



# Blocks & Math

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# Block play is nothing new!

- Plato, Comenius, Pestalozzi: the urge to build is natural to children
- Locke (1693): learning should be fun
- S.L. Hill Co. (1858): spelling & ABC blocks
- Jesse Crandall (1881): nesting blocks
- F. Ad Richter & Co (1899) Architectural blocks complete with blueprints.....

# Blocks as classroom Learning tools

- Froebel (1826/1887): gifts & occupations (#5 & 6); building forms of life (objects such as houses), forms of knowledge (number/geometry), and forms of beauty (creativity using symmetry)
- Patty Smith Hill (1905): *very* large blocks for cooperative free play ala Dewey
- Montessori (1917): pink tower & brown stairs
- Caroline Pratt (1913): UNIT BLOCKS

# Unit Blocks

- Standard unit measures 5 1/2" x 3 3/4" x 1 3/8"  
(12.47 cm x 9.53 cm x 2.21 cm)
- Other blocks designed as half units, double units, quadruples, curves, ramps, triangles, arches, pillars, switches, cylinders
- Hardwood, beveled edges
- New foam versions as well



# Beyond Unit Blocks!

- Gryphon Bricks



- Lego MindStorms



# Math emphasis

- 1957 – SPUTNIK paranoia leads to NDA, “new math,” & development of math manipulatives
- Cuisenaire rods
- Stern Apparatus
- Dienes Logiblocks
- Unifix cubes
- Lowenfeld Poleidoblocs

# Blockbuilding supports:

- Physical development
- Social/Emotional growth
- Creativity
- Cognition
- Math
- Science
- Literacy



# Blockbuilding stages

- Handles (carries), but does not build- toddler
- Makes rows (horizontal or vertical) repeated patterns, simple symbolic representation i.e. block is car (2-3)
- Makes gates/bridges (beginning of problem solving) (3+)
- Makes enclosures (2-4), with bridging = sophisticated building
- Uses to make decorative patterns/symmetry ( 4's)
- Names structures/dramatic play structure directly related to theme of play– (4/5's)
- Makes buildings that represent actual known structures (5+)



# Specific Math concepts

- Classifying
- Ordering
- Number
- Counting
- Comparing
- Part/whole
- Measurement
- Area
- Size
- Spatial relationships
- Mapping
- Patterning
- Fractions
- Operations
- Estimating/predicting
- Negative space
- Addition/subtraction
- One/one correspondence
- Seriation

# The Block Center



- Large, flat surface (carpet reduces noise)
- Separated from other activities
- Low, accessible, labeled shelves
- Variety of blocks including hollow, interlocking, cardboard, etc.
- Accessories
- Simple guidelines

# Guidelines for play

- We build with blocks, not throw them
- You may knock down only the tower you build
- You may build as tall as you are
- We keeps blocks on the carpet
- We build away from the shelves & others
- We take only what we will use

# Clean up suggestions

- Shape tickets (clean up blocks that match)
- Number tickets (clean up # on card)
- Offer choices – do you want to pick up short or long ones?
- Singing & chanting
- Choose a shelf (work in pairs or groups)

# Facilitating Block Play

- Be interested/observant
- Allow enough time
- Share products: leave up as long as possible
- Share products: Take pictures & post in center or make scrapbooks
- Provide prompts that encourage mathematical thinking

# Examples of prompts that promote mathematical thinking

- You used a lot of blocks. He has only a few blocks. He needs five more blocks (number, comparison)
- Can you find another just like this one? (matching, classifying)
- How can you make this road as long as that one? How can you make this side as high as that one? (, measurement, spatial relationships, problem solving)
- I wonder what would happen if we put this block here (experimentation, prediction, testing)
- Look, 2 square blocks are as long as, or equal to, one rectangle- This rectangle is half as long as that one (fractions, measurement, spatial relationships, labeling)
- Can you make the same pattern with your blocks that I have made with mine? (comparison, patterning)
- Try to make the other side the same as this one (symmetry)
- How can we connect these two blocks (Problem solving)

# Math Performance Assessments

- Make reproduction of structure with paper shapes
- Provide a chart with shapes of blocks and ask how many of each kind were used to build structure
- Measure/graph length/width/height of structures
- Estimate how many blocks were used
- Fractions: construct wholes using blocks that represent halves, quarters (and reverse)
- Ratios: how many ways can child represent identical structure using different sized blocks
- Reproduce patterns
- Trace/match block shapes
- Use 'blueprints' to reproduce structures

# Now You....

- Brainstorm appropriate accessories
  - Purchased
  - Free/found
- Develop an idea for an integrated block play theme; for example, “Our neighborhood” and extension of concepts to other content areas