Demographics:
Name: Gretchen Morris-Archinal **Date:** April 17, 2015 **Subject:** 8th Grade Math **School:** Pierce Middle School **Setting:** Secondary Resource Room (SRC) **School District:** Grosse Pointe Public Schools **Lesson Plan Title:** Pythagorean Theorem – practice and review/reteach

Rationale:
Geometry - Understand and apply the Pythagorean Theorem.
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.

Range of Writing:
CCSS.ELA-LITERACY.W.8.10
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

The general education 8th grade math class is just starting the study of the Pythagorean Theorem. This lesson is a mechanism that allows special education students an opportunity to do and/or review homework, reteach as necessary and write about their study of the theorem. It incorporates kinetic, oral and visual learning opportunities to reach a range of learning styles.

Outcomes (objectives/performance indicators):
75% of the students will correctly explain and apply the Pythagorean Theorem given two-sides of a right triangle as measured by an online assessment (summative assessment in part 4) and by the written Tweet It Back response cards.

Materials needed:
- Home work
- Elmo
- Smart board
- Apple TV
- Computer with internet
- Measuring tape
- iPad/iPhones with the following apps. – These are all free apps
    - Pythagoras – Boss Maths - https://itunes.apple.com/us/app/pythagorean-theorem-its-converse/id556317588?mt=8
    - Pythagorean Calculator - https://itunes.apple.com/us/app/id495387401?mt=8
    - Pythagorean Theorem 8.G.6 - https://itunes.apple.com/us/app/pythagorean-theorem-8.g.6/id692872148?mt=8
    - IXL - http://www.ixl.com/math/grade-8/pythagorean-theorem-find-the-length-of-the-hypotenuse
- Handout with writing prompt – Tweet it Out

- Pencils for students

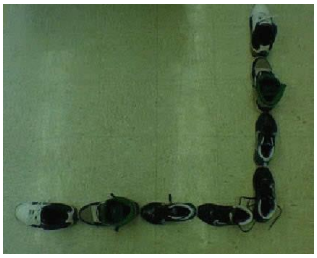
Teacher Procedure/Development:
Introduction: After students are seated ask them get out yesterday's math homework. State that the objective for the day is to get a better handle on the Pythagorean Theorem by going over the homework, evaluating what they know and re-teaching as necessary.

Methods/Procedures:

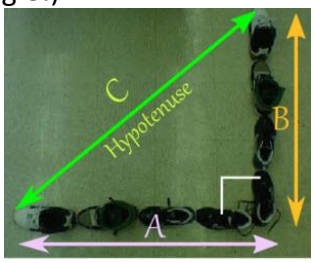
1. Using the smart board and Elmo, the students will take turns solving the problems from last night's homework. All students will have an opportunity to solve a problem giving the teacher a chance to assess individual student's abilities and knowledge.
2. Students will take part in the Pythagoras Theory Shoe Activity as a hands on representation of the theorem.
    a. https://www.mathsisfun.com/activity/pythagoras-theorem-shoes.html

1st: Gather up as many shoes as you can.
2nd: Since Pythagoras' Theorem only works for 90 degree triangles, line your shoes up to form the letter L, like this:

Or this:



3rd: Label one line of shoes A, and the other line of shoes B (you could call them "legs" of a triangle!)



4th: Measure each line of shoes with your measuring device and record them on your paper

A =	
B =	

Now we have enough information to solve the distance from the tip of one line of shoes to the tip of the other line of shoes. We call this line the hypotenuse

5th: Using Pythagoras' Theorem $A^2 + B^2 = C^2$ solve for the distance of C, our hypotenuse.

$$C = \sqrt{(A^2 + B^2)}$$

6th: Plug in your recorded information for A and B and solve for C. Hint: make sure your using the same units like inches or cm's. Record your answer below

C (by calculation) =	

7th: After recording your data, use your measuring device to measure the hypotenuse (the distance from the tip of one line of shoes to the tip of the other line of shoes). Did you get the same answer?

C (by measurement) =	

Questions To Ask Yourself

Say, instead of measuring with your ruler you counted up the size of each shoe for the distance of each line of shoes. Would your answer change? Why?

If you would have mixed multiple units of measurement like cm's and inches while working on the project, versus using the same measuring unit, how would this have affected your answer?

3. IF TIME - Using the Pythagorean Theorem 8.G.6 app on the iPad and Apple TV, show the students how the pieces work together to define the theorem.
4. Show the students how to calculate by using the calculator function on their devices or Pythagorean Calculator app again using the Apple TV.
5. Have the students practice finding the hypotenuse of the triangle by using either (a will take longer and can be shortened to just doing a few, b is just one problem:
    a. IXL on either their phone/iPad or on the smart board. Students may use a calculator or app as an aid.
    b. http://www.pbs.org/wgbh/nova/proof/puzzle/baseball.html

6. Have students report their scores – this is the summative assessment.

Closure: After the students have reported their IXL scores, the teacher will pass out the Tweet it Back forms. Students will write up a short synopsis in tweet format that synthesis what they learned today about the Pythagorean Theorem. This could be done on Twitter if appropriate. The room returned to its original state.

Technology Use: The smart board, iPad/iPhone, Apple TV and apps are used during this lesson. Students will record their tables and graphs for the shoe triangle on the smart board (if done). IPads and/or iPhones are used for the second part and projected on the smart board using Apple TV. While the students will not actually tweet their responses, this format will be utilized as a reflective synthesis of what they have learned. While it is low-tech, the shoe triangle on the floor is also considered technology.

Accommodations/adaptations:

- The only safety concerns would be downloading appropriate apps. I found ones that doesn't cost anything and doesn't have any advertising.
- Instruction was differentiated to allow for different learning styles - kinetic, visual, and verbal.
- There are also a variety of teaching styles from direct instruction to cooperative groups constructing knowledge within the groups to accommodate cultural leaning preferences.
- Because this lesson is to be used in a resource room setting, individual learners IEP goals have also been taken into consideration and any individual accommodations, such as the use of calculators, oral and written directions and additional time have been incorporated.
- This lesson incorporates students form two different resource rooms in a cooperative exchange between the two rooms.

Assessment/Evaluation: The teacher will make systematic observations during and after the group activities to form formative assessments. The Tweet it Back response acts as a summative assessment of the knowledge students have about the Pythagorean Theorem ; what they do not know; and where they still have questions .

Teacher Reflection:

References

Activity: Pythagoras' Theorem. (n.d.). Retrieved April 12, 2015, from https://www.mathsisfun.com/activity/pythagoras-theorem-shoes.html

IXL math practice - Pythagorean theorem: Find the length of the hypotenuse (Eighth grade). (n.d.). Retrieved April 12, 2015, from http://www.ixl.com/math/grade-8/pythagorean-theorem-find-the-length-of-the-hypotenuse

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(n.d.). Retrieved April 12, 2015, from http://www.pbs.org/wgbh/nova/proof/puzzle/baseball.html

TODAY'S TEACHING TWEET

@_____

Something I learned today...
I didn't know...
A question I still have is...

#_____

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@_____

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