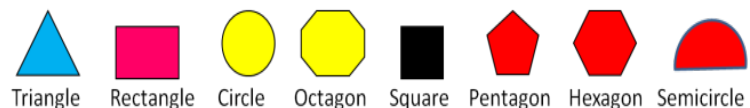
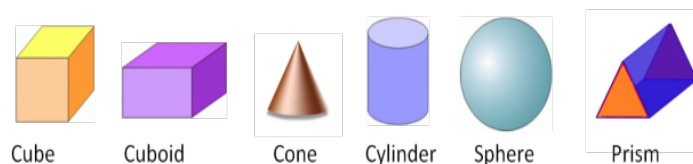


Using Coffee Stirrers to Develop Reasoning about Geometric Shapes and their Attributes

2-D Shapes



3-D Shapes



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All students in grades 3-5 should be able to:

- identify, compare, and analyze attributes of two- and three-dimensional shapes
- develop vocabulary to describe the attributes
- classify two- and three-dimensional shapes according to their properties
- develop definitions of classes of shapes such as triangles and pyramids
- make and test conjectures about geometric properties and relationships
- develop logical arguments to justify conclusions

Level 0 Visual level

Students judge shapes by the way they look.

Level 1 Descriptive level

Students identify shapes according to properties.

Level 2 Informal Deduction level

Students are able to see the interrelationships between figures.

Level 3 Formal Deduction level-Proofs

Students give reasons for steps in a proof. At this level, students are able to “work with abstract statements about geometric properties and make conclusions based more on logic than intuition” (Van de Walle)*.

Level 4 Rigor

Students supply reasons for contradictions for a proof and rigorously compare different axiomatic systems.

Types of Angles

- Right
- Acute
- Obtuse
- Straight
- Reflex

Types of Lines

- Parallel
- Intersecting
- Perpendicular

Let's explore polygon concepts

- What is a polygon?
- Polygon Vocabulary
 - Regular
 - Sides vs Edges

Based on Side Lengths

- Equilateral
- Isosceles
- Scalene

Based on Angles

- Acute
- Right
- Obtuse



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Special Types of Quadrilaterals

Use your coffee stirrers and chenille sticks to create different quadrilaterals.

- Parallelogram
- Rectangle
- Square
- Rhombus
- Trapezoid
- Kite



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Testing Conjectures

Stick Figures

Cooperative Learning Activity
from *Get It Together*





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Solution to Stick Figures 1





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Three Dimensional Solids

Let's build three-dimensional shapes



- Cube
- Rectangular Prism
- Triangular Prism
- Square Pyramid
- Triangular Pyramid



Attributes of 3-D Shapes

Three Dimensional Figures

Name of Figure	Number of Edges	Number of Faces	Number of Vertices	Conjecture
Cube				
Rectangular Prism				
Triangular Prism				
Square Pyramid				
Triangular Pyramid				



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APPS

The image displays a collection of educational applications and a search interface. The central element is the Symbaloo search page, which includes a navigation bar with links for Web, Images, Video, News, Webmixes, and LearningPaths. The Symbaloo logo and tagline "start simple" are prominently displayed above a search input field and a "Search" button. Below the search bar, it is noted as "powered by YAHOO!". Surrounding the search interface are various educational app icons, each with a title and a small graphic representing the app's content.

Apps shown include:

- Tangrams Lite
- Shapes Toddler Preschool on ...
- Awesome Shape Puzzles 123
- myBlee Education
- My First Tangrams
- Bugsy's Math Quest
- Geoboard
- StudyJams
- Touch Time
- Math Circus
- Learn Shapes
- Kids Math Fun - Fourth Grade
- Kids Math Fun - Third Grade
- KenKen Classic
- Fraction Basics
- Basic Fraction

<https://rusmp.rice.edu/resources/symbaloo>



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Additional Resources

Burns, M. (1994). *The Greedy Triangle*. New York: Scholastic, Inc.

Erickson, T. (1989). *Get it Together*. Berkeley, CA: Equals, Lawrence Hall of Science.

Greene, R. G. (1997). *When a Line Bends . . . A Shape Begins*. Boston: Houghton Mifflin Company.

Silverman, M. (2001). *Using Cuisenaire Rods: Geometry and Measurement*. Vernon Hills, IL: Learning Resources, Inc.