

Activity 3

Trash Around the World

Objectives

Students will be able to: (a) interpret graphs and data about global solid waste concerns and (b) explain the relationships between a country's physical geography, per capita income, population and solid waste disposal methods.

Preparation

Post the comparison statistics of the different countries (included in the Background Information on p. IX-5) where all students can see them.

Copy one set of handouts per student or group of students.

On an average, 4.4 pounds of trash is what each person in Ohio throws out per day. Fill a clear plastic bag with 4.4 pounds of dry household waste. The bag should include items such as food jars and cans, paper, used clothing, cereal boxes, soda pop cans, toys, assorted plastic products, etc. Be sure to include products representing the seven (#1-7) different plastic codes. (This numeric code is located inside recycling arrows near or on the bottom of the container. The number represents a type of plastic. Most communities only accept items made from #1 and #2 plastic.) The garbage should include items that can be recycled locally as well as those that can't. During the activity the students will be handling this garbage; **please do not include any wet or unsanitary items.** All former food containers should be cleaned out and checked for sharp edges.

Determine what types of materials can be recycled in your community.

Procedure

1 Show students the bag filled with garbage. Explain to students that what they see is the household equivalent to the amount of waste each person throws out everyday. Explain that the volume may differ because the bag only contains dry waste. Ask students to visualize everything they have thrown out that day.

2 Explain to students that what you are showing them is an example of municipal solid waste. Define the terms rubbish and garbage. Discuss with students the types of items that are recyclable in their community, and how some things could be reused rather than thrown away.

3 Divide students into groups and give each group a small amount of the garbage from the bag. Explain to students that the garbage they have been given is "clean." If they were handling actual garbage, they would have to wear heavy gloves. Have each group tell the class whether their item(s) could be

GOING GLOBAL

Inquiries

- How do countries manage their solid waste in comparison with the United States?
- Why do the citizens of some countries throw out more trash than others?
- What factors affect a country's waste management practices?

Content Domain

Math – Arithmetic

Social Studies – Geography

Learning Outcomes

Math, Grade 4, #24 and
Grade 6, #22

Duration

60-120 minutes

Materials

Bag of clean, dry garbage weighing 4.4 pounds. (The garbage should be placed in a **clear garbage bag.**)

Handouts

- *Tell Me About Your Trash Graphs*
- *Tell Me About Your Trash Worksheet*
- *Trash Around the World Assessment*

recycled or reused. If not, have students tell how the item would be disposed of in their community (i.e. landfilled or incinerated). Students should be told that not everything can be recycled or reused and that communities will always need landfills and/or incineration plants.

4 Each student should receive a copy of the handouts, *Tell Me About Your Trash Graphs* and *Tell Me About Your Trash Worksheet*. Ask students to look at the amount of waste thrown away per day by other countries. Discuss reasons why these amounts vary by country (per capita income, lifestyle, etc.).

5 Students can complete handouts by working individually or in groups.

6 Review with students the comparison statistics included in the Background Information on p. IX-5. Through discussion, have students correlate this information with the information provided on the graphs.

Discussion Questions

- Why would a country choose one way of getting rid of their trash as opposed to another? (Size of the country, land space available, population density, etc.)
- Why do you think Japan relies more on incineration? (Scarcity of land space, high population density, etc.)

Assessment

Assessment of student understanding can be done in two ways:

1 Through completion of the handout, *Tell Me About Your Trash Worksheet*.

2 Through completion of the assessment handout, *Trash Around the World*. The questions on this handout are modeled after the State Competency Based Education Assessment Series- Mathematics. Scoring for this handout is as follows:

QUESTION 1 - Sample Rubric

0 points- nothing is done, except to recopy part or all of the problem.

1 point- One valid conclusion or interpretation is made with no supporting discussion, OR there is some discussion, but no conclusion is drawn.

2 points- Two valid conclusions or interpretations are given, but there is no discussion, OR only one valid conclusion or interpretation is given with complete supporting discussion.

3 points- Two valid conclusions or interpretations are given, discussion is present but incomplete OR more than two valid conclusions or interpretations are given, but there is no or incomplete discussion.

4 points- At least two valid conclusions or interpretations are given with supporting discussion.

QUESTION 2

ANSWER: C – yard waste

QUESTION 3 - Sample Rubric

0 points- no work done or recopying of problem, incorrect division of circle.

1 point- corrects division of circle, no labeling, OR labeling and partially correct division.

2 points- correct division and labeling.

Extensions

1 Each year, Ohio's solid waste districts are required to submit a report to the Ohio Environmental Protection Agency outlining the different types and tonnage of recyclables that were collected. The solid waste districts are also responsible for tracking where and how that district's solid waste is disposed. Students could contact their local district and then contrast district information with state, national and international figures.

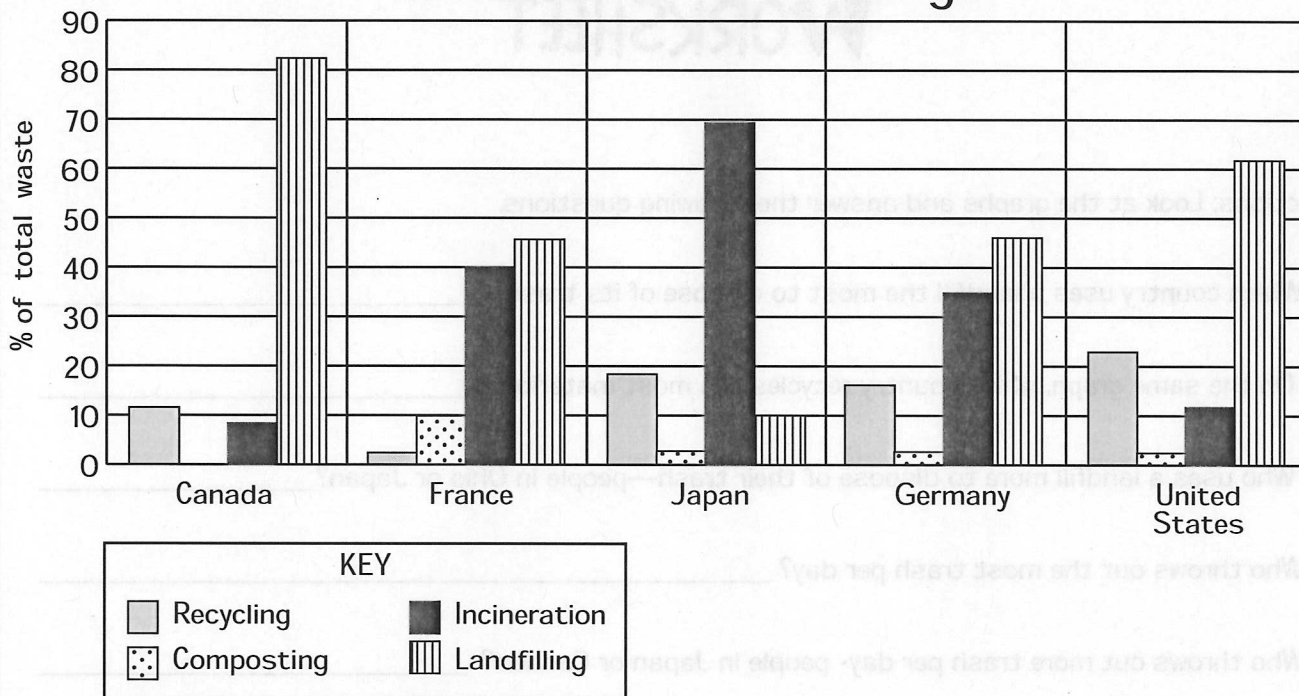
2 Through research, determine how another country disposes of its trash and how much trash is thrown away per person. This research could be done by searching the Internet, or by sending an email or letter to the country's environmental agency(s).

3 Research how different countries or states determine their recycling rates. Every country and/or state may have its own reporting method, which can make comparing statistical recycling rates misleading.

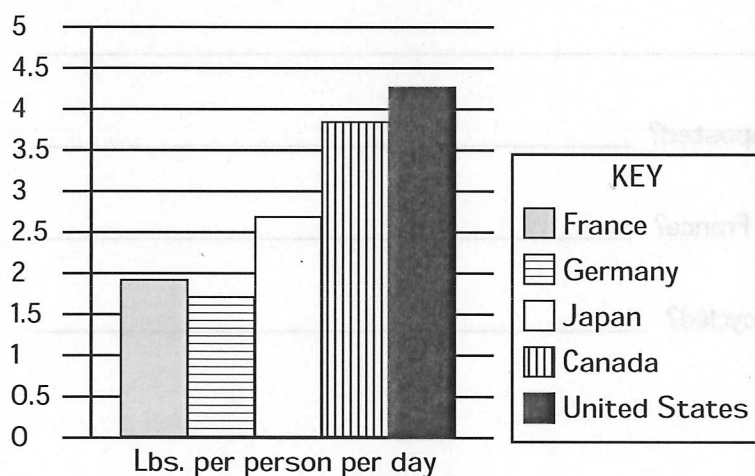
Student Handout

TELL ME ABOUT YOUR TRASH GRAPHS

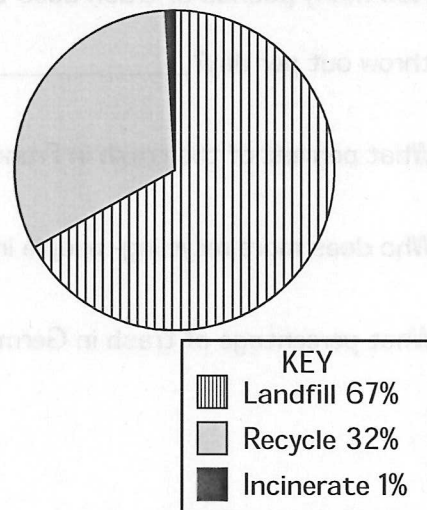
Where does our trash go?



How much trash do we throw out every day?



What do people in Ohio do with their trash?



1997 Ohio Solid Waste Facility Report, Ohio EPA.
 Note: The MSW Factbook, Ver.4, Office of Solid Waste, U.S. EPA, 1997, reports Ohio's recycling rate at 15%, with 83% landfilled.

MSW Factbook, Ver. 4, Office of Solid Waste, U.S. EPA, Washington DC, 1997

Student Handout



TELL ME ABOUT YOUR TRASH WORKSHEET

Directions: Look at the graphs and answer the following questions.

1. Which country uses a landfill the most to dispose of its trash? _____
2. On the same graph, which country recycles the most materials? _____
3. Who uses a landfill more to dispose of their trash—people in Ohio or Japan? _____
4. Who throws out the most trash per day? _____
5. Who throws out more trash per day- people in Japan or Canada? _____
6. What percentage of waste is incinerated in Japan? _____
7. How many pounds of trash does the average person in the United States throw out per day? _____
8. What percent of the trash in France is composted? _____
9. Who does more recycling- people in Ohio or France? _____
10. What percentage of trash in Germany is recycled? _____

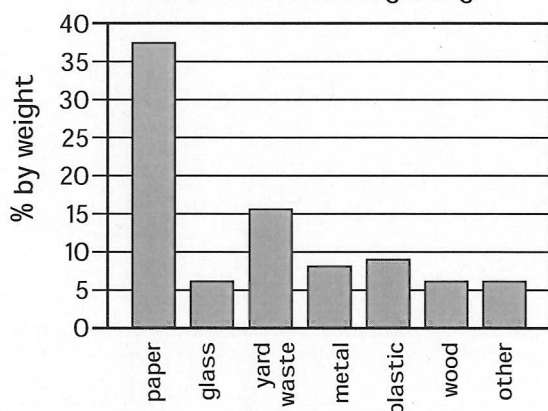
Student Handout

TRASH AROUND THE WORLD

- 1** People in different countries throw out different amounts of waste every day. To the right is a list of how much is thrown out in four different countries. Write a paragraph about two conclusions you can draw from the information. Justify your conclusions.

| COUNTRY | TRASH RECYCLED | TRASH LANDFILLED |
|---------------|----------------|------------------|
| Spain | 13% | 64% |
| Sweden | 16% | 32% |
| Netherlands | 16% | 48% |
| United States | 23% | 61% |

What's in the U.S.'s garbage?



- 2** Which item is nearly one-half the amount of paper generated in the U.S.'s garbage?

- a. metal
- b. plastic
- c. yard waste
- d. other

- 3** What's in Switzerland's trash?

| TYPE OF WASTE | PERCENT OF WASTE |
|---------------|------------------|
| Paper | 33% |
| Plastic | 14% |
| Glass | 8% |
| Metal | 5% |
| Misc. | 40% |

The table (left) shows the percentages of materials people in Switzerland throw in their trash. In the circle, make a circle graph to illustrate the data in the table. Label each part of the circle with the correct item.

