Scripted Six-point Lesson Plan* on: Pythagorean Theorem
A 90-minute lesson for the 11th grade.

Learning Objective: Students will be able to use the Pythagorean theorem to calculate the missing side length of a right triangle

Essential Question: Does the Pythagorean theorem work for all right triangles?

Mathematical Standards: CCSS.MATH.CONTENT.8.G.B.7

Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

Practice Standards: CCSS.MATH.PRACTICE.MP1 Make sense of problems and persevere in solving them.

CCSS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.

CCSS.MATH.PRACTICE.MP4 Model with mathematics.

CCSS.MATH.PRACTICE.MP6 Attend to precision.

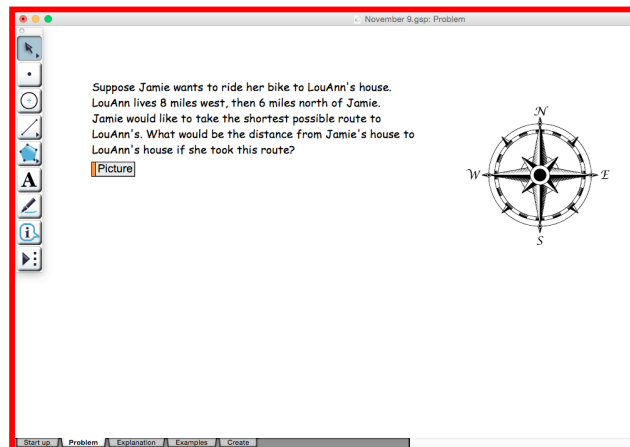CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.

Technology Standard: HS.TT.1.3 Use appropriate technology tools and other resources to design products to share information with others (e.g. multimedia presentations, Web 2.0 tools, graphics, podcasts, and audio files).

Materials: Pencil, Paper, calculator, and a creative mind!

Prior Knowledge: Some students may already be familiar with the Pythagorean theorem, but all students should know what a right triangle is and the properties of a right triangle. Students will also need to know how to calculate the area of a square.

1. **Focus and Review (5-10 minutes)**

Present the problem on the board for the students.

Here we have a problem, would anyone like to read this problem out loud for the class?

"Suppose Jamie wants to ride her bike to LouAnn's house. LouAnn lives 8 miles west and 6 miles north of Jamie. Jamie would like to take the shortest possible route to LouAnn's. What would be the distance from Jamie's house to LouAnn's house if she took this route?"

Now, I would like for you all to just think about this silently to yourselves. Think about what comes to mind when you read this problem.

Students should understand that the question is referring to a triangle, and the students will need to find the missing side.

Now, if you would please pick your pencil up and write down what you think this problem is describing. Write out everything you thought about just now about the problem.
Students will now draw a picture of what they are thinking about the problem.

Okay, what pictures came to mind? Would anyone like to share? I noticed several of you had the two streets drawn, what shape can you make of what you have drawn? "A triangle."
Show the triangle that has been constructed.
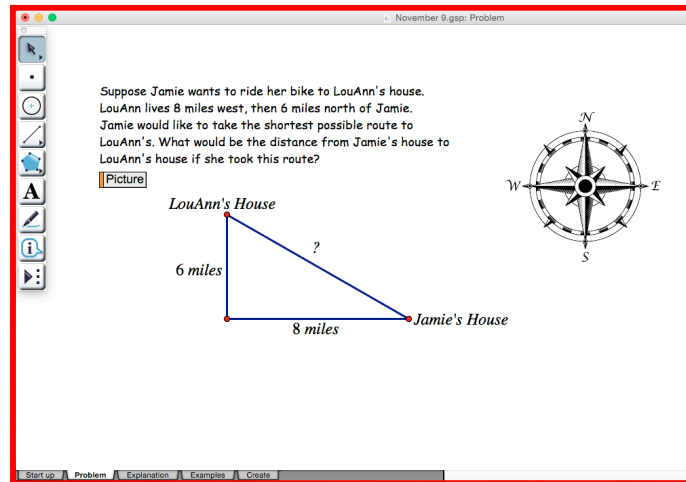
What kind of triangle, take a look at the angles you have here. What kind of angle does this look like? "A right angle" Great, so what kind of triangle do you think we have A right triangle.

Once the students have accurately labeled their picture, they will need to brainstorm on how to calculate the missing side length.

For students that are struggling, I will ask them "What is the first thing that comes to mind when you hear 'Right Triangle'?" If nothing comes to mind, I will ask them if they have heard about the Pythagorean theorem, and what they know about it.

I will have the students discuss what was similar and what was different about each person's reasoning and the process of how they got to their answer.

At this point the students should have an answer, and will share their thought process with the class.

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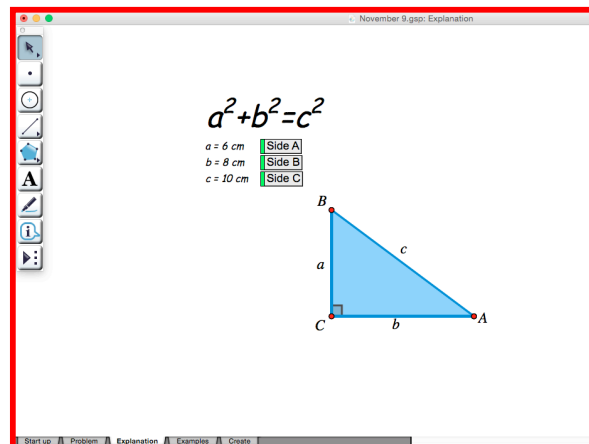
2. Statement of Objectives (1-2 minutes)

So today we will be learning about the Pythagorean theorem, and by the end of class you will be able to calculate the missing side of a right triangle using the Pythagorean theorem.

3. Teacher Input (25-30 minutes)

Next, the students will be shown the picture I have for the question. Then I will show them the demonstration for the reason why the Pythagorean theorem works.
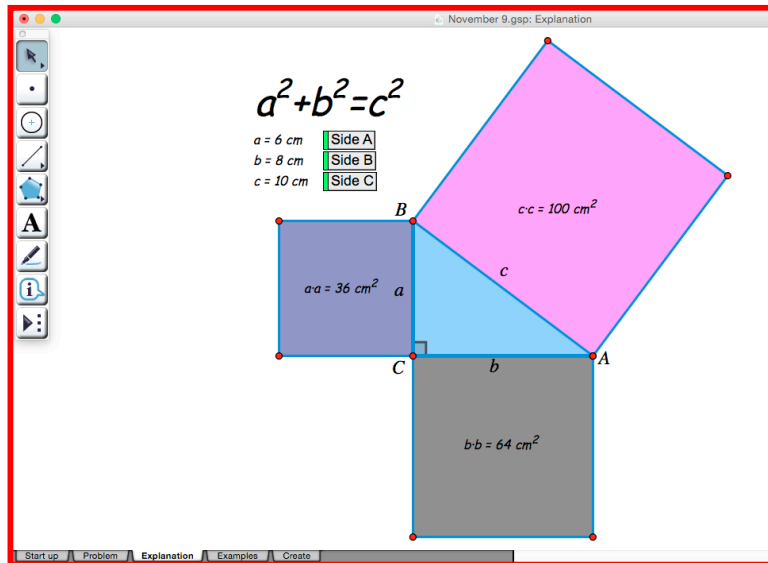
I will bring the students attention back to the board, and will ask some students to share what they were able to come up with.

Students will be able to use their own creativity and strategy to calculate the missing side.

4. Guided Practice (10-15 minutes)

Lastly the students will be given a few questions to work on to practice the theorem. These

5. **Independent Practice (5 minutes in class; 30-45 minutes at home, nightly)**
Now that we have practiced some together, take this time in class to create your own Pythagorean Problems! Please note that I will be taking this up as a classwork grade. If you
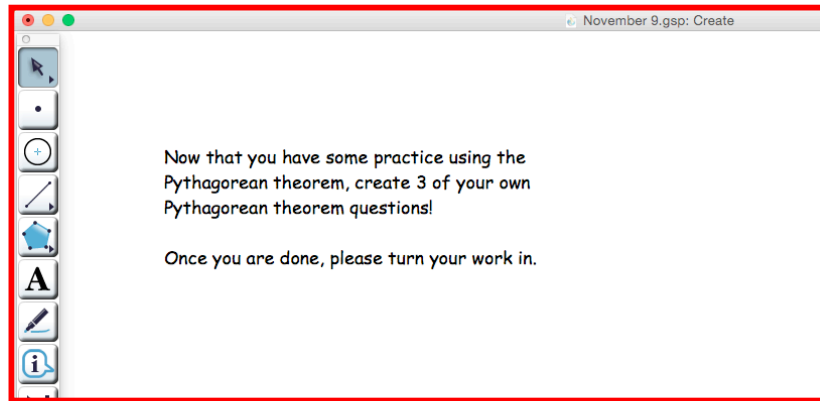
do not finish, what you have left will need to be completed for homework and submitted tomorrow.

6. **Closure (2-5 minutes)**
The last few minutes of class will be used to answer questions for the students as they complete the assignment. Students are also responsible for putting the materials back where they belong and turning their work in.

* Color is used to indicate the voice in the lesson. Specifically, the color blue represents what the teacher says in class; the color green represents directions to the teacher or information for the teacher; the color magenta represents expected student input; the color red represents what can be seen on the overhead projector or written on the chalkboard.