

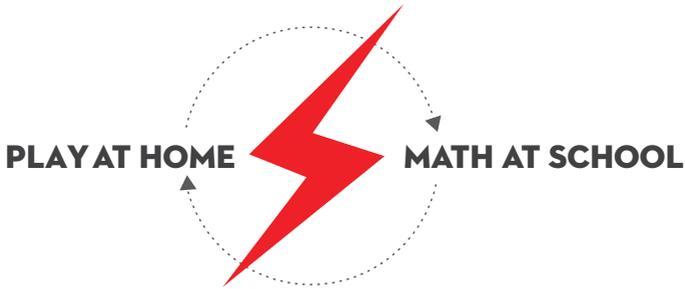


MAGNA-TILES®

where math, science, and creativity meet

CONNECTION GUIDE

CONNECTING PLAY & EDUCATION



A resource to connect Magna-Tiles® play to geometric concepts taught in school.





Magna-Tiles® are a fun, open-ended educational toy that will provide hours of play. Constructive play with Magna-Tiles® develops critical skills during early childhood.

BUILDING WITH MAGNA-TILES® IS A HANDS-ON INTRODUCTION TO THE WORLD OF 2-D AND 3-D SHAPES.

IT BUILDS THE MENTAL MATH MUSCLES FOR IDEAS TAUGHT IN SCHOOL

In school, students study geometry, the branch of math concerned with questions of shape, size, relative position of figures, and the properties of space. Kindergarteners will have lessons in identifying and describing shapes as two-dimensional (“flat”) or three-dimensional (“solid”). They will be asked to analyze and compare 2-D and 3-D shapes, describe their similarities, differences as well as compose simple shapes to make larger shapes.

At home, children will become familiar with geometric shapes through Magna-Tiles® play!

- Geometric solids are 3-D shapes. We can represent these shapes including cubes, pyramids, cones, and prisms as 2-D flat patterns, called “nets”.
- Playing with Magna-Tiles® helps children visualize how nets are folded and made into 3-D shapes.

PARENTS PLAY A PIVOTAL ROLE IN CHILDREN’S MATH ATTITUDES AND SKILLS. THE INCLUDED ACTIVITIES, WITH SUPPORT AND GUIDANCE FROM PARENTS, HELP DEVELOP SPATIAL SKILLS

Benefits of Play with Magna-Tiles®:

- Use of fine motor skills
- Develops hand-eye coordination
- Provides possibilities for collaboration and teamwork
- Creates feelings of competence and self-confidence
- Provides gains in visual/spatial understanding
- Stimulates imagination and creativity
- Increases language and vocabulary
- Improves math and science skills

Play and LEARN with Magna-Tiles®

Magna-Tiles® introduce children to important math concepts through the universal language of PLAY!

Children should have many opportunities for free time with Magna-Tiles®. Allow them to explore, be curious, and find new ways to create. The best time and age for children to play and LEARN is when they show a high level of interest and spend a lot of time with Magna-Tiles®. Magna-Tiles® encourage inventive thinking and logical reasoning while constructing 3-D patterns!

Children will explore:

- Shapes and Colors
- Symmetry
- Patterns
- Fractions

Ideas learned through building with Magna-Tiles® connect to math concepts taught in school.

Magna-Tiles® Play

As children spend more time with Magna-Tiles®, they will progress from basic shape play to constructing complex 3-D creations.



Children's understandings of mathematical relationships develop gradually over time and build upon prior experiences.

Base Play

- Begin by introducing children to Magna-Tiles® pieces and reviewing shapes and colors
- Young children often start Magna-Tiles® play by carrying and stacking the pieces, taking them apart and allowing them to “click” back together
- Enjoy creating flat patterns and connecting pieces together to make new shapes

Exploration Play

- Allow children to explore and be curious
- Replicate things they see in the real world
- Create balanced structures and demonstrate decorative or symmetrical patterns
- Incorporate other toys in imaginative play

Challenge Play

- Use critical thinking skills when planning, naming, and describing creations
- Build more complex structures
- Magna-Tiles® can be used as a powerful learning tool!

3-D Thinking

3-D geometry for young children does not have to be difficult or scary. Spark an interest in math and science from a young age.

Building from 2-D to 3-D with Magna-Tiles® will prepare children to learn about shapes and geometric solids at school.

Spatial visualization is the ability to see and think in 3-D. A very important skill!

Strong spatial visualization skills are linked to success in science, technology, engineering, and mathematics (STEM) fields. It is possible to develop these skills over time with practice.

When using Magna-Tiles® as a learning manipulative, children have fun, increasing engagement, motivation and self-confidence.

Developing Spatial Skills

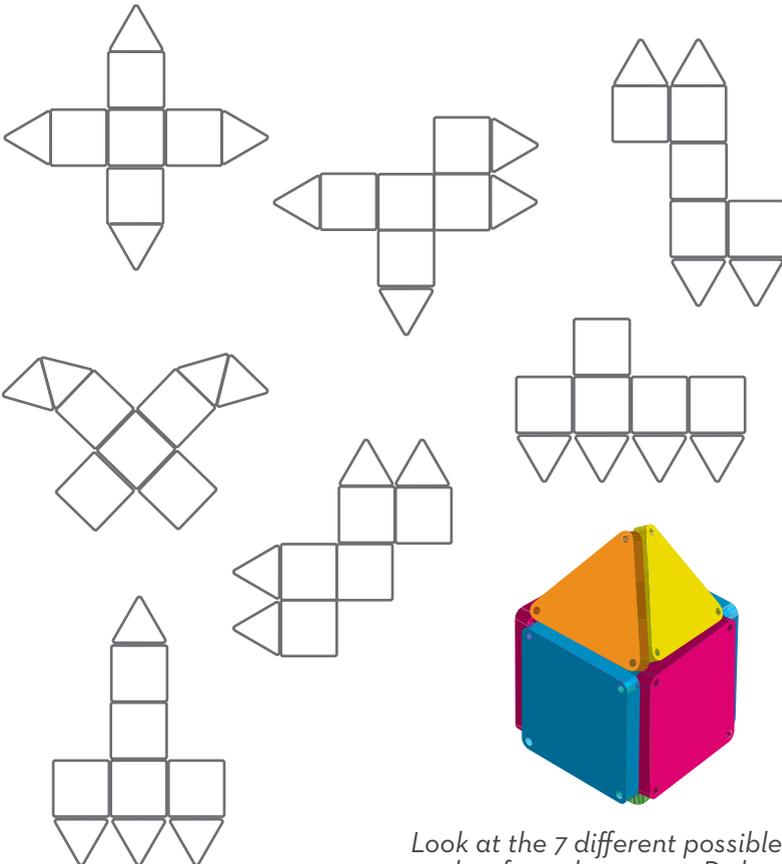
The goal is to equip children with confidence to talk clearly and easily about three dimensional problems. Parents can help lay the foundation for a later enthusiasm for working in three dimensions!

1. Use language with children to describe positional relationships of objects in space such as *behind, beside, in front, to the left, to the right, up, down, top, bottom, on, above, under*
2. Facilitate problem solving by asking questions
3. Encourage children to discuss their creations as they work to aid language development
4. Encourage children to visualize three-dimensional objects and think about what they will look like from different viewpoints or if they were rotated or transformed in space
5. Think about the concepts such as area, volume, distance, translation, rotation, and reflection while building

Imagination, experimentation and creativity are the best guides and will lead to more advanced building and fun!

How can you determine whether a net forms a solid?

- Make sure the solid and the net have the same number of faces
- Visualize how the net is to be folded
- Remember that many different nets can exist for a given shape, depending on the choices of which edges are joined and which are separated



Look at the 7 different possible nets that form the same 3-D shape!

Math Language

Parents can guide and support Magna-Tiles® play to encourage mathematical thinking. Incorporate math vocabulary into everyday play!

Attribute = a quality of characteristic, such as a color, size and shape

Two Dimensional (2-D) = flat, lying in a plane

Three Dimensional (3-D) = solid, has length, width, height

Net = a flat pattern that when folded makes a solid shape

Vertex (vertices) = corner(s) of a solid shape

Edge = where the edges of the planes of a 3-D shape meet

Geometric Solids = three dimensional figures such as the cube, pyramid, & prism

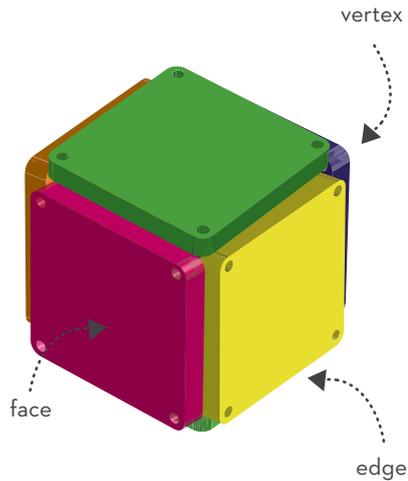
Geometric solids have flat sides called faces, edges to connect the faces, and vertices to connect the edges

A cube is a 3-D figure with:

6 square faces

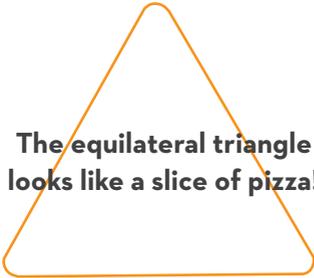
12 edges

8 vertices

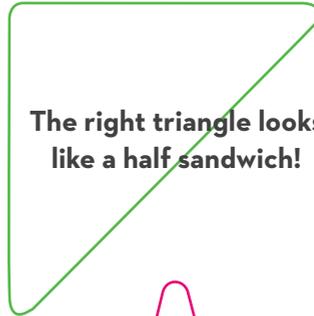


Magna-Tiles® Shapes: Base Play

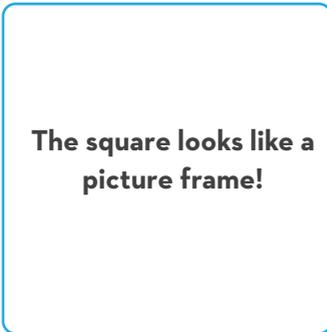
Children describe their physical world using geometric ideas and vocabulary.



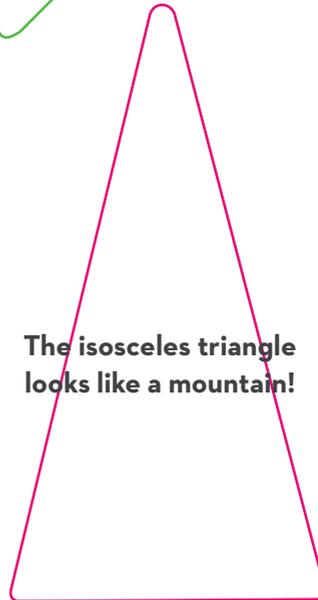
The equilateral triangle looks like a slice of pizza!



The right triangle looks like a half sandwich!



The square looks like a picture frame!



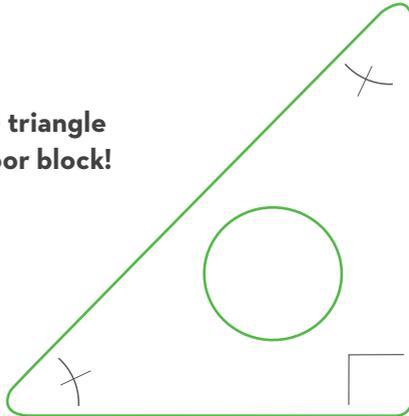
The isosceles triangle looks like a mountain!

Connect: Where else do you see Magna-Tiles® shapes around your home? At the park? Look around... Shapes are everywhere!

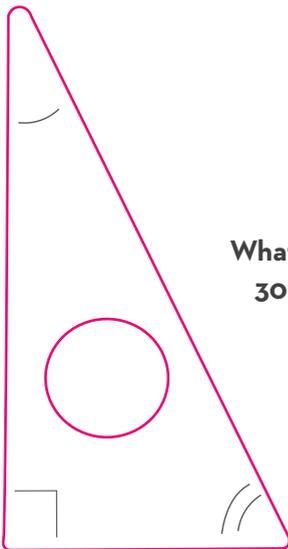
Magna-Tiles® Shapes: Base Play

Right triangles are important in advanced math and many real world applications!

The 45-45-90 triangle looks like a door block!



What do you see in the 30-60-90 triangle?

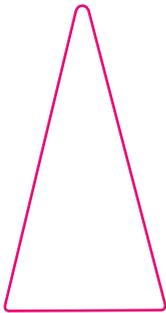


Magna-Tiles® Shapes: Exploration Play

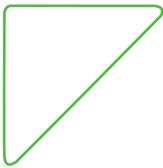
Defining attributes



The equilateral triangle has three equal length sides and all angles are 60° .



The isosceles triangle has two equal length sides and angles add up to 180° .



The right triangle sides may not be the same length and one angle is 90° .



The square has four equal length sides and all angles are 90° .

Magna-Tiles® Shapes: Exploration Play

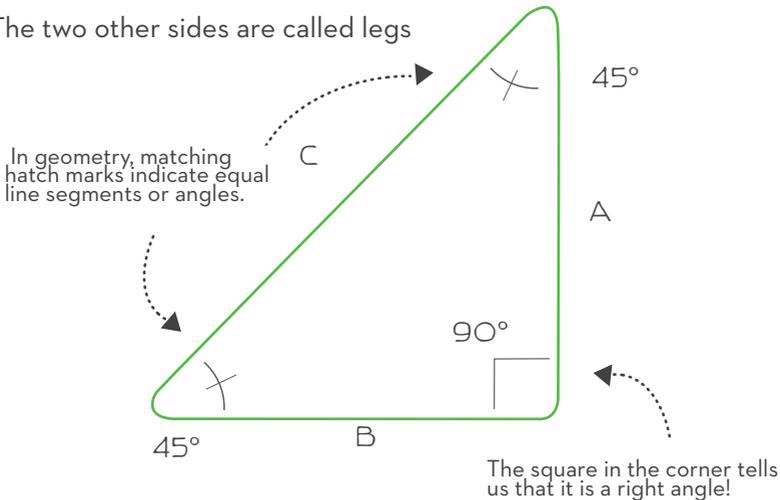
Defining attributes. Right triangles are the basis of very important ideas in analytic geometry and trigonometry. Tri-gon-metry means “three angle measurement” or “triangle measurement”

45-45-90 Triangle

A special right triangle named after it's angles

The side opposite of the right angle is called the hypotenuse

The two other sides are called legs



$$A^2 + B^2 = C^2$$

A Greek mathematician named Pythagoras developed a formula, called the Pythagorean Theorem, for finding the lengths of the sides of any right triangle. It is one of the most famous formulas in math!

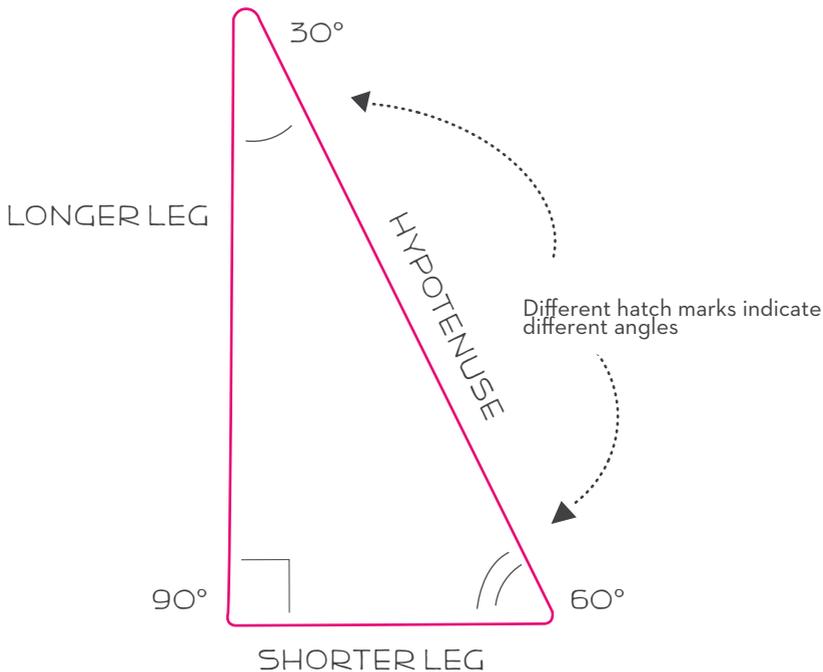
Magna-Tiles® Shapes: Exploration Play

Defining attributes

30-60-90 Triangle

A special right triangle named after its angles

The ratio of this triangle's longest side to its shortest side is "two to one." This means that the longest side is twice as long as the shortest side. Use your Magna-Tiles® pieces to test this!



These two special right triangles are important in fields of engineering, astronomy, architecture, geography, and many others!

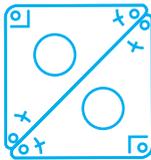
Magna-Tiles® Shape Guides

Compose simple shapes to form larger, new shapes!

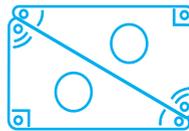
Identify, gather and place the appropriate Magna-Tiles pieces in the drawing to develop shape recognition. Shape recognition is one of the earliest geometry skills!

This building activity strengthens visual discrimination, spatial reasoning, problem solving and transformation skills.

Square



Rectangle



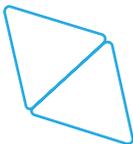
Pentagon



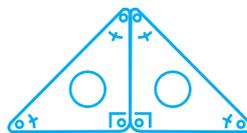
Hexagon



Rhombus

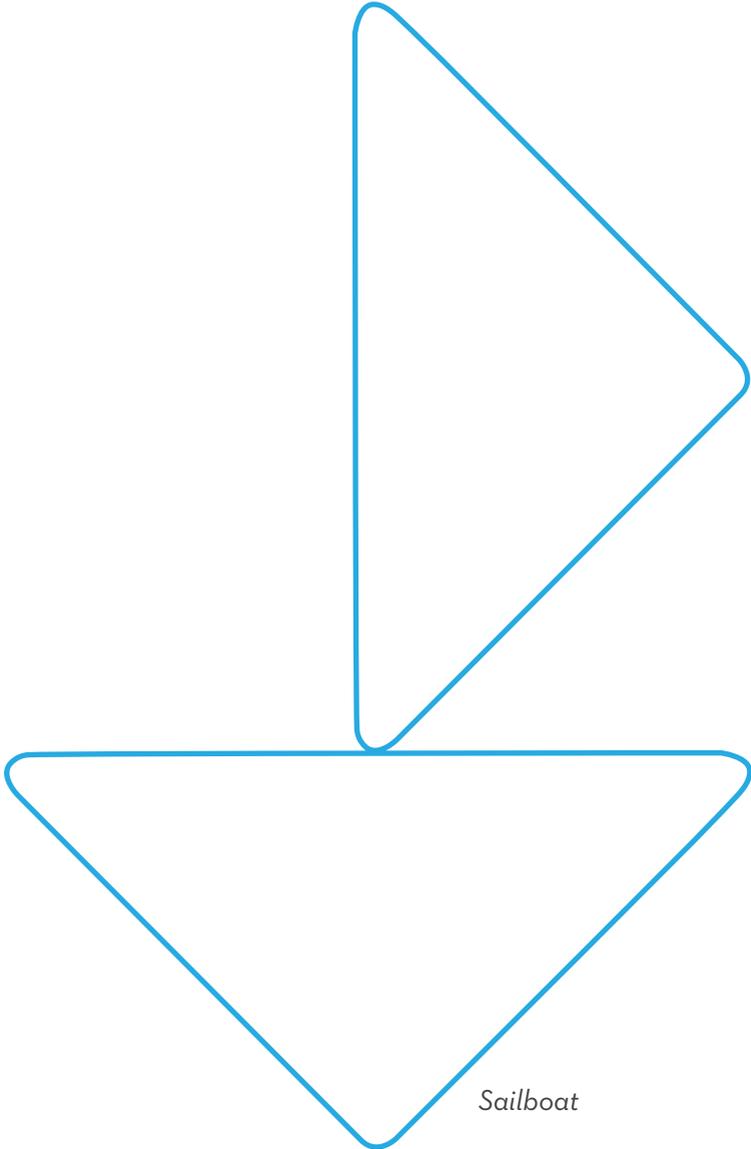


Triangle

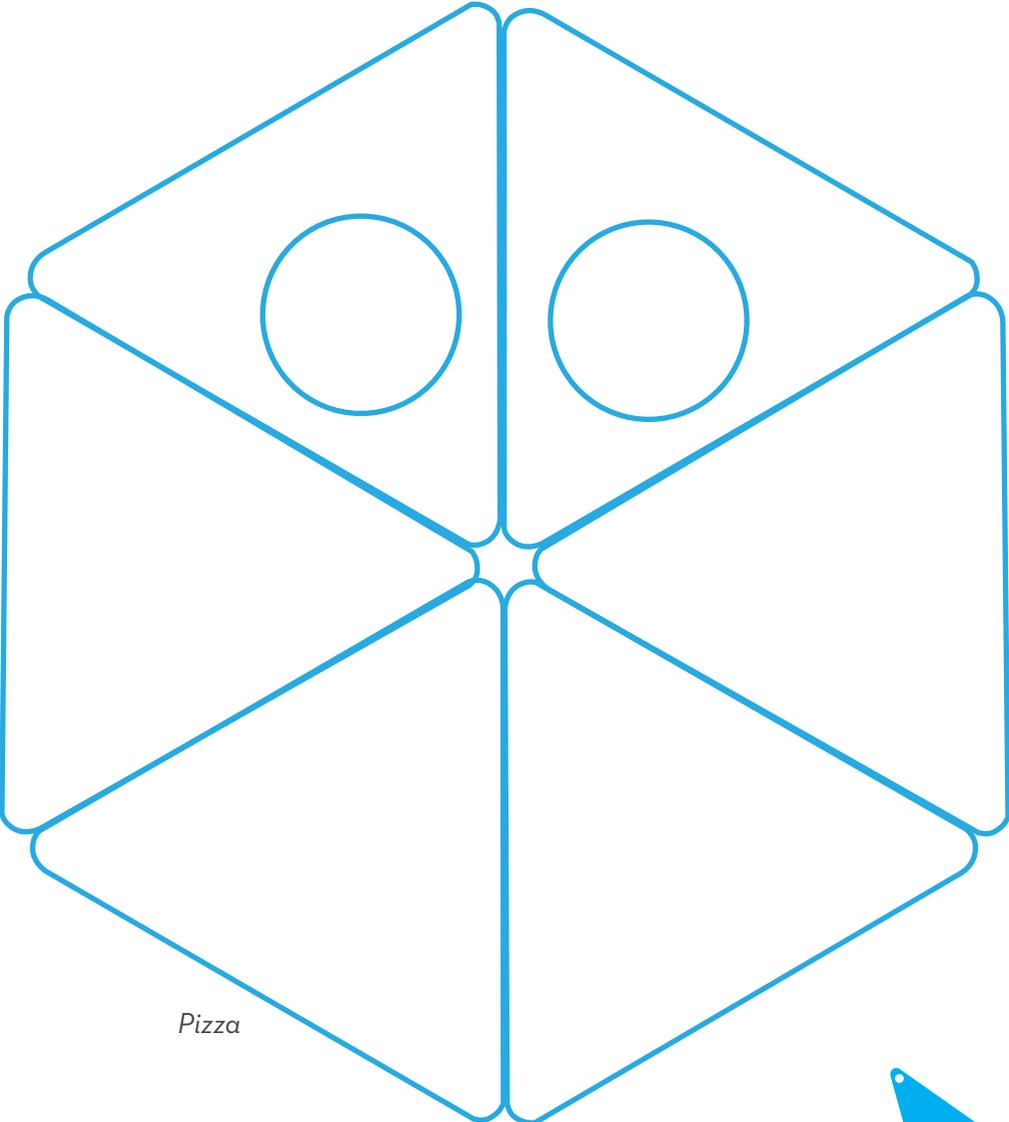


Can you make the shape of a heart?
What about a fish?

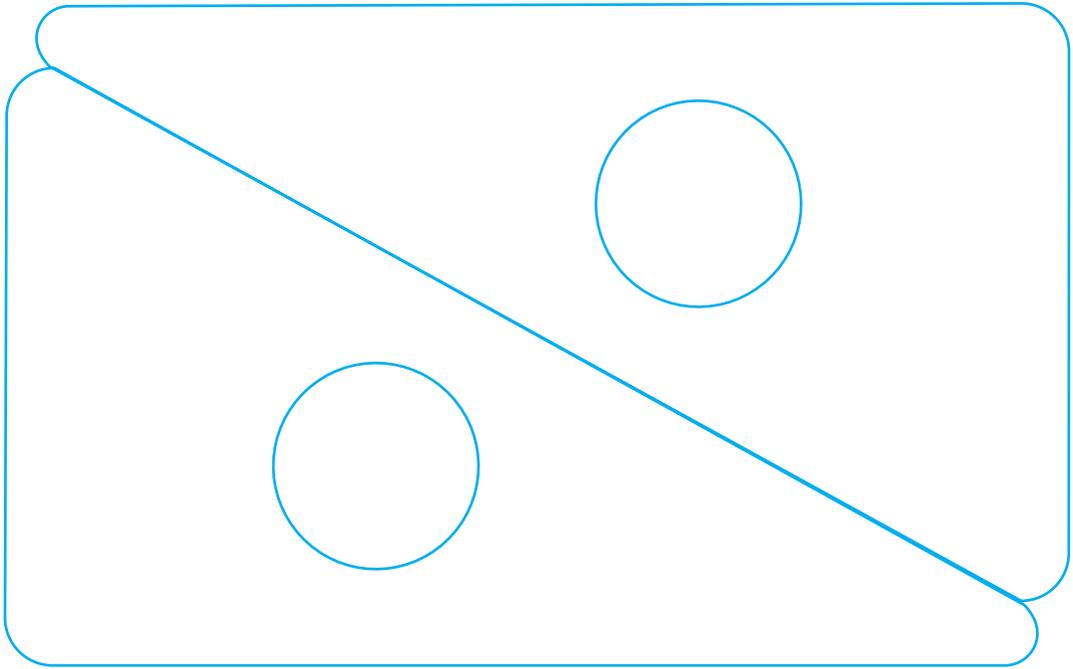
Magna-Tiles® Shape Guide: Base Play



Magna-Tiles® Shape Guide: Base Play



Magna-Tiles® Shape Guide: Base Play



Cassette Tape

Geometric Solids

Visualizing 3-D Objects within a 2-D context is a critical math and life skill.

Building with Magna-Tiles® introduces key concepts to young children so that they can gain insight into challenging areas of math.

A geometry net is a 2-D shape that can be folded to form a 3-D shape.

The following activities develop spatial visualization skills.

As you play and build, encourage children to do the following:

1. Imagine a mental picture as a prediction
2. Make it with Magna-Tiles® to check if it is correct
3. Compare and contrast the different shapes to visually link new information with prior knowledge, building new understandings

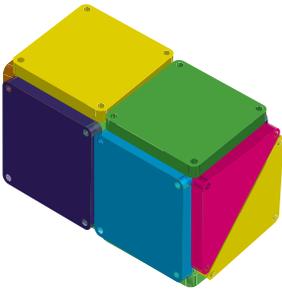
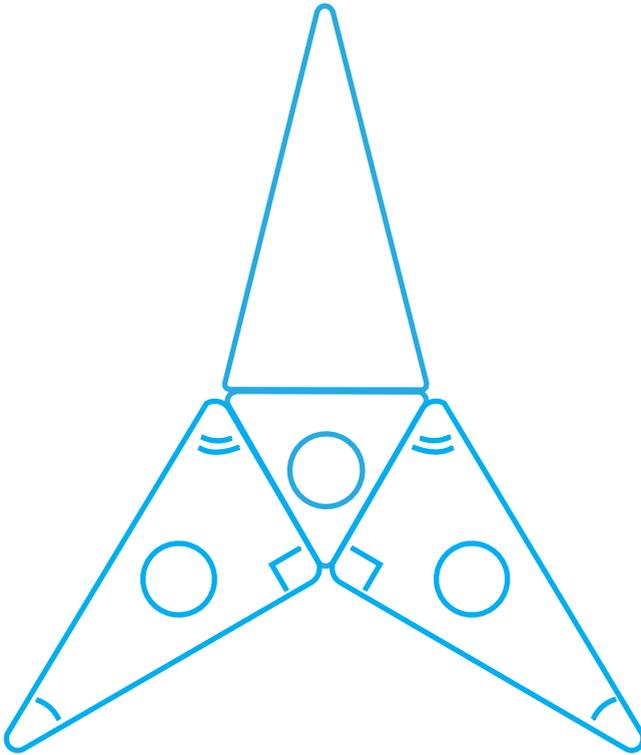


MAGNA-TILES® **GS**
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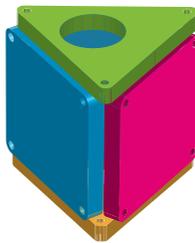
GEOMETRIC SOLIDS

Geometric Solids: Exploration Play

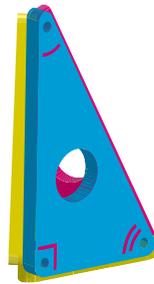
If you make this flat shape into a tower which solid will it look like?



Rectangular Prism



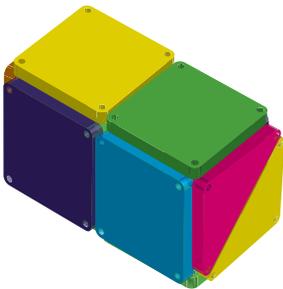
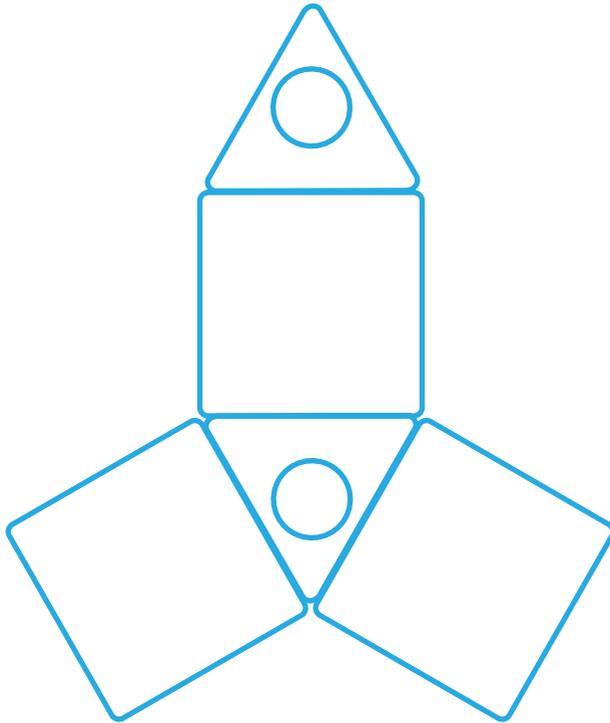
Triangular Prism



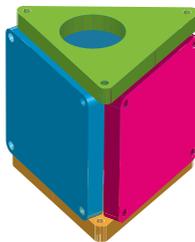
Triangular Pyramid

Geometric Solids: Exploration Play

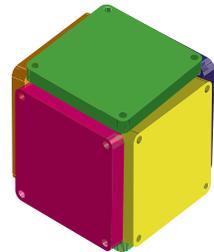
If you build this rocket from 2-D to 3-D, which solid will it form?



Rectangular Prism



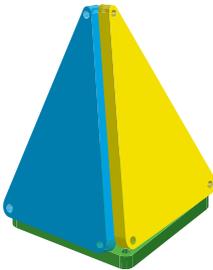
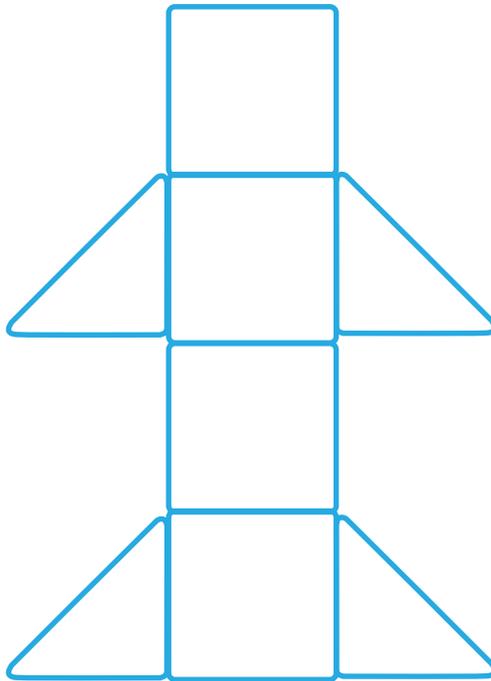
Triangular Prism



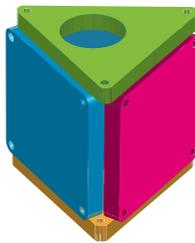
Cube

Geometric Solids: Exploration Play

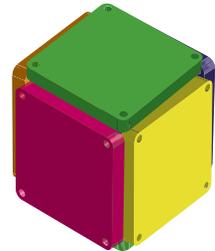
Use your imagination! What does this flat shape look like to you?
If we fold it up which 3-D figure will it make?



Pyramid



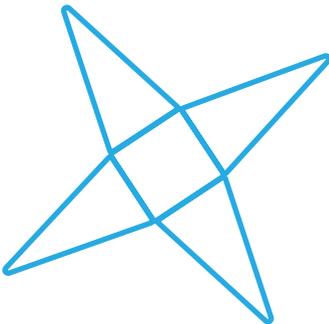
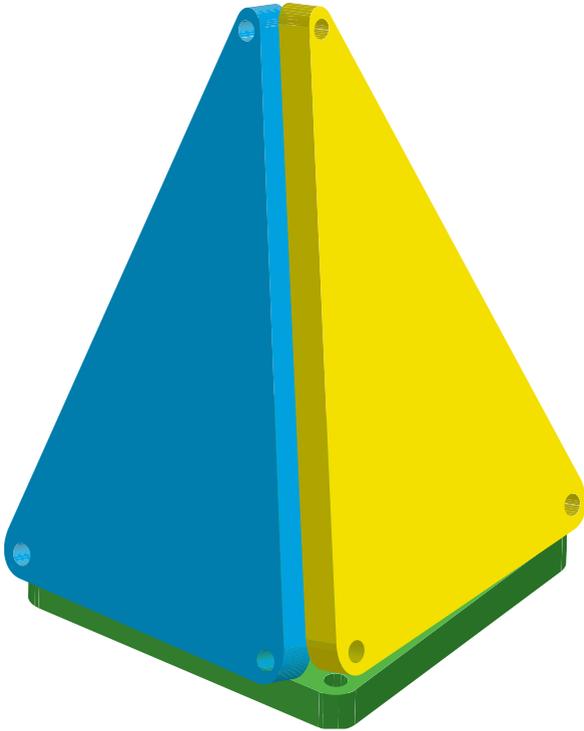
Triangular Prism



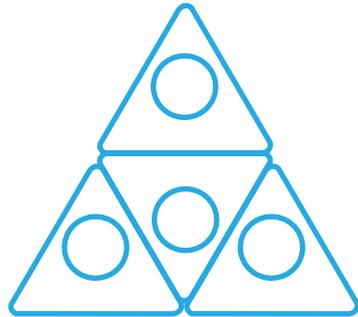
Cube

Geometric Solids: Exploration Play

Which geometric net will create this solid?



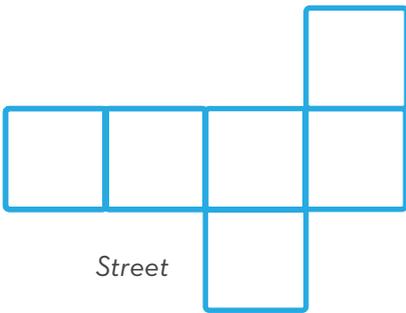
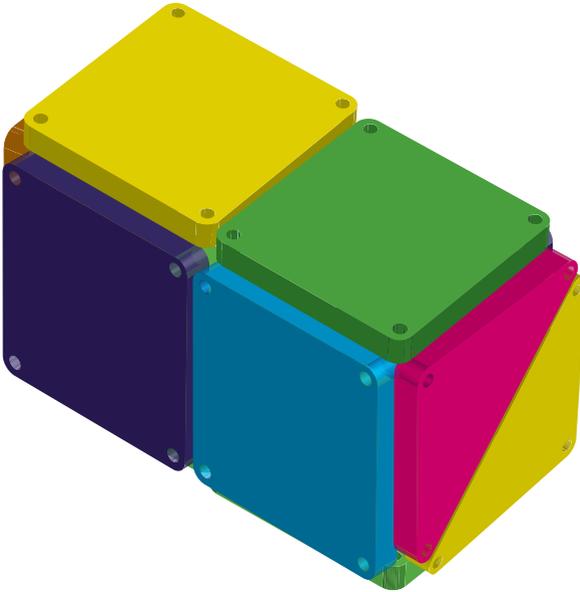
Starship



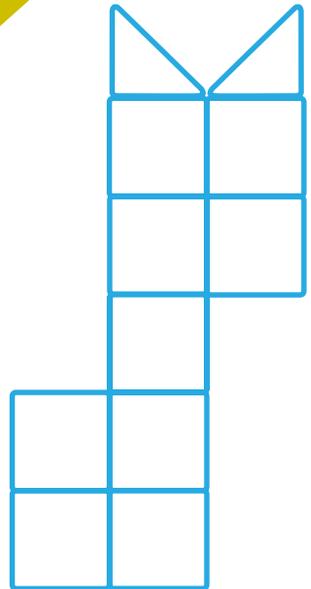
Equilateral Triangle

Geometric Solids: Exploration Play

Which 2-D pattern will fold into this box?! Let's build it!



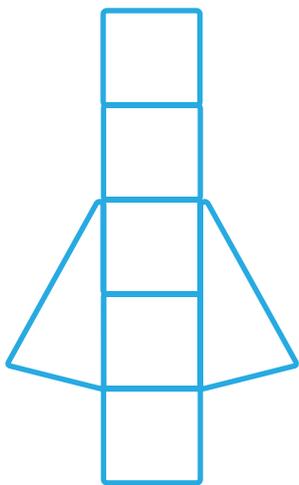
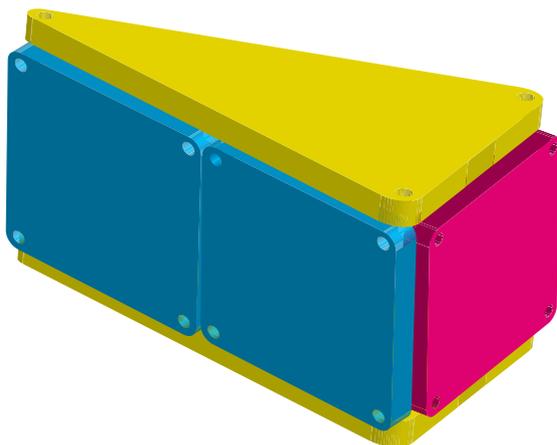
Street



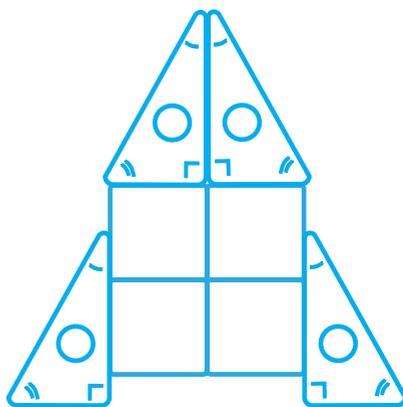
Cat

Geometric Solids: Exploration Play

Which flat pattern will build this slice of cake?



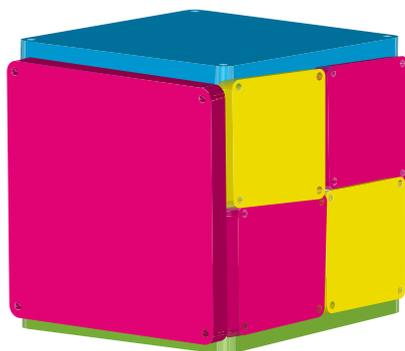
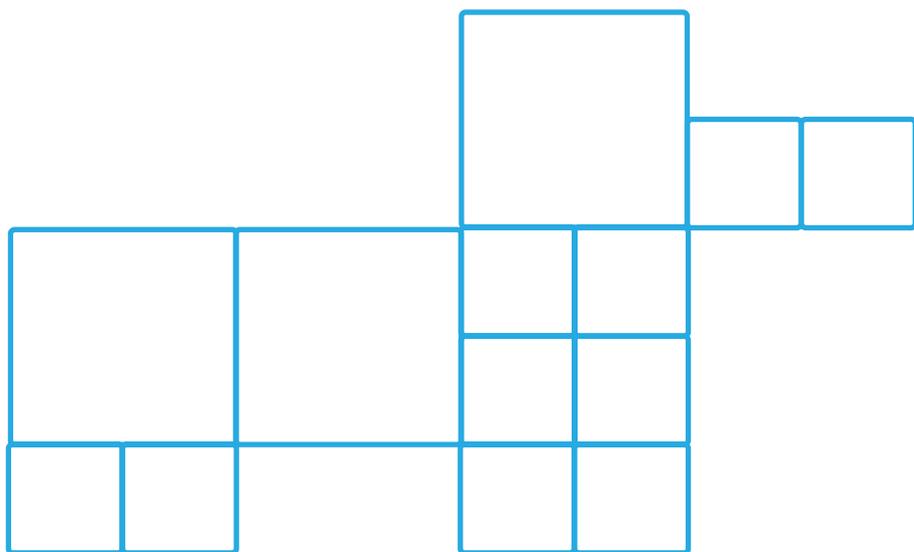
Guitar



Rocket

Geometric Solids: Challenge Play

Can you transform this elephant into a big box? Make it with your Magna-Tiles®!



Magna-Tiles® Creations



Be a Magna-Tect! A Magna-Tect is an architect who constructs with Magna-Tiles®. Design and build anything you can imagine!

**For more fun and learning activities with Magna-Tiles®,
please visit www.magnatiles.com**

Magna-Tiles® are 3-D magnetic building tiles designed to hold a child's interest and attention, build critical development skills and promote imaginative play and creativity.



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