Graphing Litter

Grade: 4-5
State Standards:
Grade: 4; Science: Investigation and Experimentation 6.c Students formulate and justify predictions based on cause-and-effect relationships. 6.e Students construct and interpret graphs from measurements. Grade 5; Science: Investigation and Experimentation 6.a Students classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria. 6.g Students record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data. Grade 4; Math: Mathematical Reasoning 2.3 Students use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to explain mathematical reasoning. Grade 5; Math: Statistical, data analysis, and probability 1.3 Students use fractions and percentages to compare data sets of different sizes. Mathematical reasoning, 2.3 Students use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
Groups of 4
Preparation Time: 25 minutes
Activity Time: 40 minutes
Key Words: garbage, inorganic, and organic litter

OBJECTIVE
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 Tehama County.

MATERIALS
For 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)

For Teacher: "Litter Disposal at School" overhead (garbage can graphic to record class percentages) 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

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.

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.

PROCEDURE

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

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 Tehama County.

4. Describe the different categories that litter can be placed into. Explain that these categories are used in Tehama County to track different types of waste generated in the county. Show an example for each of the following categories: (a) paper (b) other inorganics, 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, food, yard or garden debris) are called “organic” because they came from once-living plants or animals. The last (plastic, metal, glass, other waste) 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 Tehama County.

Activity

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, Band-Aids, 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. Now have the group compare their group findings with the waste disposal in Tehama County. Visit www.tehamacountylandfill.com "waste statistics" link for information on waste disposed of in Tehama County.

Conclusion

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 Tehama County.

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

Final

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. Post the posters around the school grounds.

ASSESSMENT

Students should have a clear understanding of landfill waste in Tehama County and the importance of reusing, reducing, recycling, and composting.

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)	Other Waste (wallboard, roofing, asphalt	Yard or Garden	Food	Plastic	Metal	Glass

Litter at School