

# NUMBER, GEOMETRY, AND MEASUREMENT! OH, MY! MATH FOR PRESCHOOLERS

PTAC July 2011

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Good early mathematics is broader and deeper than early practice on "school skills."

Quality mathematics is a joy, not a pressure.

It emerges from children's play, their curiosity, and their natural ability to think.

-Doug Clements & Julie Sarama, 2009

## NUMBER TASKS

### Counting Wand

Materials: soft or light stick to use a wand (decorated ruler, wrapping paper tube, baton, etc.)

Instructions: Draw children's attention to items that can be counted. Ask: I wonder how many children there are here? Model several times (tap each child on the shoulder and count, tap and count chairs, etc). Then allow a child to be the counter.



### Snowball Hunt

Materials: twelve cotton balls, egg carton with the egg cups numbered from 1 to 12

Instructions: Hide the cotton-ball "snowballs" around the room. Give child an empty egg carton. Let the children walk around the room looking for the hidden "snowballs." Encourage them to fill the egg cups in order from 1 to 12. The child can then hide the snowballs for the next student.



### Zero Game

Materials: none

Instructions: Ask children how many doors are in the room. How many chairs? Then ask them to count an object of which you have none. How many alligators are there? How many spaceships? Have all the children with brown hair stand up. Have all the children with purple hair stand up. Have children wearing shoes with laces stand up. Have children wearing no shoes stand up. Continue exploring the concept of zero by using characteristics that some of the children have and sometimes using characteristics that none of the children have.

### Hop To It

Materials: index cards numbered 1-10, construction paper numbered 1-10

Instructions: Give each child an index card with a number on it (can assign several children the same number). Put a construction paper number card on the floor and ask children with the matching card number to hop the corresponding number of times then place their small number card on top of the big one. Continue until each child matches his/her number.

### A Pair of Socks



Materials: socks, clothesline, clothespins

Instructions: Hang the clothesline at child-height. Set out an assortment of socks, some of which do not have matches. Have children match the socks and hang them beside each other on the line. Have the children practice counting 1-2, 1-2. Any socks that do not have a match are left off the line. Discuss what the term "pair" means.

### Pizza, Pizza

Materials: paper plates, red construction paper cut into circles (to represent pepperoni), index cards numbered from 1-10, glue

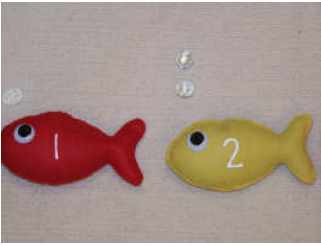
Instructions: Children draw a card and create a pizza with the number of pepperoni slices as shown on the card by gluing the construction paper circles (pepperoni) to the pizza (paper plate). Children glue the numbered index card to the back of the paper plate. (This can also be done with English muffins and real pepperoni.)

### Flower Pot Counting

Materials: plastic flower pots with a small amount of florist foam in each pot, flower cutouts attached to craft sticks

Instructions: Number the pots from 1-10 (or higher if desired). Have children place the correct number of flowers in each pot. Can make the task more challenging by writing addition facts (i.e.  $2 + 3$ ) on a flower and having the child place the flower in the 5 pot.





### Fishy Bubble Counting

Materials: fish cutouts numbered 1-10 (or higher if desired) flat-sided glass marbles

Instructions: Have children put the fish cutouts in order. Have children match the number of marbles to the number written on the fish, placing the marbles above the fish as if they were bubbles coming out of the fish's mouth. Older children may make a journal entry to record their work. Draw a picture showing a fish labeled with a number and with the correct number of bubbles coming out of its mouth.

### Wrapping Paper Sets

Materials: wrapping paper scraps, markers

Instructions: Have children circle sets of two objects, such as two teddy bears, two presents, or two balloons—whatever pattern is found on the wrapping paper. Next time, have students circle sets of three, four, or five.



### Counting Drops

Materials: eye droppers, small bowls of food coloring diluted slightly with water, ten clear-plastic cups halfway filled with water, ten color-counting cards made by drawing combinations of different colored dots on index cards. For example, draw combinations such as three blue dots and two red dots; two yellow dots and one blue dot; one blue dot, two red dots, etc.

Instructions: Have the child select a color-counting card. Have them use the eyedroppers to measure the appropriate color and number of food coloring drops into each cup. Have the children count the drops as they are adding them.

## GEOMETRY TASKS



### Pass the Shapes

Materials: index cards with shapes drawn on them (for a whole class activity, use about 4-5 cards; for small group use 2 cards), music played on a CD player

Instructions: Have the children sit in a circle and pass the card to the person next to them as the music plays. Whenever you stop the music, have the children holding a shape card hold them up and name the shape. Continue the game, substituting other shape cards as desired.

### If We Didn't Have Circles

Materials: paper and crayons or markers for making books

Instructions: Talk about the usefulness of various shapes in real world objects. Discuss the circle and rectangle in particular. Circles make handy wheels for cars and bikes, Ferris wheels, and so on. Rectangles make great doors, windows, and table tops. What would happen if we didn't have rectangles? What shape would we use for our doors? How would triangular doors look? How would triangular doors work? Make a class book. Title the book: *If We Didn't Have Circles...* or *If We Didn't Have Rectangles...*

### Shoelace Shapes

Materials: construction paper, 20-inch shoelace or string

Instructions: Draw one large shape (can also use numerals) on a sheet of construction paper. Have children place the laces or string on top of the shape or numeral. Talk about the curvy and straight parts of the shape. Ask, how is this shape the same as/different from \_\_\_\_?



### Erase a Triangle

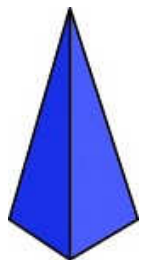
Materials: White board or chalkboard with many triangles and a few other shapes drawn on it

Instructions: Have child erase or cross out all the triangles. Next time focus on another shape. Make sure the shapes are presented in a variety of orientations and styles, i.e. not all triangles are equilateral.

### Straw Triangles

Materials: straws, playdough or clay

Instructions: Children cut straws to different lengths. Children roll small ball of clay to join three lengths of straws to make a triangle. Emphasize that a triangle has three sides. Have children make as many different triangles as possible.

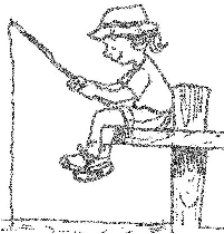


### Missing Dot Triangles

Materials: dot stickers, crayons, paper, ruler or straight edge (optional)

Instructions: On several sheets of paper, place two dots. The dots may be in the same position on each sheet of paper or you may vary the position. Have the child place a third dot, then connect the dots to form a triangle. Emphasize that a triangle has

three sides (the lines) and three corners (the dots). Have the child repeat as many times as possible, place the third dot in a different position each time. Compare the triangles and discuss the similarities and differences between them.



#### Fishing for Shapes

Materials: shapes cut from foam with a metal paper clip attached to each, string with magnet attached to end, shallow tub (water optional)

Instructions: Say a shape out loud. Have the child “fish” for that shape. When the correct shape is found, talk about its attributes (number of sides, etc.). Next round, instead of saying the name of a shape, give clues such as, “Fish for a shape with four sides that are all the same length.” Next round, give clues such as, “Fish for a shape that looks like a clock face.”

#### Shape Story

Materials: index cards with shapes drawn on them (one per child)

Instructions: Make up a story with lots of shapes in it. Each time your story mentions a shape, have the children with the corresponding cards hold them up. For example, your story might go like this: “Once upon a time, there were some children eating some snacks. They ate some crackers shaped like circles. Then they ate some cheese slices that looked like rectangles. When they got thirsty, they drank from cups with circle openings. They wiped their mouths with napkins that were folding into triangles.”

#### Circles and Cans

Materials: food cans of different sizes, construction paper (cut in half), markers

Instructions: Display several food cans and discuss their shape (round) with children. Shift focus to the bottom and top of the can (bases). Point out to children that these areas are circular; the edges are circles. Trace several food cans onto construction paper. Shuffle the papers. Have the children match the cans to the traced circles.



#### Button Sorting



Materials: selection of buttons, construction paper

Instructions: *Option One:* label paper with the numbers 1, 2, & 4. Children sort the buttons by counting the number of holes and placing the button on the appropriate sheet. *Option Two:* Ask children to sort the buttons using whatever attribute they wish. The only requirement is that they must be able to support their decision to place a button in a certain pile. *Option Three:* Have two children work together. One child selects five buttons—four of which have a common attribute and one of which does not have that attribute. The partner tries to guess which button doesn't belong and why.

#### Shape Rubbings

Materials: construction paper, unwrapped crayons, several geometric shapes made of foam or plastic taped securely to the table (attribute blocks work well)

Instructions: Have child rub a crayon over the paper. Have them name the shapes, count how many of each, etc. Afterwards, if desired, you may label or have the child label each shape.



#### Shape Memory

Materials: index cards with shapes drawn on them (four of each shape)

Instructions: Have children sit in a semi circle across from you. Set out two or three shape cards where the children can see them. Then ask the children to close their eyes while you remove one card. Have the children open their eyes and guess which card you removed.

#### Shark Teeth



Materials: gray construction paper (one per child), white construction paper folded into triangles (3 per child), scissors, glue

Instructions: Have children draw an oval on the gray construction paper to represent the shark's head. Ask them how they might use the white construction paper triangles to make shark teeth. They may do this by snipping the end points of each of the three triangles. Glue the small triangles to the oval. Draw eyes, etc. Ask them what they might do with the leftover white construction paper. Fins possibly?

#### Shape Hopscotch

Materials: using sidewalk chalk (outside) or masking tape (inside) make a simple hopscotch pattern with eleven sections then draw a shape in each section, stone or bean bag

Instructions: Have children take turns hopping on the squares, calling out the shape names as they land on them. Next have children toss a small stone or bean bag and play traditional hopscotch skipping the section where the stone landed. Have the child name an object that is the same shape as the shape the stone landed



on. Next round, call out a pattern for kids to hop on such as, “circle, square, square, triangle.”



### Hidden Shapes

Materials: white paper with shapes written with white crayon, watercolors, bowls of water

Instructions: Give each child a sheet of white paper with a shape written with white crayon all over it. Let the children brush the watercolors over the paper to reveal the hidden shape. Repeat with all of the basic shapes.

If desired, you may compile the shape sheets to make a booklet for the child to take home.

## MEASUREMENT TASKS

### Plant Growth



Materials: quick growing flowers such as sunflowers, zinnias, nasturtiums, ageratum, marigolds, bachelor's buttons, cosmos or alyssum or vegetables such as zucchini, radishes, pumpkin, peas or cucumbers.

Instructions: Let the children help make a plant ruler to insert into the soil next to the sprouting plant. Do this by taping a regular ruler to a craft stick so that the zero is level with the soil line. Check the growth once a week or more often as desired. Make a line graph to record the plant's growth over time.

### If the Box Fits

Materials: collection of boxes and items that fit into the boxes

Instructions: Show a set of boxes or containers and a set of objects that fit into the boxes. Tell children that each object needs to fit into one and only one box. Have children select the container for each object. Remind them to watch out that they don't choose a big box for a small item, because the big box may be needed for a larger item.



### How Much Does It Hold?

Materials: empty cans and boxes, packing peanuts, beans, wooden blocks, or rice and scoops to measure capacity

Instructions: Have the children choose three or four cans or boxes. Play a game guessing to discover which cans or boxes *Hold More*, *Hold Less*, and *Hold the Same*. Have children devise a method for testing their capacity guesses.

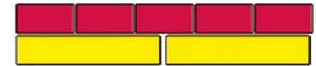
### Cuisenaire Rod Trains

Materials: Cuisenaire rods

Instructions: Have children explore the rods by sorting, building with and counting them.

Challenge children to make trains of the same length using different combinations of rods.

For example, you might challenge the children to make trains of two rods that are the same length as one orange rod. (Sample solution: one green and one purple rod)



### Weigh More Fun

Materials: Have children bring small items from home such as a can, spool of thread, toy, pen, jar, cap, stuffed animal, or mug (this also works well on show-and-tell day since kids already have something from home with them), balance scale

Instructions: Have each child try to find another student who has an item that has about the same weight. Use a balance scale to check.



### Weighing In

Materials: kitchen scale, fruits and vegetables

Instructions: Have the children explore with the scale and the food. Challenge them to find two foods that weigh the same. Encourage them to use measurement vocabulary such as heavier, lighter, compare, measure, weight, etc.

**Preschoolers' brains undergo significant development and grow most as the result of complex activities—not from simple skill learning. They need many hands-on/minds-on activities to build foundational understanding of math concepts.**