Math 5 - Act. 23: King Henry Did What?

Summary

After reading the "Fairy Tale of King Henry", students will understand how to convert between the different metric units.

Materials

For the teacher:

- *How Tall, How Short, How Faraway*
  by David A. Adler
  Meterstick
  TV and VCR with remote
- *IT FIGURES*
  video series, Video #1: How Close to Measure (USOE Consortium)
  King Henry Story
  Overheads of King Henry Worksheets
  "When I Say, You Say"
  "Metric Rap"

For each student:
  King Henry Worksheets #1 & #2
  Dry erase board with marker (or black construction paper with chalk)
  Paper metric rulers

For each set of partners or teams:
  Metric/standard rulers and meter/yardsticks
  Little baggy of candy/ various items to measure
  Candy Measuring worksheet

Additional Resources
Math Curse by Joh Scieszka and Lane Smith
Fast & Fun Mental Math by Chuck Lotta

Background for Teachers

The metric system might seems new to some students. Reminding them that pop comes in liters may make a connection to students. The metric system of measurement increases in increments of ten. Students should have had experience multiplying and dividing decimals.

Vocabulary

Area: The measure, in square units, of the inside of a closed plane figure.

Capacity: The maximum amount that can be contained by an object. Often refers to measurement of a liquid.

Metric System: A system of measurement based on tens. The basic unit of length is the meter. The basic unit of mass is the gram. The basic unit of capacity is the liter.

Perimeter: The distance around a figure.

Plane Figure: A figure that lies on a flat surface.

Metric Units of Measure:

Length

1 centimeter (cm)	=	10 millimeters (mm)
1 decimeter (dm)	=	100 millimeters
	=	10 centimeters

1 meter (m)	=	1,000 millimeters
	=	100 centimeters
	=	10 decimeters
1 dekameter (dam)	=	10,000 millimeters
	=	1,000 centimeters
	=	100 decimeters
	=	10 meters
1 hectometer (hm)	=	100,000 millimeters
	=	10,000 centimeters
	=	1,000 decimeters
	=	100 meters
	=	10 dekameters
1 kilometer (km)	=	1,000,000 millimeters
	=	100,000 centimeters
	=	10,000 decimeters
	=	1,000 meters
	=	100 dekameters
	=	10 hectometers

Area

1 square centimeter (cm2)	=	100 square millimeters (mm2)
1 square decimeter (dm2)	=	100 square centimeter (cm2)
1 square meter (m2)	=	10,000 square centimeters
	=	100 square decimeters

Volume

1 cubic centimeter (cm3)	=	1,000 cubic millimeters (mm3)
1 cubic decimeter (dm3)	=	1,000 cubic decimeters

Capacity

1 liter (L)	=	1,000 milliliters (mL)
	=	1 cubic decimeter (dm3)

Mass

1 gram (g)	=	1,000 milligrams
1 kilogram (kg)	=	1,000 grams
1 metric ton (t)	=	1,000 kilograms
1 cubic centimeter (cm3)	=	holds 1 milliliter of water that has a mass of 1 gram

Intended Learning Outcomes

2. Become mathematical problem solvers.
3. Reason mathematically.
5. Make mathematical connections.

Instructional Procedures

Invitation to Learn

Working in partners, students will measure various candies or items in a baggy using the width of their index finger. Each student will record the results of the measurement to the nearest index finger width on "Candy Measuring" worksheet.

Instructional Procedures

   Show video clip from "How Close to Measure" in the It Figures series, Tape 1. Fast forward to the part of the story about the mouse and the elephant getting measured. While watching, use the remote to pause, ask questions, and discuss as necessary for student understanding. Question students about why the elephant and mouse could not be measured in the same units. Tell the King Henry Story.

   Instruct students that when converting from one unit to another in the metric system, one must always multiply or divide in increments of 10. Demonstrate how this is done by using the King Henry Worksheets. Remind the students that this is the same process they used when multiplying and dividing with decimals.

   Students write notes in their journals as the teacher explains and writes on the overhead. Students will also make a King Henry conversion chart in their journals for reference. Students will explain in their own words how to convert from one unit to another (times by 10 or divide by 10).

   Teacher will model a few examples on the overhead/chalkboard. Students use dry erase boards and markers (or black construction paper and chalk) to show their work as they practice a few problems the teacher writes on the overhead. Teacher is able to assess and view the students understanding as they practice.

   Example: answers: 30 m = 3,000
   30 m = _____ cm   cm
   _____ m = 250
   dm   25 m = 250 dm

   Students will practice the conversion process using the King Henry Worksheets.

   Teach class When I Say, You Say. Example: Say to class: "When I say meter, you say, 'width of a door.'" Practice the others.

   Teach class the "Metric Rap." When practiced once a day for a few weeks, students are able to easily pass it off.

Concentration game

To make your own Concentration board:

   Place 24 library card pockets on a large sheet of posterboard.
   Organize them into four rows with six in each row.
   Using 3x5 cards, make sets of matching cards.
   Examples for metric:
      3 m match could be 300 cm
      2.4 hm match could be 240 m
   Cards could also be made for Customary units of measurement.
   Individual game sets of cards could be made for cooperative teams or partners.

Curriculum Integration

Math/Science: Science--The Science Fair requires all measurements to be done in the metric system.

Science--Working with matter, it would be helpful to use the metric system.

Extensions

Possible Extensions/Adaptations/Integration
Instruct students in the step process for converting metric units.
Students could also make a half-size me using the metric or customary units of measurement (recording sheet and "Make a Half- Sized Me" is attached).
Students could make a 2x the size of a doll or paper doll in either the metric or customary units of measurement.
Students measure candy/items in a baggy to the nearest centimeter and 1/8 inch and record their answers.
Homework & Family Connections
Students can estimate and then measure several items in their home.

Assessment Plan

Students create a half-size me using a metric measuring tape.
   Each student will estimate own metric measurements and fill in the estimate part of the "Make a Half-Size Me" chart.
   Students work in partners measuring each other and filling in the measurement parts of the chart.
   Each student divides his measurement by 2 and fills in the divide by 2 section of the chart.
   Using the 1/2 size measurements, each student will draw himself on a piece of butcher paper about half the size of the student's height.
      Student will draw the half-size me to look like himself.
      Students may draw, color, use yarn, fabric, etc., to make it look more like himself.

Authors

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