

Arithmetic, Algebra, Geometry, Measurement & Statistics, Oh My!

How can we foster positive attitudes and build conceptual foundations about mathematics while children are in preschool and kindergarten?

Please join us for an exploration of math opportunities at school, at home, and in the community!

Family Math

**CMU Children's School
Staff / Parent Discussion**

**Friday, September 24, 2010
10:00 – 11:30 AM, Margaret Morrison Building – Room 227**

Preschool 4's and Kindergarten Children will be in school. Child Care will be provided for children 3 and under in the Red Room.

We'll share ideas from teachers of 3's, 4's, and Kindergartners. We'll offer suggestions for supporting math learning through cooking, household chores, book reading, game playing, etc.

Please RSVP to this email, indicating how many adults will attend and the ages of children needing child care.

We look forward to exploring Math with you!!

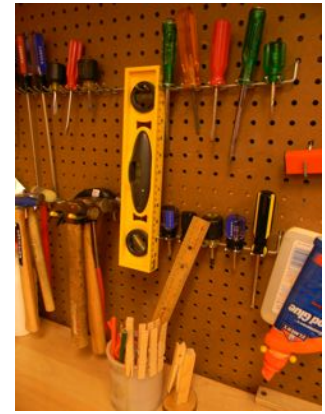
Dr. Carver

Family Math

CMU Children's School
Staff / Parent Discussion 9/24/10

5 Processes of Math

- Problem solving
- Reasoning
- Communicating
- Connecting
- Representing



5 Concept Areas of Math for Emphasis in Early Childhood

1) Number & Operations (Arithmetic)

Includes:

- Counting
- Comparing & Ordering Numbers
- Recognizing Number & Subitizing (visually perceiving the quantity)
- Composing and Decomposing Numbers
- Adding & Subtracting
- Multiplying & Dividing



2) Patterns, Functions & Algebra

Includes Identifying Patterns and Describing Change

3) Geometry & Spatial Sense

Includes:

- Recognizing & Forming Shapes (individually and in combination)
- Describing Locations, Directions, and Coordinates
- Transforming & Creating Symmetry
- Visualizing & Reasoning Spatially



4) Measurement

Includes both Comparing Attributes Using Units and Specific Techniques & Tools

5) Data Analysis & Probability (Statistics)

Includes Classifying & Organizing Data Using Varied Representations, then Using the Information to Make Decisions



CMU Children's School
Integration of Math Concept Areas

1) Number & Operations (**Arithmetic**)

- 3's Identifying numbers at centers, on the calendar, on the timer, etc.
Counting friends, items at snack, steps, etc.
Doing number puzzles
Partitioning items for equal sharing

- 4's Counting days of school, up to 100, by 10's, etc.
Table setting practices one-to-one correspondence
Guessing jar emphasizes estimation
Recognizing and writing printed numbers for signs, labels, etc.

- K Being the Number Helper (Math Spinner)
Experimenting with Bean Counters (different colors on each side,
shake to see how many of each color you get, then write the
equation $3 B + 2 W = 5 \text{ beans}$)
Exploring money and the relationships between coins

Book Samples:

Who's Counting
Feast for 10
Two Ways to Count to Ten
One Hundred Hungry Ants
How Many is a Million?
How Many Legs in All
The Doorbell Rang
Two Greedy Bears

Game Samples:

Snail's Pace Race
Number Bingo
Uno
Tip Top Tally

2) Patterns, Functions & Algebra

- 3's Noticing patterns on clothing, in the weather for the week, in stories or songs, in the routine of the day, etc.
Predicting what will happen in a story, song, routine, etc. based on the pattern so far
- 4's Recognizing and extending simple patterns of objects, on the calendar, when stringing beads, etc.
Noticing naturally occurring patterns on clothing, buildings, objects, but also in nature
Playing games with patterns of children (e.g., sitting, standing, kneeling, sitting, standing ...) and with patterns of actions (head, shoulders, knees & toes)
- K Extending patterns to materials including classmates faces, theme-related materials, etc. with longer and more complex combinations of elements
Using computer art programs, such as KidPix, to explore and create graphic patterns

Book Samples:

What is the Pattern?
Posy's Patterns
The Hungry Caterpillar
One, Two, Skip a Few

Game Samples:

Lacing Patterns
Memory Game Sets can be used for patterns (parent-child, front-back)
What's Next? Puzzles emphasize patterns of change
Rivers, Roads & Rails

3) Geometry & Spatial Sense

- 3's Cutting playdough shapes
Drawing or painting shapes
Making tracks with tape
Noticing shapes while building with blocks, magnet tiles, etc.
Emphasizing behind & in front of when lining up
- 4's Putting puzzles together using visual strategies
Using clipboard with paper to draw constructions
Making designs with tangrams and other manipulatives
Mapping the classroom
- K Emphasizing combining shapes to draw common objects
Creating symmetry in art (e.g., bilateral in totem pole, radial in "surround patterns")

Book Samples:

Bear in a Square
Right Down the Middle

Game Samples:

Shapes Up
Castle Logic
Blokus

4) Measurement

- 3's Comparing people and objects by size
Noticing cups that are full, half full, empty
- 4's Using measurement tools at the woodworking center
Creating equal weight on a balance scale
- K Comparing distances by counting steps to get there
Using unifix cubes to measure objects using standard units
Beginning to emphasize time and timing

Book Samples:

My First Look at Sizes
How Do We Measure?
Inch by Inch

Game Samples:

Tall Bird, Short Bird
Measure for Treasures

5) Data Analysis & Probability (Statistics)

- 3's Sorting toys for storage (blocks vs. play food, different types & shapes of blocks)
 Learning who's a 3's friend vs. 4's friend, blue vs. red room, etc.
- 4's Using graphing strategies to organize birthday, name length, family size, and other data about the friends in each class
- K Playing "How many in a Handful"
 Answering the Question of the Day, then comparing responses
 Being the Clipboard Helper – Take a Survey
 Graphing the weather each month and then keeping a record to compare months

Book Samples:

Just Enough Carrots
Is It Likely to Happen?

Game Samples:

Color & Shape Bingo
Pet Hunt
Guess Who

Home Activity Ideas

Card Playing: Concentration & Kings Corner Emphasize Multiple Skills

- 1) Learn the sequence of numbers & face cards, count cards or matches, etc. (Play Who has More?).
- 2) Alternate suits or colors.
- 3) Recognize spades, hearts, clubs & diamonds.
- 4) Arrange items by value, compare different decks by size, etc.
- 5) Consider chances of getting a certain card (vs. rolling a certain number on a die for example).

Household Help

Table Setting:

- 1) Count the correct number of plates, utensils, etc.
- 2) Find patterns in napkins, tablecloths, baskets, etc.
- 3) Use spatial arrangement terms - above, next to, on top of, to the right of, etc.
- 4) Notice size relations between multiple plates, forks, etc.
- 5) After washing the dishes, sort everything and put it away!

Laundry:

- 1) Count the items.
- 2) Notice patterns in the fabric, match the pairs, etc.
- 3) Identify shapes in the designs.
- 4) Arrange items by size (also identifies whose they are).
- 5) Sort items by type (also determines where they are stored).

Recycling:

- 1) Count the items of paper, plastic, metal, etc.
- 2) Notice patterns in the materials, consider changes in the materials when prepared for recycling, etc.
- 3) Find the 3-dimensional shapes vs. 2-dimensional.
- 4) Arrange items by size, weight, or weigh the recycling vs. the trash each week.
- 5) Graph the weight of the recycled materials vs. the trash to find the patterns over time.

Cooking:

- 1) Count helpers, aprons, cups of ingredients, etc.
- 1) Do operations with how much more do I need, multiplying a recipe, dividing equal shares, etc.
- 2) Emphasize patterns in recipe steps (add, stir, add, stir) or in layering (such as with lasagna).
- 3) Notice shapes and symmetry of utensils (e.g., apple cutter, funnel).
- 3) Cut biscuits, make pancakes, etc. into shapes.
- 3) Combine shapes to make a larger object (e.g., pineapple turkey).

- 4) Use measuring spoons & cups, emphasizing the relative size.
- 4) Compare the size of bowls, utensils, etc.
- 4) Use a scale to weigh food & compare (e.g., weight of a lemon before & after squeezing).
- 4) Use the oven timer according to the recipe.
- 5) Sort ingredients by food groups.
- 5) Do taste tests and compare preferences, etc.

Neighborhood Activity Ideas

Start a Collection:

- 1) Count the items in your collection.
- 2) Arrange the items to make patterns that repeat or grow.
- 3) Identify the shapes in your collection.
- 4) Arrange the items in order of size, thickness, weight, etc.
- 5) Sort the items in many different ways and record which groups have more, fewer, or the same number.

Play I Spy Math when Walking or Driving:

- 1) Find singles, pairs, triples, etc., as well as finding numerals on signs, license plate with 2's in them, etc.
- 2) Look for patterns on buildings (e.g., window, door, window, door or pillar, space, bench, space, pillar, space ...). Also consider "growing or shrinking patterns", such as 2 steps then 4 steps then 6 steps or 5 bricks then 4 bricks then 3 bricks, etc.
- 3) Locate the shapes and symmetries in both natural and artificial objects
- 4) Notice objects that are big & small, moving fast or slowly, that appear heavy or light, etc. and then estimate height, speed, weight, etc.
- 5) Using a clipboard, keep a tally of the number of different color, type or size of vehicles, or any other items that can be categorized, and then make predictions about what you're most likely to encounter next