, bring in “samples” from nature. Then have students examine the poster and identify materials that are biodegradable and those that are not. What do the biodegradable items have in common with the non-biodegradable? How are they different?

### Other Options

- Ask students to consider examples of producers, consumers and decomposers in society. For example:  
Producer = industry, farmer, rancher, manufacturer  
Consumer = us!  
Decomposer = composting activities
- How do we compare? Are we as efficient as nature? How can we become more efficient?

- In order to illustrate the difference between biodegradable and non-biodegradable ask the students to consider some of the items they may have seen on their nature walk. Have them identify which ones are biodegradable and which ones are not.

- Give the students the following list and ask them to identify the biodegradable (B) and non-biodegradable (NB) items.

- Potato (B)
- Carrot peels (B)
- Juice box (NB)
- Plastic shopping bag (NB)
- Wood (B)
- Tree leaves (B)
- Aluminum foil (NB)
- Pop can (NB)
- Pen (NB)
- Plastic milk jug (NB)
- Glass pickle jar (NB)
- Paper shopping bag (B)
- Paper plate (B)

## ACTIVITY TWO

# Where Does it Come From?

**Learner Expectation #2: Identify and classify wastes that result from human activity.**

### Purpose

To make students aware of the activities that produce waste in our daily lives. Once students recognize that their actions have consequences, they may be able to identify alternate behaviors that produce less waste.

### Background

Humans produce waste every day. The average Canadian produces approximately 2 kilograms of solid waste each day. So what are we doing to produce so much garbage? By keeping track of when we produce waste and what activities we engage in to create waste, students will become conscious of their waste-producing behaviors. This may, in turn, encourage them to modify their activities to reduce the amount of waste that they produce.

### Materials

- Copy Sheet #1 for each student
- Pen/pencil

### Procedure

1. Ask students to fill out the chart for the next three days. Every time they generate garbage, they should note it in the chart, along with the associated activity.

2. Have the students classify each piece of garbage as having come from a renewable or non-renewable resource. Then ask them to think about what they could have done differently to avoid producing that particular item of waste.

**Renewable resource:** a natural resource, such as trees and fresh water, which cannot be used up because it is continuously produced.

**Non-renewable resource:** something that cannot be replaced by nature once it is used up, such as crude oil and coal.

3. Ask each student to save one piece of garbage from this experiment to bring to class. Go around the class, asking the students to brainstorm how this item could be reused or recycled or how the user could have avoided using it in the first place.



# 1

## COPY SHEET ONE

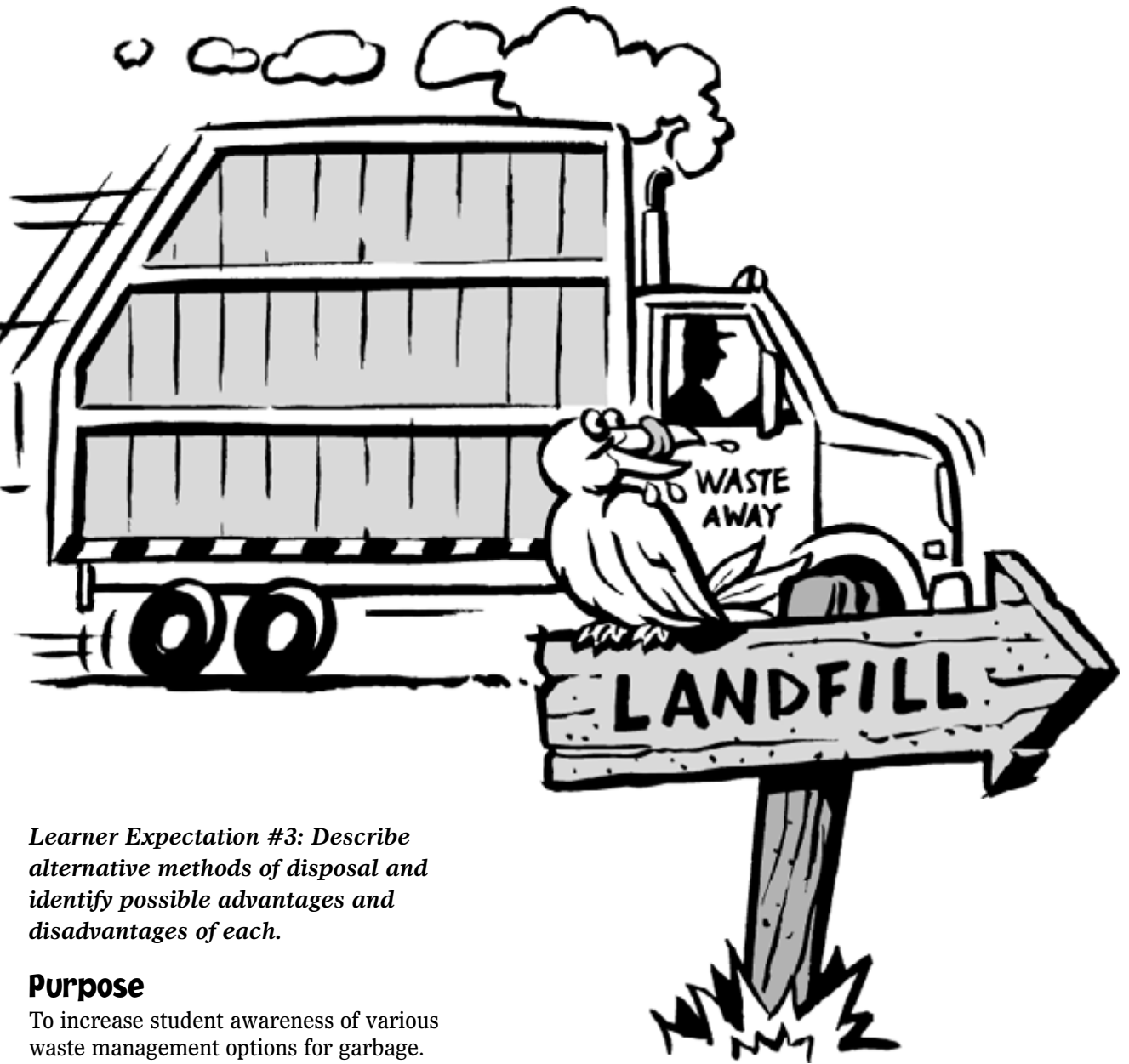
# Where does it come from?

Day	Waste Item	Activity	Renewable	Non-Renewable	Reuse or Recycle it?	How to Reduce?
<b>1</b>						
<b>2</b>						
<b>3</b>						

Name

## ACTIVITY THREE

# In the Dumps



*Learner Expectation #3: Describe alternative methods of disposal and identify possible advantages and disadvantages of each.*

### **Purpose**

To increase student awareness of various waste management options for garbage. Students may understand that garbage is sent to the landfill, but they may not be familiar with how the waste management system works, or how it can impact the environment. By discussing how students discard waste in their community, they may become aware of alternate methods of waste management, as well as their advantages and disadvantages.

### **Background**

See the *Where Does it All Go?* article on the back of the poster for information about landfills. Landfilling is the most common form of waste disposal used by Alberta

municipalities. However, there are other ways to deal with our waste, including incineration (burning), and composting. Incinerating waste can reduce the amount of land required for landfills but it can contribute to other environmental problems such as acid rain and air pollution. Ultimately, there are consequences to every waste disposal option, so it is best to limit the amount of garbage that we need to throw away by reducing, reusing and recycling. Look at the chart on page 8 for some of the advantages and disadvantages of different waste management options.

# ACTIVITY THREE

Waste Management Method	Advantages	Disadvantages
<b>Landfill</b>	<ul style="list-style-type: none"> <li>• Cheaper to construct and maintain than incineration plants</li> <li>• Recovered landfill gas (methane) can be a source of fuel</li> <li>• May remain useful even after closed if reclaimed into park or recreation area</li> </ul>	<ul style="list-style-type: none"> <li>• Must be accessible to communities</li> <li>• May cause pollution problems (e.g. contaminated groundwater) if not properly designed</li> </ul>
<b>Incineration</b>	<ul style="list-style-type: none"> <li>• Alternative energy source</li> <li>• Can reduce the volume of waste by up to 90%</li> </ul>	<ul style="list-style-type: none"> <li>• Gases may be emitted into the atmosphere, contributing to air pollution</li> <li>• Not all materials can be incinerated, so other methods of disposal are also required</li> <li>• May be comparatively expensive</li> </ul>
<b>Composting</b>	<ul style="list-style-type: none"> <li>• Compost material enriches soil</li> <li>• Saves landfill space by diverting organic wastes</li> <li>• Reduces landfill gas and leachate production</li> </ul>	<ul style="list-style-type: none"> <li>• Requires considerable space</li> <li>• Can produce objectionable odors if not properly maintained</li> <li>• Limited to organic material only</li> </ul>
<b>Reduce, Reuse, Recycle</b>	<ul style="list-style-type: none"> <li>• Keeps items out of the landfill</li> <li>• Lengthens the life of natural resources</li> <li>• If we don't create waste in the first place, it's not a problem!</li> </ul>	<ul style="list-style-type: none"> <li>• System required for managing reusable and recyclable materials</li> <li>• Not all communities have facilities for reuse or recycling</li> </ul>

## Materials

Examples of “waste” items:

- Wood
- Plastic bag
- Old computer
- Newspaper
- Used oil container
- Plastic detergent bottle
- Orange peel
- Old tire
- Eggshells
- Styrofoam
- Pop can

## Procedure

1. Have students consider the items above. Ask students to think about how each item would behave in a landfill. Is the landfill the best place for each item? Maybe there are toxic chemicals in some of the items that could leak into the groundwater (computer, oil container) or may pose operational problems if left in a landfill (tires keep rising to the surface. Refer to the *Turning Old Tires into New Products* article on the back of the poster).
2. Are there better ways to manage these items? What would happen if the items were burned in an incinerator or in a burning barrel? Would they release toxins into the atmosphere?
3. Ask the students to think about the method that is used in their communities to dispose of each of these items. Do they think that method is a good way to deal with waste?
4. What would be the best way to dispose of each of these materials? Can anything be reused, recycled or composted? Could we make better choices so that we don't have to deal with disposal at all?

## LAYERS of the LANDFILL



Final earth cover & grass seed

Clay cap

Compacted solid waste

Daily cover

Compacted solid waste

Daily cover

Compacted solid waste

Daily cover

Compacted solid waste

Protective liner

Compacted clay

Name

## ACTIVITY FOUR

# Wrap it Up

**Learner Expectation #5:** Compare different kinds of packaging and infer the relative advantages and disadvantages of that packaging.

### Purpose

To help students understand why some packaging is necessary and to help them identify wasteful packaging.

### Background

See the *Pretty Packaging* article on the back of the poster. For more information on packaging, visit [www.packagingcareers.org/E\\_index.html](http://www.packagingcareers.org/E_index.html)



### Materials

Examples of product packaging:

- Banana
- Coconut
- Yogurt container
- Granola bar wrapper
- Fast food wrapper
- Mini juice box pack
- Plastic around magazines
- Envelopes from bulk mail
- Apple
- Pop can
- Paper bag

### Procedure

1. Have students bring in different examples of packaging from the list above.
2. Have the children examine the items and discuss the packaging. Does the packaging offer protection, provide advertising, make it convenient for the purchaser, or make the product more appealing?
3. Is the packaging essential or wasteful? Why or why not? Could the item be packaged in a less wasteful way? What influence do the students think the packaging has on how well the product sells?
4. Ask the students to classify each of the packaging examples as natural (bananas), recyclable (pop cans) or non-recyclable. Discuss what happens to the packaging once the product is used.
5. Which packaging is made from recycled materials? Which ones are made from renewable resources? Which packaging do the students think is most wasteful? Which is least wasteful? Why?
6. Have the students look at the shopping tips included in the packaging information on the back of the poster. Do their families already practice some of these things to reduce packaging waste in their homes? Which ones do they currently practice, and which ones might they consider in the future?

### Other Options

- Once the students have reviewed packaging types, encourage them to bring in samples of packaging that tends to be more environmentally sound. For example, some magazine companies no longer package their magazines in plastic - some simply stick on a tab to hold the pages together.
- Compare old tin cans to new ones - companies are trying to make them thinner - but still strong enough to hold the contents, and not crush during transportation and delivery.
- Bring in plastic bottles from different companies and compare the thickness of the plastic. Does this affect the performance of the bottle?

# How Green is your Community?

## ACTIVITY FIVE

*Learner Expectation #6: Identify methods of waste disposal currently used within the local community.*

### Purpose

To help students identify environmentally-friendly features in their own community and to help them understand how their community deals with waste. Once students become aware of what environmental services are available in their own community, they could be encouraged to participate in these programs and become better environmental citizens.

### Background

We can find out more about our communities and how environmentally-friendly they are by taking a few minutes to consider where eco-resources such as bike and walking paths, recycling depots, and composting facilities are located. Once we have thought about this, we can draw a map of our community indicating where such resources are located. This is called a Green Map. If you take a few minutes to draw a Green Map of your own neighborhood, you will probably be surprised to discover just how green it is! Find out more about the global Green Map system at [www.greenmap.com](http://www.greenmap.com) and visit [www.greenmap.com/grmaps/northam.html](http://www.greenmap.com/grmaps/northam.html) to check out Green Maps for Calgary, Red Deer and Edmonton.

### Materials

- Paper
- Pencil
- Colouring tools
- Imagination!

### Procedure

1. Ask children to think about whether or not their community includes any of the eco-resources from the list below and where they might be located:
  - Parks and green spaces
  - Pathways for walking, roller-blading, bike-riding
  - Public transit
  - Composting facilities
  - Cultural/historical sites
  - Recycling depots
  - Second-hand stores
  - Landfill or transfer station
  - HHW drop-off sites



- Wildlife habitat
  - Nature Education sites/ facilities
2. Have students draw a map of their neighborhood indicating where any of these services/places can be found. These maps do not need to be geographically accurate.
  3. Tell the students to be creative and to estimate where these things are located in relation to their home or their school.
  4. When the students have completed their maps, lead them in a discussion about how often they visit their local park, trails, educational sites, or second-hand stores. If they do not visit these places often, maybe you can arrange a field trip to one or more of them.
  5. Ask the students to find out what sorts of items can be taken to their recycling depots and household hazardous wastes drop-off sites. What items are not accepted for recycling in their community?

### Other Options

- If recycling is not a priority in their community, encourage students to contact their community leaders to find out why. What could be done to change this?

# Internet Scavenger Hunt

## ACTIVITY SIX

**Learner Expectation #7: Identify kinds of wastes that may be toxic to people and the environment.**

### Purpose

To expose students to the kinds of wastes that are harmful to people and to the environment and to provide them with information on proper and safe disposal options.

### Background

Some of the items that we purchase contain toxic materials. Some of these things, such as some pesticides and solvents, are obviously dangerous to our families and to the environment. But we may not realize that other products, such as computers and fluorescent light bulbs, contain toxic substances and need to be handled in a certain way when we are finished with them. Used oil, computers, fluorescent bulbs, and other hazardous wastes used around the home (called Household Hazardous Wastes or HHW) pose a threat to humans and to the environment. Alberta has programs in place to deal with each of these items so they have less of an impact on the earth when we no longer need them. It is important for students to learn about toxic materials so they understand the dangers associated with them and how to dispose of them properly.

There are some non-hazardous alternatives to certain products. Many companies now manufacture household cleaners, gardening products, laundry detergents, etc. that are healthier for humans and the environment. One drawback of some of these products is that they may require a little more “elbow grease” than the chemical products typically found on store shelves.

Compact fluorescent light bulbs are a great alternative to incandescent bulbs because they last years longer and are up to 90% more efficient. While they do cost more to purchase, they will last 5 to 7 years on average and pay for themselves many times over during the life of the bulb. They also contain mercury, and therefore must be disposed of properly.

### Materials:

- Copy Sheet #3 for each student
- Pen/pencil


### Procedure

1. Give a copy of the Internet Scavenger Hunt Copy Sheet to each student or divide the class into groups of two and give a copy to each team. Ask them to go to the websites that are listed to find the answers to the questions.
2. When the students have found the answers, ask them to read them aloud in class and lead a discussion about their answers. Find out if the students have any of these hazardous wastes in their homes and ask them how their parents dispose of them.
3. You may take the students on a field trip around the school to find out where any of these materials might be kept and how the school deals with them. Can the students think of any other materials that might be hazardous to humans and to the environment? How should we dispose of such things?

### Other options

- Have students consider non-hazardous alternatives to certain products. For example, some companies now offer low-emission paint.
- Let kids know to look for the Eco-logo. Refer to the *Mobius Loop and Other Recycling Symbols* section on the poster to remind students what this symbol looks like.
- Are there alternative “green” products to things like chemical cleaners and energy-consuming incandescent light bulbs? What are the trade-offs, if any, to becoming a more responsible consumer?

### Copy Sheet #3 Answers

- |   |  |
|---|--|
| 1. Air, soil, groundwater                                       | wastes round-up or contact Alberta Environment to find out how to properly dispose of them.        |
| 2. 1 litre, 1 million litres                                    |  |
| 3. C  |  |
| 4. 190,000; 90,000  | 8.  Flammable |
| 5. C  |  Corrosive    |
| 6. Old medications, cleaners, paint, solvents, antifreeze, etc. |  Reactive     |
| 7. Bring them to a community household hazardous                |  Toxic        |

# 3

## COPY SHEET THREE

# Have you seen these TOXIC WASTES?

Visit the following websites to find the answers to the questions below.

[www.usedoilrecycling.com](http://www.usedoilrecycling.com)

[www3.gov.ab.ca/env/waste](http://www3.gov.ab.ca/env/waste)

[www.albertarecycling.ca](http://www.albertarecycling.ca) - click on Electronics Recycling Alberta

### Questions

- Used oil contains substances that may contaminate \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- Just \_\_\_\_\_ litre of used oil can contaminate \_\_\_\_\_ litres of fresh water.
- Fluorescent bulbs and computers contribute approximately how many tonnes of toxic mercury and lead to Alberta landfills each year?  
a. 16                      b. 160                      c. 1,600
- It is estimated that in 2004, more than \_\_\_\_\_ TVs and \_\_\_\_\_ desktop computers were discarded from Alberta households.
- How many litre equivalents of household hazardous wastes have been safely treated and disposed of in Alberta since 1988?  
a. 1 million                      c. over 4.5 million  
b. 3 million
- Give three examples of common household hazardous wastes.  
1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_
- How can we properly dispose of household hazardous wastes?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Match the hazard symbol below with the correct term.  
a. Flammable                      c. Reactive  
b. Corrosive                      d. Toxic



Name \_\_\_\_\_

# How Big is Your Ecological Footprint?

## ACTIVITY SEVEN

*Learner Expectation #8: Identify alternative materials and processes that may decrease the amount of waste produced.*

### Purpose

To introduce the concept of our “ecological footprint” so that children become aware that everything they do has an impact on the environment. Calculating their ecological footprint will help students understand how their daily activities affect the environment. They will learn that by making different choices they can reduce the amount of resources they use and the amount of waste they produce.

### Background

Your ecological footprint is the total area of productive land required to support your lifestyle, i.e. to produce all the resources you consume. It includes not only things like the amount of land needed to grow your food and store your garbage, but also other impacts, such as carbon dioxide emissions, purchasing power, number of vehicles, paper consumption, fossil energy use, fresh water withdrawal, etc.,. Everything we do, from eating a meal to taking a bath, leaves an impression on the earth and our ecological footprint is a good measure of how much of the earth’s natural resources each person uses. In general, the more affluent the country, the more productive land per person is required to sustain the population. There are only 8.9 billion hectares of land on which we can live and grow food and the latest available figures indicate that the ecological footprint of the average Canadian has increased to 7.8 hectares/capita. That means that each Canadian uses almost 20 football fields worth of land a year. If we continue to live this way, there will not be enough resources on the earth to sustain future generations.

The quiz provided is a modified, kid-friendly version of the original, which was created by William Reese and Mathis Wackernagel, and it is not meant to accurately reflect the size of each student’s ecological footprint. Its purpose is simply to introduce the notion that our lifestyles have a direct effect on the planet and that we can modify our daily activities to

reduce that impact. Many books and websites offer information about the concept of an ecological footprint, including <http://www.iisd.ca/consume/mwfoot.html> and [www.sustainabilityed.org/ef.htm](http://www.sustainabilityed.org/ef.htm).

### Materials

- Copy Sheet #4 for each student
- Scrap paper
- Colouring tools

### Procedure

1. Have students take the Ecological Footprint Quiz to calculate the size of their footprint.
2. Once they have completed the quiz, ask students to share their scores and to think about other activities they do each day that can impact the environment. Ask students to write a list of these activities and ways that they can modify their behavior to decrease the size of their ecological footprint.
3. Give students each a piece of scrap paper and have them trace their own footprint and cut it out. They can use other scrap materials and colouring tools to decorate them.
4. Then ask them to think of one thing that they can do to reduce their ecological footprint. Have each child write this activity down on their footprint as their own pledge to walk lighter on the earth. You can display these footprints in the classroom or in the hallway to remind the students of their pledge and to inspire other students to think about how they can reduce their ecological footprints.

# Ecological Footprint QUIZ

1. How did I get to school today...
  - a.  I walked or rode my bike
  - b.  I took the bus
  - c.  I was driven in a car
2. How much water did I use this morning...
  - a.  I did not shower
  - b.  I had a short shower
  - c.  I bathed in a full tub
3. I am wearing...
  - a.  Almost all second-hand or hand-me-down clothing
  - b.  Some second-hand or hand-me-down clothing
  - c.  Only brand new clothes
4. When I eat a meal there is this much food left on my plate...
  - a.  I clean my plate
  - b.  A little bit of food
  - c.  Half of the food that was there to begin with
5. In my lunch, this much food is wrapped in disposable paper or plastic...
  - a.  None of it
  - b.  Some of it
  - c.  All of it
6. When I leave a room I turn off the lights...
  - a.  Always
  - b.  Sometimes
  - c.  Never
7. At my house we recycle...
  - a.  All of the things that our depot will accept
  - b.  Some of the things that our depot will accept
  - c.  Nothing
8. When I go shopping with my family we buy products that contain recycled materials...
  - a.  Always
  - b.  Sometimes
  - c.  Never
9. If I put all of the garbage that I threw away today into a container I would need...
  - a.  I produced no garbage today
  - b.  A shoebox
  - c.  A crate
10. Each week, my family fills this many garbage bags...
  - a.  1
  - b.  2
  - c.  3 or more



Give yourself **1** point for each “a” answer, **2** points for each “b” answer and **3** points for each “c” answer. Now add up your score to see how big your footprint is!

**0 - 10**

Congratulations on having such a small footprint! You obviously walk very lightly on the earth to conserve resources and reduce waste.

**11 - 20**

You have a medium-sized footprint. Although you are doing some things to reduce your impact on the environment, you could make a few changes that will help you to walk a little lighter.

**21 - 30**

Your footprint could be smaller. Read the quiz again and ask yourself if you can make changes to help decrease the size of your footprint. Even small changes can have a big effect! What are you waiting for?

Name

## ACTIVITY EIGHT

# The Paper Chase

*Learner Expectation #9: Identify ways in which materials can be reused or recycled, including examples of things that the student has done.*

### Purpose

Students will become aware of how much paper they generate in their classroom in a week and they will be able to suggest alternatives to throwing paper products away.

### Materials

Waste paper generated in the classroom  
Any of the following:

- Brown paper grocery bag
- Cardboard box
- Gift wrap
- Cards
- Newspaper
- Lunch bag
- Milk carton
- Juice box

### Procedure

1. Ask students to save all waste paper generated by class activities for one week. Have students sort the paper into two stacks: paper that has been used on both sides and paper that has been used on one side.
2. At the end of the week, compare the amount of paper in each stack and lead students in a discussion about whether or not they are wasting paper.
3. Divide students into small groups and give each group a piece of the reusable paper and one of the articles listed in the materials section. Have each group discuss ways in which their item could be reused or list alternatives that could be used over again and then write them on the piece of paper. For example, instead of many individual juice boxes, could one have been purchased and divided into reusable containers? Could the newspaper be used to wrap a gift rather than purchasing gift wrap?
4. After ten minutes, have each group share their ideas.

### Other Options

- Have each group make something creative with their article or have all of the groups work together to combine their articles and maybe other scraps from the classroom to make something useful or creative.



## ACTIVITY NINE

# Follow that Can: Life-Cycle Analysis

**Learner Expectation #10:** *Develop a flow chart for a consumer product that indicates the source materials, final product, its use, and method of disposal.*

### Purpose

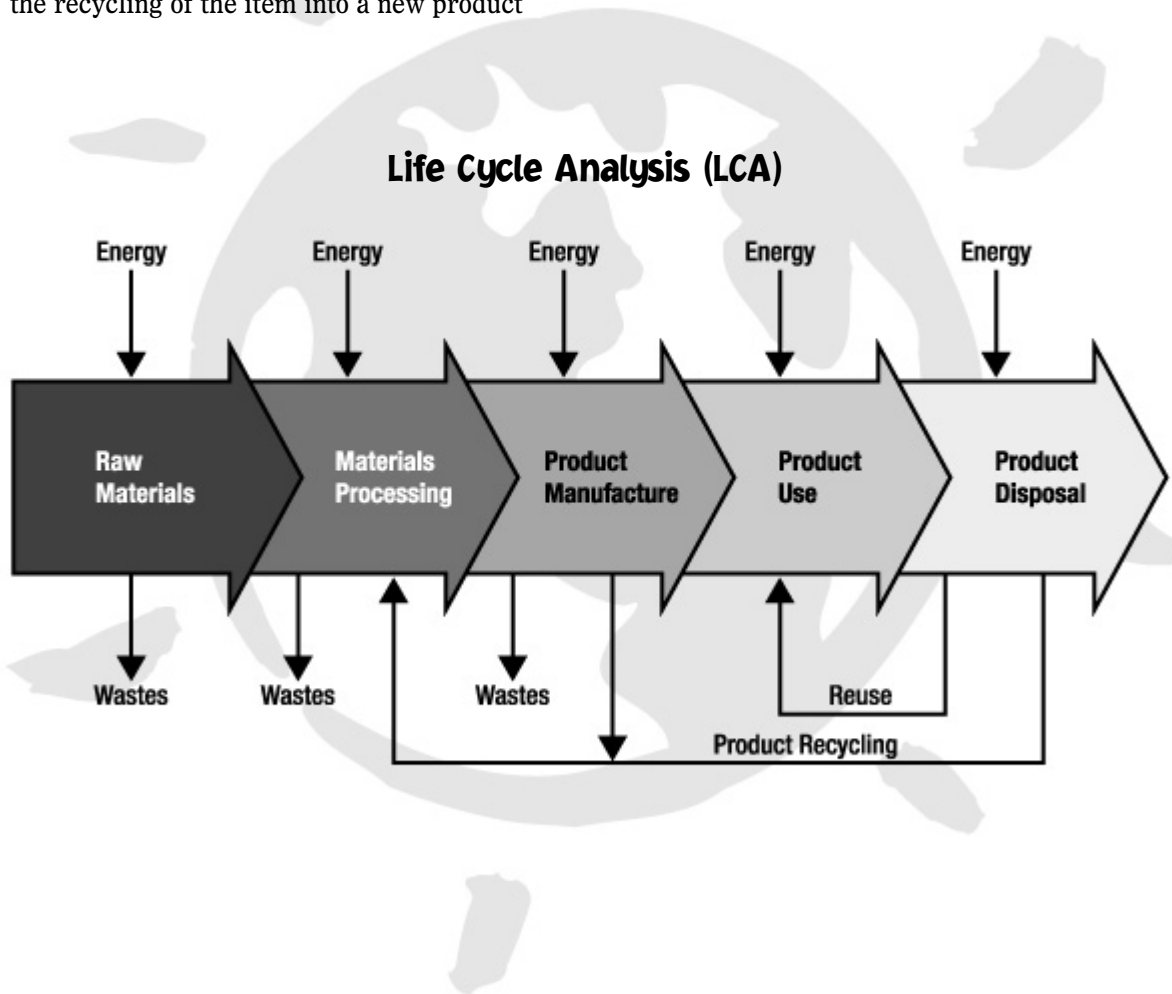
To teach students about the product life-cycle concept and how important it is to consider the impact that a product may have on the environment throughout each stage of its life from raw materials to final disposal.

### Background

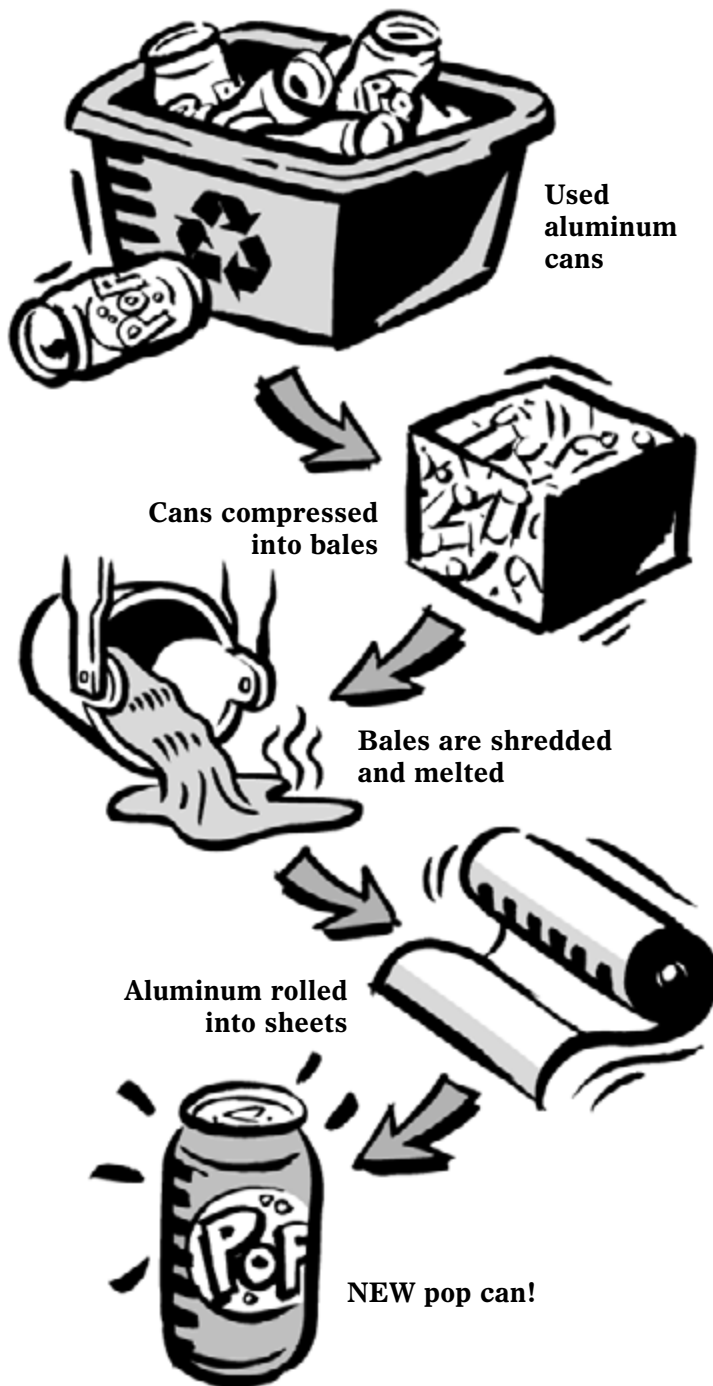
A consumer product affects the environment during every stage of its life-cycle. Life-cycle analysis or assessment considers the environmental and economic impact of a product from the extraction and processing of raw materials to the manufacturing, transportation and distribution of the finished product, to the use and reuse of the product, to the recycling of the item into a new product

and, finally, to the disposal of the product. See the diagram below, which illustrates the resource inputs, energy requirements and releases to the environment during each phase of the life-cycle of a product.

This concept is also known as the “cradle-to-grave” approach to thinking about products, services and processes, and forms the basis for the concept of “pollution prevention.” Governments, businesses and non-governmental organizations can use life-cycle assessment when making decisions related to environment and product policy, design and improvement. Students should be aware of the impact that a product can have on the environment at each stage of its life, rather than just considering how it affects the environment when its life is over. Students should also be aware that they could extend the life-cycle of an item by reusing, recycling and by buying recycled products.



## ACTIVITY NINE



### Procedure

1. Have students consider the life-cycle of an aluminum pop can, which is outlined below. Discuss how an aluminum can first starts as a natural resource that is extracted from the earth. Touch on how the removal of natural resources to make new products affects the earth. Then discuss how energy is required

to manufacture, transport and then distribute the pop can so that it may be consumed by the public.

- Bauxite is mined in the Caribbean, Australia and Africa.
- Bauxite is then turned into alumina (aluminum oxide) by grinding it and mixing it with lime and caustic soda. Once this mixture has been heated, alumina is recovered.
- The alumina is then shipped to Canada to be turned into aluminum through an electrolytic reduction process called smelting.
- The aluminum is put into furnaces and heated with other metals to form alloys for particular uses, including beverage containers.

2. Ask the students to draw a flow chart illustrating the life-cycle of an aluminum can, based on this discussion.
3. Once the can has been used by the consumer, it can be taken to the bottle depot where it will be collected and turned into a new pop can. The process of recycling an aluminum can is outlined below:
  - The consumer takes his/her used aluminum cans to the bottle depot where they are sorted and shipped to be compressed into bales.
  - The bales are sent to the processing plant to be shredded and melted in furnaces.
  - Once it has cooled, the aluminum is rolled into sheets and turned into beverage containers.
4. Explain this process to the students and ask them to consider how the life-cycle has been altered. What steps are missing from the original manufacturing process? Does recycling aluminum reduce the impact of making pop cans on the environment? How?

Visit [www.alcoa.com/global/en/about\\_alcoa/dirt.asp](http://www.alcoa.com/global/en/about_alcoa/dirt.asp) to find out more about the production of aluminum and [www.abrc.com/HRWorks/Follow/frameset](http://www.abrc.com/HRWorks/Follow/frameset) to see the aluminum recycling process in Alberta, as well as the lifecycle of beverage containers, including aluminum.

## ACTIVITY TEN

*Learner Expectation #11: Identify actions that individuals and groups can take to minimize the production of wastes, to recycle or reuse wastes and to ensure the safe handling and disposal of wastes.*

### Purpose

To expose students to the concept of “zero waste”, and to ensure that they understand there are actions we can take to minimize the amount of waste we produce. This activity is really a culmination of everything the students have learned about solutions to waste accumulation thus far, and is an excellent example of what is meant by pollution prevention.

### Background

Zero waste is the recycling of all materials back into nature or the marketplace in a manner that protects human health and the environment. It is a relatively new concept that has been introduced by environmental groups in an effort to drastically cut down on the amount of waste that we produce. The idea is based on the fact that the earth is a finite place that will not only eventually run out of space to store our waste, but be stripped of its ability to produce resources. This concept reiterates the need for us to seriously start working towards a goal of zero waste if we want to conserve the earth’s resources. It is a principle that is meant to redesign how we use materials and resources in our society by taking a “whole system approach”, which includes recycling, waste minimization, lowering consumption, and ensuring that products are made to be reused, repaired or recycled back into nature or the marketplace. This concept may be a difficult one for young students, but it is worthwhile to make them aware that this philosophy exists, and that if we all work together, it may actually be achieved. The goal of this activity is simply to get the students thinking about how their world would be without waste and about the actions they can take (which they have been learning about all along) to get us there.

### Materials

- Copy Sheet #5
- Pen/pencil
- Colouring tools
- Imagination
- Paper

### Procedure

1. Ask students to read the following story. It is unfinished, so have the children write the ending by explaining the actions that the characters can take to properly dispose of the waste that they have encountered.
2. When they have finished writing the story, ask them to draw a picture of how the area looks once all of the waste has been removed. They can be creative here and draw whatever they would like to see as long as there is no waste in the scene. The picture could be of a park, a new school, a walking trail, picnic area... whatever is in each child’s imagination.





## What A Wonderful World It Could Be...

*Stephen and Sarah were very excited as they walked to school. Today their class was going on a field trip to the town's waste management facility, where they would actually get to see a real landfill for the very first time. When they arrived at school, their teacher organized the students to get on the bus to take them to the landfill. All the kids were talking about what they might see once they arrived. Their class had been learning about waste and how bad it is for the environment. They were learning about what they can do to reduce the amount of waste they produce and what sorts of things can be recycled in their community. They even started a paper reuse program in their classroom!*

*As the bus pulled up to the landfill, Stephen and Sarah looked at each other in amazement. They had never seen so much garbage!*

*"Wow!" exclaimed Stephen. "Can you believe that people put this kind of stuff in their garbage? I can see a lot of things that could have been recycled or reused. Some things look brand new..."*

**Pretend that you are Stephen or Sarah and finish the story. Describe the types of things that you can see in the landfill and explain how they could have been saved from the landfill. Think about the types of waste that you have discussed throughout this unit, including toxic wastes, things that you use every day and the types of things that can be recycled in Alberta. Then draw a picture of how this space could look if it wasn't being used as a landfill. What would you like to see there instead?**

Name \_\_\_\_\_

## ACTIVITY ELEVEN

# Waste Reduction Challenge

*Learner Expectation #12: Develop and implement a plan to reduce waste and monitor what happens over a period of time.*

### Purpose

To help students become aware of how much waste they produce in their daily lives and to develop a plan to help them reduce waste over a period of time.

### Background

As we go about our day, sometimes we don't realize that the decisions we make and the actions we take have a negative impact on the environment. Even the best waste reducers can make a choice that is not the most environmentally-friendly one. By monitoring our behavior over time we can become aware of the choices that we make in our daily lives, and learn how to make better ones that don't negatively impact the environment by creating excess waste. When students complete this activity, they will discover how good they already are at reducing waste, and by being exposed to alternate behaviors, they will learn how to become even better waste reducers.

### Materials

- Copy Sheet #6
- Pen/pencil

### Procedure

1. Distribute Copy Sheet #6 to each student. Ask students to read each of the waste

reducing activities and to note when they practice them during the week. They should give themselves one point for each time they perform a waste reducing activity. Each time they do the opposite of the activity, they should take one point away from their score.

2. At the end of seven days, ask students to share their results so they can see what great waste reducers they all are.
3. Ask the students if there were any activities on the list that they didn't normally do in their daily lives, or if anything on the list was especially hard to remember to do. Ask them if, based on this exercise, they have started to do something they didn't do before to reduce waste, and whether this is something they will continue to do each day.



# Waste Reduction Challenge

## COPY SHEET SIX

Waste Reducing Activity	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	Green Points
Use reusable containers when packing your lunch.								
Encourage your family to purchase items in bulk instead of single-use packages.								
Use a reusable shopping bag when shopping.								
Use both sides of paper when writing or drawing.								
Save up all your recyclable beverage containers and take them to the bottle depot.								
Walk, ride a bike, or take the bus to school instead of being driven in a car.								
Use a cloth napkin at suppertime instead of a paper napkin.								
Think about whether an item can be reused, recycled or composted before you throw it away. If it can, save it and do it!								
Get books from the library instead of buying new ones.								
Use reusable cups and cutlery instead of disposable ones.								
Use second-hand sports equipment or clothing.								
<b>Total Green Points for the Week</b>								

Name

## Websites

Alberta Beverage Container Recycling Corp. School Programs / Resources: [www.abcrc.com](http://www.abcrc.com)

- Elementary school recycling program
- Teachers' tips
- Return-It Story interactive game for kids

Alberta Recycling Management Authority: [www.albertarecycling.com](http://www.albertarecycling.com)

- Information on Alberta's tire and electronics recycling programs

Beverage Container Management Board: [www.bcmb.ab.ca](http://www.bcmb.ab.ca)

- Return-It Story interactive game for kids
- Virtual adventure game

Eco Kids: [www.ecokidsonline.com](http://www.ecokidsonline.com)

- Games, stories, environmental facts
- Tip/fact of the day
- Good graphics
- Trash Troopers game
- Choose your own ending storybook
- Reuse tips

Kids at Art: [www.kid-at-art.com](http://www.kid-at-art.com)

- Has creative ways to recycle by making art
- Explains where garbage goes

Monroe County Solid Waste Management District: [www.mcswmd.org](http://www.mcswmd.org)

- Kids activities
- Information about landfills

Ollie Recycles: [www.ollierecycles.com](http://www.ollierecycles.com)

- Information for kids about waste, packaging and composting
- Some activities, word puzzles and tips on how to reduce waste at home

Recycle City: [www.epa.gov/recyclecity](http://www.epa.gov/recyclecity)

- Shows how a city that was in the "dumps" learned how to clean up their community.
- Dumptown game for kids

Recycling and Beyond:

[www.dnr.state.wi.us/org/caer/ce/eeek/earth/recycle/](http://www.dnr.state.wi.us/org/caer/ce/eeek/earth/recycle/)

- Activity page with story and games for kids about reducing waste, including information on how to build a vermicompost box and a colouring book about nature's recyclers

Sort it Out: [www.sortitout.ca](http://www.sortitout.ca)

- Sort it Out is an Edmonton-focused, Alberta based resource that includes online, video, TV, and print components about the 3Rs
- Online interaction includes "discovery" and "quiz" modes

Stanley Park Ecological Society:

[www.stanleyparkecology.ca](http://www.stanleyparkecology.ca)

- Ecological footprint quiz for kids
- Race to Stewardship board Game

Used Oil Recycling EcoSchool:

[www.usedoilrecycling.com/html/school.htm](http://www.usedoilrecycling.com/html/school.htm)

- Oil, filter and container interactive recycling facts for kids

Yucky Kids: <http://yucky.kids.discovery.com>

- "Yucky" games and crafts for kids, like how to make pulverized pest paper
- Ask Wendell the Worm - questions about science and waste
- Information about vermicomposting

## Books

*Cartons, Cans and Orange Peels: Where Does Your Garbage GO?*

Joanna Foster. Clarion Books. New York, 1991

*Cleaning Up: How Trash Becomes Treasure*

Albert and Eve Swertka. Julian Messner. New York, 1993

*Earth Watch: Changing Climate*

Sally Morgan. Franklin Watts. Connecticut, 1999

*Garbage*

Robert Maass. Henry Holt and Co. New York, 2000

*I Can Save the Earth: A Kids' Handbook for Keeping the Earth Healthy and Green*

Anita Holmes. Julian Messner. New York, 1993

*Recycle!: A Handbook for Kids*

Gail Gibbons. Little, Brown. Boston, 1992

*Recycling Book*

Elizabeth MacLeod. Greey de Pencier Books. Toronto, 1991

*Recycling: Meeting the Challenge of the Trash Crisis*

Alvin, Robert and Virginia Silverstein. Putnam and Grosset Group. New York, 1992

*The Canadian Junior Green Guide*

Teri Degler. McLelland and Stewart Inc. Toronto, 1990

*Trash Attack*

Candace Savage. Douglas and McIntyre. Toronto, 1990

## Videos

*Recycling Makes Sense: Beverage Container Recycling in Alberta.*

Alberta Beverage Container Recycling Corporation.

*My Life as a Plastic Bottle.*

Regional Environmental Action Committee. Slave Lake, 2003

# TEACHER'S RESOURCES

## Websites

Alberta Environment: [www.gov.ab.ca/env](http://www.gov.ab.ca/env)

- Information about sources of waste, including household hazardous wastes and construction, renovation and demolition waste and waste reduction initiatives in Alberta

Alberta Beverage Container Recycling: [www.abcrc.ca](http://www.abcrc.ca)

- School recycling program and teacher information

Beverage Container Management Board:

[www.bcmb.ab.ca](http://www.bcmb.ab.ca)

- Teacher resource package including poster, video, and information sheets

Great Lakes Virtual Classroom:

[www.on.ec.gc.ca/community/classroom/intro-e.html](http://www.on.ec.gc.ca/community/classroom/intro-e.html)

- Information and activities about waste, climate change and environmental citizenship from Environment Canada

Monroe County Solid Waste Management District:

[www.mcswmd.org](http://www.mcswmd.org)

- Ideas for teachers

Recycle City: [www.epa.gov/recyclecity](http://www.epa.gov/recyclecity)

- Ideas for teachers including a scavenger hunt game

Sort it Out: [www.sortitout.ca](http://www.sortitout.ca)

- An Edmonton-focused resource about the 3Rs
- Online interaction for kids

Teachers' Corner: About Global Issues and Solutions:

[www.teacherscorner.org](http://www.teacherscorner.org)

- Activities and lesson plans about resource use, ecological footprint and world issues
- Trivia game and crossword puzzles

U.S. Environmental Protection Agency:

[www.epa.gov/epaoswer/osw/kids/quest/intro.htm](http://www.epa.gov/epaoswer/osw/kids/quest/intro.htm)

- Information about product life cycles and methods of handling waste
- Fun classroom activities, including "trash bingo"

Virtual Recycling: [www.virtualrecycling.com](http://www.virtualrecycling.com)

- Ideas and projects for teachers
- Explains how to measure recycling success in the classroom

## Books

*Beyond Recycling: A Reuser's Guide*

Kathy Stein. Clear Light. New Mexico, 1997

*Complete Trash: The Best Ways to Get Rid of*

*Practically Everything Around the House*

Norm Crampton. M. Evans and Co. New York, 1989

*Cycle of Life/Recycle Handbook for Educators*

Art Response Team. 2004. [www.abcrc.ca](http://www.abcrc.ca)

*Good Planets are Hard to Find: Prescriptions for*

*Everyday Environmental Action*

Cindy Tuer. Biddell Publishing. Calgary, 1990

*Junk Treasures: A Source Book for Using Recycled Materials With Children*

M. Puckett and J.M. Shaw. Prentice Hall.

New Jersey, 1981

*Save Our Planet: 750 Everyday Ways You Can Help Clean Up the Earth*

Diane McEachern. Dell Publishing. New York, 1990

*Trash to Treasure: The Recycler's Guide to Creative Crafts*

Anne van Wagner Childs. Leisure Arts.

Little Rock, 1996

*Worms Eat Our Garbage: Classroom Activities for a Better Environment*

Mary Applehoff, Mary Frances Fenton and Barbara

Loss Harris. Flower Press.

Michigan, 1993

**Other resources available to order from Alberta**

**Environment include:**

*A Matter of Waste*

*Composting Goes to School*

*NIMBY - To Consume or Conserve*

*Sort it Out*

**To order copies contact:**

Alberta Environment

Education and Information Centre

(780) 427-2700

You can also visit [www.gov.ab.ca/env](http://www.gov.ab.ca/env)

to order materials online.

### Answers to poster back activities

#### WHICH BIN DOES IT GO IN?

- |                           |                          |
|---------------------------|--------------------------|
| A. Compost                | G. Recycle, Reuse        |
| B. Compost                | H. Recycle, Reuse,       |
| C. Recycle, Reuse, Donate | Repair, Donate           |
| D. Recycle                | I. Reuse, Repair, Donate |
| E. Recycle, Reuse, Donate | J. Reuse, Repair, Donate |
| F. Recycle, Reuse         |                          |

#### "GET IN THE LOOP!" CROSSWORD PUZZLE

##### Across

1. Biodegradable
2. Landfill
3. Natural Resources
4. Greenhouse Gas
5. Reuse
6. Packaging
7. Recycle

##### Down

8. Compost
9. Mobius Loop
10. Leachate
11. Stewardship
12. Waste
13. Reduce
14. Organic

Answer to Phrase: Let's Reduce Waste

#### LANDFILL WORD SCRAMBLE

- |               |             |
|---------------|-------------|
| 1. Sweater    | 5. Milk Jug |
| 2. Pop Can    | 6. Paint    |
| 3. Oil Filter | 7. Computer |
| 4. Newspaper  | 8. Banana   |

# Get in the Loop!

## *Certificate*

This is to certify that

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is officially “In the Loop”

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Date

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Parent/Teacher



100% Recycled Paper, 100% Post Consumer Waste