

LessonTitle: Triangle Centers and their Special Segments		Geo 3.4
Utah State Core Standard and Indicators Geometry Standards 3 Process Standards 1-5		
Summary		
In this lesson, students use Geometer’s Sketchpad or Patty Paper Geometry to create triangle altitudes, medians, perpendicular bisectors, and angle bisectors. They observe and draw conclusions related to the intersections created by these triangle lines.		
<p style="text-align: center;">Enduring Understanding</p> <p>Different triangle centers can be created at the points of intersection created by altitudes, medians, perpendicular bisectors and angle bisectors. These triangle centers (orthocenters) are used in different kinds of problem solving.</p>	<p style="text-align: center;">Essential Questions</p> <p>How do triangle centers (created by the intersection of altitudes, medians, perpendicular bisectors and angle bisectors) help in geometric problem solving?</p>	
<p style="text-align: center;">Skill Focus</p> <ul style="list-style-type: none"> • Constructing altitudes, medians, bisectors. • Differentiating triangle centers. • Drawing conclusions and reasoning out properties 	<p style="text-align: center;">Vocabulary Focus</p>	
Assessment		
Materials: Computers with Geometer’s Sketchpad,		
Launch		
<p>Explore</p> <p>What are the similarities and differences of medians, altitudes, perpendicular bisectors and angle bisectors? Make a table which demonstrates the learning and conclusions to be made related to the segments creating different triangle centers. (student copy below)</p>		
Summarize		
Apply		

Directions: Remember to post the essential questions. Discuss the essential questions during or at the conclusion of the activity.

1) Have students keep a record of their learning (see the worksheet below) while exploring triangle centers in the following activities. Pick and choose from the following

- Have students do the activities found in Exploring Geometry with Geometer’s Sketchpad p 71-77
- Have students do activities found in Patty Paper Geometry, p 32-38 and 43-48.
- The Special Segments in Triangles worksheet below could be used first as a “by hand” experience or as assessment.

2) Geo 2.7b and 2.7c are also included for further development or reinforcement of the concepts included in 2.7a.

Students who complete assignments early or who need further challenge could be given the problem solving activities related to triangle centers. They are found in Exploring Geometry with Geometer's Sketchpad, pages 78-85.

Geo 3.4 Triangle Centers and their Special Segments

Segments	Drawings	Triangle center	Conclusions or Properties
Altitudes			
Medians			
Perpendicular Bisectors			
Angle Bisectors			

Special Segments in Triangles

Cut four large, acute, scalene triangles out of paper. Label the vertices of each triangle as A, B, and C. Explain how to fold the triangles to produce the following special segments.

- a. The perpendicular bisector of side \overline{AC}
- b. The angle bisector of $\angle B$
- c. The median from $\angle B$ to \overline{AC}
- d. The altitude from $\angle B$ to \overline{AC}

Use the same four paper triangles that you folded in the above investigation. In each case compare your results to those of your classmates. What can you conclude?

- a. Fold the other two perpendicular bisectors.
- b. Fold the other two angle bisectors.
- c. Fold the other two medians.
- d. Fold the other two altitudes.

What did you discover in the each of the sets of special segments you just folded?