

"Navigation" - Curriculum



Learning Objectives

Students will:

- Gain a better understanding of real world use of geometry and algebra.
- Apply skills to indoor and outdoor exercises that are interactive and engaging

Timing: Each of these lessons are a 90 minute lesson plan. They can be broken down for

MOI = Method of Instruction (Research, Lecture, Workshop, etc.)

Lesson 1: Reading a Topographic Map and Nautical Chart

Deciphering a

Topographic Map

Using a local map and a non-local map show different regions and explain how topographic maps work.

MOI: Presentation requiring student interaction.

Deciphering a Chart

Using a Chart you may do the same thing as with the Local Map and Non-Local Map.

MOI: Presentation requiring student interaction.

Learning the Key

The Key is a very important part of any map. However on most topographic maps you will find it lacking.

MOI: Student Analysis, Student Discovery.

Contour Lines, Interval, and Depth Soundings

Contour Lines are a great way to explain 3D and 2D and charting. Contour lines can't touch so the rings

MOI: ~~Map/Chart Work,~~ Presentation requiring student interaction,

Local Map/Chart Finding Reference Points

Using the local map show how it highlights certain reference points so that students who live in the area

MOI: *Presentation, Student Analysis, Map/Chart Work.*

The Three Norths

The Three Norths Explains how you make a Sphere into a Rectangle and why compasses don't point North.

MOI: *Map/Chart Work, Presentation* .

Declination

Declination is a great way to challenge the modern mind with basic arithmetic. Explain how it is important.

MOI: *Presentation requiring student interaction, Map/Chart Work.*

Lesson 2: Using a Compass

Compass Vocabulary

Compass Vocabulary is very important so that students can follow exact instructions. It is also a great way to...

MOI: *Presentation* , *Quiz, Worksheet*

Compass History

The history of navigation, the compass, and other navigation tools as well as the discovery of Longitude.

MOI: *Presentation.*

How a Compass Works

How a compass works will explain where a compass points. How the Earth's Magnetic Poles work and why.

MOI: Presentation, Compass Work.

Bearing vs. Azimuth

This is comparing and contrasting two differing ways of reading a compass and giving headings. 360 degrees.

MOI: Compass Work, Map Chart Work .

How to Take a Heading/Bearing

This lesson on how to orient the compass and how to take a heading is important, without this knowledge you cannot navigate.

MOI: Compass Work.

Lesson 3: Triangulation

Points We Can Use to Triangulate

Students should identify what points on the map they could use to triangulate their position.

MOI: Map/Chart Work, Presentation.

Visual Triangulation

This exercise allows students to estimate. This skill is very essential for much of navigation. Getting the

MOI: Student Analysis, Student Discovery.

Bearing Triangulation

This exercise is to improve on visual bearings. It is to show how precision matters in certain navigating s

MOI: Compass Work, Map/Chart Work, Student Analysis, Student Discovery.

Reverse Triangulation

Reverse Triangulation is simply starting from a known point and taking headings on three points. This is

MOI: Student Analysis, Student Discovery, Map/Chart Work, Compass Work.

Lesson 4: Plotting a Course / Route

How to Set a Course / Route

Demonstrate or explain an Orienteering competition. This is to set expectations for the students. This ex

MOI: Presentation, Map/Chart Work, Compass Work.

Heading Off

When an object is in the way students will need to learn to head off to keep a proper course. If they don't

MOI: Student Discovery, Student Analysis, Compass Work.

Thinking Ahead & Leaving a Trace

Students need to think ahead when planning a course. This lesson helps them start to translate what the

MOI: Student Discovery, Student Analysis, Compass Work, Map/Chart Work.

Setting a Course

Finally, students will set a course of their choice. This can be checked by peers, by the teacher or by a c

MOI: Student Discovery.

Lesson 5: Deciphering a Course / Route

How to Navigate a Course

Explains to students that have now created the course, how to properly navigate to more than one point

MOI: Presentation, Student Analysis, Map Work/Chart Work, Student Discovery.

Common Navigation Errors

A brief lesson on some of the common mistakes that take place during navigation and why they occur. A

MOI: Student Discovery.

Dead Reckoning

Dead Reckoning is a great way to interject some basic algebra. Explain how based off of Time distance

MOI: Presentation, Compass Work, Map/Chart Work, Problem Sheet.

Set and Drift

If there is time you can then work from Dead reckoning into set and drift. Where on land you don't have t

MOI: Presentation, Compass Work, Map/Chart Work, Problem Sheet.

Lesson 6: Using a GPS

How a GPS Works

Most students are reliant on Global Positioning Systems (GPS) to figure out where they are. It is time to

MOI: Presentation requiring student interaction.

Finding You

Without a you are here sign most students will find themselves lost on a true GPS reader. A chartplotter

MOI: Presentation requiring student interaction, Student Discovery, Student Analysis.

Inputting a Point

Explain how to input a point or waypoint into the GPS. Each GPS reader is different and therefore this can

MOI: Student Discovery, Student Analysis, Presentation.

Setting a Route

Once students have plotted individual points of interest or waypoints it will be important for them to figure

MOI: Student Discovery, Presentation requiring student interaction.

Navigating a Course

Once students have set a route they must figure out how to actual navigate that route using both GPS a

MOI: Student Discovery.

