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| **Lesson Title : Understanding Disaster Relief** | **Unit #:1** | **Lesson #:1** | **Activity #:2** |
| **Activity Title: Learn Necessary Skills** |  |  |  |

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| **Estimated Lesson Duration:** | **2 Class Periods** |
| **Estimated Activity Duration:** | **1 Class Period** |

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| **Setting:** | **Classroom** |

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| **Activity Objectives:** |

Upon completion of the activity, students will be able to:

1. Understand accurate navigational directions through bearings
2. Understand how to calculate missing distances through Law of Sines and Law of Cosines

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| **Activity Guiding Questions:** |

1. How do we give accurate navigational directions?
2. How do we calculate missing distances that are necessary for planning?

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| **Next Generation Science Standards (NGSS)** |  |
| **Science and Engineering Practices (Check all that apply)** | **Crosscutting Concepts (Check all that apply)** |
| ☒ Asking questions (for science) and defining problems (for engineering) | ☐ Patterns |
| ☐ Developing and using models | ☒ Cause and effect |
| ☒ Planning and carrying out investigations | ☐ Scale, proportion, and quantity |
| ☒ Analyzing and interpreting data | ☐ Systems and system models |
| ☒ Using mathematics and computational thinking | ☐ Energy and matter: Flows, cycles, and conservation |
| ☐ Constructing explanations (for science) and designing solutions (for engineering) | ☐ Structure and function. |
| ☐ Engaging in argument from evidence | ☐ Stability and change. |
| ☒ Obtaining, evaluating, and communicating information |  |

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| **Ohio’s New Learning Standards for Science (ONLS)** |
| **Expectations for Learning - Cognitive Demands (Check all that apply)** |
| ☐ Designing Technological/Engineering Solutions Using Science concepts **(T)** |
| ☒ Demonstrating Science Knowledge **(D)** |
| ☒ Interpreting and Communicating Science Concepts **(C)** |
| ☐ Recalling Accurate Science **(R)** |

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| **Common Core State Standards -- Mathematics (CCSS)** |  |
| **Standards for Mathematical Practice (Check all that apply)** |  |
| ☒ Make sense of problems and persevere in solving them | ☒ Useappropriate tools strategically |
| ☒ Reason abstractly and quantitatively | ☒ Attendto precision |
| ☒ Construct viable arguments and critique the reasoning of others | ☐ Look for and make use of structure |
| ☒ Model with mathematics | ☐ Look for and express regularity in repeated reasoning |

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| **Unit Academic Standards (NGSS, ONLS and/or CCSS):** |

[CCSS.Math.Content.HSG-SRT.D.11](http://www.corestandards.org/Math/Content/HSG/SRT) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

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| **Materials**: (Link Handouts, Power Points, Resources, Websites, Supplies) |

Bearings Worksheet #1

Bearings Worksheet #2

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| **Teacher Advance Preparation:** |

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| **Activity Procedures:** |

1. Teach bearings (Precalculus Blitzer Textbook 4.8)
   1. explain what a bearing is and what instructions it is giving
   2. have two examples from the textbook ready to demonstrate
2. Teach Law of Sines (Precalculus Blitzer Textbook 6.1)
   1. show the formula and explain each part
   2. have two examples from the textbook ready to demonstrate
3. Teach Law of Cosines (Precalculus Blitzer Textbook 6.2)
   1. show the formulas and explain each part
   2. have two examples from the textbook ready to demonstrate
4. Assign Bearings Worksheets as classwork/homework



Have solutions handy so students can check their answers or even give the solutions out to the students so they are able to do formative checks as they complete each worksheet. If you hand out solutions make it clear that their work will be graded based on showing all their work and the drawings to each question.



Quiz at the end of the full unit (same as the pre-assessment).

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| **Differentiation:** Describe how you modified parts of the Lesson to support the needs of different learners.  Refer to Activity Template for details. |

Some students will need a verbal explanation, other students will need visual explanations, and some will need one on one time while other students begin working.

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| **Reflection:** Reflect upon the successes and shortcomings of the lesson. |

Learning the necessary skills went very well. It helped that this Unit came towards the end of nearly two months of Trigonometry so the students were already familiar with the individual parts. When I do this next year, I just have to remember to emphasise the “ambiguous case” over and over again when there may be more than one triangle possible.