**Lesson Objective(s):** What mathematical skill(s) and understanding(s) will be developed?

CC8.G.6: Explain a proof of the Pythagorean Theorem and its converse.  
CC8.G.7: Apply the Pythagorean Theorem to determine the unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.  (SC 8)

**Lesson Launch Notes:** Exactly how will you use the first five minutes of the lesson?

Take 2 minutes to write down everything you know about right triangles.  
(Teacher will then generate a list of prior understandings on the board.)

**Lesson Closure Notes:** Exactly what summary activity, questions, and discussion will close the lesson and provide a foreshadowing of tomorrow? List the questions.

In your own words, explain what the Pythagorean Theorem is and why it is important.

**Lesson Tasks, Problems, and Activities (attach resource sheets):** What specific activities, investigations, problems, questions, or tasks will students be working on during the lesson?

1. **Lesson Launch—This will help gauge student prior knowledge about parts of a right triangle and will help build understanding to special properties of right triangles.** [UDL I: 3]

2. **Introduction of Task—Introduce to students that we will be investigating area relationships with right triangles.**  
   Ask students when we deal with area, what are the units?  (*Square units*) Then explain that we will be looking at areas of squares based on the sides of a right triangle.  
   Now, allow students to select one of the following stations:  
   - Station 1: Computer Applet investigation (http://math.kendallhunt.com/x19481.html)  
   - Station 2: Hands-on investigation  
   - Station 3: Video Tutorial with Graph Paper [UDL I: 1,2,3, II: 4,5, III: 7] (http://ntnmath.algebraicthinking.com/Main%20Pages/Part%20II%20pages/Part%202%20English%20Flash/lesson%202059.htm)
     a. Station 1: Have students work individually or with a partner to complete Investigation One on the computer applet (http://math.kendallhunt.com/x19481.html).  Have students write a conjecture based on what they've seen with the areas of the squares.  Ask students is this always true.  Try a few examples.
     b. Station 2: Have students sit in pairs or small groups.  Pass out one of each Triangle Area Map to each group.  Tell students “Sandra has made a conjecture that when you have a right triangle the area of the two smaller squares is equal to the area of the larger square.  Work with your team to verify or disprove her conjecture.”  Provide students with scissors, rulers, and color tiles as potential tools to assist with their investigation.
     c. Station 3: Have the students watch of the video on the Pythagorean Theorem with a 3-4-5 triangle.  Stop the video at time stamp 2:50.  Now provide students with graph paper and have students investigate if the theorem holds for a 5-12-13 triangle.

3. **Bring the class together and have groups share out what they learned at their station.**  
   Have students generate a rule for the area problems they investigated.  
   Students should be able to informally state the Pythagorean Theorem.  
   Formalize the definition and provide multiple representations (algebraic equations, graphical representation, and description in words).  
   Now pose the question—does this hold for all triangle or must it be a right triangle?  
   Allow students a few moments to process and discuss with groups.  Have students make a prediction. [UDL I: 1,2,3]

4. **Now, either as a whole class or in small groups, revisit http://math.kendallhunt.com/x19481.html and look at Investigate Part 2.**  
   Have students move point A and point B to examine the relationship of $a^2 + b^2$ compared to $c^2$.  
   Students should respond to the Investigate prompts and make connections to whether the triangle is acute, right, or obtuse.  
   Have students develop conjectures in the groups and then compare with other groups/whole class. [UDL I: 3, II: 5, 6, III: 8]

5. **At this point, pose the question, “If we know two sides of a right triangle, how might we find the third side?”**  
   Allow students to think about the situation.  
   Have students go to one of the five application stations in the room.  
   Each station has one real-world situation with a missing value.  
   Students are to work in their groups to develop a strategy to find the missing value.  
   Have students write their work on chart paper.  Note: This activity may take
8.G.6&7: The Pythagorean Theorem

the remaining class time. Presentations may need to be saved for the remaining class period. If time permits, have whole class come together to discuss the strategies used to find the missing values. 

**Evidence of Success:** What exactly do I expect students to be able to do by the end of the lesson, and how will I measure student mastery? That is, deliberate consideration of what performances will convince you (and any outside observer) that your students have developed a deepened (and conceptual) understanding.

Students will be able to articulate what the Pythagorean Theorem is and why it is important in their own words. Students will then be able to apply their understanding to solve right triangle problems.

**Notes and Nuances:** Vocabulary, connections, common mistakes, typical misconceptions, etc.

Hypotenuse, legs, right angles, square units

There may be misconceptions about how to label a right triangle. Students may also make arithmetic mistakes as they solve equations with the Pythagorean Theorem.

**Resources:** What materials or resources are essential for students to successfully complete the lesson tasks or activities?

- Computers with Internet access
- Triangle Area Maps
- Scissors, rulers, color tiles
- Graph paper
- Chart paper with markers
- Application problems in stations

**Homework:** Exactly what follow-up homework tasks, problems, and/or exercises will be assigned upon the completion of the lesson?

In your own words, explain how to find the missing side of a right triangle. Explain how you know that your strategy is valid.

**Lesson Reflections:** What questions, connected to the lesson objectives and evidence of success, will you use to reflect on the effectiveness of this lesson?

Do all of my students have a strong conceptual understanding of the Pythagorean Theorem and its importance? Are students able to use the Pythagorean Theorem to find missing sides of a right triangle?

What are my plans for tomorrow’s lesson based on the information I have gathered about student understanding in this lesson?