Lesson Plan Template

Grade: 8th grade	Subject: Math 8

Materials: Graphing paper pen pencil and paper	Technology Needed: Computer(s) Calculator

Instructional Strategies:

<mark>Direct instruction</mark>
Guided practice
Socratic Seminar
Learning Centers
Lecture
<mark>Technology integration</mark>
Other (list)

Peer teaching/collaboration/ cooperative learning
Visuals/Graphic organizers
PBL
Discussion/Debate
Modeling

Guided Practices and Concrete Application:

Large group activity
Independent activity
<mark>Pairing/collaboration</mark>
Simulations/Scenarios
Other (list)
Explain:

<mark>Hands-on</mark>
<mark>Technology integration</mark>
Imitation/Repeat/Mimic

Once I am done explaining a problem or two they will solve some problems on their own with their table partners. Then, we will o back to me lecturing/ demonstrating the concepts.

Standard(s)

8.G.7 Explain a proof of the Pythagorean Theorem and its converse.

8.G.6 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real world and mathematical problems in two and three dimensions.

Differentiation

Below Proficiency:
Students below proficiency will have the option of completing the homework assignment with modifications. These modifications (hints) will guide them through the steps needed to solve the problems

Above Proficiency:
I may ask these students questions that they will learn in the next day's lesson. Maybe how to use similar triangles and the Pythagorean theorem.

Approaching/Emerging Proficiency:
These students are fully capable of solving problems. However, occasionally they will make minor arithmetic errors or be confused by a concept. If necessary, we can provide them with modifications. However, they will have fewer modifications then someone below proficiency.

Modalities/Learning Preferences:
Main modality being used in this lesson is visual. However, there is some kinesthetic being touched on.

Objective(s)

The learner will use properties of squaring numbers and the order of operations to find the missing side length of right triangles.

The learner will use perfect squares to calculate side lengths

Bloom's Taxonomy Cognitive Level: Apply, analyze, evaluation, knowledge

Classroom Management- (grouping(s), movement/transitions, etc.)

Students will be paired up with their table partners. We will move from one activity to the next by me posing the question "is there any questions at this point." In addition, I will verbalize that we are moving on to the next thing.

Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.)

	Students are expected to show respect for themselves, their classmates and me at all times. When transitioning to group work it is expected that they remain quiet and do not get too loud.

Minutes	Procedures
12	**Set-up/Prep:** Students will grade the previous days homework in class. At this time, I will ensure all final preparations for the lesson are complete
8	**Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)** Explain the concept of the Pythagorean Theorem Begin by writing c^2=a^2+b^2 and asking if they know what that is called. (Draw a right triangle to accompany the formula). Show that a and b are just numbers and they are the legs of the triangle. Show that c is the hypotenuse. Ask if they believe it makes sense for c^2=a^2+b^2. Begin the geometric representation of the Pythagorean Theorem. **Emphasize since the area of the two squares is equal, then the sum of the squares of the legs and the hypotenuse must be as well.** **Add tidbit of number of proofs of Pythagorean Theorem and famous people who have proved the Pythagorean Theorem.** **Emphasize that the Pythagorean Theorem only works for right triangles.** **Hold discussion on why that is.**
18 **Note after every two/3 examples they will work on problems on their own. This time is accounted for in explore**	**Explain: (concepts, procedures, vocabulary, etc.)** **Example 1; Find the length of the hypotenuse of the right triangle with sides of length 8 and 6.** 1.) **Draw the right triangle and label sides** 2.) **Plug in 8 for a and 6 for b** 3.) **Square 8 and 6** 4.) **Sum 64 and 36 to get 100** 5.) **C^2=100. Solve for c.** 6.) **C=10** **Are there any questions at this time?** **Example 2: Find the length of the hypotenuse on the triangle with side lengths 5 and 10** 1. **Show that a is 5 and b is 10 in this scenario.** 2. **Square 5 and 10.** 3. **Sum 25 and 100** 4. **Show c^2= (125) ^1/2. Solve for c** 5. **C= (5 x 25) ^1/2** 6. **C=5(5) ^1/2**

Are there any questions? Try and complete a and b in your packets.

Example 3: Find the length of the hypotenuse of a triangle with side lengths 4/5 and 3/5

    1.) A is 4/5 and b is 3/5
    2.) Square 4/5 and 3/5
    3.) Sum 16/25 and 9/25
    4.) C^2=1
    5.) C=1

Are there any questions?

Example 4; Triangle with legs of .2 and .6

    1.) A is .2 and b is .6
    2.) Square .2 and .6
    3.) Sum .04 and .36
    4.) C^2=.40

Are there any questions? Try c and d in your packet.

Now we will find the length of a leg of a right triangle given the length of the hypotenuse and another leg.

Explain to them how this is possible.

Reorder c^2=a^2+b^2. Into c^2-a^2=b^2.

Explain that the exact same process applies here except we now subtract the squared numbers instead of adding them.

Example 5:

    1.) Find the length of the missing leg in a triangle with hypotenuse of length .5 and another leg with length .3.
    2.) Explain that it matters here if we plug in for the right numbers. C=.5 and a=.3.
    3.) Square c and a
    4.) Subtract the square of c from the square of a.
    5.) B^2= (.34)
    6.) B= (.34) ^1/2

18	**Explore: (independent, concreate practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)** Here the students will do the problems in their Spartan notes. They will do two at a time. So, they will begin with a and b, then c and d, and finally a and b again. Once they have completed each set of two problems I will also do them on the board so those who got the wrong answers can correct their errors.
3	**Review (wrap up and transition to next activity):**

Today we learned how to apply the Pythagorean Theorem. All the Pythagorean theorem involves is knowing two lengths of our right triangle. Squaring those lengths and either adding or subtracting them together, given if we have a missing hypotenuse length or leg length. Next, we just calculate the square root of what our missing length is.

Formative Assessment: (linked to objectives)

Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc.

Several times throughout the lesson I will stop to ask the students if they have any questions. In addition, they will also be able to show me they understand the days lesson when they work in their table groups and answer the Spartan notes problems. If they do not show me they know the material I will continue working with them some more.

Consideration for Back-up Plan:

If need be, I will write out steps to each problem and guide them through the problems even more directly. If absolutely necessary, we can go back to simply adding and subtracting numbers we have squared

Summative Assessment (linked back to objectives)

End of lesson:

The summative assessment will be their summative assessment at the end of the unit/chapter. However, the homework from this day will also serve as a good baseline as to how well the lesson was taught.

If applicable- overall unit, chapter, concept, etc.:

The overall concept of this unit is using perfect squares and order of operations to find a missing side length on a right triangle.

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):

Overall, I thought the lesson as a whole went fairly smoothly. However, I could have done a better job of prepping for the technology I would be using. In addition, I also need to do a better job of pausing when asking the students questions. I had a tendency to not allow adequate wait time. Finally, I could do a better job of moving around and checking in as I teach.