Literacy in Geometry 2012 NCTM Regional Conference October, 12, 2012 Dallas, Texas

> Kari Everett Kari.everett@wku.edu Joy Curtis Joy.curtis@wku.edu Western Kentucky University

#### Connection to the Common Core State Standards

- Kindergarten: Geometry
  - Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).
  - Analyze, compare, create, and compose shapes.
- Grade 1: Geometry
  - > Reason with shapes and their attributes.
- Grade 2: Geometry
  - > Reason with shapes and their attributes.
- Grade 3: Geometry & Geometric Measurement
  - > Reason with shapes and their attributes.
  - Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
- Grade 4: Geometry
  - > Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
- Grade 5: Geometric measurement
  - > Convert like measurement units within a given measurement system.
  - > Understand concepts of volume and relate volume to multiplication and to addition.
- Grade 6: Geometry
  - Solve real-world and mathematical problems involving area, surface area, and volume.
- Grade 7: Geometry
  - Draw, construct, and describe geometrical figures and describe the relationships between them.
  - Solve real-life and mathematical problems involving angle measures, area, surface area, and volume.

Connection to Mathematical Practices • MP4: Model with mathematics "Mathematically proficient students" can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace."

## Eye Spy Shapes by Debbie MacKinnon

- Have students identify objects in the classroom
- Bring something from home or picture of object that is one of the shapes discussed
- Kindergarten level

Cubes, Cones, Cylinders, and Spheres by Tana Hoban Like Eye Spy Shapes Have students build shapes from materials like paper, blocks, newspaper rods

K-1 grade level

The Greedy Triangle by Marilyn Burns

- Use popsicle sticks, pipe cleaners, cardboard/cardstock rectangles to show shapes as you are reading the story
- Have a student help with adding sides to the shape
- Extension: vocabulary for the students
  1-3 grade level

The Secret Birthday Message by Eric Carle

Have students write realistic messages to friends or family using shapes appropriate for words
Have students make a shape book
K-3 grade level

# Secret Message for audience

Sir Cumference and the First Round Table by Cindy Neuschwander

- Different ways to make tables with pattern blocks, patty paper, or grid paper
- Great play on words in the book2-4 grade level

Spaghetti and Meatballs for All
A Mathematical Story by
Marilyn Burns

- How to arrange tables in different settings
- Use building cubes to illustrate different arrangements
- Talk about similar shapes, perimeter

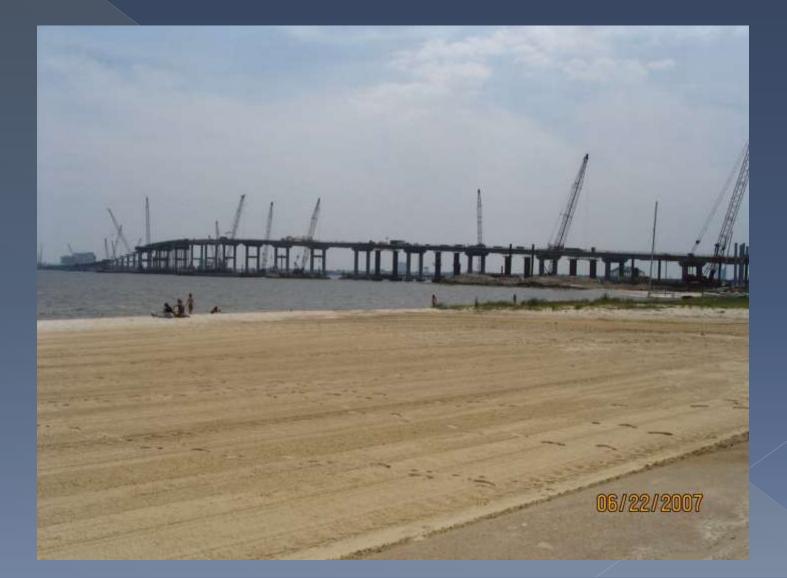
 Have worksheet to guide students through story stopping at different places to talk about table arrangements

• 3-4 grade level

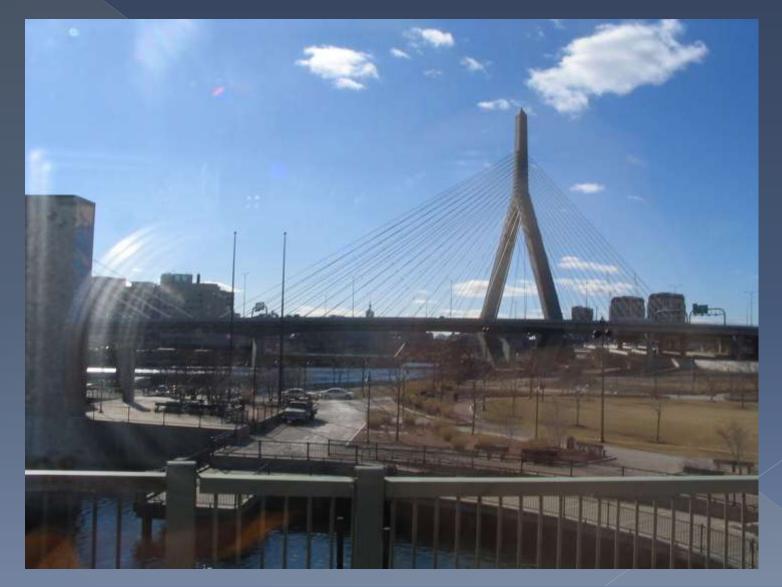
Bridges are to Cross by Philemon Sturges

- From what shapes are bridges made?
- Make own bridge from newspaper dowels in class
- Activity extension for students:
  - > connect to STEM and history of bridges
  - Have students make own bridge from popsicles sticks or pasta
- 4-5 grade level

# New Biloxi-Ocean Springs Bridge



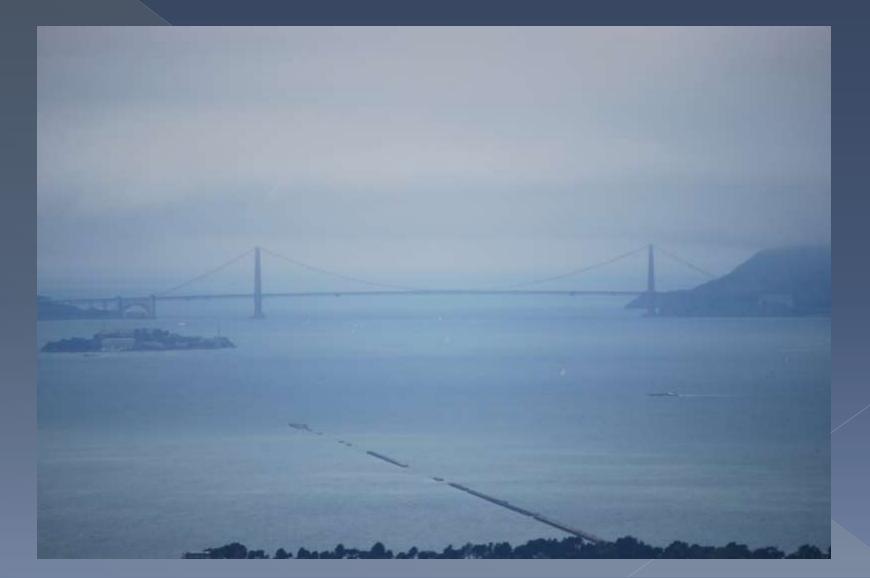




## Golden Gate Bridge



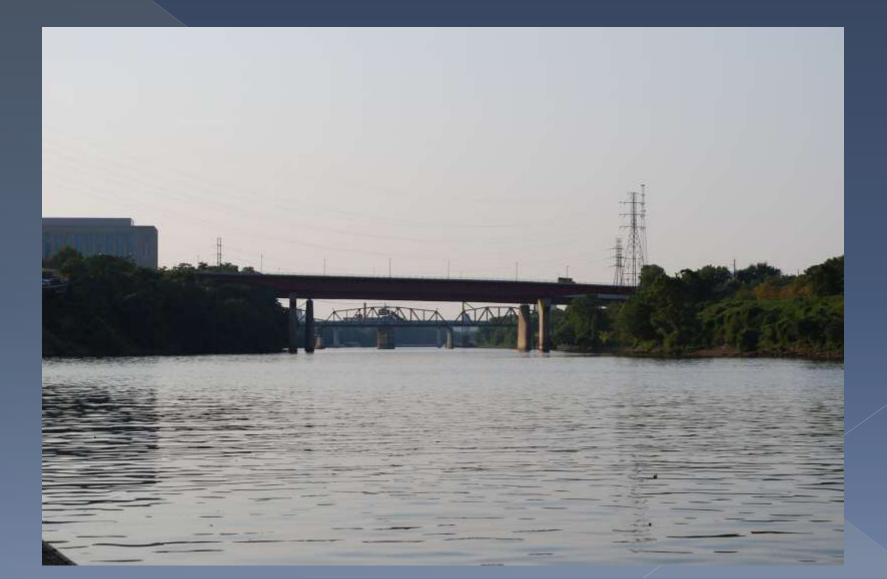
## Golden Gate Bridge



### Nashville



## Nashville



### Charleston, SC



# Monster Movers by George Ancona

- Connections to STEM and bridges
  Finding size of ships, front loaders, buckets for cranes based on volume
- able to hold
- Using various measurements for load time
- 4-7 grade level

### Shuttle mover

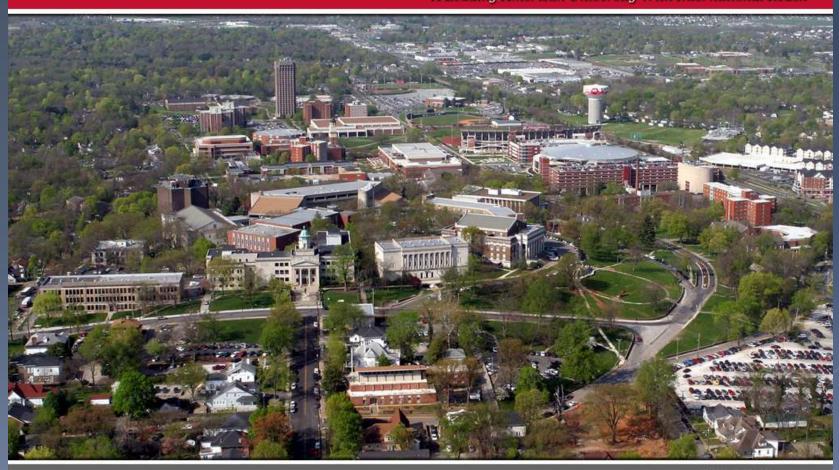


# The Phantom Tollbooth by Norton Juster

- Milo encounters amusing situations that involve numbers, geometry, measurements, and problem solving
- The chapters take Milo on various adventures
- Could assign activities for different chapters, but not necessarily all of them
- Cross-curriculum with history
- 2-8 grade level

### Questions???

A Leading American University With International Reach



**WKU Main Campus** 

#### References

- Ancona, G. (1983). Monster movers (1st ed.). New York: Dutton.
- Burns, M., & Silveria, G. (1994). The greedy triangle. New York: Scholastic.
- Burns, M., & Tilley, D. (1997). Spaghetti and meatballs for all! : A mathematical story (1st ed.). New York: Scholastic.
- Carle, E. (1972). The secret birthday message. New York,: Crowell.
- Common core state standards initiative (2011). Mathematics Standards. Retrieved from http://www.corestandards.org/the-standards/mathematics.
- Gonsalves, P., Kopp, J., & GEMS (Project). (1995). Build it! Festival : Teacher's guide : Grades k-6. Berkeley, CA: Great Explorations in Math and Science (GEMS), Lawrence Hall of Science, University of California at Berkeley.
- Hoban, T. (2000). Cubes, cones, cylinders & spheres (1st ed.). New York: Greenwillow Books.
- Juster, N., & Feiffer, J. (1961). The phantom tollbooth. New York,: Epstein & Carroll; distributed by Random House.
- Macaulay, D. (1977). Castle. Boston: Houghton Mifflin.
- MacKinnon, D., & Sieveking, A. (2000). Eye spy shapes. Watertown, MA: Charlesbridge.
- Neuschwander, C., & Geehan, W. (1997). Sir cumference and the first round table : A math adventure. Watertown, MA: Charlesbridge.
- Sturges, P., & Laroche, G. (1998). Bridges are to cross. New York: G.P. Putnam's Sons.

### More Books!

- Anno, M. (1991). Anno's math games iii (1st American ed.). New York: Philomel Books.
- Baum, A., & Baum, J. (1987). Opt : An illusionary tale. New York, N.Y., U.S.A.: Viking Kestrel.
- Birch, D., & Grebu, D. (1988). The king's chessboard (1st ed.). New York: Dial Books for Young Readers.
- Coerr, E., & Himler, R. (1977). Sadako and the thousand paper cranes. New York: Putnam.
- Flournoy, V., Pinkney, J., & Juvenile Collection (Library of Congress). (1985). The patchwork quilt (1st ed.). New York: Dial Books for Young Readers.
- Froman, R., & Weiss, H. (1972). Rubber bands, baseballs and doughnuts; a book about topology. New York,: Crowell.
- Grifalconi, A. (1986). The village of round and square houses. Boston: Little, Brown.
- Hoban, T. (1986). Shapes, shapes, shapes (1st ed.). New York: Greenwillow Books.
- Högner, F. (1986). From blueprint to house. Minneapolis: Carolrhoda Books.
- Jonas, A. (1983). Round trip (1st ed.). New York: Greenwillow Books.
- Newman, L. S., & Newman, J. H. (1974). Kite craft; the history and processes of kitemaking throughout the world. New York,: Crown Publishers.
- Paul, A. W., & Winter, J. (1991). Eight hands round : A patchwork alphabet (1st ed.). New York: HarperCollins.
- Pittman, H. C. (1986). A grain of rice. New York: Hastings House : Distributed to the trade by Kampmann & Co.
- Polacco, P. (1988). The keeping quilt. New York: Simon & Schuster Books for Young Readers.
- Robbins, K. (1991). Bridges (1st ed.). New York: Dial Books.
- Rogers, P., & Tucker, S. (1990). The shapes game (1st American ed.). New York: H. Holt.
- Simon, S., & Barton, B. (1971). The paper airplane book ([1st ed.). New York,: Viking Press.
- Srivastava, J. J., & Lustig, L. (1980). Spaces, shapes, and sizes (1st ed.). New York: Crowell.
- Steltzer, U. (1995). Building an igloo (1st American ed.). New York: H. Holt.
- Stevenson, R. L., & Wolff, A. (1988). Block city (1st ed.). New York: E.P. Dutton.
- Sutton, E., & Dodd, L. (1974). My cat likes to hide in boxes. New York,: Parents' Magazine Press.
- Testa, F. (1983). If you look around you (1st ed.). New York, N.Y.: Dial Books for Young Readers.
- Tompert, A., & Parker, R. A. (1990). Grandfather tang's story (1st ed.). New York: Crown Publishers.
- Webb, P. H., Corby, J., & Miniature Book Collection (Library of Congress). (1990). The little book of hand shadows (Running Press miniature ed.). Philadelphia, Pa.: Running Press.
- Weiss, S. (1984). Wings & things : Origami that flies. New York: St. Martin's Press.
- Yue, D., & Yue, C. (1984). The tipi : A center of native american life. New York: A.A. Knopf.