Math 5 - Act. 22: A Thin Inch

Summary

This activity will help students understand the importance of everyone using the same standard measurements. In addition, students will practice their measurement skills.

Materials

For the teacher:
- *Measuring Penny*
  by Loreen Leedy
- *How Big is a Foot?*
  by Rolf Myller
  TV and VCR with remote
- *IT FIGURES*
  video #1, "How Close to Measure" (Downloadable Version, requires Real Player)
- *MATH WORKS*
  video #1, "Measurement" #9 (View online here)

For each student/partners/team:
  Wheat Thins
  Wheat Thin chart for recording the measuring
  paper rulers (ruled to 1", 1/2", 1/4", and 1/8")
  inch grid paper
  graph paper

Additional Resources
Videos:
Math Works
It Figures

Background for Teachers

Vocabulary:

Area: The measure, in square units, of the inside of a closed plane figure.
Customary: A system of measurement used in the United States. The system includes units for measuring length, capacity, and weight.
Perimeter: The distance around a closed figure.
Formulas for Perimeter:
Rectangle:
$P = 2 \times (l + w)$
$P = (2 \times l) + (2 \times w)$
$P = (l + l) + (w + w)$
Square:
$P = 4 \times s$
$P = s + s + s + s$
Area: Measure of the surface of a region in square units.
Formulas for Area:
Rectangle:
$A = l \times w$
Square: Area equals sides squared

$A = s\,2$

$A = s \times s$

Customary Units of Measure:

Length

one foot (ft or ')	=	12 inches (in or ")
one yard (yd)	=	36 inches
	=	3 feet
1 mile (mi)	=	5,280 feet
	=	1,760 yards

Area

1 square foot (ft2)	=	144 square inches (in2)
1 square yard (yd2)	=	9 square feet
1 acre	=	43,547 square feet
	=	4,840 square yards
1 square mile	=	640 acres

Intended Learning Outcomes

1. Demonstrate a positive learning attitude towards mathematics.
2. Become mathematical problem solvers.
4. Communicate mathematically.

Instructional Procedures

Invitation to Learn

Instruct students to estimate about how many Wheat Thins it would take to measure around the edge of a math book and to record their estimates on the "Wheat Thin Measuring" worksheet. Next students will estimate about how many Wheat Thins it would take to fit side-by-side on top of the math book and record their answers. Students will then measure the edges of their math books, using wheat thins, and record their answers. They will then measure how many it would take to cover the top of their math books and record those answers. When done, instruct students to experiment by estimating, measuring, and recording results from other objects (for example: other books, piece of paper, CD case).

Instructional Procedures

Begin reading the book, *Measuring Penny*. Point out the different items that were used for measuring in this story. After reading, discuss the various items that were used to measure Penny and the other dogs. Ask what other items could have been used for measuring.

Summarize *How Big is a Foot?* by Rolf Myller. Review with students how the king had seen each do their jobs correctly. What had happened so his bed didn't fit him? Help the students to recognize that each had different size feet.

Using the clip "How Close to Measure" from the video It Figures, fast forward to show the part of the video where the kids are making a clubhouse and using a pencil to measure how big the piece of wood needs to be. Watch as they build their clubhouse. Discuss why using a pencil might have made their job a little more difficult.

Discuss why it would be helpful to have a standardized type of measuring system. Help the students understand the importance of everyone using the same measurements.

Using color tiles on the overhead (compare them with Wheat Thins), demonstrate how to find the perimeter and area.

Make a rectangle with color tiles (e.g., 2x4).
Using another color tile, count out loud while measuring around the perimeter of the shape (12).
Count how many color tiles are in the whole shape (8).
Try a few more rectangles while the class counts with you.
Students will then make rectangles with color tiles on oneinch grid paper.
Students should draw each rectangle on a smaller piece of graph paper to record and compare their discoveries as they look for patterns.
Model for and instruct students to write how many tiles are on each edge of the rectangle, and how many total tiles there are in each rectangle.

Demonstrate how to use the ruler to measure the edges of the overhead or some other object to find out how many inches the perimeter would be.

Instruct students to work in partners/teams to estimate and then measure the perimeter of other items in the classroom with a rule. Extend this to estimating and then figure the area from the measurements. Have students record their results for each item.

Review with students the definitions of length, width, perimeter, and area.
After students have experimented with several items (books, a videotape case, etc.) and recorded their results, instruct them to look for patterns.
Discuss what patterns they found when using wheat thins or rulers for measuring.
Ask how they might apply the patterns they have found so they would work with any rectangle they might measure.
Ask if there might be an easy way to remember or to figure without measuring (explore and discover possible formulas)
Help students see the connection that a square has the largest area (other than a circle--7th grade curriculum).
Show video, Math Works, Video #1: Measurement. Fast forward to the part where the boy and girl have some fencing and are figuring the area for the garden. Pause and discuss as the boy and girl talk about their thoughts and plans.
Review and write the formulas for perimeter and area on the overhead. Refer to the formulas in the Background Information throughout the instruction as applicable.

Curriculum Integration
Math/Science: Real Life--When planning for and planting a garden, students would want to have the most possible available area.

Extensions

Possible Extensions/Adaptations/Integration
Math—A Wheat Thin activity could be also be done by using items from the metric system (for example: centimeter blocks to find the area and perimeter of a book). Students could then outline the book on centimeter grid paper. More items could be measured while the students seek for patterns.
Homework & Family Connections
Measure to the nearest inch the length and width of five or six items at home, then find the perimeter and area and record the results.

Assessment Plan

Have students measure items with a ruler to the nearest inch, then find the perimeter and area of each item and record results.

Authors

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