(A) Lesson Context

BIG PICTURE of this UNIT:	• mastery with algebraic skills to be used in our work with co-ordinate geometry (midpoint, length, slope) • understanding various geometric properties of quadrilaterals & triangles • how do you really prove that something is "true"?		
CONTEXT of this LESSON:	Where we've been You know about triangles and now you know how to find a slope, midpoint & length	Where we are Investigating various properties of triangles using slope, midpoint & length	Where we are heading How can I prove various geometric properties of quadrilaterals and triangles?

(B) Lesson Objectives:

a. Exploring the construction of geometric figures through dynamic geometry software (geogebra)
b. Using algebra & geometry software as tools, use slopes, midpoints & lengths of line segments to problem solving questions

(C) EXPLORATION ASSIGNMENT #1: Dynamic geometry software: Working with Geogebra

Open Geogebra (by now, downloaded onto your computer) and show me:

a. Show me an axes with a grid

b. Show me that you can construct a line through two points & determine the lines slope and equation

c. Show me that you can construct a triangle and measure the slope of each side and the area

d. Show me you can rotate a triangle by 90°, 180°, 270°

e. Show me you can reflect a triangle across the x-axis and across the y-axis

f. Show me that you can construct a perpendicular bisector of a side of a triangle

g. Show me that you can construct an angle bisector of an angle in a triangle

h. Show me that you can construct a median (as a line segment) in a triangle

i. Show me how to construct an altitude of a triangle

(D) EXPLORATION ASSIGNMENT #2: Triangle Centers (research required)

  a. Find the INCENTER in a triangle ➔ explain/construct significance

  b. Find the CIRCUMCENTER in a triangle ➔ explain/construct significance

  c. Find the CENTROID in a triangle.

  d. Find the ORTHOCENTER in a triangle.

(E) EXPLORATION ASSIGNMENT #3: Triangle Proofs

  a. Prove that the centroid divides a median into a 2:1 ratio

  b. Use slopes to prove that $\triangle ABC$ is a right triangle, given that $A(4,2)$, $B(-2,4)$, $C(2,-4)$

  c. A triangle is enclosed by the lines $3x + 13y = 56$, $5x - 8y = 34$, $-8x - 5y = -1$. Determine

   1. the coordinates of the vertices and

   2. the type of triangle (scalene, isosceles, equilateral)

EXPLORATION ASSIGNMENT #1: Dynamic geometry software: Working with Geogebra

(A) Show me an axes with a grid	
(B) Show me that you can construct a line through two points & determine the lines slope and equation	
(C) Show me that you can construct a triangle and measure the slope of each side and the area	
(D) Show me you can rotate a triangle by 90°, 180°, 270°	
(E) Show me you can reflect a triangle across the x-axis and across the y-axis	
(F) Show me that you can construct a perpendicular bisector of a side of a triangle	
(G) Show me that you can construct an angle bisector of an angle in a triangle	
(H) Show me that you can construct a median (as a line segment) in a triangle	
(I) Show me how to construct an altitude of a triangle	

EXPLORATION ASSIGNMENT #2: Triangle Centers (research required)

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(C) Find the CENTROID in a triangle.	
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EXPLORATION ASSIGNMENT #3: Triangle Proofs

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(B) Use slopes to prove that $\triangle ABC$ is a right triangle, given that $A(4,2)$, $B(-2,4)$, $C(2,-4)$	
(C) A triangle is enclosed by the lines $3x+13y=56$, $5x-8y=34$, $-8x-5y=-1$. Determine (i) the coordinates of the vertices and (ii) the type of triangle (scalene, isosceles, equilateral)	