ABSTRACT

In *Math Hunt*, student groups search for evidence of math. Students leave the classroom with a bag of science and math tools, and venture into the cafeteria, gym, or lobby to find evidence of patterns, geometric shapes, and fractions. Working cooperatively, students take measurements and make computations of what they find. They record their findings in a spreadsheet on their group's laptop computer. Back in the class-room, students create a graph of their data, write about their investigations, and share their group's findings.

TIES TO CURRICULUM

This activity embodies several National Council for Teaching of Mathematics (NCTM) standards for grades K–4. Students measure, collect, and organize data, and recognize and describe patterns. During *Math Hunt*, students learn to relate physical materials to mathematical ideas, use estimates of measurements. Following the NCTM standards, students realize that representing, discussing, reading, writing, and listen-ing to math are vital parts of learning and using math.

The *National Science Education Standards* (NSES) state that a K–4 curriculum should strongly emphasize natural phenomena and science-related social issues encountered by students in everyday life. The NSES *standards* also call for more laboratories and field trips emphasizing inquiry-based learning. *Math Hunt* em-phasizes both of these mandates. This activity also fulfills two of the *Project 2061 Benchmarks for Science Literacy* standards for grades 3 to 5—first, that mea-surements are always likely to give slightly different numbers even if the variable measured is constant, and second, that it is important to state units of measurements.

LEARNING OBJECTIVES

In *Math Hunt*, students will

◆ work cooperatively in a group sharing tools and computer;

◆ identify at least four geometric shapes;

◆ measure at least four objects;

◆ discover evidence of patterns;

◆ use computation methods to figure out the number of an item (e.g., tiles on a floor, number of seats at a table);

◆ find at least four examples of fractions (e.g., window panes divided into fourths);

◆ record data on a spread-sheet;

◆ compile group data and create a graph showing results; and

◆ write a paragraph summ-arizing *Math Hunt* findings.

NUMBER OF LAPTOPS AND GROUP SIZE

It is ideal to have one laptop per group of four to five students.

TIME REQUIREMENT

Not including teacher preparation time of about 30 minutes, *Math Hunt* takes approximately two hours:

Task	Time	Location
Introduction	20 minutes	Classroom
Hunt	40 minutes	School
Data analysis	30 minutes	Classroom
Sharing and discussion	30 minutes	Classroom

LESSON DESCRIPTION

- Laptop computers
- Spreadsheet software
- Plastic sandwich bags
- Calculator
- Measuring tapes and/or rulers
- String
- Protractors

Teacher Preparation

Prior to the lesson, collect and bag all items needed for the groups. Create a simple spreadsheet template and load the template on all the laptops you'll be using (see Appendix). Make sure laptop batteries are charged.

Introduction

Introduce *Math Hunt* by asking your students if they're ready to go on a special field trip. Explain that they won't be going as ordinary students, but as scientists and mathematicians on a hunt for math shapes and other math related things, such as fractions. Brainstorm a list of geometric shapes, patterns, and other ideas on the blackboard.

Explain that students will be working in groups and using scientific and mathematical tools to help find examples of patterns, geometric shapes, and fractions. Groups will take measurements and perform computations with the items they find. Show students a sample of the bags of tools and a laptop. Discuss the proper use of each item. Depending on the students, you may need to review computers, spreadsheets, and data collection.

Divide students into groups and assign jobs:

◆ Communicator—asks teacher questions

◆ Materials manager—keeps track of tool bag

◆ Laptop coordinator—carries and sets up computer

◆ Project reporter(s)—reports group findings to class

Activity

Take the class into the school cafeteria, gymnasium, playground, or other large area. Groups should search for at least 20 examples of geometric shapes, in at least four different shape categories (e.g., squares, rectangles, circles, triangles, pentagons). Groups use computation methods to figure out the number of an item. For example, groups count the number of tiles on a floor, or the number of seats at a table. Groups should also look for evidence of four different patterns and four examples of fractions. For example, a group may find a pattern of repeating squares in a window and observe that the large window is broken into fourths by smaller window panes. Let groups explore and record their findings on the laptops or individual spreadsheets. Bring students back into the classroom after about 40 minutes.

Data Analysis

Review the process of graphing data. Each group should use its data to create a table and a bar graph of shape frequency on its laptop computer. Rotate between groups to help with graphing. Once the graphs are finished, each group should write a short paragraph summarizing its findings and answering these discussion questions:

1. What geometric shape had the most examples? Why?

2. In which area of the school did you find the most examples, and the least examples? Why?

3. What was hard for you to do? Why?

4. If we did this activity again what would you want to change?

◆ You can conduct this lesson with a limited number of laptops. During the hunt, groups record data on spreadsheets printed out from the computer. During the data analysis activity, groups take turns inputting data to create graphs and the written report on the computer.

◆ Repeat the activity several times during the semester. Students will make more sophisticated observations, and will recognize more fractions, measure angles, and compute with large numbers.

◆ Use *Math Hunt* for pre- and post-assessments. For example, students can compare findings about fractions from a hunt before you teach a fraction unit, and from a hunt at the end of the unit.

◆ Students can use the laptop to draw a map of the area where they went on the hunt. Adding details could be a long-term project.

◆ Students could write a detailed description of a particular object without naming it. They read the description aloud and classmates must figure out what object was described.

◆ Invite one of the school cafeteria workers or custodians to speak to your class about using math in his or her job.

REFERENCES

Books

American Association for the Advancement of Science. *Benchmarks for Science Literacy-Project 2061*. New York: Oxford University Press, 1993.

National Council of Teachers of Mathematics. *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA: NCTM, 1989.

National Research Council. *National Science Education Standards*. Washington DC: National Academy Press, 1996.

Web sites

Teacher Help Service. Annenberg/CPB Math and Science Project: http://www.learner.org/sami/

Frank Potter's Math Gems. A list of Internet resources: http://www-sci.lib.uci.edu/SEP/math.html

Sharing

The project reporter from each group shares the group's findings with the class. The reporter should present the data and read answers to the questions. After all groups have shared, hold a class discussion comparing group results.

ASSESSMENT

Assess students' skill in sharing tools and the computer, using mathematical techniques, focus on task, and data recording. In addition, each student should turn in his or her data sheet, graph and paragraph. The data sheet should have at least five different items recorded; the graph should be titled, with both axes labeled and bars consistent with group data; and the paragraph should be written in complete sentences and correctly portray data.

APPENDIX

Set up a blank table on your spreadsheet to use as a template prior to *Math Hunt*. Save the table on each laptop. Table 1 contains sample data.

Table 1

Item	Patterns	Computation	Geometry	Fractions	Measurements
Sidewalk	Pattern of cracks	1 long crack and 3 shorter cracks			Cracks vary in length
Cafeteria window	Small squares create 1 big square	12 panes	squares		Each pane is 15 cm by 15 cm
Gym window	Repeating rectangles	2 panes	rectangles	Each pane is ½ of the window	Each pane is 25 cm wide and 5 cm high