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| **Lesson Title : The Hook; Essential Questions; Natural Hazards** | **Unit #: 1** | **Lesson #:**  **1** | **Activity #:**  **2** |
| **Activity Title: Effects of Natural Hazards** |

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| **Estimated Lesson Duration:** | **6 class periods** |
| **Estimated Activity Duration:** | **4 class periods (45-50 minutes)** |

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| **Setting:** | **9th Grade Integrated Science Classroom** |

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| **Activity Objectives:** |

I can create a presentation to show and explain where/why natural hazards have occurred and how they have influenced human activity.

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| **Activity Guiding Questions:** |

What are three causes of natural hazards? (**geological, meteorological, hydrological -- also biological but not considered part of Earth-Space science curriculum)**

Where have natural hazards occurred in recent years (eg, past two decades)?

What scientific processes cause natural hazards to occur?

How have natural hazards influenced human activity:

-locally? (in the town/city)

-regionally? (in the state or country)

-globally? (internationally)?

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

HS-ESS3-1 Construct an explanation based on evidence for how the occurrence of natural hazards have influenced human activity.

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

<https://www.youtube.com/watch?v=sBzHhUnPhRg> Red Cross statistics: disasters last year

<https://www.youtube.com/watch?v=QfmRf8iOBkI> 10 most brutal natural disasters of 2011

**computers with slide show (Power Point, Google Slides, etc) technology**

[**https://www.e-education.psu.edu/geog030/node/377**](https://www.e-education.psu.edu/geog030/node/377) **Penn State Geography 030 course module on Natural Hazards**

**Handout to go with Penn State Website**

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| **Teacher Advance Preparation:** |

Preview video links.

Prepare handouts.

Reserve computers.

Review Penn State Website, Geography 030 Module 8 (Natural Hazards).

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| **Activity Procedures:** |

Day 1:

Motivation: Our Challenge (last part of handout from lesson 1.1.1 The Hook /EQs - Have students write down the Challenge: **Create a plan for delivering supplies after a natural disaster.**

Guiding Questions:

-What are the causes and effects of Natural Disasters?

Introduce first two videos: What are Natural Hazards? What relief help is needed?

What are Natural Hazards?

Have students list some examples. (volcanic eruptions, earthquakes, tsunamis, mass wasting, soil erosion, hurricanes, floods, droughts)

Have students review Penn State Website, Geography 030 Module 8 (Natural Hazards) and answer the worksheet questions. (25 minutes)

Day 2-3

Divide students into groups -- each group will be assigned one type of natural disaster / hazard. Students will have 2 days to prepare a slide show, 4 slides each group:

1. Name of Natural Hazard, with picture.
2. Type of Natural Process, with brief explanation of how natural process causes this hazard and how human activity may contribute
3. Example of this Natural Hazard from history - with picture and facts: date, location, damage statistics
4. How has this natural hazard influenced human activity?

-locally? (in the town/city)

-regionally? (in the state or country)

-globally? (internationally)?

Day 4 – Student presentations. Have students use the Class Notes Handout included in Worksheet 1.1.2d to write down information from each presentation on scientific processes, examples from history, and any approaches to prevention, preparation, and response.

**Formative Assessments:** Link the items in the Activities that will be used as formative assessments.

Worksheet 1.1.2c: Natural Hazards Overview

**Summative Assessments:**

Handout 1.1.2d includes the rubric for the Natural Hazards Slide Show.

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| **Differentiation:**  . |

Ramp up - some students may move on to the “extension” questions on the Natural Hazards Overview WS

Some students may only need to complete 2 of the 4 types of Natural Hazards, and some students may be assisted by extra support during their partner work creating presentations.

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| **Reflection:** |

Students were still very engaged in this high interest topic. They worked well in their partner groups, and many of their presentations included good information about scientific processes, preparation, prevention, and responses. However, some students had trouble understanding or explaining the technical details of the scientific processes for specific hazards, and I tried to assist them. All student groups were able to find historical examples of their disaster type with statistics and pictures. We discussed how human behavior can help prevent some natural hazards (such as forest fires and floods) but not others (volcanoes, tsunamis). On the presentation rubric, the unit post-test, and the final exam, students showed improved understanding of how and when human behavior can affect natural hazards. The presentation created by one of my students with an Extended Service Plan did not include all the components I was looking for, so an additional differentiation strategy I will use next time to improve the quality of all presentations will be providing extra scaffolding during presentation creation for students with learning difficulties.