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# Exploring Trigonometry with TI-Calculator

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# Group Project Lesson Plan

Name: Megan Bonacci
Grade level(s)/Subject taught: Geometry / Grade 10
TI Graphing calculator
Objectives: Students will demonstrate their knowledge of trigonometry concepts. Students will use the TI- 84 graphing calculator to correctly identify lengths of the missing side of a triangle using trigonometry concepts. Students will work cooperatively during group instruction.

Please provide a rich **one-page, single-spaced**, description or a *vision* of your best thinking on a way or ways you might teach the planned lesson. (approximately  $\frac{1}{2}$  page for the teacher role,  $\frac{1}{2}$  page for the student role). Also, construct a tentative rubric that you might use with your students (see example)

Items to include in your lesson plan: (Choose your discipline/concepts from your own area).

1. Write the Mathematical Concept or “key idea” that modeling will be used to teach: (e.g. Students use mathematical modeling/ multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships)

Students will use the TI – 84 Graphing Calculator to understand the components of a right triangle and how they relate to beginning Trigonometry concepts. Students will learn how to use the scientific calculator to understand trigonometry functions.

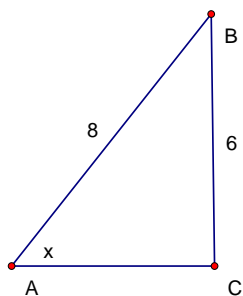
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Materials: Pens/pencils  
Paper  
Interactive whiteboard / LCD projector  
TI – 84 graphing calculator (class set)  
Homework sheet

For the introduction of the lesson, students will be asked to draw a wave (a series of waves) on their paper. Each student will then draw their wave on the Interactive whiteboard (it is an 8:1:1 class). We will discuss the different waves students have drawn (Why are they different? How are they the same?) and brainstorm the different kinds of waves there are (sound, water, hand, stadium, etc.). After this discussion, I will draw a wave that would be seen in the water on the whiteboard (with the crest, trough, etc). At this point, we will discuss the anatomy of the wave, and I will lead them through relating the wave to a triangle (comparing the height of the wave with the height of the side of a triangle, comparing the base of the triangle with the distance between where the crest of the wave hits the water and where the wave started, etc.) We will also discuss how a smaller angle denotes a smaller wave. After this discussion, we will brainstorm why waves have different heights (large objects being dropped in water, duck splashing, tsunamis, etc.) and brainstorm appropriate heights according to the type of disturbance causing the wave. The students should be able to hypothesize that smaller disturbances will make smaller waves versus earthquakes causing huge waves (tsunamis) and the possible heights of these waves.



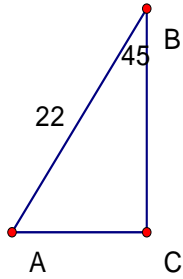
After this introduction, I will review labeling the sides of a triangle with the students (how to identify the hypotenuse and label the other two sides according to the angle specified – for example, opposite and adjacent). I will introduce the acronym SOHCAHTOA. I will put notes up on the whiteboard explaining what the acronym stands for. I will then go over how to use the acronym to solve for the missing angle and/or side of a triangle. Students will receive a worksheet. On this worksheet, they will first practice labeling the sides of triangles. They will then practice applying SOHCAHTOA to triangle, without actually using numbers. This means that they will simply identify the angle, apply the acronym SOHCAHTOA, and show how to figure out the answer without actually using numbers. For example, students will recognize they are looking for the Sine of angle A. They will label (Sine=opposite/hypotenuse) which side is opposite and which side is the hypotenuse.



The next step, the students will begin applying the SOHCAHTOA acronym to right triangles to determine the length of a side using the TI 84 graphing triangle. I will work through several problems with the students as a class, showing them how to use the TI 84 to solve. As the students demonstrate their ability to solve, they will then begin to work through some problems (3-5) independently in class. I will walk around to help students if they need it. Homework will be assigned (see following).

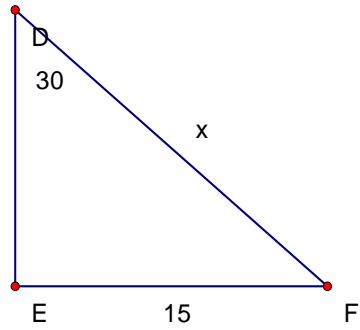
Some examples of the problems students will be solving:

Using the Cosine of Angle B, find the measurement of side BC



```
cos(45)
.7071067812
.7071*22
15.5562
```

Find the measure of DF using SOHCAHTOA



```
sin(30)
.5
15/.5
30
```

## Math - Problem Solving : Beginning Trigonometry Concepts

Teacher Name: **Megan Bonacci**

Student Name: \_\_\_\_\_

CATEGORY	4	3	2	1
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Mathematical Reasoning	Uses complex and refined mathematical reasoning. Is able to independently solve for missing side of triangle.	Uses effective mathematical reasoning. Is able to solve for missing side of triangle with minimal teacher assistance.	Some evidence of mathematical reasoning. Needs a lot of teacher assistance in order to solve for missing side of triangle.	Little evidence of mathematical reasoning. Is unable to solve for missing side of triangle.
Working with Others	Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged partner but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.
Mathematical Terminology and Notation	Correct terminology and notation are always used, making it easy to understand what was done. Can successfully identify and use acronym SOHCAHTOA and sides of triangle.	Correct terminology and notation are usually used, making it fairly easy to understand what was done. Needs some adult support to use acronym SOHCAHTOA and identify sides of triangle.	Correct terminology and notation are used, but it is sometimes not easy to understand what was done. Needs significant adult support to use acronym SOHCAHTOA and identify sides of triangle.	There is little use, or a lot of inappropriate use, of terminology and notation. Is unable to use acronym SOHCAHTOA and/or identify side of triangle.

Date Created: **Aug 03, 2006 02:40 pm (CDT)**

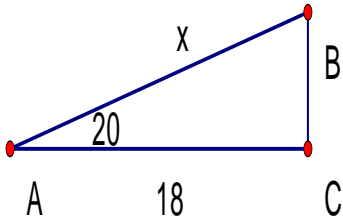
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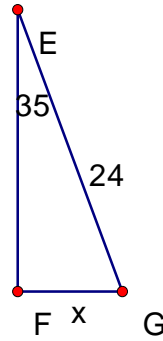
Homework: Using SOHCAHTOA (Beginning Trigonometry Concepts)

Use SOHCAHTOA to correctly solve for missing side.

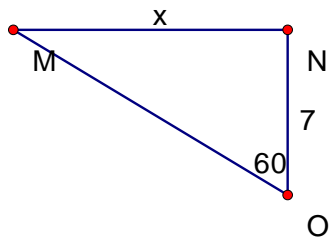
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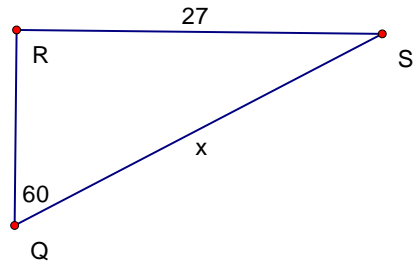
2.



3.



4.



BONUS:

Using SOHCAHTOA, solve for missing angle.

