Lesson Title:	This building is Tall…….
Length of Lesson	2 Days
Created By	Michael Andre Hamilton
Subject	Geometry, Algebra
Grade Level	10th-12th grade
State Standards	Transition to Algebra 3a, Geometry 4a,4b,
DOK Level	DOK 2
DOK Application	Estimate, Predict, Interpret, Make Observation
National Standards	Geometry for $9 - 12^{th}$ Math Standards
Graduate Research Element	None

Student Learning Goal:

State Standards for $9 - 12^{th}$ Geometry

   A. Apply the Pythagorean Theorem to solve problems
   B. Solve real-world problems involving formulas for perimeter, area, distance, and rate
   C. Explain and apply the appropriate formula to determine length, midpoint, and slope of a segment in a coordinate plane

State Standards for $9 - 12^{th}$ Transition to Algebra

   A. Apply the Pythagorean Theorem to solve problems

Materials Needed (supplies, hand-outs, resources):
Writing utensils; Notebook paper; White board; GPS Units, Angles Estimator, Pointer pen, Inspiring Minds;

Lesson Performance Task/Assessment:
The lesson performance task is to give the student's understanding using Google Earth to calculate the high of buildings using the Pythagorean Theorem.

Lesson Relevance to Performance Task and Students:
The lesson performance task is to give the student's understanding of how to apply the Pythagorean Theorem in a real world situation. Also the objective calculate different dimension of building heights using Geometry

**Anticipatory Set/Capture Interest:**
The way I plan on capturing interest is first showing them a clip of a video of really tall building. I will ask the class question like "how can you get the high of a building without measuring it?" I will provide brainstorming time and give the answer.

Guided Practice:
Day One:

The instructor will talk about the Pythagorean Theorem and how to capture data points with the GPS units. In a right triangle with sides *a*, *b* and hypotenuse *c*, trigonometry determines the sine and cosine of the angle
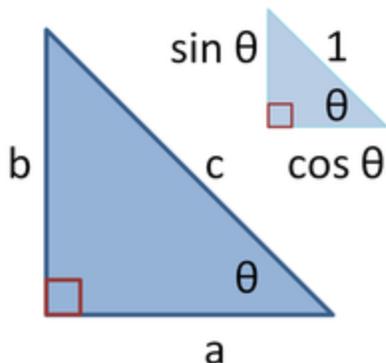
θ between side *a* and the hypotenuse as:

$$\sin\theta = \frac{b}{c}, \quad \cos\theta = \frac{a}{c}.$$

Day Two:
The students will be given the GPS units, angles projectors, and shown how to use them. Students will be separated into two groups and they will be able to measure angles of buildings.

Independent Practice:

Day One:
The students will listen and gain understanding about the Pythagorean Theorem. They will take note and do examples problems calculating a side of the triangle when given one angle and one side. The will be able to get into groups to discuss their answer and help each other if need be.

Day Two:
The students will be separated into two groups. Each group will be given a marker, GPS unit, and a Goniometer (measures angles). The student will find a building that they are interested in the height information. The will capture the GPS data points next to the building first. Then next step, the students will try to perform a straight line from their initial data points and capture another set of point. Then, they will use the Goniometer the

estimate the angle of the building for their last point to the roof. The students will go back in and use this form of the Pythagorean Theorem to calculate the height:
Similar right triangles showing sine and cosine of angle θ

Remediation and/or Enrichment:
Remediation:
Individual IEP; partner help throughout lesson; shorten parts of assignment; focus on few process

Enrichment:
*None

Check(s) for Understanding:
Day 1:
How many sides of a triangle you need to calculate a side with a given angle?
Do you understand how to use the GPS units?

Day 2:
What are under situation that using the Pythagorean Theorem is beneficial?
What are advantages and disadvantages of using GPS?
Closure:
Day One
I will have a quiz about their understanding of calculating the Pythagorean Theorem using angles.
Day Two:
The class and I will discuss what we have learn and talk about other situation that the Pythagorean Theorem useful.
Possible Alternate Subject Integrations:
*None
Teacher Notes:
None