

Intro to Trigonometry and the Unit Circle

Day 1: Right triangle trig review- SOH CAH TOA

Investigation 2 Core Plus 2B p. 395

Review the basic trig functions from Geometry. Explore by drawing triangles with same angle measures and computing ratios. Assignment: Group work. Complete in class or finish at home, through problem 7.

Day 2: Indirect measurement using trig functions-

Investigation 3 Core Plus 2B p. 400

Measuring without Measuring. Using trig ratios to measure objects indirectly. Reviews angle of depression and angle of elevation, taught in Geometry. Also reviews inverse trig functions on calculator. Assignment: Group work. Complete in class or finish at home, through problem 8.

Day 3: Outside...more indirect measurement.

Make and use the Clinometer model from Investigation 3 to actually measure some objects outside. Have several students measure the same item, do calculations, discuss differences in class. Each pair of students should measure two items. Students should write up their results informally for the next day's class.

Day 4: Quiz on triangles and ratios (from Core Plus 2)

Day 5: Ferris wheel problem

What does the graph of height above ground when you're riding a ferris wheel look like? Comap's Precalculus: Modeling our World, Activity 4.2 p. 260. Students gather data on height above the ground, plot data in a graph. Explore graphing the sine function using graphing calculators. Assignment: Finish problems through #4.

Day 6: The unit circle and radians

Exploration Simms Level 5, Volume 3, p. 328. Students work in groups to create radian measures using a can and paper strip to calculate radian measures for common angles like 45 degrees. Discuss relationship between radians and degrees. Assignment: Simms p. 331, 1.1-1.5.

Day 7-8: Modeling circular motion

Students create a cardboard model of the unit circle (ferris wheel) in Investigation 3, Core Plus 2B, p. 432. Distances on the unit circle are measured and calculated using trig ratios and students begin to find formulas. Sine, cosine and tangent are defined in the unit circle. Work through problems in groups to answer questions from text. Students should be learning unit circle values as they progress.

Day 9: Quiz on Unit Circle. (On file.)

Day 9: Looking at graphs

Periodic change. Investigation 4, Core Plus 2B p. 436. Daylight hours are examined over a year's time to explore a periodic function. Graphing calculators are used to determine effect of changes of constants in formulas such as $y = A \sin x + B$. Ultimately students are introduced to the $y = A \sin B(x - C) + D$. Assignment: Listen to some music tonight. Think about sound waves.

Day 10-11: Music and sound waves

Simms Level 5, Volume 3, Activity 3-4, p. 339. Students explore frequency, period, cycles, and amplitude in sound waves. Need to borrow machine from science dept. to view sound waves. If possible have students bring in instruments, or bring in bottles for the Exploration in Activity 4. Assignment. Work through 3.1-3.6 and 4.1-4.5.

Day 12: Project Mathematica video.

Watch video as a review of the unit.

Day 13: Assessment assigned.

PERFORMANCE PACKAGE TASK 1
(Title of Package)

Content Standard: Trigonometry

Level: Partial

Specific Statement(s) from the Standard:

MN standards for Grades 11-12, Trigonometry

6. Graph the functions of the form $A\sin(Bt + C)$, $A\cos(Bt + C)$, and $A\tan(Bt + C)$ and know the meaning of the terms frequency, amplitude, phase shift and period.

Product(s): A written report including a graph and table.

Task Description:

You are going to Australia to see the country. Naturally, you want to go there at the best time of year. But what time of year is that? Decide which of the following climate information, for you, determines the best time of year: temperature, rainfall, longest days? Go to the site, <http://www.bom.gov.au/climate/averages/> and gather some data. You may choose whichever area of Australia you would like.

Once you have found some useful data, enter that data into your calculator, create a scatterplot of your data, and find an appropriate trigonometric equation that represents that data. Decide exactly what time of year you would like to visit Australia.

In a report, explain where you are going, show your data in a table and a graph form (your graph should show your actual data and the equation you found), and justify your results using your data. Include in your report an explanation of your equation which includes the practical meanings of amplitude, period, phase shift and vertical shift. Make sure your data supports your results!

Special Notes:

You will need access to a computer and a graphing calculator or other graphing utility to complete this assignment.

PERFORMANCE PACKAGE TASK 1
(Title of Package)

FEEDBACK CHECKLIST FOR TASK 1

The purpose of the checklist is to provide feedback to the student about his/her work relative to the content standard. Have the standard available for reference.

Y=Yes

N=Needs Improvement

<u>Student</u>		<u>Teacher</u>
_____	Data chosen appropriately	_____
_____	Data shown in a table	_____
_____	Data graphed appropriately	_____
_____	Equation correctly found for data	_____
_____	Clear justification of rationale for visiting	_____
_____	Data supports justification	_____
_____	Report is grammatically correct and well written	_____

Overall Comments (information about student progress, quality of the work, next steps for teacher and student, needed adjustments in the teaching and learning processes, and problems to be addressed):