



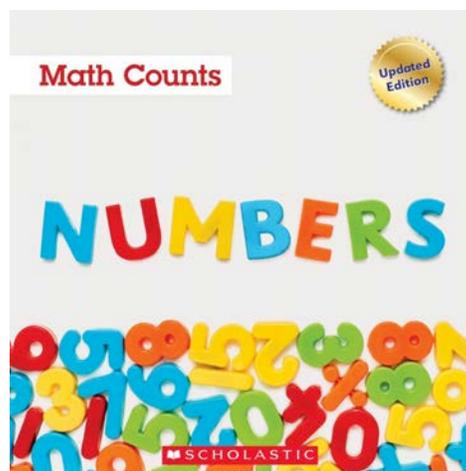
Math (S.T.E.A.M.)



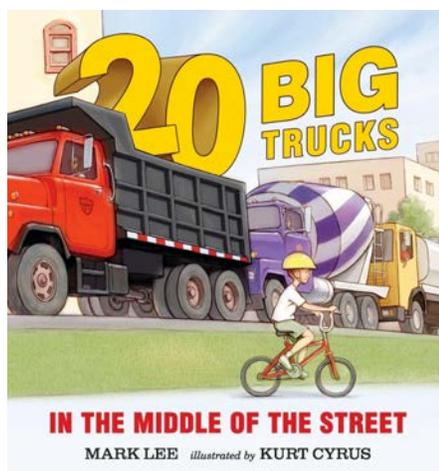
Math

Engaging with mathematics helps children develop logical thinking and problem-solving skills essential for success in various academic and real-world contexts. By exploring patterns, shapes, and numbers, children build a solid foundation for understanding complex mathematical concepts, enhancing their analytical abilities and preparing them for future academic and professional pursuits.

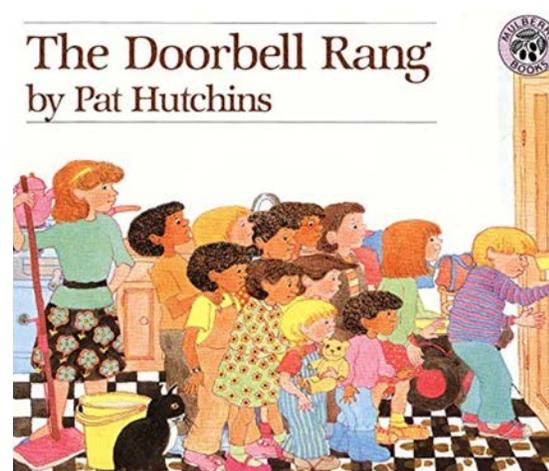
Books We Love That Support Math Concepts:



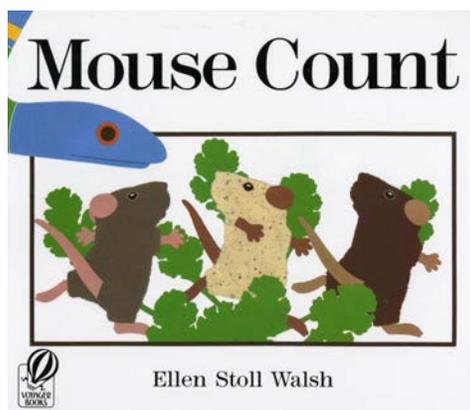
Numbers,
by Henry Pluckrose



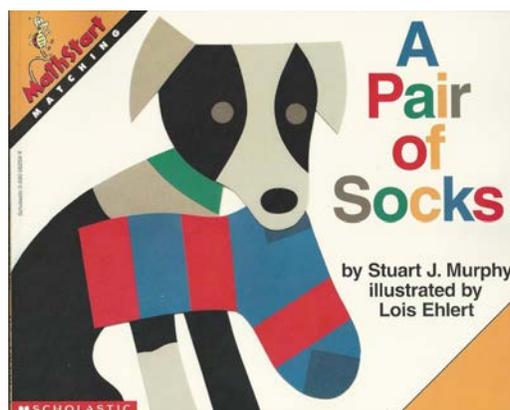
20 Big Trucks In The Middle Of The Street,
by Mark Lee



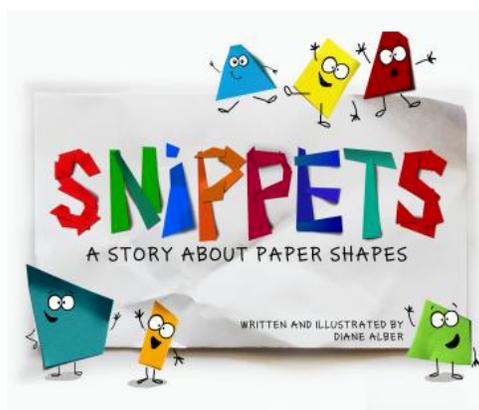
The Doorbell Rang,
by Pat Hutchins



Mouse Count,
by Ellen Stoll Walsh



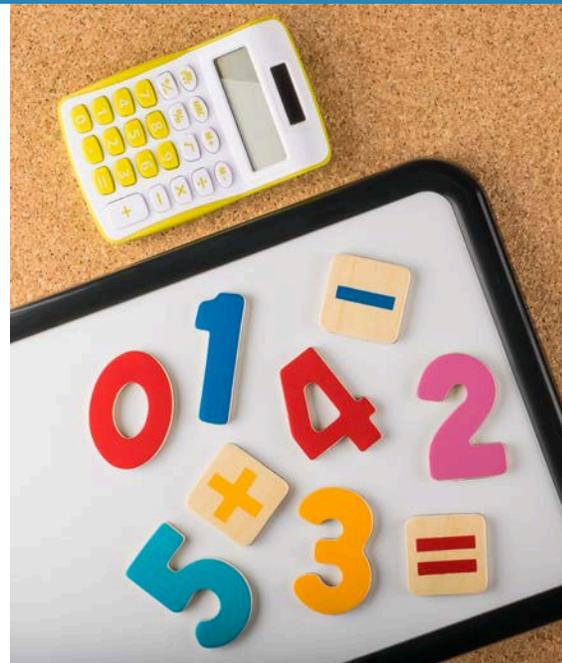
A Pair of Socks,
by Stuart J. Murphy



Snippets,
by Diane Alber

20 Materials to Support Math Exploration

1. Pattern blocks
2. Geometric solids
3. Math manipulatives (e.g. base-ten blocks)
4. Fraction tiles or circles
5. Wood or magnetic numbers
6. Calculator or toy register
7. Math dice or playing cards
8. Measuring tape
9. Rulers
10. Protractors and compasses
11. Abacus or counting frames
12. Balance scales
13. Loose parts (to weigh and measure materials)
14. Clocks and timers
15. Dominoes or number tiles
16. Dice (standard and polyhedral)
17. Math puzzles
18. Math storybooks
19. Geoboards and rubber bands
20. Building blocks for counting or patterning





Exploring Shapes & Dimensions

MATERIALS

- Geometric shapes
- Magna-Tiles or similar building tiles
- 2 Acrylic mirrors
- Large tray or baskets to store materials.
- Optional:
 - Book: Mouse Shapes, by Ellen Stoll Walsh
 - String lights to add an element of light that may foster concepts of transparency, translucency, and opaque.

DIRECTIONS

- Place one mirror down on the table, and stand the other mirror up.
- Next to the mirrors, place pattern blocks and/or magna tiles and invite children to explore and play.
- If you have the book "Mouse Shapes," you may read before or after their play to connect hands-on experimentation + literacy.

LEARNING OBJECTIVES

- **Shape Recognition:** Support the ability to name various geometric shapes, including squares, triangles, circles, and rectangles.
- **Dimensional Understanding:** Through hands-on exploration, children will develop an understanding of two-dimensional (2D) and three-dimensional (3D) shapes and their properties.
- **Symmetry and Reflection:** Children will explore symmetry and reflections using acrylic mirrors, observing how shapes and patterns are reflected across the mirror's surface.
- **Creative Expression:** Children will express their creativity by building unique structures and patterns using the geometric shapes and Magna-Tiles.



DIY Loose Parts Puzzle

MATERIALS

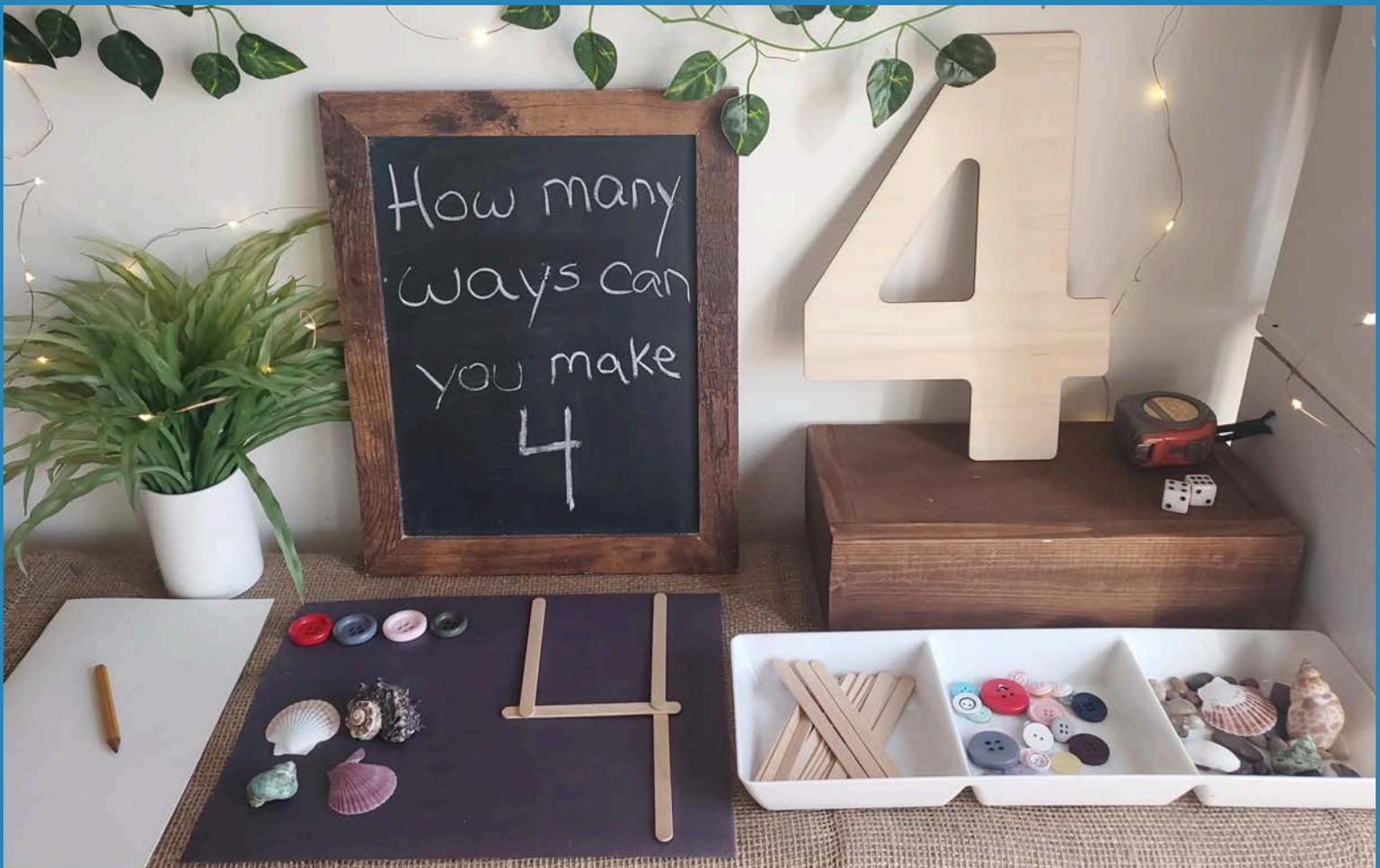
- 1 sheet of white paper
- 1 black marker
- Tray of various loose parts/open-ended materials. Consider: rocks, seashells, leaves, sticks, pipe-cleaners, loose toy pieces, wood slices, gemstones, sea glass, caps, shapes, etc.

DIRECTIONS

- Invite each child to pick a shape to outline their puzzle.
 - You can either draw the shape or have your child draw the shape.
- Draw the shape large enough to span the entire sheet of paper.
- Have children fill the shape as best they can using the loose parts provided.

LEARNING OBJECTIVES

- Comparing the size of loose parts to the shapes they are filling **encourages mathematical thinking about size relationships, including concepts of bigger, smaller, and equal.**
- Engaging in the puzzle activity requires spatial awareness as children analyze the size and orientation of the drawn shapes in relation to the available materials, **fostering understanding of spatial relationships.**
- Encouraging children to count the number of loose parts used to fill each shape **promotes numeracy development and reinforces counting skills.**
- Children will **practice identifying and recognizing geometric shapes** as they engage in filling the drawn shapes with loose parts and open-ended materials.
- Children will **develop problem-solving skills** as they experiment with different arrangements of loose parts to effectively fill the shapes, strategizing and adapting their approach to overcome challenges.



How Many Ways Can You Make the Number...

MATERIALS

- Clipboard with paper or notepad
- A visual reference of the chosen number (e.g. 4 in this example).
 - Consider a wooden number or simply write the number on a large sheet of paper for your child to refer to.
- 1 sectional tray or a few small containers
- Various materials. E.g buttons, pom-poms, seashells, rocks
- A handful of popsicle stick or twigs
- 1 sheet of paper and 1 pencil

DIRECTIONS

- You or your children can choose one number to explore (the example displays "4").
- Provide a model of the chosen number for children's reference (wooden or written).
- Present the materials next to the number to inspire mathematical exploration.
- Please note, children are not expected to create the number or use the materials in this way. This provocation provides an inspiration to developmentally appropriate exploration of numbers, but does not suggest they have to use materials this way.

LEARNING OBJECTIVES

- **Supports mathematical concepts** such as number recognition, as well as concepts of quantity, units of measurement, 1:1 correspondence, shape, and size.
- As your child explores and compares materials, they begin **internalizing basic concepts of "greater than" and "less than"** as they count/subtract materials.
- Your child will also **practice hand eye coordination, while expanding visual perception**, and motor strength and control (fine and gross).



Can you make a
Pattern?

Can You Make a Pattern?

MATERIALS

- Natural materials for creating patterns (pinecones, leaves, rocks, twigs, shells, etc.)
- Large tray or open surface for arranging patterns
- Optional: baskets or containers for collecting natural materials during outdoor exploration

DIRECTIONS

- Take children on an outdoor exploration to collect natural materials for creating patterns.
- Once back indoors, encourage children to examine the natural materials and discuss their characteristics, such as size, shape, color, and texture.
- Invite children to create patterns using the natural materials, arranging them on the tray in a repeating sequence according to their chosen pattern.
 - You can model a pattern to support this concept.

LEARNING OBJECTIVES

- **Pattern Recognition:** Children will recognize and identify patterns in their natural environment, developing an understanding of the concept of patterns and their significance in mathematics and nature.
- **Mathematical Thinking:** Children will engage in mathematical thinking as they create, analyze, and extend patterns using natural materials, fostering skills such as sequencing, prediction, and problem-solving.
- **Observational Skills:** Children will sharpen their observational skills as they collect and examine natural materials, paying attention to details such as size, shape, color, and texture.



Can You Make These Shapes?

MATERIALS

- Unit blocks of various shapes and sizes (e.g., wooden blocks, foam blocks)
- Drawing materials (e.g., markers, chalk, or tape) for outlining the shapes
- Paper or a flat surface to draw the outlines

DIRECTIONS

- Gather a variety of unit blocks and draw outlines of geometric shapes on paper or a flat surface.
- Let children freely combine the blocks to match the shapes outlined.
- Afterward, remove the blocks and challenge children to recall the shapes and identify which blocks were used.
- Encourage reflection on the activity, discussing strategies and solutions with the children.

LEARNING OBJECTIVES

- **Develops spatial reasoning skills** by manipulating unit blocks to fit geometric shapes and patterns, while gaining **understanding of basic geometric concepts**.
- **Experiments with trial and error to find solutions** to spatial puzzles, **fostering problem-solving skills, while applying logical reasoning** to determine which blocks are needed to recreate the outlined shapes.
- **Enhances motor skills** through handling and manipulating unit blocks to fit within the outlines which also **improves hand-eye coordination** by accurately placing and aligning the blocks to match the shapes.



1:1 Correspondence with Loose Parts

MATERIALS

- Tinker tray filled with loose parts (e.g. natural materials, recycled materials, craft items, small toys, etc.)
- Numbered cards (can adjust the number based on your child's level. Consider anywhere from 5-10
 - Create your own with cards with paper and a dark marker
- Optional: construction paper to create a space to work within.

DIRECTIONS

- On 5-10 small sheets of paper, write the numbers "1," "2," "3," etc out (numbers 1-6 shown in example picture).
- Keep a stocked tinker tray of loose parts and natural materials in close proximity.
- Allow children to add objects under each corresponding number.
- You can model one number to kick things off and guide your child.
- If your child decides to explore the materials in a different way, that is okay! We want to keep a relaxed environment of exploration to uphold interest and engagement. You can welcome this experience back several times. They are still being exposed to concepts of math no matter how your child plays.

LEARNING OBJECTIVES

- Number-related elements can help children **become familiar with numerals and develop number recognition skills**. Counting toys and objects can also enhance their **counting abilities**, while internalizing concepts of more than/less than.
- Working with and creating patterns can **help children recognize and differentiate shapes**, as well as **understand the concept of patterns and sequences**.
- **Supports 1:1 correspondence and concepts of quantity**.
- Sensory-rich materials **engage multiple senses, reinforcing mathematical concepts through tactile exploration**.