

Discipline: Mathematics

Standard Category: Trigonometry & Mathematical Problem Solving and Communication

Lesson Focus: To investigate the Pythagorean Theorem

Suggested Level:
High School

PA Standard(s):	Related TESOL Standard(s):
2.10.11B: Identify, create, and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem. 2.5.11 Math Problem Solving and Communication	Goal 2: To use English to achieve academically in all content areas. Standard 2: Student will use English to obtain, process, construct and provide subject matter information in spoken and written form.

Lesson Focus:
To investigate the Pythagorean Theorem

Teaching Strategies:
Whole group instruction

Peer work

Key Objectives in Accordance with TESOL Level:

Pre-Conversational/ Beginning	Intermediate	Advanced
Students will be able to: <ul style="list-style-type: none">• To determine if a triangle is a right triangle.	Students will be able to: <ul style="list-style-type: none">• Use the Pythagorean theorem to find the third side of a right triangle.	Students will be able to: <ul style="list-style-type: none">• Solve problems using the Pythagorean theorem.

Assessment Strategies:
Questioning for understanding

Label work given

Materials:

1. Graph paper
2. Scissors
3. Glue
4. Paper
5. Pencil
6. Calculator

Procedures: (ELL suggestions are written in italics)

Explain:

The Pythagorean Theorem states that there is a special relationship among the sides of all right angles. In words, if a triangle is a right triangle (contains one 90° angle) then the square of the hypotenuse is equal to the sum of the squares of the legs. The converse is also true. That is if this relationship is true, then the triangle is a right triangle. *Simplify language when appropriate.*

Demonstrate:

1. *Give step-by-step instruction* on finding the square of each side of a triangle.
2. Cut out squares from grid paper and tape squares to the sides of the triangles.
3. Pass out materials.
4. Record the results of your Investigation on the chart below.

Length of sides			Area of the square along each side		
A	B	C	A	B	C

When completed, *answer the following questions with your partner:*

1. Were you able to form squares on the third side of each triangle?
2. What is the relationship between the area of the square along both shorter leg (side a and b) and the area of the square along the hypotenuse? *Discuss this with your partner then write what you found.*

Have students work in pairs to complete the table. *Pair an ESL student with a student who might be able to help him, either with primary language or through motions.* Once students are complete, collect materials. Fill in a class table on overhead. Discuss results.

Examples:

Beginner

Do the following sides form a right triangle?

3, 4, 5

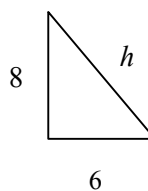
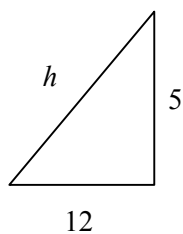
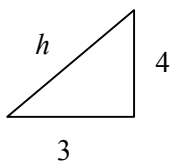
5, 6, 7

5, 12, 15

5, 12, 13

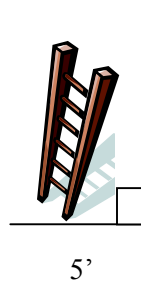
Intermediate

Find the length of the hypotenuse

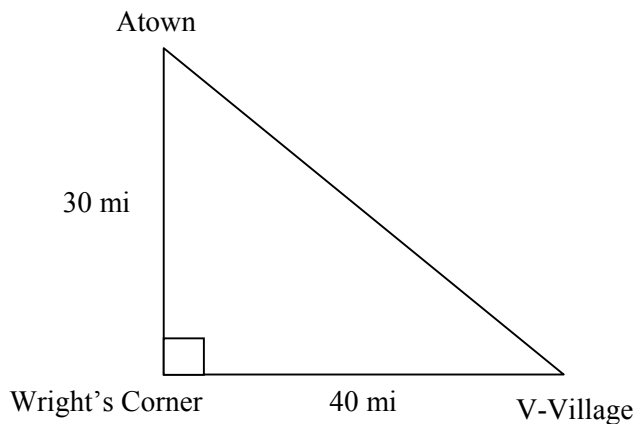


Advanced

Find the length of a ladder that is leaning on wall as shown.



How far is it from Atown to V-Village if we know the following?



Assessment:

Beginner

Questioning for understanding. Observation as they work in pairs. Student should be able to determine if a triangle is a right triangle. Correctives (Remedial activities) Return to concrete examples, and re-teach areas unlearned.

Intermediate

Student should be able to solve for one missing side.

Advanced

Student should be able to solve real life problems using the Pythagorean Theorem. Extensions (Enrichment activities) Have students find real life examples for uses of this new learned theorem and make a word problem.

Notes:

1. Do not “water down” the context.
2. Use simplified language, and speaking slowly might bring your point across. Even the simple words like “leg” might confuse the student.
3. Label each part of a diagram on overhead as you say the words.
4. Do not ask individual student if he understands, but as students work in pairs, listen and observe as he work with peers.