

# Re...Think

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# CHAPTER 1

## WHY RE...Think?

### 1. Why is RE...Think important to you and your students?

Some of the startling facts that you should know about the waste that we Canadians generate:

- Canadians produce more garbage than any other country in the world, approximately 15 kilograms of garbage per person per week.
- As we enter the 21<sup>st</sup> Century Canada's recycling record has improved. In urban areas with recycling facilities we now recycle up to half of all our refuse and most recycling programs now significantly reduce the amount of garbage going into landfill.
- However, 10% of garbage still going into landfills can also be recycled.
- Household (consumer) garbage accounts for approximately 40% of the solid waste disposed of in Canada.
- Other sources of garbage that fill our landfills and dumps include wastes from construction projects; industrial, commercial and institutional operations, such as factories, schools, mills, and mines; businesses and governments.

### 2. The THREE R's – or are there FOUR?

The slogan adopted about 30 years ago by those concerned by the proliferation of solid waste, its effect on our environment and resources was:

#### REDUCE, RE-USE, RECYCLE

But we now know that these three actions aren't enough, and the slogan now has **FOUR R's**:

#### REDUCE, RE-USE, RE-CYCLE, RE...Think

The activities in this unit have been designed to start you and your students **RE...Thinking** about our garbage. The solid waste problem is only one of the many environmental problems created by our industrial society, but it is one that affects every one of us in our daily lives. Each of us generates garbage at home, at work and at play. Each of us is part of Canada's solid waste problem. Each of us will have to become part of the solution.

### 3. About **RE...Think**

**RE...Think** was first produced by **PITCH-IN CANADA** in 1977 as “**The Solid Waste Unit**”. The concerns about solid waste, recycling and litter, and their effects on our environment and resources, as expressed in the activities of that unit, have not changed since 1977.

However, our understanding of those concerns and our factual knowledge about, and public attitudes towards, them have changed. **RE...Think** is a revision of the original “Solid Waste Unit” incorporating the most recent research and understanding about the solid waste problem, its effects on our environment and its resources, and solutions that are now viable options.

**RE...Think** is comprised of two units, one for Primary (K-3), the other for Intermediate (4-7).

In the Primary unit, the activities are designed to help increase the students’ awareness and to help them make informed decisions about problems, which they can understand, and tackle. However, the issue of solid waste reduction and disposal in our society is not easy to solve and simplistic statements and solutions are to be avoided. The Intermediate Unit provides more in depth study of the problems and solutions.

All of the activities in **RE...Think** are only **BEGINNNINGS** designed to start you and your students **RE...Thinking** about solid waste. Some of the ideas, concerns and projects introduced in these activities might already be familiar to your students, as many children are more environmentally aware than their elders. Select those activities that best suit the abilities and interest of your class.

The recent and rapid “greening” of the marketplace and all levels of government, and the resulting changes in the attitudes and actions of individuals, corporations, and governments, will provide your students with many more topics and issues, local and global, to explore.

### 4. About the Primary Unit (K – 3)

The Primary Unit, designed for use in Grades K – 3, is organized into three main themes:

1. **OUR GARBAGE AT HOME AND AT SCHOOL**
2. **REUSING AND RECYCLING**
3. **LITTER AND OUR ENVIRONMENT**

The activities within a theme focus primarily on that theme, but may also refer to related activities in other themes. Each activity has a grade level notation beside the title, but these are recommended grade levels only. Some activities have further suggestions for older students.

## 5. Using Re...Think in the classroom

The heading to each activity provides specific information to enable you to select appropriate activities quickly:

### OUR GARBAGE:

**Skills:** (Skills required by students to complete Activity)

**K-3:** (Recommended grade level)

### ACTIVITY 11

**Time:** (Approximate time needed to complete Activity)

#### \*\*\*Are There Treasures In Our Trash?

Title of Activity. When the title is preceded by \*\*\* it indicates the activity requires significant advance preparation or special scheduling.

**Learning Objective:** (Major learning objectives of the Activity are listed – knowledge and/or skills)

**Materials and Equipment:** (Lists materials and equipment needed, other than regular class/student supplies, such as pencils, drawing paper, paints, etc.)

## 6. Vocabulary

The following words appear in *italics* in the text and are defined in the glossary:

biodegradable	mulch
biodegrade	non-renewable resource
compactor	packaging
compost	photodegradable
compostable	recyclable
conservation ethic	refillable
deposit-return	refuse derived fuel (rdf)
dump	renewable resources
environment	resource recovery plant
hazardous waste	returnable
incinerator	reusable
landfill	reuse/reusing
leachate	sanitary landfill
litter	scavenger
methane: CH <sub>4</sub>	solid waste management
midden	sources of litter
Mobius Loop	tell
	vermin

## CHAPTER 2

### SOLID WASTE MANAGEMENT

#### 1. Some Surprising Garbage Myths

For many years, certain assumptions about our solid waste problems have existed in the books, pamphlets, films and teaching units produced about garbage. Some of these ideas seem to be just plain common sense, based on our everyday observations. However, research has proven some of these to be false – you might be surprised!

**Myth:** We can *recycle* our way out of an ever-increasing waste stream.

**Fact:**

Even those communities with a curbside collection recycling system in place recycle only 50% or less of their waste. Even if a much higher rate of recycling could be achieved, most communities would have difficulty keeping up with the rate by which waste generation is increasing. Also, some items are just not recyclable for practical and sanitary reasons.

**Myth:** Garbage biodegrades in a landfill.

**Fact:**

After 30 years, some newspapers, one of the most easily biodegradable products under the right conditions moisture and temperature, have been found intact and readable in landfill excavations.

#### 2. What Is In Our Garbage?

Canadians produce the largest amount of household garbage per capita of any people in the world, producing approximately 2.2 kilograms per person per day. But the total amount of garbage produced is more than just household garbage. It also includes manufacturing, construction and commercial wastes.

The constituents of garbage can be measured by **weight** and **volume**; each method is valid when considering various factors. For instance, heavier garbage costs more to transport, thereby causing more air pollution and using up more of a **non-renewable resource** because more gasoline is required in its transportation. More voluminous garbage requires greater landfill space, a dwindling resource, which is causing a garbage disposal crisis in many more densely populated communities.

#### 3. Solid Waste Disposal

Concern about our garbage, what it represents in terms of resource depletion, environmental costs and attitudes and how we dispose of it, is a fairly recent phenomenon. Historically, garbage has been treated in one of four ways: burning, dumping, reclaiming, or reducing at source. Dumping was (and is) the most popular method.

Since ancient times, man has dumped his garbage on the floors or out of the windows of his dwellings. Domestic animals roaming streets and homes scavenged the edible remains, and

human **scavengers** hunted for **reusable** and/or resalable items; disposal systems which are still in use today in many developing countries.

Today, most municipal garbage collected by truck is disposed of in one, or a combination, of three ways. In urban areas, the garbage is transported either directly or via collection stations to a landfill, which is called a **sanitary landfill** site. This is a large area of land dedicated to the specific use of storing garbage. The site is often an area determined to be undesirable for development, such as a bog or swamp, an old quarry, non-arable land, etc... The garbage dumped is then regularly compacted and covered with dirt. Eventually, when the mass is settled, the area may be reclaimed for housing or parkland.

Landfills cause environmental problems, including the production of potentially explosive **methane** gas and other air pollutants, and **leachates**, which can pollute groundwater and thus adjacent water bodies. Recently, liners of clay or plastic have been used in landfills to try to prevent the escape of pollutants into the surrounding land and/or water, but these are not guaranteed solutions.

In a landfill site there is little decomposition of wastes, even largely **biodegradable** wastes such as paper, because the specific moisture, PH, nutrient, bacterial and temperature conditions required for decomposition are not present in landfills. Since landfill sites are covered by dirt, **photodegradable** items do not breakdown either, as they do not receive enough light to decompose.

In some rural areas, garbage can be taken to a **dump**. A garbage dump operates without the environmental controls used at a sanitary landfill, such as high and strong fencing, regular compaction and covering with earth, leachate controls, etc... dumps are eyesores, providing a source for wind blown litter and groundwater pollution.

In some municipalities in Canada, the collected garbage (with or without an accompanying curbside recycling program) is processed at a **Resource Recovery Plant**. Certain recyclable resources such as paper, plastics, metal and glass may be removed and the remainder is incinerated or landfilled. In some plants, the remaining garbage is first converted into refuse derived fuel (rdf) for use in **incinerators**.

Municipal garbage may also be burnt in an incinerator without the recyclable portion being claimed. Modern incinerators are equipped with emission abatement devices to control air pollutants, including combustion gases and unburned combustion products. The remaining ash and non-combustibles, often containing chemical pollutants, still have to be disposed of. Heat produced during incineration can be converted to provide electricity.

Incineration requires a steady and considerable volume of garbage in order to run efficiently, and at sufficiently high heat to minimize the toxic effects of combustion. Maintaining these large volumes of garbage may divert money and effort away from the development of more environmentally friendly disposal efforts, such as waste reduction and recycling.

**Hazardous waste**, such as some industrial, chemical, and pharmaceutical wastes, and clinical hospital wastes, is handled independently of municipal solid waste. The handling and disposal of hazardous wastes is discussed in the Intermediate Unit of **RE...Think**.

#### 4. Re-using and Recycling

Recycling, for years a minor alternative to post-consumer garbage disposal, has now become the most popular alternative, with a rapidly increasing number of communities in Canada setting up recycling systems to help reduce the amount of garbage going into landfills or being incinerated. Largely in response to public pressure, manufacturers of materials previously considered not post-consumer recyclable (many manufacturing industries **recycle** production scraps in-house) are now recycling consumer-provided wastes, most notably in the plastics industry. The combined effects of consumer pressure for more responsible ways of handling our wastes and non-renewable resources, and legislative action at all levels of government, are helping to make the recycling of many products both more cost-effective and socially acceptable.

Almost half of the household garbage we now produce can be diverted from going to a landfill site, or an incinerator, if we reuse and recycle some of the wastes we produce. Non-meat food wastes, for example, account for up to one-third of our total garbage by volume, and are entirely reusable by **composting**. In addition to non-meat food wastes, we can also compost other nitrogen rich materials such as fresh grass clippings, houseplants and manure as well as carbon rich materials such as dry leaves, straw and dry seaweed.

In addition to composting, we can also **reuse** some containers and other items, such as reusable shopping bags (if you do not already own your own reusable shopping bags), thereby reducing the waste produced in our homes.

Recycling is becoming increasingly popular in many parts of Canada, as many communities initiate organized household (curbside) recycling programs and as more and more community recycling centres are established. Recycling programs are now aimed at significantly reducing the amount of refuse going into landfills and incinerators.

The viability of a recycling program depends on several factors, including:

- The development of the technology to handle the product from collection to recycling to marketing the recycled product;
- The development of infrastructures to handle the collection, recycling and marketing;
- The market demand for the recycled product, which can be market-driven and/or legislated;
- The cost-effectiveness of recycling the item, including cost comparisons of energy consumption when manufacturing the item from raw or recycled materials;
- The possible necessity of government subsidies and/or participation in the process to make recycling more cost-effective than using raw materials;
- The environmental effects of the recycling process compared to manufacturing from raw materials (e.g. paper production);
- The scale of the operation that can be optimally maintained in the collection/marketing area.

Materials, which can now be recycled in most urban areas in Canada, include paper (various grades, most commonly newspapers and high grade paper such as computer paper), glass, metal, most plastics, paint and used motor oil.

## 5. What this means for your Students

Recent changes in attitudes and behaviour towards our garbage problem have shown that the aware, informed citizen who is prepared to take environmentally positive actions can make a difference. Your students can help to educate their parents and their community about what else can be done to help improve environmental quality and to conserve our resources through better ***solid waste management***.

Some of the activities in this Primary Unit ask the students to examine their attitudes to such things as disposables (**RECYCLING: ACTIVITY 9**), wearing/using second-hand items (**RECYCLING: ACTIVITY 11**), scavenging (**RECYCLING: ACTIVITY 11**) and littering (**LITTER: ACTIVITY 6**). It is accepted by all those concerned about our environment, and the quality of the environment for our children, and our children's children, that we have to change our attitudes to wasteful, endless consumption.

The activities in this unit were designed to help students work together as a group to realize the necessity of more environmentally aware attitudes and thus decisions for the good of all. It is very difficult for the individual to stand alone in his/her attitudes and beliefs. We hope that through activities such as these, when today's student is tomorrow's adult, he/she will realize that he/she is not alone when making environmentally positive decision, but will have the support and encouragement of his/her peers who learned the same lessons when they were young.

## CHAPTER 3

### STARTING OUT

We recommend that you let the parents know that you will be studying the solid waste problem in class, and solicit their cooperation and help, which will be needed for some activities. Also, their children will want to discuss the new concepts being learned with their families. **APPENDIX 1** provides you with a sample letter which can be sent home at the beginning of the unit.

#### 1. Scheduling

Most activities will take about one class period. Some activities need some advance preparation, for obtaining materials or information. Though most of the activities in this unit can be done at any time during the year, some of the activities are most effective if carried out in conjunction with the annual **PITCH-IN CANADA WEEK** or other local environmental clean-up campaigns (usually held during the end of April--beginning of May), as that is when most communities schedule special garbage pick-ups, and the weather usually allows the outdoor activities to be carried out as well.

Activities that will require more than one period, significant advance preparation (other than just gathering needed supplies), or special scheduling are marked with \*\*\*.

As some of the activities are more difficult and some are designed for young students, as indicated by the suggested level, you will probably not do all of the activities in the unit. Select those that best suit your class, and your time frame.

As already stated, these activities are only **BEGINNINGS**. As your students become involved with the problems and issues, their interest and enthusiasm will lead you into further explorations.

#### 2. Subject Integration

The activities can be integrated into at least one, and usually several if not all, of the following areas:

**Language Arts**  
**Social Studies**  
**Arithmetic**  
**Science**  
**Art**

#### 3. Class “junk” pile

Reference is made to some activities utilizing materials from the class “junk” pile. This pile is “created” as part of activity **RECYCLING: ACTIVITY 3**, if you do not already have such a resource in your classroom.

#### 4. Expansion Activities for this Unit

There are many activities, more general in nature, that can be applied to each of the three themes which have not been described in detail in the unit. You may wish to do some or all of the following with your students as you work through this unit:

- Show a related film or video
- Discuss or read a book
- Keep an ongoing display
- Invite guest speakers from local authorities, non-profit agencies, environmental groups, etc.
- Appoint a class reporter to keep a file or related newspaper and magazine articles
- Have students address a school assembly
- Write and perform a play
- Write stories, poems, newspapers, magazine articles, for real or imaginary publications
- Make posters, draw pictures, take photographs or videos to illustrate what is being studied
- Write letters to local authorities
- Visit a library, a recycling centre, a landfill site, a municipal works yard, a nature reserve
- Make up a survey on environmental attitudes and/or knowledge, then use it with the other students and/or parents and teachers
- Write ads, jingles, songs
- Draw cartoons or comic strips
- Use the class “junk” pile to make sculptures, collages, jewellery, Christmas ornaments, toys, dolls, puppets, games, board games, decorative containers, musical instrument, bird feeders
- Design a board game about Solid Waste Disposal, Recycling and Reusing, or Litter
- Make up a “Garbage Dictionary”

## CHAPTER 4

### OUR GARBAGE AT HOME AND AT SCHOOL

#### 1. About this theme

This theme section provides an overview of **solid waste management** in your community:

- Where does your garbage go?
- Who gets rid of it?
- How do we collect garbage at home?
- Why are these systems necessary?

Students are then asked to **RE...Think** their attitudes towards their garbage. They are encouraged to realize that everything around them, at home, at school, at play, is potential garbage, and that environmental quality is affected by both the production processes and our efforts to dispose of everything that becomes garbage. They are encouraged to **RE...Think** their attitudes and behaviour towards the consumption and disposal of products.

#### 2. Learning Objectives

This theme section includes the following major learning objectives:

##### Knowledge

1. Students will describe, in simple terms, the garbage collection process in their community.
2. Students will identify the health and safety aspects of proper garbage disposal.
3. Students will analyze by weight the amount of garbage produced by an average family over a period of time.
4. Students will describe ways of reducing the amount of garbage we produce.
5. Students will divide garbage into groups.
6. Students will measure garbage by weight and by volume.
7. Students will be able to identify renewable and non-renewable resources.
8. Students will be able to identify and explain the use of the **PITCH-IN** symbol.

##### Skills

1. Students will use counting and the number line.
2. Students will construct graphs.
3. Students will write stories.
4. Students will paint and make collages.
5. Students will use role-playing.
6. Students will write and conduct imaginary interviews.
7. Students will use grouping, and weight and volume measurement.
8. Students will design and construct models.
9. Students will use problem-solving skills.

## Attitudes

1. Students will develop an awareness of the importance of the garbage collection service and personnel in their community and their school.
2. Students will consider the problems of garbage disposal, with specific reference to their own community.
3. Students will realize that some discards are reusable.
4. Students will develop an awareness of the amount of garbage we produce, and consider ways of reducing it.
5. Students will develop an awareness of why we need to reduce the amount of garbage we produce.
6. Students will realize the importance of individual action and using problem-solving skills.

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**OUR GARBAGE:  
ACTIVITY 1****Skills:** none  
**Time:** one class period**K – 3****What Happens To Our Garbage?**

**Learning Objective:** students will be able to outline the process of garbage collection in their community; students will consider the importance of the collection service to themselves and to their community.

**NOTE:** In communities with recycling programs, this Activity should be followed by **REUSING AND RECYCLING: ACTIVITY 7**. You may also wish to do **REUSING AND RECYCLING: ACTIVITY 10**, which focuses on composting food scraps from household garbage.

**Materials and Equipment:** clean and safe samples of non-food, non-recyclable household garbage brought in by the teacher or provided by students.

**Activity:**

In this activity, it is not necessary that the students have a detailed understanding of **solid waste management**, especially the technical differences between the commonly used term **dump** and a **sanitary landfill**. A generalized understanding of the waste disposal process in their community is the learning objective.

1. Use the sample(s) to introduce the topic of household garbage to the students.
  2. Discuss:
    - What is this?
    - What was it used for?
    - Why was it thrown out?
    - What do you think will happen to it now?
    - What happens to things like this at your house?
    - Where does the garbage from our houses go?
  3. Have students fold a large piece of paper into four sections, then draw a story about the piece of garbage, showing the following steps. Have the students dictate their captions, if necessary:
    - A garbage can at home with garbage
    - The garbage cans (and recycling boxes if appropriate) waiting to be picked up
    - The garbage trucks picking up the garbage
    - The garbage being disposed of at the dump
-

## RE...Think

Ask students to imagine, then illustrate, what their house would look like if there was no garbage pickup service.

Discuss with the students:

- What items would accumulate?
- What problems would this cause?
- If there was no pick-up service, how would they and their families deal with the mess in their homes?
- Did the First Nations people of Canada many years ago have a garbage pick-up service?
- Why not?
- What happened to the things they had finished with or broken?
- Why didn't this cause a problem in their environment?

Explain to students that a few hundred years ago, there was very little or no organized garbage collection. In the cities, people just threw their trash onto the floors of their homes or into the streets, creating unsanitary conditions that bred **vermin** and disease. How have our attitudes towards garbage changed in the past few hundred years so that we now need the garbage pickup and disposal service?

### For Older Students

Have students look up **midden**. Why do archaeologists look for middens when they want to find out about the native cultures?

Have students look up **tells**. What do these Middle East mounds tell us about ancient solid waste disposal methods?

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**OUR GARBAGE:**  
**ACTIVITY 2****Skills:** counting using a number line  
**Time:** one class period**K – 3****What Is That Noisy Truck?**

**Learning Objective:** students will understand the purpose of the garbage truck and sanitation personnel; students will use a number line to illustrate the number of garbage cans in their neighbourhood.

**NOTE:** This Activity can be carried out in conjunction with **OUR GARBAGE: ACTIVITY 4**, **OUR GARBAGE: ACTIVITY 5** and **REUSING AND RECYCLING: ACTIVITY 7**.

**Materials and Equipment:** cutouts representing garbage cans or bags; number line.

**Activity:**

1. On garbage pick-up day, take students for a short walk to observe the garbage bags and cans waiting for pick-up and, if possible, the garbage trucks at work.
  2. Together, count the number of cans and bags observed.
  3. Students observe the work done by the sanitation personnel—the driver, the pick-up people.
  4. Students watch and listen to the garbage truck. Observe the **compactor** crushing the garbage, if a compactor truck is used.
  5. In the classroom, discuss:
    - Describe what the workers do
    - What does the truck do to the garbage? (Crushes it)
    - Why is compacting (crushing) the garbage useful?
    - Where will this truck go when it is full?
    - Why do we need this truck and the workers?
  6. Using cutouts to represent the number of garbage cans/bags counted, have students make a number line to show the number. Then, using cutouts, show students how many cans/bags would be collected in one month from the area they surveyed.
-

## RE...Think

Discuss:

- Did we count all of the garbage cans/bags collected in our neighbourhood?
- Whose house (of the students present) did we miss?
- Where else might the trucks pick up garbage? (Local shopping centres, businesses, other homes, etc.)

Help students to realize that a huge amount of garbage is collected weekly in their community, and that the amount of garbage we throw away is causing serious problems, both in finding places to dump it, and the problems the **dumps** cause to the **environment**.

### For Older Students:

Multiply the cans/bags collected in one month by 12, to show how many cans/bags are collected in one year in the area surveyed.

On average, EACH Canadian throws out 80 garbage cans of garbage per year. Help students compute how many cans/bags of garbage per year, on average, are thrown out by the students in the class (class number X 80).

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**OUR GARBAGE:**  
**ACTIVITY 3****Skills:** drawing  
**Time:** one class period**K – 3****Where Do The Garbage Trucks Go?**

**Learning Objective:** students will describe the solid waste disposal method used in their community; students will consider issues and problems, relating to that disposal method, with the emphasis on the local situation.

**Materials and Equipment:** contact local authorities for accurate information on the solid waste disposal method(s) (other than recycling) used in your municipality, including **resource recovery plants, dumps/landfills, incinerators**, etc.

**Activity:**

1. Discuss with the students where their garbage is disposed of, some may have visited the site.
2. Provide students with the information you have obtained.
3. Have students use the information to make a mural showing the municipal dump/landfill, incinerator, resource recovery plant, etc. (depending on the system used in your municipality). For instance, a landfill mural may include the trucks arriving, trucks dumping the garbage, the bulldozers working to spread and compact, special environmental controls such as fencing, pipes to take away the **methane** gas, etc.

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**RE...Think**

The following are general guidelines for discussion. Depending on your local situation, you may have other garbage disposal issues and problems you will want to discuss with your students.

Discuss with the students:

**If a dump/landfill site is used in your municipality:**

- Can you think of environmental problems the dump/landfill may cause in our community?
- What environmental controls are used to prevent pollution problems from the landfill?
- Would you like to live next to a dump/landfill?
- What will happen to our garbage when this site (dump/landfill) is full?
- Would you like (name a local park or wilderness area) used as the site for the next dump?
- Why or why not?

- When our dump is full, should we send our garbage to (name a nearby local town or community)?
- Do you think the residents of (as above) would like to have our garbage dumped close to them?
- What are some of the things we can do so that as little as possible of our garbage has to end up at the landfill/dump? (Reduce our garbage, **reuse** and **recycle** wherever possible rather than throw away.)

**If an incinerator is used by your municipality:**

- Can you think of environmental problems the incinerator might cause in our community? (e.g. air pollution)
- How is the incinerator designed to prevent environmental problems? (Emission control devised, etc.)
- What happens to the ash residue from the incinerator?
- What are some of the other things we can do with our garbage other than sending it to the incinerator?

**If a resource recovery plant is used by your municipality:**

- What happens to the remainder of the garbage that can't be recovered/used by the resource plant? (See above for further questions, depending on whether an incinerator or landfill is then used.)

Further activities would depend on your location situation. You may wish to invite a representative of your municipality's solid waste management department to discuss the local situation with your students. Have students prepare questions for him/her in advance.

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**OUR GARBAGE:  
ACTIVITY 4****Skills:** role-playing  
**Time:** one class period**K – 3****Let's Pretend We're Sanitation Workers!**

**Learning Objective:** students will understand some of the difficulties of the work of the sanitation workers; students will consider ways in which they, or their family, can help the sanitation worker do his/her job most effectively.

**NOTE:** this activity can be carried out in conjunction with **OUR GARBAGE: ACTIVITY 2**.

**Materials and Equipment:** clean discards, such as milk cartons, plastic containers, etc. that can be turned into houses, trucks, garbage cans, recycling containers, etc.

**Activity:**

1. Recall **OUR GARBAGE: ACTIVITY 2** with the students.
2. Students, using glue, paint, etc., make houses, trucks, garbage cans, etc. to make props for "let's pretend".
3. Using their props, students create a street scene in their community in the sandbox or on the floor.
4. Encourage students to act out the various roles involved in municipal sanitation: the householder, the truck driver, the sanitation worker, the *landfill* operator.

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**RE...Think**

Encourage students to think of the problems and difficulties a sanitation worker faces in his/her job.

**Discuss:**

- What are some of the problems the sanitation worker might have doing his/her job?
- What are some of the dangers he/she might face?
- How can we help the sanitation worker do his/her job safely and quickly?
- What parts of the job would you like?
- What parts of the job would you not like?

Have students draw a picture illustrating how they can help when putting out the garbage at home.

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**OUR GARBAGE:**  
**ACTIVITY 5**

**Skills:**conducting interviews  
**Time:** one class period

**1 – 3**

**Let's Interview The Sanitation Worker!**

**Learning Objective:** students will consider the work of the sanitation worker now and in the future as we learn to reduce and **recycle** more of our garbage.

**NOTE:** If your community has a recycling program, you may wish to do **REUSING AND RECYCLING: ACTIVITY 7** as well. This Activity could follow **OUR GARBAGE: ACTIVITY 2** and **OUR GARBAGE: ACTIVITY 4**.

**Materials and Equipment:** none

**Activity:**

1. If done, review **OUR GARBAGE: ACTIVITY 2** with your students. Discuss:
  - Where does your garbage go?
  - Who picks it up? OR if not already done, take students outside to watch the sanitation workers picking up the neighbourhood garbage.
2. Ask students to imagine an interview between a radio or TV interviewer and a sanitation worker. Have students prepare the interviews individually, OR prepare a class interview. Questions could include:

Do you like your work better in the winter or the summer?

- Why?
  - Do you wear special clothes, if so, what?
  - Could anyone do this job?
  - What sort of things do people throw away?
3. Select pairs of students to conduct the interviews.
- 

**RE...Think**

As more and more people in communities all across Canada reduce, reuse, and recycle their garbage, the amount of garbage thrown out to go to the **landfill** or **incinerator** will be reduced.

Discuss:

- Where might the sanitation worker be needed, if he is no longer needed to handle the garbage going to the **dump**?
- How might the sanitation worker's job change?

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**OUR GARBAGE:  
ACTIVITY 6**

**Skills:** hypothesizing  
story writing  
role playing  
**Time:** one class period

**2 – 3****Let's Be Public Health Inspectors!**

**Learning Objective:** students will consider the health and safety aspects of proper garbage disposal methods.

**NOTE:** In **OUR GARBAGE: ACTIVITY 13** students are asked to design a garbage can and/or garbage can holder that will prevent this sort of accident from happening. In **LITTER: ACTIVITY 3** students learn about the seven **sources of litter** and how improperly disposed garbage becomes litter.

**Materials and Equipment:** make an overhead projection of **APPENDIX 2** or draw it on the board.

**Activity:**

1. Show the overhead projection of **APPENDIX 2**, illustrating spilled household garbage.
  2. Discuss with the students:
    - What has happened in this picture?
    - How might this have happened?
    - Have you seen this happen in your neighbourhood?
    - What might happen to the garbage now?
    - What animals or birds might be attracted to the garbage?
    - What would they probably do with the garbage?
  3. Ask each student to pretend that he/she is a Public Health Inspector. Have students consider the following questions, then write a "report" as a class story, or individually:
    - How was the garbage spilled?
    - What problems could the spilled garbage cause?
    - What should be done to make sure that this doesn't happen again?
  4. Ask pairs of students to play the roles of "Health Inspector" and "Homeowner", with the Health Inspector reading the report to the Homeowner, and the Homeowner explaining how he/she will correct the situation.
-

## RE...Think

Discuss with the students:

- Is it always people who spread garbage around a neighbourhood?
- Can you think of any ways in which the local authorities try to prevent this from happening in parks, and other public places? (Specially designed garbage cans.)
- What are some of the problems when animals, such as bears, and birds, such as seagulls, start to depend on finding their food in garbage cans or at garbage **dumps**?

Ask students to look out for situations, such as the one on the overhead, occurring in their neighbourhoods, and to describe them to the class. Can the students suggest any actions that could be taken to prevent this from happening?

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**OUR GARBAGE:  
ACTIVITY 7**

**Skills:** measuring weight  
grouping  
**Time:** one class period

**1 – 3****Do You Weigh As Much As Your Garbage?**

**Learning Objective:** students will be able to describe the amount of garbage produced in one month by an average family in terms of a comparison to their own weight.

**Materials and Equipment:** scales; the garbage produced by an average family in one week. (Assume the average family is two adults and two children or you may prefer to use the statistic of an average of 60 kilograms per week produced by an average Canadian family of four people.)

**Activity:**

1. Ask students to predict who/what will weigh more—a student or a month's worth of garbage.
2. Weigh the garbage of the average family.
3. Multiply the weight by 4 to find the weight of garbage produced by the family during the month.
4. Record the weight on a graph.
5. Weigh each student and record his or her weights on the graph.
6. Who weighs more—the student or a month's worth of garbage?
7. Total the weight of all the students and compare that figure to that of the garbage.
8. Compute the garbage produced by the family in a year and compare that to the weight of the students.

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**RE...Think**

Discuss with the students:

- Whose prediction was correct?
- Are you surprised at the results? Why?
- Why is the weight of our garbage something we should think about? (The garbage has to be lifted and transported; the heavier the garbage, the more it costs to transport.)
- How can we reduce our garbage?

**NOTE:** Many activities in the **REUSING AND RECYCLING** theme section consider waste reduction and recycling. If you have not yet done any of the activities, list the students' ideas and post the list in the classroom. As you do the **REUSING AND RECYCLING** theme section, check off those suggestions that are discussed, and work on those ideas suggested by your students that are not.

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**OUR GARBAGE:  
ACTIVITY 8**

**Skills:** counting  
grouping  
graphing  
measuring weight  
estimating volume  
**Time:** one class period

**2 – 3****What Is In Our Garbage?**

**Learning Objective:** students will be able to divide a typical collection of household garbage into groups; students will realize that garbage has volume and weight.

**NOTE:** This Activity can be followed by **OUR GARBAGE: ACTIVITY 9**, or **OUR GARBAGE: ACTIVITY 10** which focuses on composting to reduce and *recycle* household waste.

**Materials and Equipment:** samples of different types of garbage, including paper, plastic, glass, and metal garbage; strong bags to hold the sorted garbage; scales.

**Activity:**

1. Ask each student to bring one piece of garbage to school, from their household garbage OR bring in appropriate items yourself.
  2. Discuss the items.
  3. Help the students to sort the garbage into groups, depending on what the item is made of, such as a glass group, a paper group, a plastic group, a food scraps group, etc.
  4. Count up the items in each group.
  5. Make a graph, using cutouts to represent the number of items in each group.
  6. Discuss which group has the most items, and why.
  7. Put each group into a separate bag, and determine which group fills up the bag the most, i.e., which group has the largest volume.
  8. Have students graph the volumes.
  9. Weigh each bag—which bag weighs the most?
  10. Have students graph the weights.
-

## RE...Think

Help students realize that garbage has weight (is heavy) and volume (takes up space). (Of course, in urban areas the garbage would be compacted if collected in a **compactor** truck, and would be crushed by bulldozers in the **landfill**. However, the volume of flattened garbage is still considerable.) These factors cause disposal problems, as it is increasingly difficult to find enough space for our garbage, and it is expensive to take heavy garbage by truck to these sites.

Ask students to suggest ways in which the amount of garbage in each group could be reduced so that the amount of garbage going into our landfill sites would be reduced.

Have students illustrate their ideas.

**NOTE:** Activities in the **REUSING AND RECYCLING** theme section focus in greater detail on ways to reduce, **reuse**, and recycle our garbage.

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**OUR GARBAGE:  
ACTIVITY 9****Skills:**grouping  
**Time:** one class period**1 – 2****Things That Grow; Things That Don't Grow**

**Learning Objective:** students will group household garbage into two groups: made from things that grow, made from things that don't grow, to explore the concepts of *renewable* and *non-renewable resources*.

**NOTE: OUR GARBAGE: ACTIVITY 8** is a pre-requisite for this Activity. This Activity is a variation of **OUR GARBAGE: ACTIVITY 10**. You may wish to do both or select the activity that best suits your class.

**Materials and Equipment:** as in **OUR GARBAGE: ACTIVITY 8**.

**Activity:**

1. Carry out steps 1-3 of **OUR GARBAGE: ACTIVITY 8**.
2. Brainstorm with the class to make a list of "Things that Grow" and "Things that Don't Grow", such as rocks, sand, etc.
3. Explain to the class that all the items in our garbage are either made from "things that grow" such as plants and trees, or from "things that don't grow", such as rocks (metals) and sand (glass).
4. Help students to look at each of the garbage groups they've made, and decide which of the two headings apply to each group.
5. Make up labels "Garbage from Things that Grow" or "Garbage from Things that Don't Grow" and place each group of garbage under the correct heading.

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**RE...Think****Discuss:**

- When we use up and throw away something made from the "Things that Grow" group, how can we get more of the "thing that grows"? (By growing more trees, plants, etc.)
- When we use up and throw away something made from the "Things that Don't Grow" group, can we make more of the "thing that doesn't grow"?

Explain to students that “Things that Grow” are renewable resources and that “Things that Don’t Grow” are non-renewable resources.

Put these two headings on the board and ask students to name objects for each category by looking around the classroom and thinking about their bedroom at home

OR  
Have each student make two collages, one for each category, using catalogue and magazine pictures.

Discuss:

- How can we help to make our non-renewable resources last as long as possible?
- What is paper made of, a renewable or non-renewable resource?
- What do the forestry companies have to do to “renew” the supply of trees for paper?

If your community has a paper recycling program:

- What do we do with our newspapers at home so that as few trees as possible have to be cut down?

Have students make a poster showing one thing they can do to help non-renewable resources last as long as possible.

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**OUR GARBAGE:**  
**ACTIVITY 10**

**Skills:**grouping  
**Time:** one class period

**2 – 3**

**Renewable Or Non-Renewable?**

**Learning Objective:** students will be able to group household garbage into two groups: “comes from a *renewable resource*” or “comes from a *non-renewable resource*”.

**NOTE: OUR GARBAGE: ACTIVITY 8** is a pre-requisite for this Activity. This Activity is a variation of **OUR GARBAGE: ACTIVITY 9**. You may wish to do both, or select which Activity best suits your class.

**Materials and Equipment:** as in **OUR GARBAGE: ACTIVITY 8**.

**Activity:**

1. Carry out Steps 1-3 of **OUR GARBAGE: ACTIVITY 8**.
  2. Put the terms “renewable resource” and “non-renewable resource” on the board. Ask students to explain them and to give examples of each.
- 

**RE...Think**

Select the paper garbage group and discuss:

- What was the resource from which these items were made?
- Is it a renewable or non-renewable resource?
- How do the forestry companies make it a “renewable resource”? (Replanting)
- How can we help to make sure that as few forests as possible have to be cut down to make paper? (*Recycling, reusing*)

For each of the remaining garbage groups, have the class decide if it is made primarily from a renewable or non-renewable resources.

For each non-renewable resource group, discuss how we can help to conserve the resources.

Have each student select one of the groups, and make up a poster illustrating how he/she can help to conserve the resource (renewable or non-renewable).

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**OUR GARBAGE:**  
**ACTIVITY 11****Skills:** story writing  
**Time:** one class period**K – 3****\*\*\*Are There Treasures In Our Trash?**

**Learning Objective:** students will realize that some of the things we discard into the garbage could be *reused*.

**NOTE:** In **REUSING AND RECYCLING: ACTIVITY 11** students will examine their attitudes towards owning and using “pre-owned” items.

**Materials and Equipment:** catalogues, magazines.

\*\*\* A few days before you do the activity, ask students to think about what their family throws away as garbage. Ask them to think of some item that they’ve seen thrown away, at their home or elsewhere, that might surprise the class, or that they thought was unusual or interesting.

This activity could be scheduled during a special garbage pick-up week. Ask students to observe the items put out for pick-up in their neighbourhood. (Special pick-ups are often held in spring, during **PITCH-IN WEEK** and sometimes also in the fall. Contact your local solid waste management authority for more information.)

**Activity:**

## 1. Discuss:

- What was the most unusual or surprising item thrown away?
- Why do you think this item was thrown away?
- Did you see anything that you thought could be used again?
- What might have to be done to the item before it can be used again?
- Did you see anyone taking some of the trash for recycling, such as a scrap metal collector?

2. Have students use magazines and catalogues to make a picture collage of what they would expect to see thrown away at their local **dump/landfill** site (or sent to the **incinerator**).

3. Have students imagine that they are one of the items that they saw, then write the story of their life. They can change the ending if they wish OR have students paint a picture showing the story of the item.

## RE...Think

Discuss the pictures and/or stories with the students.

Ask students:

- Is there anything in this room that could not be thrown away when we no longer need it, or when it is broken?
- Is there anything at home that could not be thrown away when we no longer need it, or when it is broken?

Ask students to think about all the homes in our neighbourhood, and all the things in them, and all the things in this school, then imagine it all in one garbage dump. Help students to realize that every object around them could one day end up in a garbage dump, landfill, or incinerator.

Discuss:

- What can we do with some of it, when we've finished with it?
- What can we do with some of the broken things, rather than sending them to the dump?

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**OUR GARBAGE:**  
**ACTIVITY 12**

**Skills:** using a map  
counting  
**Time:** one class period

**1 – 3****How Many Garbage Cans Can We Find In Our School?**

**Learning Objective:** students will count the number of garbage cans in the school and consider their necessity; students will be able to identify and use the **PITCH-IN** symbol.

**NOTE:** In schools/classrooms with recycling programs, you may wish to do **REUSING AND RECYCLING: ACTIVITY 6** instead of this Activity. For information on the **PITCH-IN** symbol see **APPENDIX 3**.

**Materials and Equipment:** map of the school and school grounds, preferably on 11”x 14” paper, one per two students; enlarged copy or overhead projection of the map.

**Activity:**

1. Introduce the activity by discussing the classroom garbage can:
  - Do we need it?
  - Why?
  - Do you think there are more in the school?
  - Where?
2. Provide each student, or pair of students, with a copy of the map. Explain to the students that they will be looking for garbage cans.
3. Show the students the **PITCH-IN** symbol. Discuss the symbol, what it depicts, and why and how it can be used.
4. Take students on a walk through the school, looking for other garbage cans. In order to not disturb other classes, assume the same number of garbage cans that your class has (usually one or two) for each occupied classroom. On their map, have students mark (using the **PITCH-IN** symbol) the location of garbage cans that they find, such as in the library, the office, the supply room, etc.
5. Take students on a walk around the playgrounds, looking for garbage cans. Mark these on their maps using the **PITCH-IN** symbol.
6. In the classroom, on the large map, have students indicate locations of the garbage cans, including the pre-determined number for each occupied classroom.
7. Count up the number of garbage cans.
8. Indicate the number of garbage cans on a number line.

## RE...Think

Draw students' attention to the number of garbage cans found in and around the school.

Discuss:

- Why do we need these garbage cans?
- What would happen to our school *environment* without them?
- Who empties them?
- What happens to the garbage collected?

If possible, arrange a visit with the school custodian to find out his/her responsibilities in handling the school's garbage. You may wish to have him/her give a brief talk to the students on how the school's garbage is handled, and how they can help him/her to do the job properly.

If your school's garbage cans are not marked with the **PITCH-IN** symbol, to encourage their use, you may wish to obtain adhesive **PITCH-IN** decals from **PITCH-IN CANADA**. See the **RESOURCES** section for more information.

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**OUR GARBAGE:**  
**ACTIVITY 13****Skills:** graphing

2 – 3

**Time:** two class period on separate days**\*\*\*How Many Garbage Cans Can We Find At Home?**

**Learning Objective:** students will compute the number of garbage cans in their homes; students will consider the necessity of the garbage cans; students will consider ways of reducing the amount of garbage produced in their homes.

**Materials and Equipment:** graph paper; cutouts representing garbage cans; copies of **APPENDIX 4, Worksheet 1** and **APPENDIX 5, Worksheet 2** (one copy of each Worksheet per student).

**Activity:**

1. Discuss with the students:
    - Where do you have garbage cans and/or wastebaskets in your home?
    - Why are they where they are?
    - How many do you think you have at home?
    - Are they needed? (Include safety and health considerations, as well as aesthetic reasons.)
    - What might happen if we didn't have garbage cans in our homes?
  2. Provide each student with a copy of **APPENDIX 4, Worksheet 1**. Have students complete the sheet at home and return it to school.
  3. Provide each student with a copy of **APPENDIX 5, Worksheet 2**. Help students to complete their graphs using the data they collected on Worksheet 1.
  4. Draw the same graph on the board in order to graph the class results. With the students, compute the class total for the number of garbage cans in each category, and then fill in the graph on the board. (You may wish to count by twos or fives for the class graph.)
  5. Discuss with the students:
    - Are there more bedrooms or more kitchens in most homes?
    - How does the graph show this?
    - Were there any rooms in your house that didn't have garbage cans—why didn't they?
    - Were you surprised at the number of garbage cans we counted in our homes—why?
-

## RE...Think

Discuss with the students:

- Why do we need garbage cans in our homes? (Health, safety, aesthetic reasons.)
- What would happen if we didn't have garbage cans in our homes?
- Can you think of any places in the world where people might not have garbage cans? (Some native cultures.)
- Why wouldn't they need them?
- Does the number of household garbage cans tell us something about the way we live in Canada?
- How can we reduce the use of our garbage cans at home? (Reduce, **reuse**, **recycle** our garbage.)

Have each student think of one way in which he/she can reduce the amount of garbage produced in his/her home then write a pledge detailing the action he/she will take. Ask students to take their pledges home to be signed by a parent. Post the pledges. A week later, review the pledges with the students. Have they been able to keep them? Can they think of more pledges they could make?

Have students make a BEFORE AND AFTER mural, showing the use of garbage cans in the home BEFORE people were aware of the need to reduce, reuse, and recycle, and an AFTER scene showing families finding other ways of disposing or reducing waste.

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**OUR GARBAGE:**  
**ACTIVITY 14**

**Skills:** designing  
**Time:** one class period

**K – 3**

**Let's Design And Make A Garbage Can!**

**Learning Objective:** students will consider the design of garbage cans; students will design garbage cans for maximum usefulness and practicality.

**NOTE:** this Activity can be done in conjunction with **LITTER: ACTIVITY 3** which discusses the seven **sources of litter** which include inadequate garbage cans. This Activity can also be done with **LITTER: ACTIVITY 13**. If your classroom, school, or community has a **recycling** program, you may wish to do **REUSING AND RECYCLING: ACTIVITY 14** as well.

**Materials and Equipment:** supplies from the class “junk” pile.

**Activity:**

1. Discuss with the students the features that make a garbage can useful and practical:
    - Shape
    - Size
    - Features such as lids, handles
    - Decorations
    - Sturdy
    - Stable
    - Portable
    - Easy to lift
    - Wind-proof
    - Animal and bird-proof
  2. Have students collect containers suitable for making into model garbage cans. Using the class “junk” pile, have students make and decorate their models. They may wish to include garbage can carriers/holders in their design.
- 

**RE...Think**

Discuss with the students:

- Can we think of garbage systems of the future that might not even use garbage cans at all?
- Can we design such a system for a home, a school, an office, and a park?

Ask students to design the garbage systems of 2099, keeping in mind the need to reduce, **reuse**, and **recycle**. Students could build their systems, using “junk”.

Students may wish to use larger containers to make litter bins that they can use in their bedrooms at home, or give to their parents to use as Christmas, Mother's or Father's Day presents.

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**OUR GARBAGE:**  
**ACTIVITY 15****Skills:** active game  
**Time:** one class period**K – 1****Put It In The Garbage Can!**

**Learning Objective:** students will *reuse* discards from the class “junk” pile to make a game; students will play a team game to review the use of the garbage cans.

**NOTE:** If your community/school/classroom has a *recycling* program, you may wish to do **REUSING AND RECYCLING: ACTIVITY 13** as well. This Activity may also be accompanied by **LITTER: ACTIVITY 13**.

**Materials and Equipment:** large drawing of a garbage can with a large opening; items from the “junk” pile, either “as is” or redesigned by the students to represent items to be discarded, at least one per student, each item clearly marked or coloured to show that student’s team; thumbtacks.

**Activity:**

This game is similar to “Pin the Tail on the Donkey”

1. Have the students make the “garbage”, if not already made.
2. Pin the drawing of the large garbage can onto a tackboard.
3. Divide the class into two (or more) teams.
4. As each pupil takes his/her turn, he puts a thumbtack through his/her piece of “garbage”.
5. Blindfold the student and aim him/her towards the “garbage can”.
6. The student tries to put the item into the garbage can opening by pinning the item on the drawn opening. Count the piece as “in” if at least half is in the opening.
7. The team with the most pieces “in” is declared the winner.

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**RE...Think**

Ask the students to think of some other games they can design and play using the materials in the class “junk” pile. (The games do not have to relate to garbage.)

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**OUR GARBAGE:**  
**ACTIVITY 16****Skills:**problem solving  
**Time:** one class period**3****Solving A Solid Waste Problem**

**Learning Objective:** students will apply problem-solving skills to analyze selected solid waste disposal problems to decide an appropriate course of action; students will realize that individual action is important in solving problems.

**Materials and Equipment:** none.

**Activity:**

1. Discuss the following situations with the students OR make up similar situations to suit your community:
  - You and your family are enjoying a picnic in the local park, and your mother asks you to put the (non-compostable, non-recyclable) leftovers in the garbage. You can't find a garbage can. What can you do with the garbage? What action could your family take to help solve this problem?
  - As above, but you find that the garbage cans are over-flowing. What can you do with your family's garbage? What do you think the park authorities need to do about the problem? What could your family do to help solve the problem?
2. Select one situation and help the students to apply problem-solving steps\* to find a solution.
3. Have students role-play the situations, including the solutions.
4. Using the problem-solving steps as an outline, have the students draw on of the above situations, or one they suggest themselves, in comic-strip form.

**\*Problem Solving Steps:**

1. Define the problem
2. Get the facts
3. Identify causes (of the facts)
4. Identify possible solutions
5. Evaluate solutions
6. Select best course of action
7. Follow course of action
8. Evaluate success of chosen action

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## RE...Think

If the students know of a local problem situation, such as inadequate or overflowing garbage cans, have them decide on and then follow an appropriate course of action, using the problem-solving steps, to have the problem corrected.

Discuss with the students:

- In the imaginary situation, how did one person, or one family, help to solve the problem?
- Who are some of the people in our community who could help us to solve a similar problem?

You may wish to invite a representative of the local Parks Department, Solid Waste Management Department, or similar authority, to discuss their responsibilities, and how concerned citizens can help them to do their job properly.

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## CHAPTER 5

### REUSING AND RECYCLING

#### 1. About this theme

In this theme section, students will look at alternatives to garbage disposal. Reusing and recycling are not new ideas, but have only recently become truly viable options for post-consumer, household wastes in many areas of Canada.

The generally accepted definitions to distinguish between the use of the two words, **reuse** and **recycle**, is that reuse means to find another use for an item, without having to alter or reprocess it whereas recycling involves reprocessing the item, either into the same or a different item. Reusable items include containers that are **returnable** and **refillable**. To some, an item can only be considered, and thus labelled, recyclable, if the technology and infrastructure for recycling the item exists now and is conveniently available to most consumers; to others it means that the item is potentially recyclable, but the technology and infrastructure to recycle the item may not be readily available, or only available in limited markets.

At the primary level, it is not necessary for the students to understand the nuances of definitions of these terms; a general understanding of reuse and recycle is sufficient. The emphasis should be on realizing that used items do not always have to be thrown away, but can often be reused or recycled, using existing programs or systems available in the community, and that, by doing so, we are conserving valuable resources, be they **renewable** or **non-renewable**.

#### 2. Learning Objectives

This theme section includes the following major learning objectives:

##### Knowledge

1. Students will suggest reasons for reusing and recycling.
2. Students will be able to identify and explain the use of the recycling and the **PITCH-In** symbol.
3. Students will be able to identify reusable and non-reusable items.
4. Students will be able to identify reusable, recyclable, refillable, and compostable items.
5. Students will be able to describe their classroom's/school's/community's recycling program, as applicable.
6. Students will list the items accepted in their community's recycling program, and describe how those items should be prepared for recycling, as applicable.
7. Students will use a practical example (their own lunches) to examine how they can reuse and recycle.
8. Students will learn how to compost organic wastes.

**Skills**

1. Students will use a simulation game.
2. Students will sort, group, and make sets and subsets.
3. Students will make posters, a mural, and a model.
4. Students will design, draw, and colour.
5. Students will count and follow-the-dots to 8.
6. Students will use a map.
7. Students will measure weight and volume.

**Attitudes**

1. Students will develop an awareness of the importance of the recycling symbol to consumers.
2. Students will develop an awareness of the importance of reusing and recycling in conserving natural resources.
3. Students will develop an awareness of the importance of recycling and reusing in reducing the amount of garbage entering the solid waste stream.
4. Students will reconsider their attitudes towards using/owning pre-owned items.

**REUSING AND RECYCLING:****Skills:** simulation game**K – 3****ACTIVITY 1****Time:** one class period**Why Recycle?****Learning Objective:** students will examine the reasons for *reusing* and *recycling*.**Materials and Equipment:** plasticene (or similar material); pretend money if desired.**Activity:**

1. Introduce the word “**recycle**” to the students and have students brainstorm for word associations and definitions. Record the students’ suggestions.
2. Explain to the students that they are going to play a game to learn more about recycling.
3. Divide the class into the following groups, or select one student to represent each of the following groups while the rest of the class watches the game:
  - Supplier of raw materials needed to make pop bottles
  - Pop bottle manufacturer
  - Pop bottle filling plant operator
  - Store owner selling pop
  - Consumer buying pop
 Provide the following materials:
  - Supplier—a small quantity of plasticene or similar material
  - Consumer—a garbage can
  - To each participant—pretend money if desired
4. Direct the participants through the following steps:
  - a. Manufacturer “buys” raw materials from supplier so he can make pop bottles (supplier gives some of his “raw materials” to the manufacturer)
  - b. Manufacturer uses the “raw materials” to make the pop bottles (manufacturer shapes the plasticene into bottle shapes)
  - c. Filling plant operator “buys” the bottles from the manufacturer
  - d. Operator “fills” the bottles (operator pretends to fill the bottles with pop)
  - e. Store owners “buys” the filled bottles and puts them in his/her store (owner puts bottles on his/her desk)
  - f. Consumer “buys” pop from store owner
  - g. Consumer “drinks” all the pop and puts bottles into the garbage can
  - h. Consumer returns to the store to buy more pop
5. Have participants repeat the above sequence until all of the raw materials are used up and the store owner has no more pop to sell.

6. When the “raw materials” are all used up, discuss with the students:
    - Why can’t the consumer have any more pop?
    - Where have all the “raw materials” used to make the pop bottles gone?
  7. Select one more participant for the game—the recycler. Instruct the recycler to take the “empty” pop bottles out of the garbage. Explain that sometimes the bottles are crushed into small pieces (have the recycler crush some bottles) and some bottles may be washed and used again.
  8. Discuss:
    - Who can the bottle manufacturer now go to for raw materials to make into new bottles? (The recycler)
    - Who can the pop bottle filling plant operator go to for bottles to fill? (Both the recycler and the manufacturer)
  9. Have the students play the game again, this time having the recycler retrieve the bottles from the garbage and participate, as in step #7.
  10. Continue the game for a short period of time, then stop to **RE...Think** with the students.
- 

### RE...Think

Show the students the empty garbage can, after the recycler has removed the bottles. Ask students to suggest reasons why it is important we recycle as much as possible. Encourage students to think about what they have just learned in the game and what they already know about garbage, reusing, and recycling.

**NOTE:** You may wish to review **OUR GARBAGE: ACTIVITY 7** if done, which discusses the amount of garbage we produce.

Look again at the brainstorm list the students made up at the beginning of the lesson. Are there any more words or ideas they would like to add?

### For Older Students:

You may wish to point out that the concepts of both “reuse” and “recycle” were illustrated in this game, as some bottles were crushed and re-processed to make new bottles (recycling) and the remainder could be cleaned and refilled (reuse).

Older student may wish to research how other post-consumer wastes, such as cans, paper, and plastics, are recycled in Canada.

**REUSING AND RECYCLING:**  
**ACTIVITY 2**

**Skills:** none  
**Time:** two class periods, one week apart

**K – 3**

**\*\*\*The Hunt For The Recycling Symbol**

**Learning Objective:** students will be able to identify the *recycling* symbol (the *Mobius Loop*); students will understand the use of the recycling symbol; students will consider the importance of the recycling symbol to consumers.

**Materials and Equipment:** samples of the recycling symbol on various products; paper strips; 3 cm x 15 cm, at least one per student.

**Activity:**

1. Ask who can draw the recycling symbol for the class, or draw the symbol on the board yourself.
2. Discuss:
  - What is the symbol made of? (Three arrows)
  - How does it explain the idea of recycling? (Keep going around)
  - What other words have the root “cycle” in them (e.g. bicycle)?
  - How are these words related to “recycle”?
3. Show students how to make a Mobius Loop. (Take a narrow piece of paper about 15 cm long. Twist the paper once, and glue the ends together.)
4. Have students draw along one side of the completed loop with a pencil.
5. Discuss what happens, and point out that the recycling symbol shows a Mobius Loop (broken up into arrows) to show that things keep going around.
6. Explain to students why the loop is broken into three arrows.
7. Ask students to look out for the recycling symbol at home for the next week and bring to class as many objects as they can find which display the recycling symbol.

When students have brought in their examples:

8. Discuss the examples with the students. (OPTIONAL: Help the students to realize that the symbol is currently used in two ways:
  - To identify items that contain at least some recycled materials, such as paper products.
  - To identify materials that can be recycled, such as shampoo bottles.)
9. Prepare a display of the items the students brought in, with information prepared by the students on why this symbol is important.

---

## RE...Think

Discuss with the students:

- How do you think the recycling symbol can help us when we are out shopping?
- When a product is made out of recycled materials, does it mean that it is a poorer quality than one that is not made out of recycled materials?
- How does choosing items made out of recycled materials help our **environment**?

Have students make up a list of ideas, then have students select one or two ideas to use in making a poster to promote the use of items displaying the recycling symbol.

With the students, draft a letter to the parents which explains why purchasing recycled/**recyclable** items is important for the environment, and which asks them to please look for the symbol when shopping so that they can make environmentally positive decisions about which products to purchase.

### **For Older Students:**

Older students may wish to research the mathematician, August Mobius.

## REUSING AND RECYCLING: ACTIVITY 3

**Skills:** sorting  
making sets  
**Time:** two class periods, scheduled at the

**2 – 3**

end of the day, two weeks apart

### \*\*\*Is It All Really Garbage?

**Learning Objective:** students will sort classroom garbage into two sets: **recyclable** and/or **reusable** items and non-recyclable and/or non-reusable items.

**NOTE:** If your classroom/school has a recycling program, go on to **REUSING AND RECYCLING: ACTIVITY 5**. You may wish to keep the “can be used again” group, step 5, to use in **REUSING AND RECYCLING: ACTIVITY 4**. **APPENDIX 6** describes how to set up a recycling program, if your class or school does not already have one.

**Materials and Equipment:** newspapers, two large sheets of differently coloured paper; two felt pens, same colours as the large coloured sheets of paper; large plain sheet of paper for graphing; classroom garbage.

In order for this Activity to be most successful, you may wish to ensure that some appropriate items are in the classroom garbage or you may wish to use household garbage as well. You may also wish to collect the classroom garbage for a few days to use in this Activity.

### Activity:

1. Towards the end of the school day, place the two large sheets of coloured paper on the floor.
2. Explain to the students that they are going to sort the class garbage into two groups: “can be used again” and “cannot be used again”. Label each piece of coloured paper with one of these two headings. You may wish to have students select suitable symbols to put on the sheets to help them remember which sheet is which.
3. Empty the class garbage can out onto newspapers spread on the floor.
4. As each item is removed from the garbage, have students decide if it could or could not be reused again in some way. Include recycling as a “reuse” option if your community has a recycling program. Encourage students to be creative in thinking of ways in which an item can be reused, at home or at school. For instance, does a child’s family have a compost pile at home that could take the food scraps from the students’ lunches? Does the classroom have a “junk” pile for scrap paper, cardboard tubes, clean containers, etc., that can be used for student doodling, craft, art, socials and science projects? Can students take the extra scrap paper, or other materials, for use at home, if the pile gets too large?
5. Place each item on the appropriate piece of coloured paper.
6. Count up the number of items on each piece of paper.

7. On the large sheet of plain paper, draw a graph comparing the number of items in each group.
  8. On the graph, have the students fill in the columns, using the colour of felt pen that matches the appropriate coloured piece of paper.
  9. Keep the graph in a prominent place for two weeks.
  10. Repeat this Activity two weeks later. Compare the results. Have students been successful in finding ways to reduce the amount of classroom garbage?
- 

### RE...Think

Discuss with the students:

- How have we helped the **environment** by reusing/recycling our classroom garbage, rather than throwing everything out?
- How can we encourage other classes in the school to reduce their classroom garbage by recycling and reusing?

Have students select some ways of spreading the message to the other classes, such as making posters, writing letters or stories, writing a play.

If your class has just established its class “junk” pile ask your students what they can bring from home to donate to the “junk” pile? Explain to the students that they will be reusing and reducing their household garbage by bringing items to reuse in class. Have students draft a letter to their parents that lists the items that could be saved from the household garbage for the class “junk” pile.

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**REUSING AND RECYCLING:**  
**ACTIVITY 4**

<b>Skills:</b>	grouping into subsets making a mural	2-3
<b>Time:</b>	one class period	

**Is It Reusable, Recyclable, Refillable, Compostable Or ...?**

**Learning Objective:** students will make subsets to define *reusable*, *recyclable*, *refillable*, and *compostable*.

**Materials and Equipment:** the “can be used again” garbage group from **REUSING AND RECYCLING: ACTIVITY 3** or a selected collection of household garbage.

**Activity:**

1. Review **REUSING AND RECYCLING: ACTIVITY 3**, if done, with the students, showing them the “can be used again” group they made in that Activity OR show the students the household garbage.
  2. Put out four sheets of differently coloured paper on the floor.
  3. Explain to the students that you will divide the set “can be used again” (OR the household garbage) into four subsets. In front of the students, separate the “can be used again”, placing each item on one of the four sheets.
  4. Ask students to decide on a name for each group, when all the garbage has been separated, providing the names (recyclable, refillable, reusable, compostable) if necessary.
  5. Discuss each term with the students.
  6. Divide the class into four (or eight) groups, and assign one term to each group (or to two groups).
  7. Have each group decide on a definition for the assigned term and present their definition to the class.
  8. Have each group make a mural to illustrate their term. Include the written definition, and drawings and examples to show what can be recycled or refilled, etc., and how this can be done in your community.
- 

**RE...Think**

Discuss with the students:

- Are there some items that could go into more than one subset? (e.g. some glass pop bottles can be recycled or refilled)
- How would you decide what to do with these items when you want to discard them? (Responses would be individual, depending on the recycling programs available in your community.)

**REUSING AND RECYCLING:**  
**ACTIVITY 5**

**Skills:** sorting  
making sets  
**Time:** two class period, two weeks apart

**K – 3**

**\*\*\*Our School/Classroom Recycles!**  
(For schools and/or classrooms that have a recycling program.)

**Learning Objective:** students will be able to locate and describe the school's (or classroom's) *recycling* program.

**NOTE:** this Activity uses the same garbage and steps #3-10 as in **REUSING AND RECYCLING: ACTIVITY 3**.

**Materials and Equipment:** a collection of classroom garbage, as in **REUSING AND RECYCLING: ACTIVITY 3**.

**Activity:**

1. Visit the school recycling container OR review the class recycling program with the students.
2. Discuss:
  - What can we put into the recycling container?
  - What can we not put into the container?
3. At the end of the day, examine the class garbage as in **REUSING AND RECYCLING: ACTIVITY 3**, adding a third category "can go into the school/classroom recycling container".
4. Carry on with steps 3-10 in **REUSING AND RECYCLING: ACTIVITY 3** allowing for the third category.
5. Discuss:
  - Were there many items that we discarded that we could have put into the school/classroom recycling container?

Tell the students that this Activity will be repeated in two week.

6. Repeat this Activity two weeks later. Discuss the results with the students:
  - Were there more or less items in the garbage that could have been *reused*/recycled rather than discarded?
  - Why do you think this happened?

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## RE...Think

Discuss with the students:

- How have we helped the **environment** by reusing/recycling our classroom garbage, rather than throwing everything out?
- How can we remind ourselves to use our classroom's recycling container as much as possible?
- How can we encourage other classes in the school to reduce their classroom garbage by recycling and reusing?

Have students select some ways of spreading the message to the other classes, such as making posters, writing letters or stories, writing a play.

**REUSING AND RECYCLING:**  
**ACTIVITY 6**

**Skills:** using a map  
counting  
**Time:** one class period

**1 – 3**

**How Many Garbage Cans And Recycling Containers Can We Find In Our School?**  
(For schools that have a recycling program.)

**Learning Objective:** students will count the number of garbage cans and map their location in and around the school and consider their necessity; students will count the number and map the location of **recycling** boxes in the school and consider their necessity; students will use the recycling and **PITCH-IN** symbols.

**NOTE:** this Activity is an alternative to **OUR GARBAGE: ACTIVITY 12** You may also wish to do, if not done. **REUSING AND RECYCLING: ACTIVITY 2**, which discusses the recycling symbol, before doing this Activity. For more information on the **PITCH-IN** symbol, see **APPENDIX 3**.

**Materials and Equipment:** map of the school and school grounds, preferably on 11" x 14" paper, one per two students; enlarged copy or overhead projection of the map.

**Activity:**

1. Introduce the Activity by discussing the classroom garbage can and classroom and/or school recycling container:
  - Do we need it?
  - Why?
  - Do you think there are more in the school?
  - Where?
2. Introduce and discuss the recycling symbol, if your students have not done **REUSING AND RECYCLING: ACTIVITY 2**.
3. Introduce and discuss the **PITCH-IN** symbol.
4. Provide each pair of students with the map.
5. Take students on a walk through the school, looking for other garbage cans and recycling containers. In order to not disturb other classes, assume each occupied classroom has the same number of garbage cans and recycling containers as are found in your classroom. On their map, have students mark the location of garbage cans and recycling containers that they find, using the **PITCH-IN** and recycling symbols respectively.
6. Take students on a walk around the playgrounds, looking for garbage cans and recycling containers. Mark these on their maps using the appropriate symbols.
7. In the classroom, on the large map, have students indicate locations of the garbage cans and recycling containers.

8. Count up the number of garbage cans and recycling containers.
  9. Indicate the number of garbage cans and recycling containers on two separate number lines.
- 

### RE...Think

Discuss with the students:

- Why do we need these garbage cans?
- Why do we need these recycling containers?
- What would happen to our school **environment** without them?
- Who empties them?
- What happens to the garbage collected?
- What happens to the **recyclable** items collected? (A general understanding is sufficient.)

If possible, arrange a visit with the school custodian to find out his/her responsibilities in handling the school's garbage. You may wish to have him/her give a brief talk to the students on how the school's garbage is handled, and how they can help him/her to do the job properly.

You may wish to have the person responsible for collecting the recyclable items talk to the students about his/her job, with the emphasis on how they can help him/her to do his/her job properly.

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**REUSING AND RECYCLING:**  
**ACTIVITY 7****Skills:** drawing  
**Time:** two class periods**K – 3****Our Community Recycles!**  
(For communities with curbside (household) or other easily accessible recycling programs.)

**Learning Objective:** students will be able to describe the recycling program in their community; students will consider the importance of the *recycling* program to their community.

You may wish to contact your local recycling agency for information on your community's recycling program, including which materials are and are not accepted for recycling.

**NOTE:** this Activity can accompany **OUR GARBAGE: ACTIVITIES 1 and 2**. It is not necessary that the students understand exactly what happens to the items at the recycling centre(s), but it is important that they be able to distinguish between what happens to non-recyclable household garbage (*landfilled* or *incinerated*) and *recyclable* household garbage (turned into something useful again).

**Materials and Equipment:** clean items that are accepted in your municipality's recycling program: tins, bottles, newspaper, plastic containers, etc.

**Activity:**

1. Use the sample(s) to introduce the topic of recyclable garbage to the students.
2. Discuss:
  - What is this?
  - What was it used for?
  - Why was it thrown out?
  - What do you think will/should happen to it now?
  - What happens to things like this at your house, does it go into the garbage can, or does it have a special place (e.g. a "blue box") after they are collected, where do the recyclable items from our houses go?
3. On recycling pick-up day, take students for a short walk to observe the recycling containers waiting for pick-up, and, if possible, the recycling truck at work.
4. Together, count the number of recycling containers observed.
5. Students observe the work done by the recycling personnel, especially noting how the items are separated.

6. In the classroom, discuss:
    - Describe what the workers do.
    - How is the truck designed to hold the recycled items?
    - Where will the truck go when it is full?
  
  7. Have students fold a large piece of paper into four squares. In each square show one of the following steps:
    - A recyclable item being used at my home
    - The item in the recycling container outside my house on garbage day
    - The recycling truck picking up the items/container
    - The items being accepted/processed at the recycling centre
- 

### RE...Think

As students to imagine and then make a picture showing what their household garbage putout would be like if they didn't have a recycling service OR have students use scraps from the class "junk" pile to make the picture.

Discuss with the students:

- Why do we need this service?
- How does this service help our community?
- If we didn't have this service, how would it affect our garbage collection?
- How does this service help the *environment*?

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**REUSING AND RECYCLING:**  
**ACTIVITY 8****Skills:** making posters  
**Time:** one class period**K – 3****Let's PITCH-IN And Recycle!**

(For communities that have a curbside (household) or other easily accessible recycling system such as a Recycling Centre.)

**Learning Objective:** students will list the items that are accepted in the community's recycling program; students will describe how those items are to be prepared for *recycling*.

**NOTE:** you may wish to keep the list compiled in step 3 of this Activity for use in **LITTER: ACTIVITY 8**.

**Materials and Equipment:** obtain information on what can be collected in your community recycling program, and how those materials should be prepared; samples of each type of material that can be recycled in your community.

**Activity:**

1. Ask students to tell you about the community recycling program and record their comments on the board. (You may wish to omit this if working with a kindergarten class.)
2. With the class, make a list of items that they think can be collected in the community recycling system.
3. Show the class the information you have obtained, and together correct the class list if necessary.
4. Discuss with the class how the materials should be prepared for recycling.
5. As a demonstration, or with the students, practise preparing the materials for recycling. Stress the steps the students could safely do at home to help their families recycle.
6. Form students into groups, assign each group one of the items that can be recycled.
7. Have each group make up a poster, illustrating the item assigned to the group, and how it should be prepared for recycling. Display the posters in the school.

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## RE...Think

Discuss with the students:

- Why is it important we prepare the materials they way we are asked to?
- Can you think of some reasons why some materials are not accepted for recycling? (No market for product, no technology to recycle, no plants nearby that can recycle the material)
- Are there other ways of **reusing** these items? (e.g. unwanted clothes to go to charity, etc.)

**REUSING AND RECYCLING:**  
**ACTIVITY 9**

**Skills:** measuring weight  
measuring volume  
**Time:** two class periods, one month apart

**1 – 3**

**\*\*\*The Garbageless Lunch**

**Learning Objective:** students will examine their own contributions to the solid waste problem, specifically by examining the garbage remaining from their lunches; students will investigate ways of reducing and *reusing* the remains from their lunches.

**NOTE:** this Activity can be followed by **REUSING AND RECYCLING: ACTIVITY 10**, which discusses composting.

**Materials and Equipment:** all the garbage from the students' lunches and recess snacks for three consecutive days collected in a special garbage container; newspapers; bathroom scale; box no larger than one cubic meter in volume (e.g. a vegetable shipping box); chart paper.

**Activity:**

1. Review with the students what has been collected in the special garbage container.
2. Empty its contents into a plastic bag and weigh it. Record the weight onto a chart, labelled "BEFORE", with the date.
3. Push the plastic bag, still containing the garbage, into the box, filling the corners as much as possible, and flattening the bag so that it assumes, as closely as possible, the length and width of the box. Measure the length and width of the box, and the height of bag in the box. Use the measurements to compute the volume of the garbage collected. Record the volume onto the chart as well. Keep the records for comparison in one month.
4. Empty the contents of the bag onto newspapers on the floor. Review with students where this garbage came from, who produced it, etc.
5. Remove items from the pile to draw their attention to unnecessarily wasteful items such as non-recyclable wrappings and containers, etc. Also draw students' attention to *compostable* items (clean fruit/vegetable remains); items that are *recyclable* in your community; items that could have been used again (plastic containers); etc.
6. Review why we should all try to reduce and recycle whenever possible. Challenge students to look at the remains before them to see if they can find ways to reduce and recycle their lunches. Some suggestions your students might want to consider if they don't think of these themselves:
  - Use a reusable lunch container rather than a disposable bag
  - Use containers for sandwiches rather than disposable wrappings
  - Avoid one-serving packaging: e.g. spoon yoghurt from a large container into reusable containers, use juice containers rather than disposable one-serving boxes

- Save vegetable scraps for a compost pile (See **REUSING AND RECYCLING: ACTIVITY 10** for suggestions on how to start a school compost pile.)
7. Have students list and/or illustrate their suggestions on a class chart. Display the chart in the classroom, along with measurement chart, as reminders of the project.
  8. With the students, draft a letter to the parents explaining the “Garbageless Lunch” project, and soliciting their cooperation. Include in the letter suggestions for the parents to follow when preparing their children’s lunches.
  9. Repeat Steps 1-3 in one month. Compare the results. Have the students been successful in reducing the garbage produced at lunch? What else could be done?
- 

### RE...Think

Encourage the students to think of other situations where they could bring a garbageless lunch or snack:

- On a picnic
- At a ball game
- Attending a special event

Have students encourage their parents to “lug-a-mug” to events where beverages might be served.

Have students think of ways of encouraging the rest of the school to join in the “Garbageless Lunch” Project. Some suggestions include:

- Parents could be asked to sew reusable lunch bags out of sturdy fabric for sale as a school fundraiser
- Students could visit a local supermarket or hardware store to list the reusable food and beverage storage containers that are suitable for lunch use
- Students could make a collection of containers found at home, such as yoghurt containers, that could be reused for lunches and put them on display for the rest of the school to see how easy it is to have a “garbageless lunch”

**REUSING AND RECYCLING:**  
**ACTIVITY 10**

**Skills:** none **1 – 3**  
**Time:** several class periods,  
several weeks apart

**\*\*\*Let's Make A Compost Pile**

**Learning Objective:** students will learn the value of composting as a way of recycling *biodegradable* wastes; students will learn how to make a *compost* pile.

**NOTE:** this Activity can follow **REUSING AND RECYCLING: ACTIVITY 9** and/or **OUR GARBAGE: ACTIVITY 8**.

**Materials and Equipment:** class garbage that includes food scraps (could be collected over several days); newspapers. **APPENDIX 7**, an information sheet on composting produced by **PITCH-IN CANADA**, is included in this unit for your reference. You may also wish to contact your provincial Ministry of the Environment, local solid waste authority, or other organizations for further information.

**Activity:**

1. If **REUSING AND RECYCLING: ACTIVITY 9** was done, save the vegetable/fruit scraps for this Activity OR empty the collected class garbage onto newspapers OR bring collected food scraps from a household garbage.
2. If necessary, sort out the food scraps from the rest of the garbage.
3. Review with the students that one way to reduce the amount of garbage we produce is to *recycle*. Discuss with the students:
  - How does nature recycle its wastes, such as leaves and fruit?
  - How could we recycle this pile of food scraps?
4. Introduce the concept of composting if students are not familiar with the idea.
5. Ask students for information on composting OR provide students with information:
  - What should be included?
  - What shouldn't be included?
  - Why shouldn't we include meat, bones, dairy products? (Suggestion: ask students to think about what would happen if their dog found meat bones in the compost.)
  - What could we do with the compost? (Grow a vegetable or flower garden at school, *mulch* the school shrubs and plant, put into planter boxes for the school entrance, grow seeds in the classroom, donate to the Parks Department, a Seniors home, etc.)
6. Select an appropriate site and construct the compost pile with as much student help as possible. Encourage students to bring food scraps from home as well, if practical.

7. When there is a useable amount of compost in the pile, remove it to carry out the project(s) your class selected.
  8. Have students draw a class mural, or write a class story, to describe their compost project.
- 

### RE...Think

Have students write and illustrate a simple brochure that they can take home to encourage their parents to start a compost pile.

Ask students to make a list of all the reasons why composting is good for the **environment**.

Students could visit local hardware stores and garden centres to find out about ready-made compost containers for sale. Have students prepare a report describing the containers, and their pros and cons. Invite the stores to make a display of the containers for an Open House Night or Parents Night at the school.

#### **For Older Students:**

Older students could research different ways of composting, and the different designs of compost boxes. Information can be obtained from your municipal solid waste department or from some environmental organizations.

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## REUSING AND RECYCLING: ACTIVITY 11

**Skills:** making a poster      **K – 3**  
**Time:** one class period

### Is It New?

**Learning Objective:** students will reconsider their attitudes towards using/owning pre-owned (second hand) items as opposed to always having new items; students will consider the benefits to the *environment* of *reusing* rather than always buying new.

**NOTE: OUR GARBAGE: ACTIVITY 11** also examines the concept of *reusable* garbage.

**Materials and Equipment:** samples of old items, some that can be *recycled* in your community, and some that can't but which could be reused such as old clothing, furniture, etc.

### Activity:

1. Ask students to look up *scavenger* in the dictionary OR continue to #2.
  2. Explain to students the historical importance of scavenging by people as part of the solid waste disposal system, from ancient to recent times: Scavenging was an accepted way of living, and still is in developing countries today. Human scavengers retrieve reusable items from the garbage for resale or reuse. Ironically, with the development of organized garbage disposal and controlled *sanitary landfills*, the opportunities for scavenging have become very limited.
  3. Have students suggest items that they've seen thrown out that could have been used again in some way.
- 

## RE...Think

Discuss with the students:

- Is there anything wrong with repairing and reusing items, rather than buying new?
- How does reusing help the environment? (Reduces the consumption of resources and energy used in the manufacturing of new items.)
- Give examples of items that you and/or your family now own that were previously owned, used, or worn by someone else. (Clothing, cars, furniture, etc.)
- Give examples of items that are considered more valuable even though they are not new. (Antiques, painting, some cars, etc.)

Help students to realize that many items can be repaired, and/or given away or sold so that others can reuse the items.

Have students make a chart comparing the advantages and disadvantages of buying new items compared to "previously owned" items. Be sure to include the environmental costs.

Some activities that your class or school could undertake to emphasize reuse:

- Arrange with a suitable charity to collect specific items that the students can bring in, such as unwanted clothing, or toys.
- Compile information for the students to take home about local agencies/charities that will take reusable household items. (The reference pages in your local phone book may list such agencies.)
- Arrange a Toy and/or Clothing Exchange (or Sports Equipment, or ?) to be held at the school.
- Organize a Giant Garage Sale.

Encourage students to suggest other ways in which unwanted items that might still be useful to other could be kept out of the dump. For instance, in some communities, the day before a special garbage pick-up is designated as **Community Sharing Day**. On that day, citizens are encouraged to put out unwanted items so that others may come along and take what they want from the share piles. The remainder is collected in the special garbage pick-up the next day.

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**REUSING AND RECYCLING:**  
**ACTIVITY 12****Skills:** follow the dots (1-8) **K – 1**  
**Time:** one class period**Follow The Dots To Find The Recycling Box**  
**(For use in communities that have a curbside recycling program.)**

**Learning Objective:** students will become more familiar with the *recycling* box; students will be encouraged to think about the value of the recycling program in their community.

**Materials and Equipment:** copies of **APPENDIX 8, Worksheet 3** (one per student).

**Activity:**

1. Have students follow-the-dots on the worksheet to complete the recycling box.
2. Discuss with the students:
  - What is this object?
  - What is it used for?
  - Can you give this box a name?
  - What do you think this box is saying?
3. Have students draw items in the box that can be collected by the recycling program in your community OR cut out and glue on pictures from magazines, etc., of appropriate items.

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**RE...Think**

Ask students to pretend that they could talk to the box. What would they tell the box about its job and why it is important to the community? Have students tell you what they would tell the box and write their comments on their completed pictures.

---

**REUSING AND RECYCLING:**  
**ACTIVITY 13****Skills:** active game  
**Time:** one class period**K – 1****Put It In The Recycling Box!**  
**(For classrooms/schools/communities that have recycling programs.)**

**Learning Objective:** students will reuse discards from the class “junk” pile to make a game; students will play a team game to review the use of the *recycling* box.

**Materials and Equipment:** large drawing of a recycling box; items from the “junk” pile, either “as is” or redesigned by the students to represent items to be recycled, at least one per student, each item clearly marked or coloured to show that student’s team; thumbtacks.

**Activity:**

This game is similar to “Pin the Tail on the Donkey”.

1. Have the students make the “recycled items”, if not already made.
2. Pin the drawing of the recycling box onto a tackboard.
3. Divide the class into two (or more) teams.
4. As each pupil takes his/her turn, he puts a thumbtack through his/her “recyclable item”.
5. Blindfold the student and aim him/her towards the “recycling box”.
6. The student tries to put the item into the recycling box by pinning the item on the drawn opening. Count the piece as “in” if at least half is in the opening.
7. The team with the most pieces “in the box” is declared the winner.

---

**RE...Think**

Ask the students to think of some other games they can design and play using the materials in the class “junk” pile. (The games do not have to relate to garbage.)

---

**REUSING AND RECYCLING:**  
**ACTIVITY 14**

**Skills:** designing  
model making  
**Time:** one class period

**K – 3**

**Let's Make A Model Recycling Box!**

**(For use in classrooms, schools or communities that have recycling programs.)**

**Learning Objective:** students will consider the design of *recycling* boxes; students will design their own recycling boxes for maximum usefulness and practicality.

**NOTE:** this Activity can be done in conjunction with **OUR GARBAGE: ACTIVITY 14.**

**Materials and Equipment:** supplies from the class “junk” pile including a variety of clean, used containers.

**Activity:**

1. Discuss with the students how recycled materials are collected and stored in their classroom, school, or home.
2. Discuss the features that would make a recycling container useful and practical:
  - Shape
  - Size
  - Sturdy
  - Stable
  - Special design features (e.g. to hold the different categories of recyclables)
  - Easy to carry
3. Have students select a container from the class “junk” pile suitable for making into model recycling containers, then decorate their model, using materials from the “junk” pile.
4. The containers could be Christmas, Mother’s Day, or Father’s Day gifts to hold small jewellery, coins, etc.

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**RE...Think**

Discuss with the students:

- Can we imagine recycling systems of the future that might not use recycling containers at all?

Ask students to design the recycling system of 2090, keeping in mind the need to reduce, *reuse*, and recycle. Students could build their systems, using “junk”.

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## CHAPTER 6

### LITTER AND OUR ENVIRONMENT

#### 1. About this theme

As our environmental awareness increases, *litter* is seen not just as an unsightly, sometimes dangerous or polluting nuisance, but also as a symptom of an irresponsible, uncaring attitude toward our *environment*. In this theme section, students are encouraged to take personal responsibility for helping to look after our environment and the other creatures that inhabit it. That environment includes not just the wilderness area we might visit occasionally but also our neighbourhoods, our parks and playgrounds, our school grounds and our backyards.

#### 2. Learning Objectives

This theme section includes the following major learning objectives:

##### Knowledge

1. Students will consider the origins of litter.
2. Students will be able to identify the seven sources of litter.
3. Students will consider actions that will help to control the sources of litter.
4. Students will consider the effects of littering on their environment.
5. Students will be able to identify recyclable litter (as applicable in their community).
6. Students will be able to identify dangerous litter.
7. Students will be able to identify and explain the use of the **PITCH-IN** symbol.

##### Skills

1. Students will write a story.
2. Students will conduct an experiment.
3. Students will design, draw, and colour.
4. Students will count and follow the dots to 20.
5. Students will use a map.
6. Students will role-play.

##### Attitudes

1. Students will examine their attitudes to litter through word-associations.
2. Students will explore the concept of “away”.
3. Students will develop an awareness of environmental quality.
4. Students will develop an awareness of how littering reflects an attitude towards the environment.
5. Students will realize that personal attitudes and values are important when making decisions that affect their environment.
6. Students will realize that their actions can have serious consequences for their environment.
7. Students will develop an awareness of the importance of the **PITCH-IN** symbol.

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**LITTER:**  
**ACTIVITY 1****Skills:** word associations  
**Time:** one class period**K – 3****What Is Litter:**

**Learning Objective:** students will list the words they associate with the word *litter*, students will make their own definition of litter.

**NOTE: LITTER: ACTIVITY 4** discusses the concept of “away” in greater detail. **LITTER: ACTIVITY 3** discusses the *sources of litter* in greater detail.

**Materials and Equipment:** samples of litter.

**Activity:**

1. Using a book on litter, a photograph, a short walk outside, or a few samples, introduce the topic of “litter” to the students.
2. Have students brainstorm words they associate with litter. List their words.
3. Ask students to write their own definitions of litter OR write a class definition together. (With a kindergarten class you may wish to illustrate their ideas as well.)
4. Have students copy, then illustrate the class definition.

---

**RE...Think**

Discuss with the students:

- What do we mean when we say “throw away”?
- Is there such a place as “away”?
- Is all litter bad for the *environment*? (e.g. an apple core thrown away in a forest will *biodegrade* into useful nutrients, but may attract rodents if left on a city street.)
- Why do people litter?
- Who do you think litters—do you? When?
- What else, other than people, might be sources of litter? (e.g. wind or animals, carelessly loaded trucks, etc.)
- How do you think these other sources of litter could be controlled?

**For Older Students:**

You may wish to have older students research “natural litter” and its importance to the environment such as the leaf litter on a forest floor. Have students compare the environmental effects of “natural” litter compared to those of “man-made” litter.

---

**LITTER:**  
**ACTIVITY 2****Skills:** story writing  
**Time:** one class period**1 – 3****A Garbage Story****Learning Objective:** students will consider how *litter* becomes litter.**Materials and Equipment:** one piece of litter for each student.**Activity:**

1. Have students bring a piece of litter to class (emphasize safety when picking up litter—see **APPENDIX 9** for safety guidelines) OR bring in samples of litter for the students.
  2. Ask students to imagine the life story of their piece of litter:
    - Where did it come from?
    - How did it become a piece of litter?
    - Who was responsible for turning the wrapping, can, etc. into litter?
    - What might have happened to the piece of litter if it hadn't been thrown down?
    - What might have happened to it if it hadn't been picked up?
  3. Ask students to write, then illustrate, the life story of their piece of litter.
- 

**RE...Think**

Discuss with the students:

- Do we have to have litter?

**For Older Students:**

With older students, you may wish to arrange a debate, asking students to argue for or against littering.

**Note:****LITTER: Activity 3** has been eliminated – proceed to **LITTER: Activity 4**

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**LITTER:**  
**ACTIVITY 4**

**Skills:** experiment conducted K – 3  
over time  
**Time:** two periods, separated by a  
season--one in winter, one in  
spring

**\*\*\*Where Is “Away”?**

**Learning Objective:** students will conduct a simple experiment to find out what happens when some types of *litter* are thrown “away”.

**NOTE:** if not done, you may wish to do **LITTER: ACTIVITY 1** as an introduction to this Activity. You may wish to do **LITTER: ACTIVITY 9** as a follow-up to this Activity.

**Materials and Equipment:** samples of litter, including paper, metals, glass, food, etc.

**Activity:**

1. On a snowy day, discuss the concept of throwing things “away” into the snow. Discuss what items are often found as litter.
2. Explain to the students that they will be conducting an experiment to find out what happens to items “thrown away” in the snow. Even though the items disappear under the snow, do they really disappear?
3. Have the students select a variety of items that could be thrown away by someone when outside, such as potato chip bag, and bring them to class.
4. Make a chart listing each item, and have the students predict what will happen to each item a few months after it is thrown “away”.
5. With students, select a suitable site, undisturbed yet exposed to the usual weather. “Throw away” the pre-selected litter by burying it in the snow. Record date, time, and weather conditions.
6. Have each student, or as a class project, start a diary of the experiment. Take photographs or make drawings of the site to put into the diary.
7. Return to the site regularly, recording observations for the diary.
8. In the spring, when the snow has melted, conclude the experiment.

**It is important that the experiment be concluded as soon as the litter has been exposed and before wind, water, people or animals can spread it around.**

9. Discuss with the students:

- What happened to each piece of litter?
- Did any pieces move away from the original burial site?
- Did any pieces “disappear”?
- What were they made of?
- Did any pieces remain the same or almost the same?
- What were they made of?
- Is there an “away”?

10. Have the students complete their diary with their conclusions to the experiment.

---

### RE...Think

Discuss with the students:

- Is there an “away”?
- What should we do with our litter in winter?
- Is this any different from what we should do with our litter in the summer?

---

**LITTER:**  
**ACTIVITY 5****Skills:** drawing  
**Time:** one class period**K – 3****A Plague of “Litterbugs”!**

**Learning Objective:** students will use an imaginary creature, the “Litterbug”, to consider the effects of littering on their *environment*.

**Materials and Equipment:** none.

**Activity:**

1. Discuss with the students what a “Litterbug” is and what “it” does to the environment. Ask them to imagine what their community would look like if it were invaded with a plague of “Litterbugs”.
2. Have students pretend that they are newspaper photographers reporting on this plague, and draw their “photographs” of the effects of the infestation.

---

**RE...Think**

Look at the students’ pictures together to look for similarities and differences in how the students imagined such a plague would affect their community.

Discuss with the students:

- How would you feel if your community was really infested as you’ve shown in your picture?
- What would you do to get rid of the Litterbugs?
- Are there some Litterbugs in real life?
- How do the real Litterbugs affect your community?
- How should we deal with real Litterbugs?

**LITTER:**  
**ACTIVITY 6**

**Skills:** mapping **K – 1**  
**Time:** two/three class  
periods on at least two separate  
days, in fall or spring

**\*\*\*Let's Be E.Q. Inspectors!**

**Learning Objective:** students will consider the concepts of a “clean” and “dirty” **environment**; students will inspect the school grounds for clean and dirty environments; students will consider how littering reflects an attitude towards the environment.

**NOTE: LITTER: ACTIVITY 7** is a similar activity designed for older students.

**Materials and Equipment:** map of the school grounds; pre-made stickers (such as a happy face, a sad face).

**APPENDIX 9** outlines safety guidelines for clean-ups.

**Activity:**

1. Discuss the concepts of a “clean environment” and a “dirty environment” with the class and the effects of each on the health and safety of people and animals, aesthetics, waste or **reusable/recyclable** resources, etc.
2. Explain to the class that they are going to be “Environmental Quality Inspectors”, and will be inspecting the school grounds for clean and dirty areas.
3. Take the class for a walk around the school grounds (preferably right after recess or lunch). On a master map of the school grounds, make notes from the students’ comments about the quality of the school ground environment.
4. Back in the classroom, post the map. Discuss the students’ comments and have students affix the appropriate “environmental quality” stickers to the areas inspected.
5. Plan a clean up for the “dirty” areas, explaining that the student “Environmental Quality Inspectors” will again inspect these areas.

**(PLEASE READ SAFETY RULES FOR CLEAN-UPS – APPENDIX 9)**

6. After the clean up, take the class on a second inspection tour. Take the marked map of the school grounds with you. As each area is inspected by the class, put appropriate stickers beside the first stickers.

---

## RE...Think

Discuss with the students:

- Why is a clean environment important? (Health, safety, aesthetics)
- What sort of attitude to the environment does the people who throw their garbage around, without thinking about the health/safety of others and the appearance of their environment, and sometimes without trying to recycle their recyclable garbage, show?
- How can we encourage students at our school to keep the areas clean that we have just cleaned up?
- Why is it important to care about the environment now; nobody thought about it very much about 100 years ago?

Carry out the students' suggestions, which might include E.Q. (Environmental Quality) Awards for those seen using litter/recycling bins, posters, commercials, displays, etc.

**NOTE: PITCH-IN CANADA** has a variety of materials available to support environmental awareness and clean-up campaigns – [www.pitch-in.ca](http://www.pitch-in.ca)

**LITTER:**  
**ACTIVITY 7**

**Skills:** mapping  
**Time:** one to two class periods,  
possibly repeated a few weeks later

**2 – 3**

**\*\*\*Let's Be E.Q. Inspectors!**

**Learning Objective:** students will consider the concepts of a “clean” and “dirty” **environment**; students will inspect the school grounds for clean and dirty environments; students will consider how littering reflects an attitude towards the environment; students will examine the correlation between the cleanliness of the school grounds with the presence or absence of garbage cans; students will identify and use the **PITCH-IN** symbol.

**NOTE: LITTER: ACTIVITY 6** is a similar activity designed for younger students. The **PITCH-IN** symbol was discussed in Activities **OUR GARBAGE: ACTIVITY 12** and **REUSING AND RECYCLING: ACTIVITY 6**. **APPENDIX 3** provides information on the **PITCH-IN** symbol.

**Materials and Equipment:** map of the school grounds; pre-made stickers (such as a happy face, a sad face).

**Activity:**

1. Discuss the concepts of a “clean environment” and a “dirty environment” with the class and the effects of each on the health and safety of people and animals, aesthetics, waste of **reusable/recyclable** resources, etc.
2. Explain to the class that they are going to be “Environmental Quality Inspectors”, and will be inspecting the school grounds for clean and dirty areas.
3. Introduce the **PITCH-IN** symbol to the students if **OUR GARBAGE: ACTIVITY 12** or **REUSING AND RECYCLING: ACTIVITY 6** was not already done. Discuss why the **PITCH-IN** symbol is an appropriate symbol to us in this Activity to indicate the presence of garbage cans on the map.
4. Take the class for a walk around the school grounds (preferably right after recess or lunch). On a master map of the school grounds, make notes from the students’ evaluations about the quality of the school ground environment. On the map, mark the location of garbage cans with the **PITCH-IN** symbol.
5. Back in the classroom, post the map. Discuss the students’ comments and have students affix the appropriate “environment quality” stickers to the areas inspected.
6. Have the students analyze the map, looking for correlations between the presence or absence of garbage cans and the quality of the surrounding environment. Is there less garbage close to the garbage can? Is there more? What might cause this?

7. Discuss the results with the students:

- Do your results indicate that more garbage cans on the school ground might improve its environmental quality?
- Do your results indicate that moving the existing garbage cans might improve the environmental quality?
- Do you think better identification of the garbage cans, such as brighter colours, use of the **PITCH-IN** symbol, etc., would encourage their use?

8. If students feel some action regarding the garbage cans is needed, help them formulate and carry out a plan.

9. After the action plan has been in place for some times (a few months) repeat the inspection.

10. Discuss the results again:

- Has there been an improvement in the environmental quality of your school grounds?

## RE...Think

Discuss with the students:

- Why is a clean environment important? (Health, safety, aesthetics, etc.)
- What sort of attitude to the environment does the people who throw their garbage around, without thinking about the health, safety, of others and the appearance of their environment, and sometimes without trying to recycle their recyclable garbage show?
- How can we encourage students at our school to keep the school grounds clean?
- Why is it important to care about the environment now; nobody thought about it very much about 100 years ago?

Carry out the students/ suggestions, which might include E.Q. (Environmental Quality) Awards for those seen using litter/recycling bins, a clean-up campaign, posters, commercials, displays, etc.

**NOTE:** **PITCH-IN CANADA** has a variety of materials available to support environmental awareness and clean-up campaigns. Check out PITCH-IN CANADA's on-line Resource Centre at [www.pitch-in.ca](http://www.pitch-in.ca) .

You may wish to discuss how the traditional North American native attitude to the environment differed from those of Europeans at the time of the discovery and colonization of North America. Which culture promoted environmental awareness and a **conservation ethic**? Why?

**LITTER:**  
**ACTIVITY 8**

**Skills:** none **K – 3**  
**Time:** one or two class periods

**Is Some Litter Recyclable?**  
**(For communities that have a recycling program.)**

**Learning Objective:** students will realize that some *litter* could have been *recycled*.

**NOTE:** if not already done, you may wish to do **REUSING AND RECYCLING: ACTIVITY 8** before this Activity as it involves the students in drawing up a list of materials that can be recycled in your community.

**Materials and Equipment:** a list and samples of items that are accepted in your community's recycling program.

**Activity:**

1. Review the list of items that can be recycled in your community drawn up in **REUSING AND RECYCLING: ACTIVITY 8**, if done, OR provide students with a list of items that can be recycled in your community.
2. Discuss with the students:
  - Where should we find these items? (In recycling containers.)
  - Can you think of some other places where we might find some of these items?
3. Explain to the students that they are going to go on a hunt for *recyclable* litter.
4. Provide each pair of students with the list of items that can be recycled, or drawings of what they should be looking for.
5. Take students to a local park or other suitable area for the hunt.

**THOUGH THIS IS NOT A CLEAN-UP ACTIVITY, PLEASE READ APPENDIX 9, SAFETY GUIDELINES FOR CLEAN-UPS BEFORE UNDERTAKING THE "HUNT".**

6. Have students keep a tally on their list or illustrations of the recyclable litter that they find.
7. Back in the classroom, discuss the results with the students:
  - Were they surprised at the results?
  - What did they find the most of?
  - Might the results be different in another location? (e.g. closer to or further away from a convenience store.)

---

## RE...Think

Discuss with the students:

- How can we encourage the students in our school to recycle their recyclable litter?

Students may wish to make a display of litter that they found that could have been recycled. The display could be accompanied by the students' comments on how recycling the item, rather than discarding it, would have helped the **environment**. If students have done other activities in this unit, encourage them to think of what they have learned, such as health and safety concerns, aesthetics, resource conservation, and reduction of solid waste.

If your Province has a **deposit-return** system for certain containers, include this information in your discussion with the students in Step #1 and on the information sheet they take on the hunt. Calculate the value of the **returnables** found on the hunt. Display this information as well.

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**LITTER:**  
**ACTIVITY 9****Skills:** role playing      **2 – 3**  
**Time:** one to two class periods**A Garbage Play**

**Learning Objective:** students will act out situations involving *litter* or garbage in which a decision or action based on personal values and an attitude towards the *environment* must be made.

**NOTE:** this Activity could follow **LITTER: ACTIVITY 4**.

**Materials and Equipment:** none.

**Activity:**

1. Ask students to role-play the following situations:
  - You come into a classroom chewing gum and want to get rid of it. You can't see the garbage can. What can you do with the gum?
  - You are playing an exciting game on the school grounds at recess. You unwrap your piece of cake, but it's a long way to the nearest garbage can. What can you do with the wrapping?
  - You and your friend are walking home, sharing a can of pop. You each have different ideas about what to do with the empty container. What ideas do you each have? What do you do with it?

---

**RE...Think**

Ask students to suggest similar situations for role-playing involving litter or garbage in which they have to make a decision about what to do in the situation.

Discuss the role-playing with the students:

- How did you feel in the role-play?
- Was it easy to make a decision, or hard?
- Is that the decision you would make in "real life"? Why or why not?
- Has this role-playing affected how you think about littering? If so, how?

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**LITTER:**  
**ACTIVITY 10****Skills:** hypothesizing  
drawing  
story writing  
**Time:** one class period**1 – 3****Litter Can Be Dangerous!****Learning Objective:** students will realize the dangers of *litter* to wildlife and people.**NOTE:** this Activity may be followed by **LITTER: ACTIVITY 11**.**Materials and Equipment:** an overhead projection of **APPENDIX 10, Worksheet 4** and one copy per student. **APPENDIX 11** provides the teacher with some background information on dangerous litter.**Activity:**

1. Show the overhead projection of **APPENDIX 10** to the class.
  2. Discuss:
    - What does this picture show?
    - How do you think the broken glass got there?
    - Can you think of other forms of litter that can be dangerous to people and animals?
  3. Give each student a copy of **APPENDIX 10, Worksheet 4**
  4. In the first box beside the illustration on the worksheet, have the students draw how they think the broken glass got there.
  5. Have students write a story about the two pictures.
- 

**RE...Think**

Have students bring in samples or pictures of other types of potentially dangerous litter, and draw pictures to show how each sample could be dangerous. Use the samples, drawings, and stories to make a display.

You may wish to invite a wildlife expert, such as a veterinarian, an amateur or professional naturalist, or a worker at a wildlife rescue shelter, to visit your students to discuss this topic.

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**LITTER:**  
**ACTIVITY 11****Skills:** role playing  
**Time:** one class period**K – 3****Let's Think About Dangerous Litter!****Learning Objective:** students will identify how their own actions may create dangerous *litter*.**NOTE:** this Activity can follow **LITTER: ACTIVITY 10**.**Materials and Equipment:** none. **APPENDIX 11** provides background information for the teacher on dangerous litter.**Activity:**

1. Review what the students learned about dangerous litter in **LITTER: ACTIVITY 10**, if done, OR discuss the concept of dangerous litter.
2. Discuss the following situations with the students then have them role-play the situations OR have students make up their own similar situations for role-playing:
  - You and a friend are in his boat on the lake fishing. Your friend wants to throw the wrappings from your picnic lunch into the lake. What do you do?
  - Your older brother wants to throw out his empty drink container as you are driving home together. What would you say to him?
  - You and a friend are walking along the riverbank. You see an empty bottle lying in the rocks. Your friend wants to throw rocks at it. What would you do?
3. You may wish to have students select one situation to write about and to illustrate.

---

**RE...Think**

Encourage students to think about how very simple actions can cause problems for people and wildlife. You may wish to contact local animal and/or wildlife agencies for information on this topic, and have students monitor newspapers and magazines for related articles.

*To The Teacher:*

While this unit focuses on **land-based** solid waste issues, litter in the **marine environment** (fresh and saltwater), commonly referred to as marine debris, poses considerable hazards to all forms of marine life, from invertebrates to mammals. Thousands of birds, seals, turtles, sealions, dolphins, porpoises and even whales are killed each year through entrapment in or ingestion of marine debris. You may wish to discuss and explore this issue with your older students. The PITCH-IN CANADA website, [www.pitch-in.ca](http://www.pitch-in.ca), has more information on marine debris.



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**LITTER:**  
**ACTIVITY 13**

**Skills:** follow-the-dots (1-20)  
colouring  
story writing  
**Time:** one class period

**K – 1****Follow The Dots To Find “Canny”**

**Learning Objective:** students will use a simple game to explore their own concepts of garbage cans, their usefulness, and function.

**NOTE:** this Activity could accompany **OUR GARBAGE: ACTIVITIES 14** and **15**.

**Materials and Equipment:** copies of **APPENDIX 12, Worksheet 5**, “Follow the Dots to Find Canny” (one per student).

**Activity:**

1. Have students “follow-the-dots” on the worksheet to discover the **PITCH-IN** cartoon character, “Canny”.
  2. Discuss with the students:
    - What is “Canny”? (A garbage can)
    - Do you have another name for him/her?
    - What do you think Canny is saying?
  3. Have students complete the picture by drawing in the surroundings around Canny (a park, a playground, a school ground, a home, etc.) and someone using Canny.
  4. Have students write a story about their picture.
- 

**RE...Think**

Discuss with the students what they thought Canny was saying. Why did they decide this? Use their comments to lead the discussion on why we have garbage cans, what purpose they serve, and what our **environment** would be like without them.

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**LITTER:**  
**ACTIVITY 14****Skills:** designing  
colouring**K – 3****Time:** one to two class periods**Let's Make A Car Litterbag!**

**Learning Objective:** students will make their own litterbags to use in the family car; students will consider the importance of using car litterbags.

**Materials and Equipment:** pre-used small bags or containers; paints; crayons; felt pens.

**NOTE: LITTER: ACTIVITY 3** discusses the seven *sources of litter*, one of which is motorists. If not already done, you may wish to do **LITTER: ACTIVITY 3** before this Activity.

**Activity:**

1. Ask students to imagine that they are travelling in their parents' car and have just unwrapped a package of gum. What should they do with candy wrappings?
2. Use the example to introduce the need for car litterbags or car mini garbage cans.
3. Using pre-used bags or containers, such as small grocery bags, boxes, etc., have students design and make a car litterbag.
4. The litterbags could be given as Christmas, Mother's or Father's Day gifts.

---

**RE...Think**

Discuss with the students:

- How else can we encourage our families to not *litter*?
- What can we say to them to make them realize that littering is bad for our *environment*?

Help the students realize that through their words, and actions such as giving their families the car litterbags, they can encourage their own families to not litter, and to be more aware of their environmental responsibilities.

Students may wish to make car litterbags/litter containers to sell at a school event.

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**APPENDICES**

<b>APPENDIX</b>	<b>ASSOCIATED ACTIVITY</b>
1	INTRODUCTION
2	OUR GARBAGE: ACTIVITY 6
3	OUR GARBAGE: ACTIVITY 12 REUSING AND RECYCLING: ACTIVITY 6 LITTER: ACTIVITY 7
4	OUR GARBAGE: ACTIVITY 13 (Worksheet 1)
5	OUR GARBAGE: ACTIVITY 13 (Worksheet 2)
6	REUSING AND RECYCLING: ACTIVITY 3
7	REUSING AND RECYCLING: ACTIVITY 10
8	REUSING AND RECYCLING: ACTIVITY 12 (Worksheet 3)
9	LITTER: ACTIVITY 2 LITTER: ACTIVITY 6
10	LITTER: ACTIVITY 10 (Worksheet 4)
11	LITTER: ACTIVITY 10 LITTER: ACTIVITY 11 LITTER: ACTIVITY 12
12	LITTER: ACTIVITY 13 (Worksheet 5)

## APPENDIX 1

### INTRODUCTION

*Dear Parents:*

Our class will soon be learning about solid waste in our environment. The three themes we will be discussing are:

**OUR GARBAGE AT HOME AND AT SCHOOL**

**REUSING AND RECYCLING**

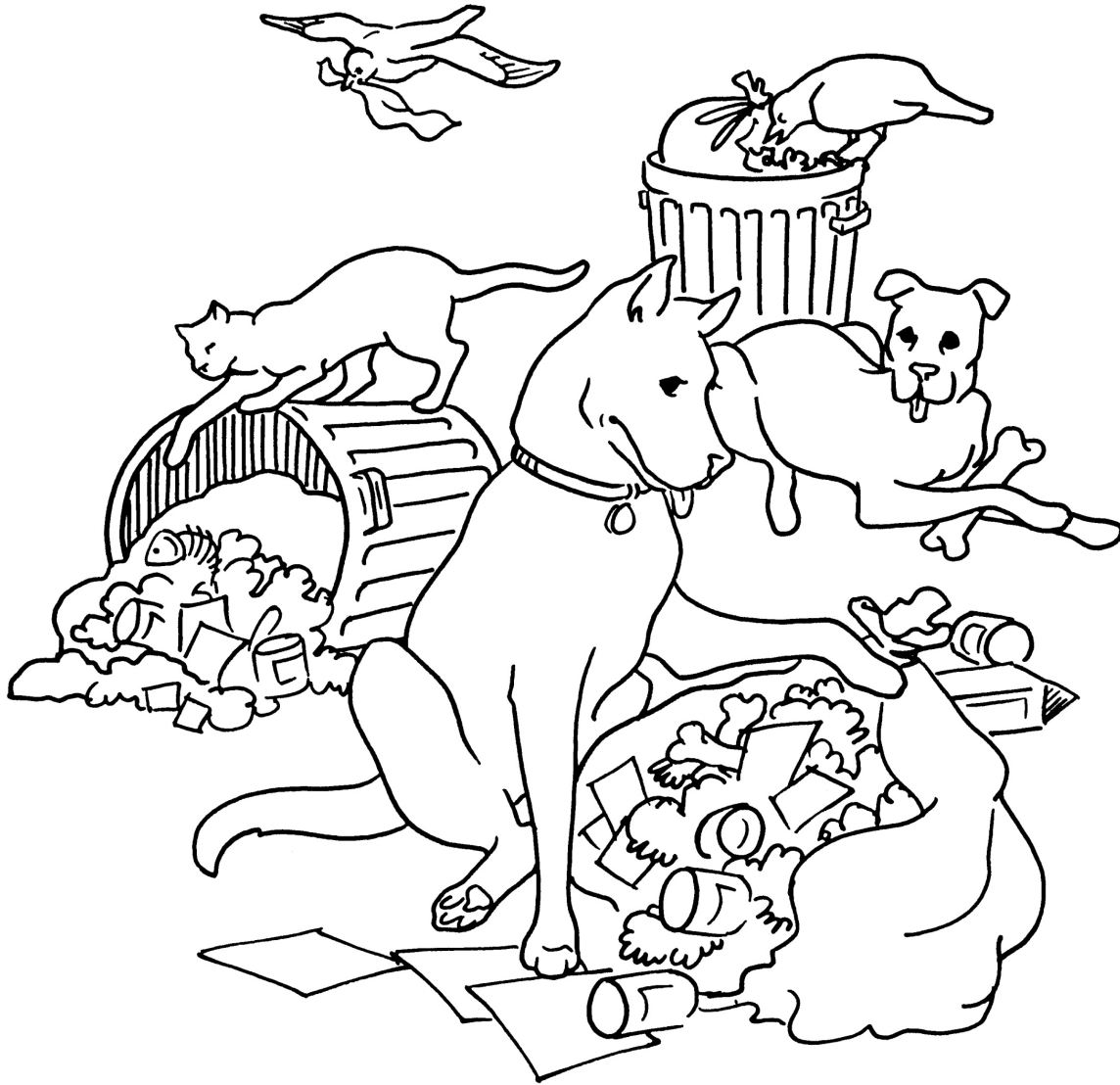
**LITTER IN OUR ENVIRONMENT**

Your child will need your help with a few activities that have to be done at home. We will send you notices about these activities when we do them. Could you please also help your child to look for articles and information on the three themes that he/she can bring to school for class discussions.

Thank you very much for your assistance!

**APPENDIX 2**

**OUR GARBAGE: ACTIVITY 6**



## APPENDIX 3

**OUR GARBAGE: ACTIVITY 12**

**REUSING AND RECYCLING: ACTIVITY 6**

**LITTER: ACTIVITY 7**

### THE PITCH-IN SYMBOL

The **PITCH-IN** symbol, which encourages all of us to place waste which cannot be reused or recycled into an appropriate waste container, was adopted as the international litter-prevention symbol in 1976 by Clean World International, an international Secretariat concerned with litter prevention and recycling.

**PITCH-IN CANADA** is a founding member of Clean World International and, in 1976, adopted the **PITCH-IN** symbol as the organization's trademark in Canada.

For permission to reprint the symbol, contact: **PITCH-IN CANADA**



**[www.pitch-in.ca](http://www.pitch-in.ca)**

**APPENDIX 4**  
**WORKSHEET 1**  
**OUR GARBAGE: ACTIVITY 13**

**How Many Garbage Cans Can We Find At Home?**

*Dear Mom and Dad:*

Please help me to complete this worksheet.

Thank you.

---

**HOW MANY GARBAGE CANS CAN I FIND IN MY HOME?**

**Name:** \_\_\_\_\_

Number of garbage cans in our house:

Our kitchen has \_\_\_\_\_ garbage cans.

Our bedrooms have \_\_\_\_\_ garbage cans.

Our bathrooms have \_\_\_\_\_ garbage cans.

Other rooms have \_\_\_\_\_ garbage cans.

**We have a total of \_\_\_\_\_ garbage cans.**

**APPENDIX 5 - GRAPH**  
**WORKSHEET 2**  
**OUR GARBAGE: ACTIVITY 13**

Name: \_\_\_\_\_

**Garbage Cans At Our House**

**# of Garbage Cans**

**Garbage Cans at Our House**

15					
14					
13					
12					
11					
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					
	<b>Kitchen</b>	<b>Bedrooms</b>	<b>Bathrooms</b>	<b>Other Rooms</b>	<b>TOTAL</b>

**Rooms**

## **APPENDIX 6**

### **REUSING AND RECYCLING: ACTIVITY 3**

**PITCH-IN CANADA** supports and encourages recycling. However, **many communities in Canada have not as yet established a recycling program.** Furthermore, market conditions for recyclable materials fluctuate like they do for all materials and, in some instances, local markets may not yet exist or may not have been developed for certain recyclable materials. As a result, some community recycling programs only accept **certain** materials.

Remember, whether your community has a recycling program or not, your organization can initiate activities to promote the reduction and re-use of waste. See our brochure on our website ([www.pitch-in.ca](http://www.pitch-in.ca) – go to The Resource Centre) entitled “**Project Suggestions to Get Your Started**” for further ideas.

Here are a few suggestions before you start your recycling project:

#### **1. FIND OUT IF THERE IS AN ORGANIZED PROGRAM IN YOUR COMMUNITY, WHICH ACCEPTS RECYCLABLE MATERIALS.**

If there is a blue box or other organized program in your community then contact the organizers, usually your local government or their agents. If there is no organized blue box program, then try contacting:

- Local environmental groups.
- The local government department responsible for waste disposal to obtain names of scrap dealers who may be accepting certain recyclable materials.
- Local food retailers, especially if certain containers are returnable in your province.
- Recycling or bottle return depots if they exist in your province.

#### **2. FIND OUT WHICH MATERIALS ARE CURRENTLY BEING ACCEPTED FOR RECYCLING IN YOUR COMMUNITY.**

#### **3. FIND OUT HOW THE RECYCLABLE MATERIALS, WHICH YOU WILL BE COLLECTING, MUST BE PREPARED BEFORE THEY CAN BE ACCEPTED FOR RECYCLING.** For examples, should bottles have metal caps removed; should papers be bundles; etc.

#### **4. FIND OUT IF YOU WILL BE REMUNERATED FOR ANY RECYCLABLE MATERIALS**

Some materials, such as aluminum, are in high demand and could provide your organization with some monetary return. Remember, your financial return may depend on how far your community is removed from recycling markets.

## APPENDIX 7 REUSING AND RECYCLING: ACTIVITY 10

Household garbage can be reduced by about one third by composting your kitchen and garden wastes. By doing so, you will also be returning organic matter back to the soil when you compost in your garden.

Organic matter in the soil improves plant growth by helping to break down heavy clay soils, adding water and nutrient-holding capacity to sandy soils and adding essential nutrients to any soil. Healthy plants help clean our air and conserve our soil.

### What do I put in the Compost?

Try to combine nitrogen rich materials with carbon rich materials in your compost heap. Which materials can you add?

Nitrogen Rich Materials	Carbon Rich Materials
<ul style="list-style-type: none"> <li>• fresh grass clippings</li> <li>• plant trimmings</li> <li>• house plants</li> <li>• manure</li> <li>• kitchen scraps including vegetable &amp; fruit peelings, coffee grounds, tea bags and rinsed out egg shells</li> </ul>	<ul style="list-style-type: none"> <li>• dry leaves</li> <li>• straw</li> <li>• dry seaweed</li> </ul>

### What don't I put in the Compost?

Do NOT add the following:

- cooked kitchen scraps
- meat/bone/fish scraps
- grains
- fatty foods including cheese, salad dressing, butter and cooking oil
- dog and cat feces
- diseased or insect infested plants
- pernicious weeds (eg: morning glory, buttercup, quackgrass)

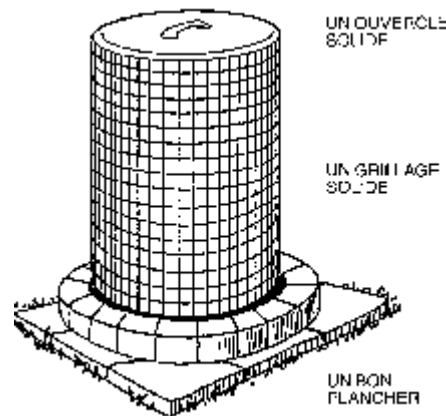
## How do I make a Composter?

There are many designs of compost containers to choose from. You can build your own or buy a commercial model.

**In urban areas:** choose a rodent-proof bin to ensure that public health standards are maintained.

**General Instructions:** one quarter or one half inch wire mesh of sufficient strength (19 gauge or stronger) will exclude small animals. Sides, a solid floor (eg: concrete patio stones), and a secure lid must all be included in your design.

Here is a drawing of a sample composter:




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## What is the best location for a Composter?

**Choose a spot where there is good water drainage.** If the drainage is good, a shady spot is best so that the compost pile does not dry out. If the drainage is poor, a sunny spot is best.

---

## How do I maintain my Compost Pile?

**Ideally, you should try to mix different organic materials together.** When you add nitrogen-rich green material try to add an equal amount of carbon-rich brown material.

The key is to alternate layers of organic waste, keeping the compost pile moist but not dripping wet and turning it frequently. It is helpful, although not essential, to add thin layers of soil in order to add micro-organisms to the pile.

---

## I live in an apartment - can I Compost?

**Yes.** Worm composting would be most appropriate for you. Your bin could sit on the balcony in warm weather and be brought indoors in winter.

---

## Can I compost in Winter?

**The compost process generates heat.** Cold weather will not destroy your compost. It just slows it down. Continue to add material to your heap throughout the winter, even if it freezes. After spring thaw, the decomposition process will become active again.

## How do I use my Compost?

**By adding compost to your garden, you help build good soil texture and structure.** These qualities enable soil to retain nutrients, moisture and air which support healthy plants.

Finished compost, when removed from the bin or pile after three to six months (earlier in some areas of Canada), should resemble rich soil. Mix 7.5cm of compost into the top 15cm of the garden beds before planting.

Compost can also be placed on top of the ground around growing plants, shrubs and trees to help retain moisture in the soil, smother weeds and prevent soil compaction.

Finally, compost is an excellent soil conditioner.

## Troubleshooting chart.

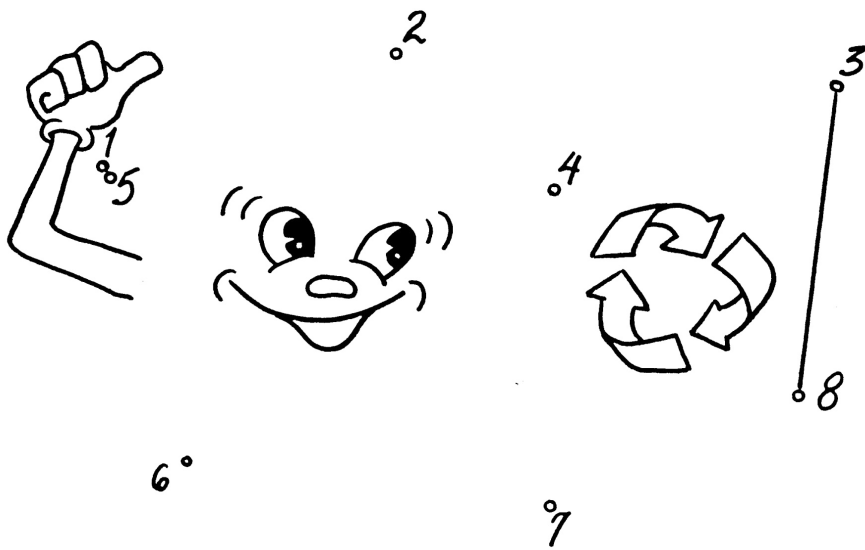
<b>SYMPTOMS</b>	<b>PROBLEM</b>	<b>SOLUTION</b>
The compost has a bad odour	Not enough air, or too wet	Turn it
The centre of the pile is dry	Not enough water	Moisten materials while turning the pile
The compost is damp and warm in the middle but nowhere else	Too small	Collect more material and mix the old ingredients into a new pile
The heap is damp and sweet-smelling but still will not heat up	Lack of nitrogen	Mix in a nitrogen source (fresh grass clippings, fresh manure, bloodmeal, or commercial fertilizer high in nitrogen)

## Audio Visual Resource and Activity Suggestions for Elementary School

- **REDUCE, REUSE, RECYCLE** Video (15 minutes). Order at [www.pitch-in.ca](http://www.pitch-in.ca)

**APPENDIX 8**  
**WORKSHEET 3**  
**REUSING AND RECYCLING: ACTIVITY 12**

Name: \_\_\_\_\_



## APPENDIX 9

LITTER: ACTIVITY 2

LITTER: ACTIVITY 6

### SAFETY GUIDELINES FOR LITTER PICK-UPS

Some of the Activities in this unit include litter pick-ups by the students as part of the learning process. **Please note the following safety guidelines, to protect the health and safety of yourself and your students.**

1. Do **NOT** allow students to even touch discarded needles (intravenous needles) AND to inform you immediately if they see any. These should only be handled by a responsible adult wearing adequate protection. You may prefer to ask your community health authorities to remove such items.
2. Do **NOT** allow students to pick up any litter that might be hazardous, such as broken glass.
3. Do **NOT** allow students to go near or into bush or wilderness areas unless accompanied by a responsible adult.
4. Do **NOT** allow students on the street(s); take care around parked cars, in school driveways, or parking lots.
5. Wear gloves (rubber, disposable, gardening, etc.) and/or wash hands thoroughly after picking up litter.
6. Use adequate containers to hold the collected litter.
7. Do **NOT** allow students to carry heavy, bulky items or containers or litter.

**APPENDIX 10**  
**WORKSHEET 4**  
**LITTER: ACTIVITY 10**

NAME: \_\_\_\_\_



## APPENDIX 11

**LITTER: ACTIVITY 10**

**LITTER: ACTIVITY 11**

**LITTER: ACTIVITY 12**

### **DANGEROUS LITTER**

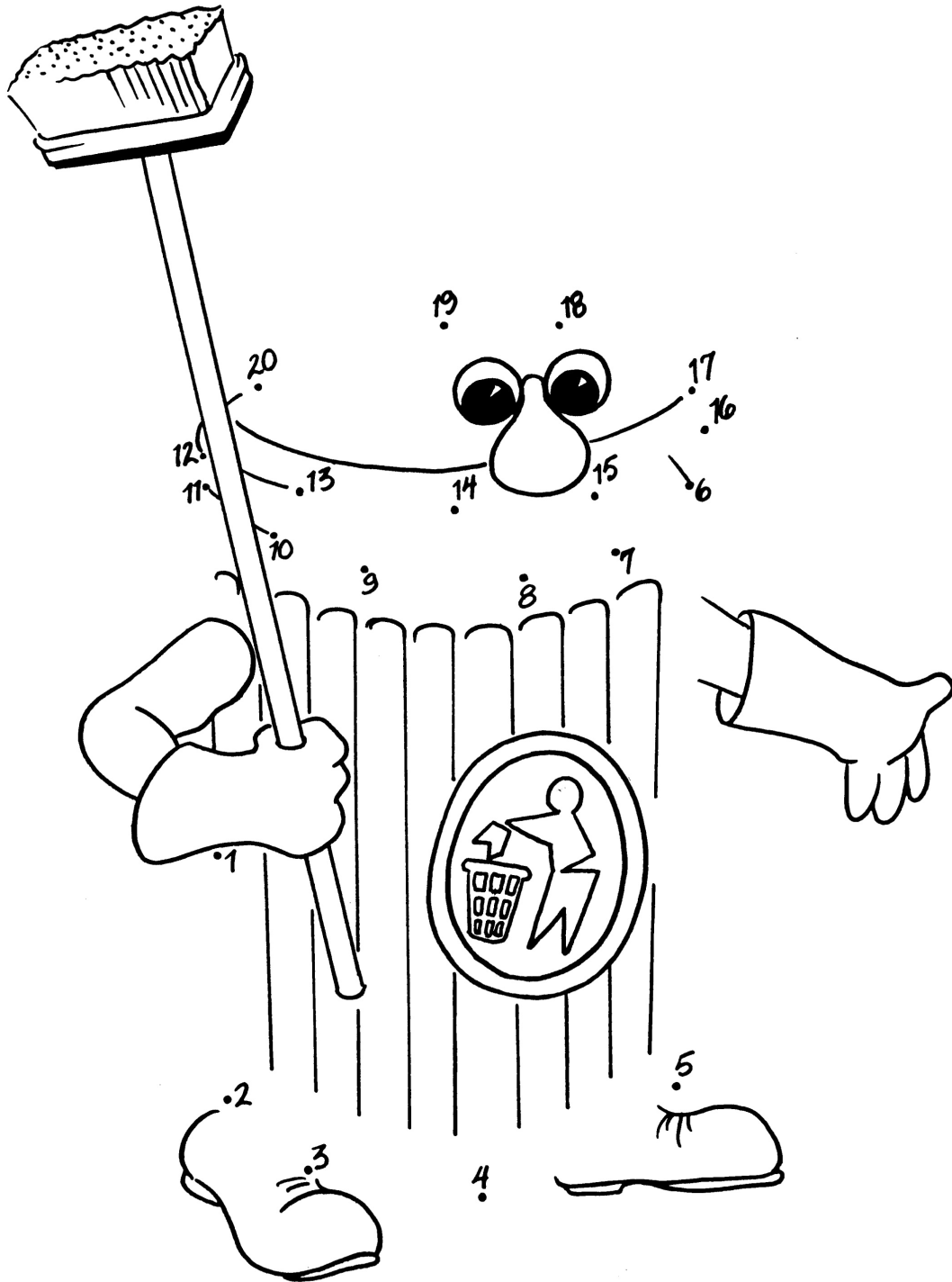
Dangerous litter is created by people who, either purposely or thoughtlessly, don't dispose of their garbage correctly and safely. Litter becomes dangerous when it poses a threat to wildlife, humans and/or the ecosystem. Dangerous litter can be found on land or in water. The following items are some of the examples of dangerous litter mentioned in relevant reference materials and research papers:

- Metal, glass and plastic items and fragments, which can be ingested by wildlife.
- Sharp objects such as broken glass, plastic or metal, which can cut.
- Plastic bags, string, fishing line, rope, fishing nets, rubber rings, and wire, discarded on land and/or in water, which can trap land and marine life.
- Purposeful or accidental littering of hazardous wastes (such as poisonous chemicals) that can kill or seriously harm humans, wildlife and eco-systems.

The following are just some examples of how dangerous litter is created:

- Hikers discarding the leftovers from their lunch, including such items as drink containers, pull-tabs and sandwich wrapping, rather than packing it out.
- Recreational boaters throwing their garbage overboard, rather than bringing it back to shore.
- Fishermen discarding worn and damaged nets and equipment into the ocean or lake, rather than bringing it back for proper disposal.
- Dangerous or hazardous wastes escaping from garbage trucks, garbage barges, transport trucks, freighters, dumps or storage facilities.
- Ocean-going vessels dumping their garbage at sea.
- Sewage outfalls without adequate treatment facilities resulting in discharges of dangerous litter into water bodies and on land.

**APPENDIX 12**  
**WORKSHEET 5**  
**LITTER: ACTIVITY 13**



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## GLOSSARY

<b>biodegradable</b>	capable of being broken down into simpler substances by micro-organisms
<b>biodegrade</b>	the process of being broken down by micro-organisms
<b>compactor</b>	the garbage truck specially designed to crush and flatten garbage by means of a hydraulic plate that compresses the garbage thrown into the truck
<b>compost</b>	decomposed organic material (n); the process of breaking down organic material (v)
<b>compostable</b>	organic material capable of being broken down into <b>compost</b>
<b>conservation ethic</b>	an attitude towards the environment that stresses respect for and survival of habitat, flora, and fauna
<b>deposit-return</b>	a system established in some jurisdictions in Canada to help prevent litter and reduce waste; a deposit is paid by the consumer when purchasing certain items, usually beverage containers, which is refunded to the consumer when the containers are returned in the manner outlined by the applicable legislation
<b>dump</b>	open, unmanaged site for the deposit of waste materials; a dump is not subject to the same environmental controls as a <b>sanitary landfill</b>
<b>environment</b>	the conditions and surroundings of a person, plant, animal or object
<b>hazardous waste</b>	toxic and harmful wastes, such as chemical pesticides and herbicides, paint, batteries, used motor oil, some household cleansers
<b>incinerator</b>	a specially designed furnace in which waste is burnt; incineration produces air emissions, flue and bottom ash, and non-combustible residue, the amount and composition of which varies according to the age, design, and environmental controls of the incinerator
<b>landfill</b>	see <b>sanitary landfill</b>
<b>leachate</b>	the liquid containing dissolved solids such as chemicals, decomposed wastes, bacteria, and other noxious materials, that drain from a landfill or dump
<b>litter</b>	waste that has not been properly disposed, either by putting into a container or recycling

<b>methane: CH<sub>4</sub></b>	the natural gas produced by the process of decay; methane is produced by the decay of solid waste in a <b>sanitary landfill</b> ; methane is explosive and has to be piped off; methane produced by sanitary landfills can be recovered, refined and sold as a fuel
<b>midden</b>	a pre-historic garbage dump, usually containing shells and/or bones
<b>Mobius Loop</b>	named after a German mathematician, August Mobius, who died in 1868; the Mobius Loop is now the common symbol for recycling. Mobius is credited with discovering the property of the twisted loop, which demonstrates an infinite or endless surface and symbolizes the endless use and re-use of materials. The three arrows refer to solids, liquids, and gases, the three kinds of recyclable substances.
<b>mulch</b>	material placed around plants to prevent moisture loss and to control weed growth; mulch materials may include grass cuttings, leaves, sawdust, straw, hay, peat moss and rotted compost
<b>non-renewable resource</b>	a natural resource that exists in a fixed quantity or whose replacement time by natural processes greatly exceeds the rate of consumption
<b>packaging</b>	the wrappings, container or sealing materials used to hold a product
<b>photodegradable</b>	capable of being broken down by ultra-violet light
<b>recycle/recycling</b>	to process an object or substance that is no longer needed in its original form in order to obtain raw materials for the manufacture of a new or similar product or substance; may also refer in general to the whole range of resource recovery activities
<b>recyclable</b>	capable of being recycled
<b>refuse derived fuel (RDF)</b>	a fuel that is made by separating domestic waste, then processing the combustible remains into fuel pellets suitable for commercial or municipal use
<b>refillable</b>	capable of being refilled; also used specifically to describe bottles, such as milk bottles, which, when empty, can be returned for refilling through established return systems
<b>renewable resource</b>	a source of raw materials or energy that can be renewed by nature, such as trees
<b>resource recovery plant</b>	a solid waste processing facility where <b>recyclable/reusable</b> plastic, glass, paper and metal are removed; the remainder may be processed into <b>refuse derived fuel</b> and/or <b>landfilled</b> and/or <b>incinerated</b>

<b>returnable</b>	a container on which a deposit, paid at the time of purchase, is refunded upon the correct return of the container as established in the regulations of the applicable legislation; the returnable container is disposed of, <b>refilled</b> or <b>recycled</b>
<b>reusable</b>	an item or substance that can be reused in some way without being <b>recycled</b>
<b>reuse/reusing</b>	see <b>reusable</b>
<b>sanitary landfill</b>	an area specifically designated for the burial of wastes, in which the waste is layered with dirt and compacted, and which is managed to minimize public health, safety and environmental damage; some <b>landfills</b> may be lined with clay or plastic to prevent <b>leachates</b> and may be piped to remove <b>methane</b> gas
<b>scavenger</b>	an animal that eats carrion; a person who uses garbage as a source for any or all of the following: food, shelter, or income through the resale of useable items
<b>solid waste management</b>	the control, collection and disposal of all solid wastes and discards including household, commercial, industrial, and construction wastes and garbage
<b>sources of litter</b>	the seven sources of urban litter are: motorists, pedestrians, construction sites, overflowing and inadequate residential and other garbage containers, warehouse loading docks, commercial garbage put-outs and uncovered trucks
<b>tell</b>	an artificial mound consisting of the accumulated remains of one or more ancient settlements in the Middle East and Egypt; an ancient garbage dump
<b>vermin</b>	small animals such as rats, mice, moles, etc. that are attracted to compost and garbage containing food

## REFERENCES

This is a brief listing of only some of the many books and other materials now available on the topic of solid waste and our environment. As knowledge of our environmental problems, and an understanding of their inter-relatedness, has grown rapidly in the last few years, we recommend that you look in your local bookstore and library for many more current, and possibly localized, publications. We also suggest you review PITCH-IN CANADA's website's Resource Centre at [www.pitch-in.ca](http://www.pitch-in.ca) for information.

### 1. General

The following books are readily available and provide excellent tips on actions we can all take to help our environment. Though these books were written for adults, their format and general information make them very useful references for class use.

**The Canadian Green Consumer Guide** by Pollution Probe Foundation,  
McLelland & Stewart, 481 University Avenue, Toronto, M5G 2E9

**The Daily Planet: A Hands-On Guide to A Greener Environment**, by Paul Griss, 1990;  
Key Porter Books, 70 The Esplanade, Toronto, M5E 1R2

**50 Simple Things You Can Do To Save The Earth**, by Earthworks Group,  
Earthworks Press, Box 25, 1400 Shuttleworth Avenue, Berkeley, California, 94709

**Save Our Planet: 750 Everyday Ways You Can Help Clean Up The Earth**,  
by Diane MacEachern, 1990. Dell Publishing Co.

**Two Minutes A Day For a Greener Planet: Quick and Simple Things You Can Do To Save The Earth**,

By Marjorie Lane, 1990; Harper Collins Publishers, Ltd., Ste. 2900 Hazelton Lanes, 55  
Avenue Road, Toronto, M5R 3L2

### 2. For Elementary Students

More and more books about solid waste disposal and recycling are being written for younger readers. Unfortunately, the complexity of the topic limits the readability level, and most titles are suitable only for intermediate grades or higher. The following are all worthwhile references.

**Facts on Domestic Waste and Industrial Pollutants** by Hugh Johnstone;  
Franklin Watts Publishers, 387 Park Avenue South, New York, 10016, USA, 1990

- **Intermediate** – emphasis on the polluting aspects of waste and disposal methods used to get rid of it. Includes information on sewage, metals, organic, and plastic waste, and methods of separating and recycling. A well illustrated reference book, including Table of Contents, Index, and Glossary

**50 Simple Things Kids Can Do To Save The Earth**, by Earthworks Group,  
Andrews & McMeel, 4900 Main Street, Kansas City, Missouri, 64112

- **Intermediate** – suggestions on recycling, composting, conserving water, protecting animals, and saving energy accompanied by clear black and white illustrations. Includes six “Eco Experiment”.

**Good Planets Are Hard To Find** by Roma Dehr and Ronald M. Bazar;

Invest Plus Properties, Inc., 194 Pemberton Avenue, North Vancouver, BC, V7P 2R5

- **Intermediate** – using an alphabet book format, this comprehensive book covers a wide range of environmental issues and topics with colourful, simple illustrations, and short, succinct descriptions that often include action projects and suggestions for the young reader. A thorough, valuable resource book for all classrooms. Includes list of some environmentally concerned organizations and government agencies in Canada and other countries.

**A Kid’s Guide To How To Save The Planet** by Billy Goodman;

Avon Books, 105 Madison Avenue, New York, NY, 10016

- **Grade 7+** - this informative book explains ecology, nature’s recycling, population, energy and climate, food production, and garbage. Each chapter includes black and white photographs, illustrations, and diagrams as well as thought provoking questions and suggestions for action projects suitable for kids. An index and glossary are included.

**Trash** by Charlotte Wilcox, 1988, Carolrhoda Books, Inc.,

241 First Avenue North, Minneapolis, Minnesota, 55401

- **Intermediate** – excellent photographs of waste disposal processes supplement a thorough, well-written text that explains dumps, sanitary landfills, incineration, refuse-derived fuels, and recycling.

**Trash Attack** by Candace Savage, 1990;

Douglas & McIntyre Ltd., 585 Bloor Street West, Toronto, M6G 1K5

- **Grade 5+** - an excellent book for children about our solid waste problem and solutions; lively layout and illustrations enhance a thorough examination of the solid-waste problem. The reader is encouraged to learn about the problem and become part of the solution through participation in “Trash Attack” activities.

**Treasure in Your Garbage** by Toni Ellis, 1986;

Is Five Press, 467 Richmond Street East, Toronto, M5A 1R1

- **Primary** – the story line of this colouring book is primary level, but the readability is upper-primary to intermediate level, so best as a “read-to-me” book about how recycling programs help to cure a sick earth.

**Waste and Recycling: Conserving Our World Series** by Barbara James, 1989;

Wayland Publishing, 61 Western Road, Hove, East Sussex, BN3 1JD, England

- **Intermediate** – a well-designed reference book, includes Table of Contents, Index and Glossary. Excellent photographs and illustrations include information on domestic, industrial, agricultural, and radioactive wastes, and the problems and benefits caused by these products.