

**Florida Math and Science Day 2009  
Lesson Plan Template**

***Theme: Space Exploration***

<b>Lesson Title</b>	Blast Off with Geometry!
<b>Grade Span</b>	K-2
<b>Content Emphasis</b>	Mathematics
<b>Targeted Benchmark</b>	MA.1.G.3.2-Compose and decompose plane and solid figures, including making predictions about them to build an understanding of part-whole relationships and properties of shapes.
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<b>Lesson Preparation</b>	
<b><u>Learning goals:</u></b>	
<p>Students will identify and explain characteristics of various shapes.            Students will apply shapes with values to measure area of an object and compare with others.            Students will apply a variety of shapes to create a design.</p>	
<b><u>Estimated time:</u></b> This lesson can be done as a series of brief lessons, or as an extended lesson.	
<p>Introduction: 15 minutes            Exploration: 25 minutes            Application: 30 minutes            Extend the Experience: 30 minutes</p>	
<b><u>Materials/Resources:</u> Please list any materials or resources related to this lesson.</b>	
<p>Introduction: Pre-Assessment; Large geometric figures of equilateral triangle, right triangle, trapezoid, hexagon</p> <p>Exploration: Bag of shapes per group (4 hexagons, 24 equilateral triangles, 8 trapezoids, 8 right triangles) *Shapes can be cut using die-cuts from a media center, or using the attachments</p> <p>Application: Each child will need a bag or access to an abundance of assorted shapes from which to work, test ideas, and discover, as well as rocket activity sheet (attached). Assortment of equilateral triangles, trapezoids, hexagons, right triangles available to students; Post-Assessment</p>	
<b><u>Teacher Preparation:</u></b>	

In advance of the lesson, pre-cut geometric shapes using a die-cut machine or the attached sheets of manipulative shapes.  
The teacher will also need to enlarge one sample of each shape for the class to use during the introduction.

### **Lesson Procedure and Evaluation**

#### **Introduction:**

Engage:

Begin the lesson by assessing student knowledge. A teacher may choose to use the attached pre/post assessment for this purpose.

Teacher gathers students into a circle and introduces geometric shapes, equilateral triangle, right triangle, trapezoid, hexagon. The teacher asks, "let's look at these shapes, who would like to share an observation of one of these shapes?" The teacher will record student responses on record paper or classroom board. Allow students to share observations of shape attributes, such as number of sides/corners, what shapes fit into other shapes, etc.

Discussion Questions:

- How many sides does this shape have?
- How many corners does this shape have?
- What can we do with these shapes?

#### **Exploration:**

Explore: Place the children into groups of 3-4 students each. The teacher explains to the students they will be exploring their shapes. Give each group a bag of shapes. Direct the students to work in their groups to see what they discover with their shapes. Circulate and encourage groups to test to see if shapes fit into other shapes.

Gather students back into a large group. Ask students to share their discoveries.

Discussion Questions:

- How many of these (equilateral) triangles fit into this (trapezoid) shape?
- How did you find out?
- How many of these (trapezoid) shapes fit into this large (hexagon) shape?
- How do you know?
- How many of these (equilateral) triangles fit into this large (hexagon) shape?
- How do you know? Can you show me?
- What shapes fit into this (rhombus) shape?
- How did you discover this? Can you show me?

If one of these (equilateral) triangles equals 1 point, then how many points should this (trapezoid) equal? (3) Why do you think this?

If this (trapezoid) shape equals 3 points, then how many points should this large (hexagon) be worth? (6) Why do you think this?

Explain:

Take this time to introduce and explain the names of the different geometric shapes.

Equilateral triangle-A triangle with all 3 sides of equal length

Trapezoid-A quadrilateral (a 4 sided polygon with 4 angles) with one pair of parallel sides

Hexagon-A six-sided polygon

Right triangle-A triangle with a  $90^\circ$  angle

Rhombus-A four-sided figure with all sides equal in length and opposite sides are parallel.

**Application:**

Next explain and introduce the activity. "Today we will be using our geometric shapes to measure rockets. You will use your shapes to discover the area of each rocket. Area is how much space is inside a shape. For example, I have a fence around my backyard. The area is how much space is inside the fence (the dog runs around the backyard 'area'). Let's do an example together. Let's look at this hexagon. The area of the hexagon is equal to 6 equilateral triangles and the trapezoid equals 3 equilateral triangles. Now let's look at this rectangle...can we use equilateral triangles, or do we need right triangles? Let's move and test some shapes to measure the area." Discuss and share ideas.

Provide each student a rocket activity sheet. The students place shapes on each rocket to fill the area. Once the area is filled, the student will remove each shape one at a time, and trace the shape into the rocket. Once a rocket is completed, the student counts how many equilateral triangles, trapezoids, hexagons, and right triangles were used for construction and records the number below the rocket.

What did you learn about your shapes as you worked in the rockets? Which shapes did you use most? Which shapes did you least use? Could you remove any triangles and replace them with other shapes to use fewer shapes?

Extend the experience: "Wow! You all are fantastic rocket designers! Now, use your rocket construction experience to design your own rocket." Provide each student a blank paper (black construction paper is popular, then the students can use white crayons to add 'stars' to the background). Explain the students may use any of their shapes to design their own rocket. Once the rocket is designed, students may glue their paper shapes into place and write a story to tell where the rocket is traveling. \*The teacher may want to have the children use 'patterns' when designing their own rockets, or 'symmetry' for rocket design.

Provide post-assessment.

**Assessment:**

Teachers can assess student understanding of this benchmark through teacher observation (while circulating around the room, asking questions), student papers (the rocket activity sheet should demonstrate a student's understanding of part-whole relationships).

Teachers may choose to use the pre/post assessment (attached).

**Teacher Self-Reflection: Record your thoughts on the lesson and describe any modifications you would recommend based on the outcomes.**

The students enjoyed this lesson as allowed for creativity and exploring new ideas. This lesson challenged all ability groups, yet all the students enjoyed the activity and displaying their own rocket designs with their stories.

A teacher will need to circulate throughout the room, encouraging students to demonstrate the part-whole relationship.

This lesson could be used prior to introducing fractional parts.

**Modification:**

Have students assign point values to equilateral triangles that will equate to trapezoids and hexagon figures. (For example: equilateral triangle=1 point, trapezoid=3 points because 3 equilateral triangles equal a trapezoid, hexagon=6 points because 6 equilateral triangles equal a hexagon; right triangles=2 points)

**Using Technology:**

This website has a rocket that allows students to interact (flipping, sliding, and rotating) with geometric shapes to correctly fill a rocket's area.

[http://nrich.maths.org/public/viewer.php?obj\\_id=1495](http://nrich.maths.org/public/viewer.php?obj_id=1495)

