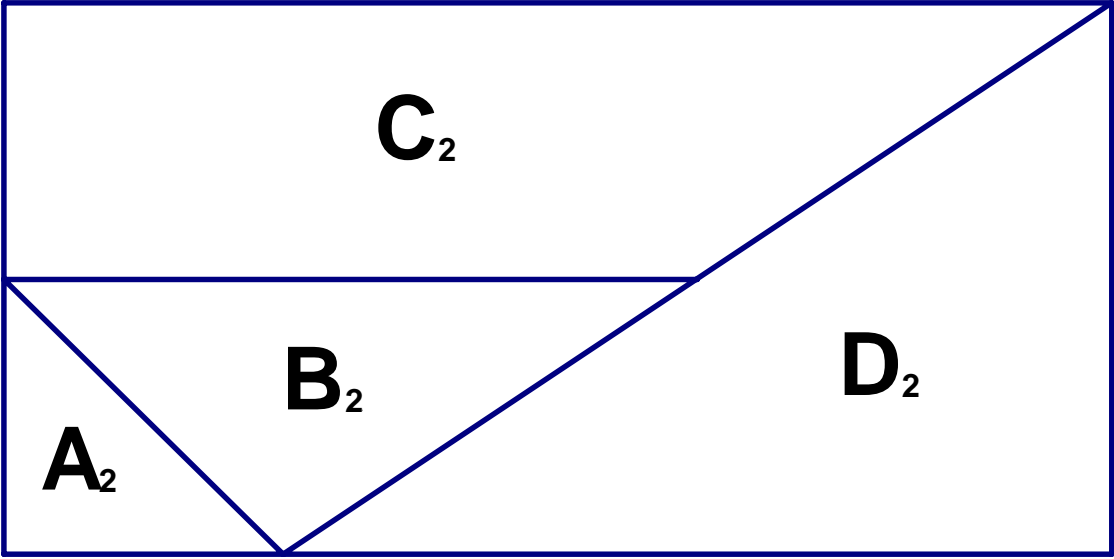
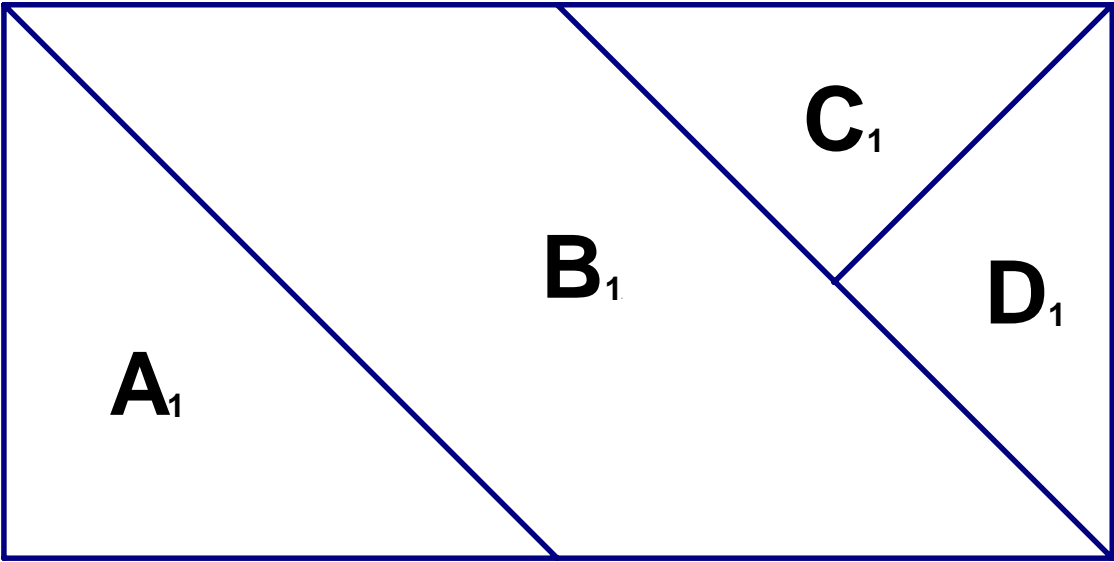


<b>Lesson Title: Puzzles Intro to Geometry</b>		<b>Pre 7.4</b>
<b>Utah State Core Standard and Indicators</b> Geometry Standards 3 Process Standards 1-4		
<b>Summary</b>		
The lessons provided below are a fun way to introduce geometry. The students silently solve four rectangle puzzles, build geometric shapes from toothpicks, try to create squares by cutting irregular shapes once only, and find geometric shapes and symmetry in the world around them.		
<b>Enduring Understanding</b>	<b>Essential Questions</b>	
We use spatial visualization and perspective in every aspect of our lives. Many jobs utilize these skills as well.	What is geometry? How do we use it?	
<b>Skill Focus</b>	<b>Vocabulary Focus</b>	
<ul style="list-style-type: none"> <li>• Spatial visualization</li> <li>• Depth perception</li> </ul>		
<b>Assessment</b>		
<b>Materials:</b> Rectangle cutouts for silent geometry puzzle, toothpicks, isometric dot paper, blocks, clay or play dough and dental floss if desired for cutting cross sections.		
<b>Launch</b>		
<b>Explore ideas:</b>		
<p>“On the silent geometry part, I am having them identify all parts before they begin putting the puzzle together. I have each person with their own set of pieces. On their table, they need to identify all:</p> <ul style="list-style-type: none"> <li>triangles</li> <li>trapezoids</li> <li>rectangles</li> <li>right angles</li> <li>equal pieces (ie. <math>A1 = C1 + D1</math>)</li> </ul> <p>After our class discussion, they will solve the puzzle and put the 4 rectangles together. They will draw their solutions on a piece of paper.”</p>		
<b>Summarize</b>		
<b>Apply</b>		

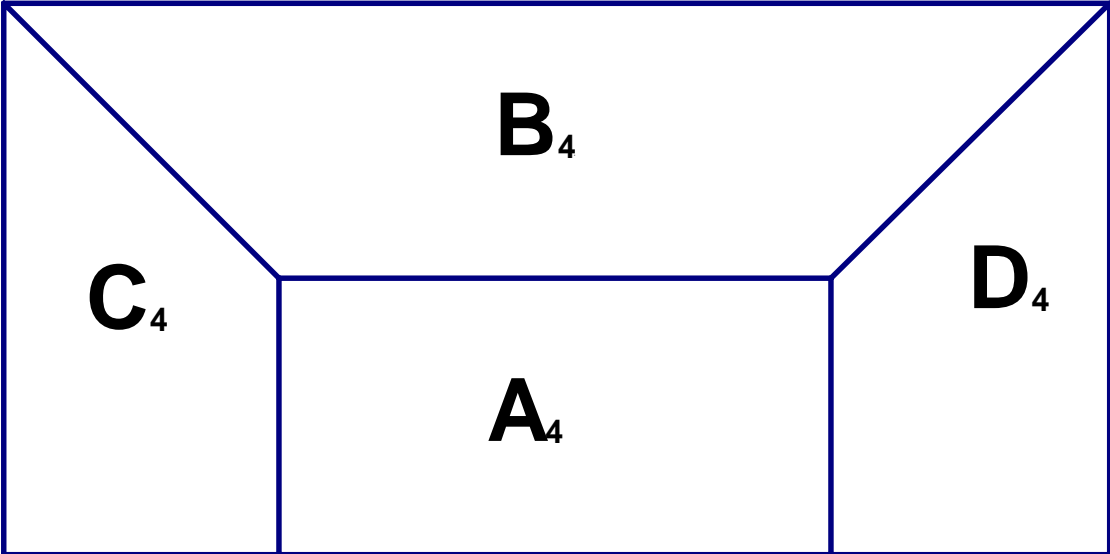
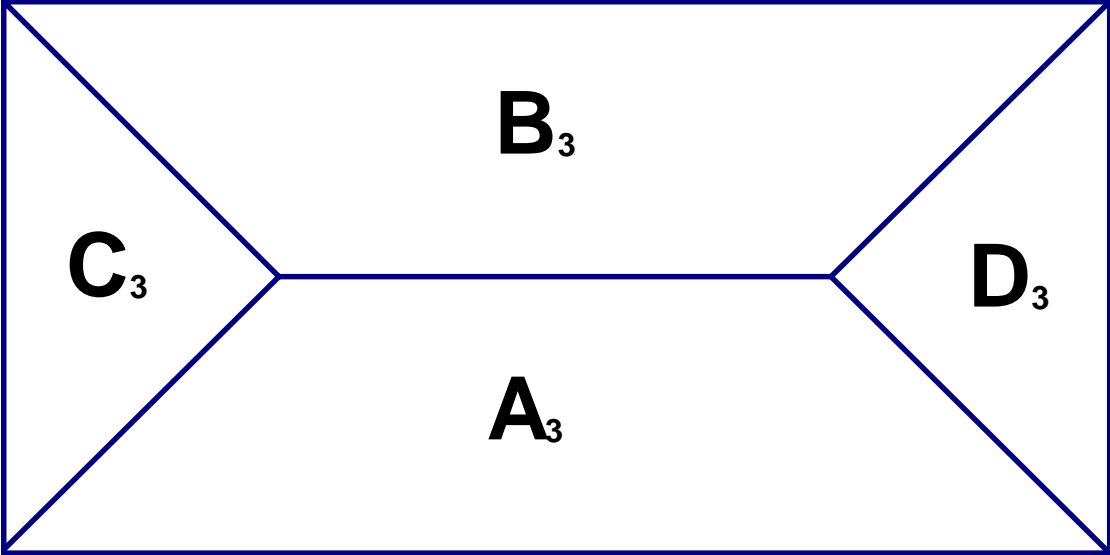
**Directions:**

- 1) Silent Geometry. Copy the rectangle puzzles below. Make enough for one copy per group. Cut each set of four puzzles up and place the pieces in an envelope. Give the envelopes to student groups. Students must be silent through the whole puzzle solving process. Students separate the pieces into four groups (the four rectangles) by the number series—all the ones together etc. They silently create the four rectangles using the puzzle pieces. All four rectangles are congruent.
- 2) Toothpick Puzzles. Follow instructions on the activity sheet.
- 3) Slice Once and Slide to Make a Square. Follow instructions on the activity sheet.
- 4) Use the Cracker project below as homework.

Rectangle puzzles for Silent Geometry



Rectangle puzzles for Silent Geometry



## Pre 7.4b

## Toothpick Puzzles

Draw the solution for each variation below.

**1) Use 17 toothpicks to construct a 2 by 3 rectangle. (hint: show the area on the inside using some of the toothpicks.)**

Remove 5 toothpicks to leave 3 squares.      Remove 6 toothpicks to leave 2 squares.

**2) Make a hexagon using 12 toothpicks.**

Remove 4 toothpicks to leave 3 triangles.      Move 5 toothpicks to form 3 triangles.

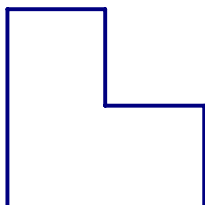
**3) Use 9 toothpicks to create 4 equilateral triangles within a 5<sup>th</sup> congruent triangle.**

Remove 2 toothpicks to leave 3 triangles.      Remove 3 toothpicks to leave 1 triangle.

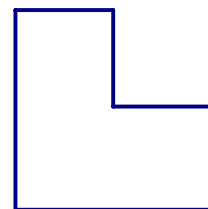
Remove 6 toothpicks to make 1 triangle.      Remove 4 toothpicks to get 2 triangles.

Remove 2 toothpicks to get 2 triangles.

**4) Use 4 toothpicks to divide this shape into 3 equivalent congruent shapes.**

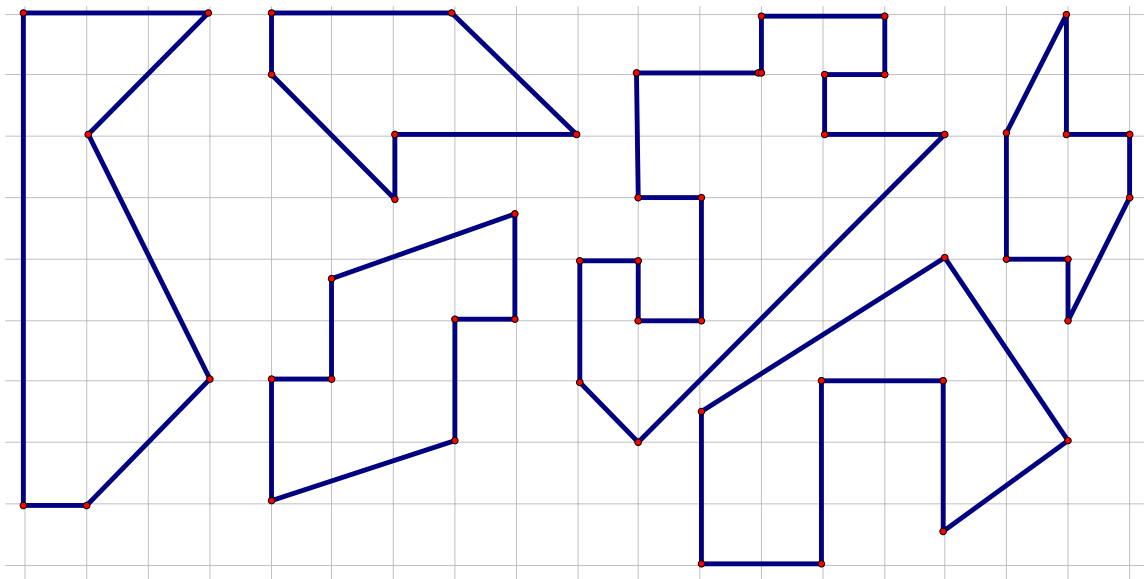
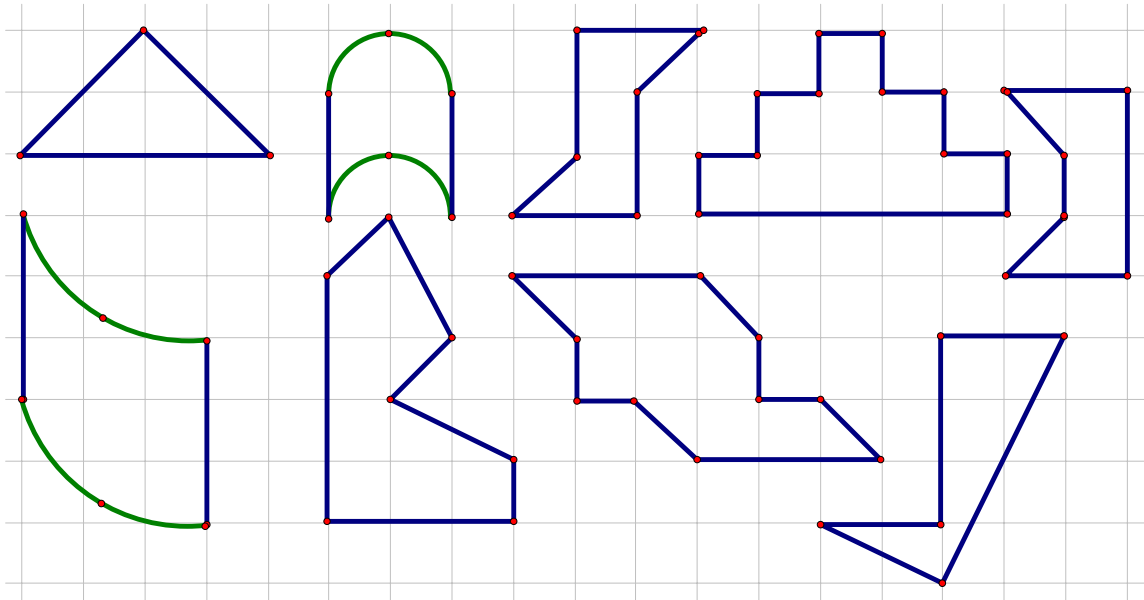
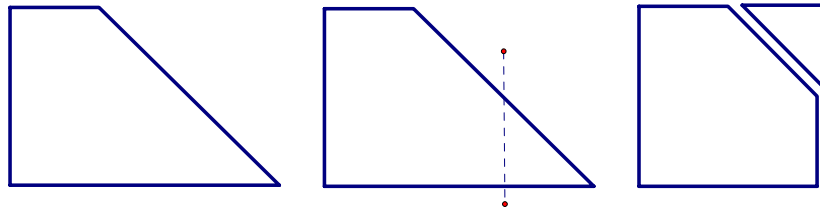


Use 8 toothpicks to divide this shape into 4 equivalent congruent shapes



# Pre 7.4c      Slice Once and Slide to Make a Square

Example





**Pre 7.4d**  
***Crackers, Crackers, and More***  
***More Crackers***  
***or Shapes, Shapes and More Shapes***

Perhaps one the best things about Geometry is its visual nature. We can see examples of geometric ideas in every day experiences.

Use crackers or other objects you find around the house. Look for different shapes. Collect them and then do the following for each shape.

- \* If possible give the name of the shape. (Example: Hexagon)  
If you do not know the name then give a description of the shape.
- \* Draw a small sketch of the shape and draw all the lines of symmetry.
- \* Tell whether or not the shape or cracker is congruent or similar with any of the other crackers and if so with how many. Draw a picture illustrating the congruent or similar crackers or shapes.
- \* List one other geometric idea about the shape or cracker.

In closing write one to two paragraphs about the geometry we find around us.