

Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.LibraryVideo.com

- mathforum.org/
"Math Forum," sponsored by Drexel University, contains a wealth of information about math for students and teachers. Students can tackle the "Problem of the Week," or send a question to Dr. Math. Teachers can find lots of helpful resources for teaching math, including lesson plans.
- www.harcourtschool.com/glossary/math_advantage/index.html
This multimedia math glossary offers illustrations and definitions for many mathematical concepts, individualized for grades 1 through 8.
- illuminations.nctm.org/lessonplans/prek-2/measurement/index.html
The National Council of Teachers of Mathematics presents this unit plan entitled "Magnificent Measurement." Through these six lessons, students learn to make sense of the units, systems and processes of measurement.

Suggested Print Resources

- Adler, David A. *How Tall, How Short, How Far Away?* Holiday House, New York, NY; 1999.
- Leedy, Loreen. *Measuring Penny*: Henry Holt, New York, NY; 1997. This fictional story tells about Penny who measures her dog using various units, and teaches about measurement in the process.
- Lionni, Leo. *Inch by Inch*. I. Obolensky, New York, NY; 1960. This classic story describes a worm who loves to measure.
- Richards, Jon. *Units and Measurements*. Copper Beech Books, Brookfield, CT; 2000.
- Schwartz, David M. *Millions to Measure*. HarperCollins Publishers, New York, NY; 2003.

TEACHER'S GUIDE

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TITLES

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|-----------------------|-----------------------------|------------------|
| • Addition | • Gathering & Graphing Data | • Multiplication |
| • Decimals & Percents | • Geometry | • Number Sense |
| • Division | • Measurement | • Subtraction |
| • Fractions | • Money | • Telling Time |

Teacher's Guides Included
and Available Online at:

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Measurement

Grades K–4

We use math in everything we do, from catching a movie at the local theater to shopping at the grocery store! Because math is an important aspect of our everyday lives, it's crucial that students are fluent in mathematical thinking and communicating. In our ever-changing world, it's not enough for students to be able to perform calculations. Students need to be challenged to solve problems in creative ways, using various approaches. Enhancing students' mathematical understanding can help to unlock the secrets of the world around them.



Introduction

How heavy? How tall? How cold? The answers to these questions and many more can be found with measurement! Students can use all kinds of tools to measure, including nonstandard tools like paper clips and popcorn kernels, and standard instruments like rulers and balance scales. The value of the standard unit becomes obvious when students want to compare results or share their findings with others. Students can gain skills in measuring length, weight, capacity and temperature, which provide them with the ability to make sense of measurements in the world around them.

Vocabulary

measurement — A count of how many units are needed to match a property of an object. Length and weight are examples of properties of objects.

unit — A quantity of measurement.

customary system — A system of measurement that is most commonly used in the United States. Feet and pounds are examples of customary units.

length — A measurement of how long something is.

weight — A measurement of how heavy something is.

metric system — A system of measurement that is used in many countries around the world and by most scientists. Meters and grams are examples of metric units.

ruler — A tool used to measure length.

balance scale — A tool used to measure weight.

mass — The amount of matter in an object.

capacity — A measurement of how much a container can hold.

temperature — A measurement of how hot or cold something is.

thermometer — A tool used to measure temperature.

Pre-viewing Discussion

- Ask students to discuss what measurement means to them. What are some of the things that measurement can tell them?
- Encourage students to think about what life might be like if they couldn't measure anything. Brainstorm a list of activities that they could not accomplish without the help of measurement (e.g., find out how tall they are, how much they weigh, how hot it is outside).
- Help students to generate a list of measurement tools with which they are familiar. Discuss with them the use of nonstandard measurement tools. Can students measure with a paper clip? Can they discover any possible problems associated with measuring with a paper clip?

Follow-up Discussion

- Discuss with students why they think all scientists use the metric system. Help students to identify the possible problems scientists would encounter if they used different systems of measurement.

- Encourage students to think about why it is important to be accurate when measuring. Have students present situations in which a slight error in measurement might be very significant. Can they think of situations when it's okay to estimate a measurement?
- Have a class discussion about selecting a unit of measurement. How do students know when to measure with a large unit like miles or a small unit like inches?
- Discuss with students why it's important to label the units when they measure. What could happen if they didn't label the units (e.g., my house is 15 away)?

Follow-up Activities

- Students can measure the same objects (e.g., desks, books) using nonstandard units like hands, feet and fingers. As a class, compare the results. Did everyone's results match? Discuss why nonstandard units aren't always the most useful when communicating results. Share *How Big is a Foot?* by Rolf Myller (Dell Publishing Company, 1991) to emphasize this concept.
- Benchmarks can help students to judge and compare sizes. Encourage students to select benchmarks that will help them estimate measurements (e.g., a paper clip weighs about a gram). Students can create posters of their measurement benchmarks and hang them in the classroom as visual reminders.
- Units of capacity can best be explored when cooking! Bring in several simple recipes that you can make as a class. Encourage students to problem solve with recipes. What if the recipe only serves eight people but you need enough for your entire class? You can also introduce the metric system in the kitchen. See www.pueblo.gsa.gov/cic_text/misc/usmetric/metric-equiv.htm for a recipe for "metric" chocolate chip cookies.
- Students can learn a great deal about measuring temperature by becoming familiar with the thermometer! Hang a thermometer outside of your classroom and encourage students to keep a record of the outside temperature over the course of several weeks. What patterns do they notice? You can also invite a local meteorologist to come for a classroom visit to discuss local temperature trends.
- Conduct a scavenger hunt to find the smallest and largest items in your classroom. Estimate the length of these items, and then use a ruler to obtain the exact measurements.
- Arrange a group of objects on a table, and encourage students to estimate and to rank the objects from lightest to heaviest, identifying which objects weigh about the same amount. Then encourage students to use a balance scale to obtain the actual weights.
- Invite an architect to your classroom to discuss the use of measurement in a real-world setting. Before the visit, students can conduct research about this profession that relies on measurement by reading books like *Architect* by Mindi Rose Englart (Blackbirch Press, 2002).

(Continued)