

## MEASUREMENT (Strand B)

### Measuring Quantities and Making Estimates (Standards 1 and 3)

1. Axelrod, Amy. *Pigs on a Blanket*. New York: Simon & Schuster Books, 1996.

The pigs want a change of pace, so they decide to go to the beach. Do they run out of time?

- Have students keep track of the time it takes them to do various activities at home and at school. Classify activities of like type; if appropriate, determine statistics (mean, median, or mode) to describe the amount of time that students engage in the activity. Also, gather timetables from airport, bus, or train schedules and have students determine the total traveling time from one location to another.

2. Ash, Russell. *Incredible Comparisons*. London: Dorling Kindersley, 1996.

This book provides comparisons for many different categories.

- The various comparisons in this book provide a natural resource for creating word problems of all types. In addition, have students compare two objects of their own choosing, writing ratios and proportions that describe the comparisons.

3. Hoban, Tana. *Is It Larger? Is It Smaller?* New York: Mulberry Paperbacks, 1985.

Relative sizes are explored through photographs of real-world objects.

- Have students estimate sizes of objects and then actually measure the objects. Also have students make estimates for real-life objects in their environment, such as the height of their school, their classroom, or a famous local building. Compare their estimates with the real measures to help students improve their visual measuring skills with estimation.

4. Kellogg, Steven. *Much Bigger than Martin*. New York: Dial Books, 1976.

A young boy always feels too small when compared to his brother. He imagines what it would be like to be considerably bigger than his brother.

- Have students consider life on a scale model – such as model trains or model dollhouses. What would be the heights of tables, combs, brushes, people, etc. in such an environment? This is a good opportunity to mix measurement with number skills involving multiplication, division, and fractions.

5. Lionni, Leo. *Inch by Inch*. New York: Mulberry Books, 1960.

An inchworm uses itself to measure lots of different objects.

- Have students measure different objects using non-standard measures. Have students put five objects and five measuring units on a piece of chart paper and have other students attempt to match the measure with the unit used.

6. Malam, John. *Highest, Longest, Deepest: A Fold-Out Guide to the World's Record Breakers*. London: Simon and Schuster, 1996.

This book provides many natural examples that are record breakers for being the longest, highest, or deepest in their category.

- Many of the same types of activities as with *Incredible Comparisons* are appropriate here. The context of record breakers in the natural environment provides an opportunity to blend math with geography.

7. Most, Bernard. *How Big Were the Dinosaurs?* San Diego: Voyager Books, 1994.

Twenty different dinosaurs are introduced, with their sizes compared to modern day objects.

- Have students make comparisons of themselves and everyday objects to the size of a dinosaur. For instance, how many baseball bats would need to be laid end to end to be equal to the length of a student's favorite dinosaur?

8. Nathan, Cheryl and Lisa McCourt. *The Long and Short of It*. Bridgewater Books, 1998.

Animal pairs, at opposite ends of the spectrum, are used for comparisons.

- Similar activities as for *How Big Were the Dinosaurs?* can be used. Depending on their location, children could visit a zoo and attempt to check some of the comparisons in the book.

9. Walpole, Brenda. *Measure Up with Science: Distance*. Milwaukee: Gareth Stevens Publishing 1995.

This book discusses numerous aspects of linear measurement, with many experiments that children can complete.

- Students can engage in activities and experiments similar to those described in the book.

### **Area, Perimeter, and Volume (Standards 1 and 3)**

10. Grifalconi, Ann. *The Village of Round and Square Houses*. Boston: Little, Brown and Company, 1986.

In the African village of Tos, the men live in square houses and the women live in round houses. The story explains how this practice came to be.

- Have students explore the maximum area that can be enclosed with a given perimeter or the minimum perimeter that is used with a given area.

11. Mendez, Phil. *The Black Snowman*. New York: Scholastic, Inc., 1989.

A poor young Black boy decides he doesn't like being Black. He and his younger brother build a black snowman of dirty snow. When a kente cloth is placed on the snowman, he comes to life and relates important aspects of African heritage to the young boy.

- Have students consider the volume of various objects, including the volume of a snowman (or snowcone). Students can estimate results by using sand or kitty litter to fill cylinders or spheres using containers of known volume.

12. Moncure, Jane Bell. *The Biggest Snowball of All*. Columbus, Ohio: American Education Publishing, 1993.

Snowballs are used to explore size.

- Have students explore the volumes and surface areas of different balls. Students can also explore the circumferences of balls from various sports. What are the regulation sizes in each sport?

### **Weight (Standards 1 and 3)**

13. Allen, Pamela. *Who Sank the Boat?* New York: Coward-McCann, Inc., 1982.

A number of animals try to get in a boat. Which one causes the boat to sink?

- Have students fill a cup or lid floating in water with objects of the same size. How many can the lid hold before it sinks?

14. Barner, Bob. *How to Weigh an Elephant*. New York: Bantam Doubleday Dell, 1995.

Different animals compare their weight to that of an elephant.

- Have students write ratios or word problems comparing their weight with the weight of an animal. How does the amount of food they eat each day in relation to their weight compare to that of an animal of their choice?

15. Tompert, Ann. *Just a Little Bit*. Boston: Houghton Mifflin Company, 1993.

Which animal will be big enough to allow the elephant to go up and down on the see-saw?

- Have students try a weight experiment similar to that with *Who Sank the Boat?* If there is a see-saw on the playground, have the children actually try the experiment. Does the distance one sits from the pivot impact the number of children needed to balance the see-saw?

### **Money (Standards 1 and 3)**

16. Medearis, Angela Shelf. *Picking Peas for a Penny*. New York: Scholastic, 1990.

This book explores what it was like to pick peas for a living during the Depression. (The context of this book makes it great for use with a social studies connection.)

- Have students compare the salaries for different occupations and how they have changed over time. Have students compare the salaries for the same positions in different parts of the country and determine the average. Why would salaries vary in different parts of the country?

### **Systems of Measurement (Standard 2)**

17. Hightower, Susan. *Twelve Snails to One Lizard: A Tale of Mischief and Measurement*. New York: Simon & Schuster, 1997.

Many measurement activities take place as a beaver tries to measure the distance across a creek so he can build a dam.

- Have students measure a set of given objects in inches, feet, and yards. Record the values in a table and have students look for patterns. This is one way to have students develop the relations between various units.

18. Myller, Rolf. *How Big Is a Foot?* New York: Dell Publishing, 1962.

An apprentice tries to make a bed for the queen. Until he measures with the same foot size as the king, he is not able to build a bed that is the proper size.

- Have students measure the dimensions of the classroom using their own feet. Use the different measures as a way to discuss the need for standard units. Have students consider how the size of the units impacts the number of units needed.

## **Determining Appropriate Units and Instruments (Standard 4)**

19. Pluckrose, Henry. *Math Counts: Capacity*. Chicago: Children's Press, 1995.

Capacity is discussed through real-world pictures of objects.

- Have students make estimates of the amount that various containers will hold. Then have students actually measure the capacity of the container. Recording an estimate and then comparing to the actual amount is critical in helping students develop realistic conceptions of capacity.

20. Pluckrose, Henry. *Math Counts: Length*. Chicago: Children's Press, 1995.

The book discusses length through real-world pictures. Issues of customary and metric measures are included.

- Have students make estimates of the lengths of various objects and then check their estimates against actual measures.

21. Pluckrose, Henry. *Math Counts: Weight*. Chicago: Children's Press, 1995.

Issues of weight are discussed with pictures of real-world objects.

- Have students estimate the weight of various objects and then check their estimates against the actual weights.

## **Miscellaneous Measurement Ideas**

22. Brenner, Barbara. *Wagon Wheels*. New York: HarperTrophy, 1978.

A family travels from Kentucky to Kansas in the late 1800s seeking free land.

- Have students plan a trip from their home to a destination of their choice. How long does it take to travel there by car? By plane?

23. Caselli, Giovanni. *Wonders of the World*. New York: Dorling Kindersley, 1992.

This book describes ancient and modern wonders of the world.

- Have students compare the sizes of ancient wonders to the sizes of many of today's modern wonders. This book provides a natural opportunity to teach mathematics in a social studies context.

24. Jenkins, Steve. *Biggest, Strongest, Fastest*. New York: Ticknor & Fields Books, 1995.

Seventeen animals are highlighted who represent the strongest, or biggest, or fastest, etc. in some area.

- Similar comparisons to those made with other books can be done with this book as well.

25. Mollé, Tololwa M. *The Princess Who Lost Her Hair: An Akamba Legend*. Troll Associates, 1993.

This African tale describes a princess with long beautiful hair. Through selfishness, she loses her hair and faces shame. With the help of a poor young man, she learns kindness and generosity of spirit; when her hair returns, she has learned to share with others.

- For a set period of time, have students keep track of the length of their hair to determine how fast it grows. The data collected can be used to determine the average number of inches that a student's hair grows each day or week.

26. Wells, Robert E. *Is a Blue Whale the Biggest Thing There Is?* Morton Grove, IL: Albert Whitman & Company, 1993.

Sizes of objects on earth and throughout the galaxy are compared using the size of a blue whale.

- Have students compare the sizes of the different planets in the solar system. How long does light take to travel from the sun to the different planets? How long would it take the shuttle to travel from earth to the various planets and return home?

27. Wells, Robert E. *What's Faster than a Speeding Cheetah?* Morton Grove, IL: Albert Whitman & Company, 1997.

Speeds of different objects are compared through wonderful pictures and illustrations.

- Have students make word problems involving speed comparisons from the book and similar sources.

28. Wells, Robert E. *What's Smaller than a Pygmy Shrew?* Morton Grove, IL: Albert Whitman & Company, 1995.

Sizes of objects are compared to the size of a pygmy shrew.

- Have students explore the sizes of very small objects, including science objects such as molecules.