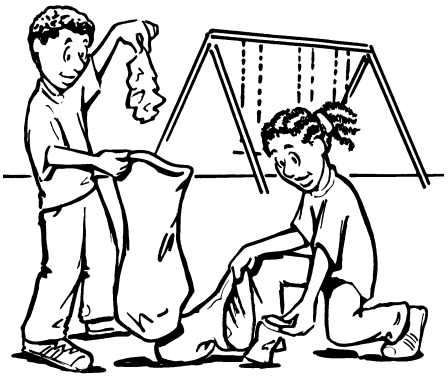
Scavenge for Litter



OBJECTIVES:

Students will:
1. collect five items of litter found on school grounds and identify the natural resource it came from.
2. calculate the percentages for different types of litter found on school grounds.
3. compare the percentages of each type of waste produced in Alameda County to litter found on school grounds.

STANDARDS: Science and Mathematics

SKILLS: Analysis, classification, construction, description, problem solving

SETTING: Outdoors and in the Classroom

TIME:
Outdoors: 10 minutes
Classroom: 40 minutes

VOCABULARY:
Garbage
Inorganic
Litter
Organic

Introduction

Overview:
In this lesson, students will collect litter found on school grounds and link this litter back to natural resources. They will classify the materials into different categories of waste and compare the types and percentages of litter found on school grounds to the amount of waste that's generated in Alameda County.

Teacher Background:

Litter commonly includes pieces of paper, plastic and glass, packaging, bottle tops, cigarette butts and bottles, but it can also be anything considered out of place. Litter impacts the environment in many ways. It can become hazardous to wildlife and humans, it reduces the aesthetic appeal of public places and it costs money to clean up.

Litter can be a major problem on school campuses. Many items that become litter when discarded could have been reduced, reused, recycled or composted. Teachers can remind students that they can take responsibility for reducing litter by practicing the 4Rs and participating in litter cleanups at school and in their community.

Materials:

Students:
- ❑ Paper or plastic bags (one per group of four students)
- ❑ "School Litter Bar Graph" worksheet (one per student)
- ❑ Latex gloves (one pair per student)

Teacher:
- ❑ "School Litter Bar Graph" overhead (model how to complete and record class data)
- ❑ "Litter Disposal at School" overhead (garbage can graphic to record class percentages)
- ❑ "Waste Disposal in Alameda County" overhead
- ❑ One to two items from the following categories: (a) paper (b) other organics, e.g., tires, rubber, scrap wood, diapers, textiles (c) other waste, e.g., wallboard, rock, asphalt, roofing (d) yard/garden (e) food (f) plastic (g) metals (h) glass
- ❑ Rubric overhead
- ❑ Rubrics (one per student)

Preparation:

Gather bags and waste items. Be prepared to divide the class into groups of four students.

ACTIVITY

Discussion

1. Explain that students will be collecting litter at their school. Invite the students to guess what items of litter they may find at school. For example, the students may expect to find only wrappers and aluminum cans.

2. Record and save their ideas on the board so they can compare their predictions to what they actually collected.

3. Explain to the students that after they collect litter, they will categorize and compare the items collected with different types of waste generated in Alameda County.

4. Describe the different categories that litter can be placed into. Explain that these categories are used in Alameda County to track different types of waste generated in the county. Show an example for each of the following categories: (a) paper (b) other organics, e.g., rubber, scrap wood, diapers, textiles (c) other waste, e.g., wallboard, rock, asphalt, roofing (d) yard/garden (e) food (f) plastic (g) metals (h) glass.

5. Explain that the first five categories (paper, other organics, other waste, food, yard or garden debris) are called "organic" because they came from once-living plants or animals. The last three (plastic, metal, glass) are "inorganic" because they did not come from a living organism.

6. Tell students that they will be doing a scavenger hunt for litter from the school grounds.

7. Ask students to predict what kind of litter they think they'll find and where they might find it. Put these predictions on the board.

8. Let the students know that they will be comparing the type and percentage of litter found on their school grounds to the amount of waste that's generated in Alameda County.

9. Show an overhead of the lesson rubric, and review the expectations for this lesson.

Procedure

1. Organize the students into groups of four, and give each group a bag.

2. Tell the students that they have ten minutes to collect at least five items of litter from the school grounds.

3. Explain that litter consists of items that should have been placed in garbage cans or recycle bins or something that is considered out of place.

4. Ask the students to be safe during their search. Pass out latex gloves to students. Discuss items that should not be picked up such as needles, BandAids, etc. Stress that if the students are in doubt, they should ALWAYS ask the teacher.

5. Return to the classroom, and have the students remain in their groups with their bag of litter.

6. Put up the overhead "School Litter Bar Graph." Model for the students how to fill it out.

7. Tell the students that in their group, they should identify and discuss the natural resources used to make the items of litter collected. Next, they will classify their items according to the categories on the graph. They will each individually graph their data.

8. Pass out the student worksheet "School Litter Bar Graph," and give the class about ten minutes to complete it.

9. Have the students put their litter items back into the bag.

10. Put up the overhead "School Litter Bar Graph" to record the class data.

11. Have one person from each group report their data while you fill out the overhead.

12. Guide the class into turning the class graph data into percentages. Model how to convert the graph data into class percentages.

13. Put up the overhead "Litter Disposal at School" to record the class's percentages.

14. Put up the overhead "Waste Disposal in Alameda County." Compare this data with the class percentages of litter at school.

15. Now have the group compare their group findings with the waste disposal in Alameda County.

Wrap-Up

1. How did the students' predictions compare to the type of waste they found on the school grounds? Ask why their collection of litter closely resembled or was greatly different from the percentages of garbage disposed in Alameda County.

2. Ask the students what they can do at home and at school to reduce litter and waste.

Final Assessment Ideas

Have students work in groups to design a poster that informs other students about litter commonly found at school and the importance of the natural resources used to make each item. Students can draw pictures, cut out pictures from magazines or use the litter they have collected on their posters. They should also include several ways to reduce litter and waste at school.

Extensions:

Have the students individually create pie charts showing the percentages of litter found on school grounds.

Have students predict where they would find the most as well as what type of litter on school grounds. Then have students create a map of the school grounds showing where they collected the greatest amount of litter and where recycling and garbage bins are located in these areas. In writing, have them hypothesize why they found very little litter in some areas and large amounts in another. For example, some areas may be heavily used by students during lunchtime and there are not enough recycling and garbage bins, so they throw stuff on the ground.

Teacher Materials:

California State Content Standards

The standards below represent broad academic concepts. This lesson provides connections to these academic concepts through hands-on activities and exploration. This lesson is not designed for a student to master the concepts presented in the standards. Additional lessons in the classroom that build on this lesson or the standard(s) ensure that students will have the opportunity to master these concepts.

SCIENCE	CONTENT STANDARDS
Grade 4	**Investigation and Experimentation** 6.c. Students will formulate and justify predictions based on cause-and-effect relationships. 6.e. Students will construct and interpret graphs from measurements.
Grade 5	**Investigation and Experimentation** 6.a. Students will classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria. 6.g. Students will record data by using appropriate graphic representations (including charts, graphs and labeled diagrams) and make inferences based on those data.
MATHEMATICS	**CONTENT STANDARDS**
Grade 4	**Mathematical Reasoning** 2.3 Students will use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams and models to explain mathematical reasoning.
Grade 5	**Statistics, Data Analysis and Probability** 1.3 Students will use fractions and percentages to compare data sets of different sizes. **Mathematical Reasoning** 2.3 Students will use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams and models to explain mathematical reasoning.

Scavenge for Litter Rubric

A rubric is a scoring tool that defines the criteria by which a student's work will be evaluated. This rubric is provided to assist you in setting expectations for students and assessing their performance and engagement during the lesson based on specific tasks. Ideally, a rubric is developed with the cooperation of the students. Two blank rows have been provided for you and your class to develop and add your own assessment criteria.

CATEGORY	4	3	2	1
Collect and identify litter	Student collects more than five types of litter.	Student collects five items of litter of several types.	Student collects less than five items or all of the same type.	Student fails to do the assignment.
Compare percentages	Student correctly interprets the amount of litter items collected in a bar graph and correctly compares these to the percentages of waste in Alameda County.	Student correctly interprets the amount of litter items in a bar graph but has difficulty in comparing these to the percentages of waste in Alameda County.	Student does not correctly organize the amount of litter items in a bar graph and is not able to compare with percentages of waste in Alameda County.	Student fails to do the assignment.

Teacher

School Litter Bar Graph

Directions: Write the name of each litter item in the appropriate column starting at the bottom of the column. The filled-in spaces will show you a bar graph of each category.

PAPER	**OTHER ORGANICS (RUBBER, SCRAP WOOD, DIAPERS, TEXTILES)**	**OTHER WASTE (WALL-BOARD, ROCK, ASPHALT, ROOFING)**	**YARD/ GARDEN**	**FOOD**	**PLASTIC**	**METALS**	**GLASS**
ORGANIC					**INORGANIC**		

School Litter Bar Graph

Directions: Write the name of each litter item in the appropriate column starting at the bottom of the column. The filled-in spaces will show you a bar graph of each category.

PAPER	**OTHER ORGANICS (RUBBER, SCRAP WOOD, DIAPERS, TEXTILES)**	**OTHER WASTE (WALL-BOARD, ROCK, ASPHALT, ROOFING)**	**YARD/ GARDEN**	**FOOD**	**PLASTIC**	**METALS**	**GLASS**

Name:_____ Date:_____

Teacher

Litter Disposal at School

Paper ____%

Other Organics ____%
(rubber, scrap wood, diapers, textiles)

Other Waste ____%
(wallboard, rock, asphalt, roofing)

Food ____%

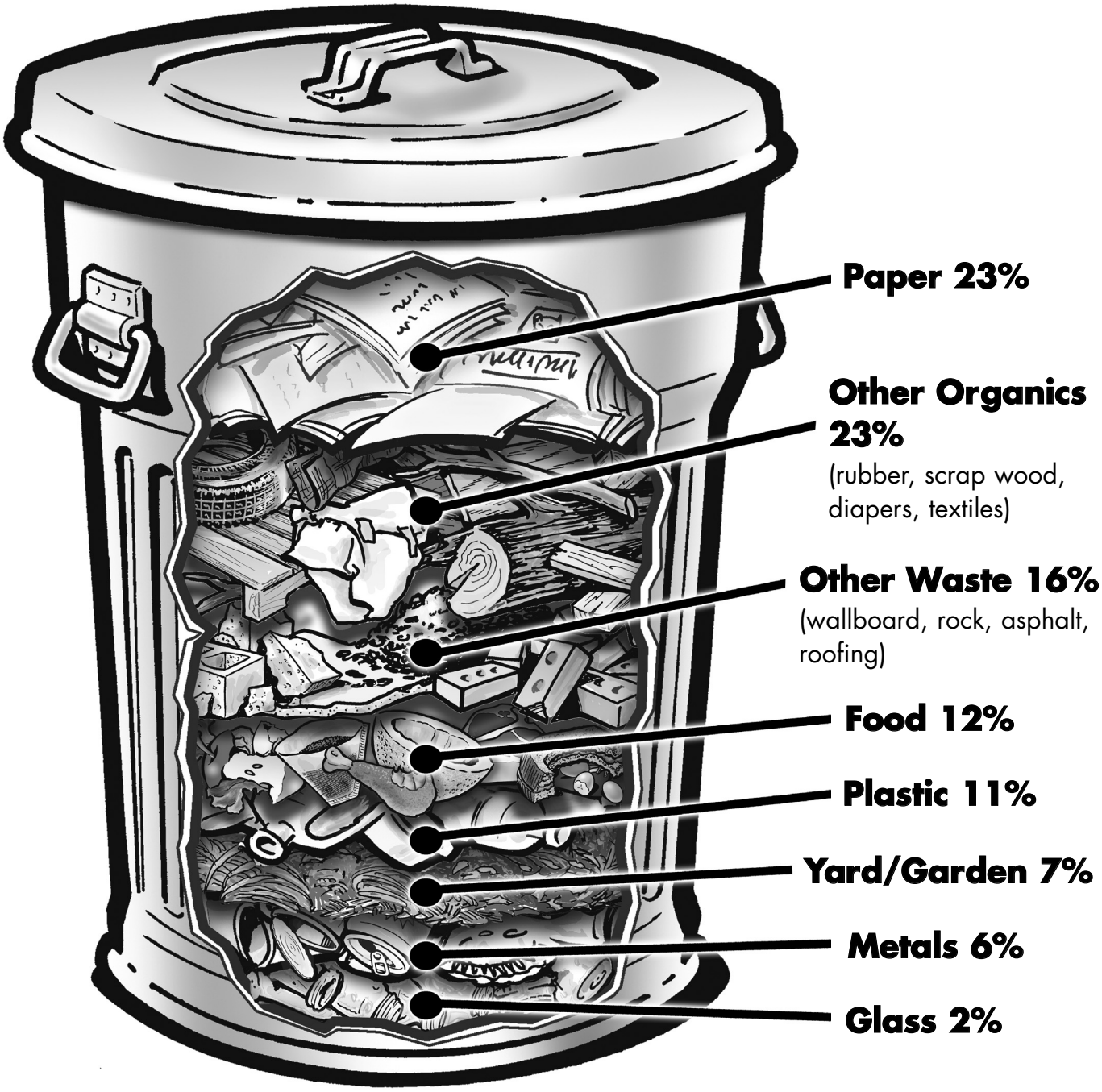
Plastic ____%

Yard/Garden ____%

Metals ____%

Glass ____%

Waste Disposal in Alameda County



Source: Waste Characterization Study prepared for the Alameda County Waste Management Authority and Recycling Board by RW Beck 2001.

DEFINITIONS

Vocabulary:

Garbage: things that people throw away.

Inorganic: any material that is not composed of matter that was once living or produced by a living organism.

Litter: waste materials that are carelessly discarded or put in the wrong place.

Organic: materials that were once living or material produced by a living organism such as food, leaves, plant trimmings, hair, clothing fibers, paper, etc. Organic may also be used to describe food grown using sustainable agricultural methods.