

He'eia Elementary  
(Grade 3)  
EDP Natural Disasters Unit

<b>Teacher's Name:</b> Mrs. Guro, Mrs. Gorai, & Ms. Kekina	<b>School:</b> He'eia Elementary School	<b>Grade Level:</b> Grade 3
<b>Content Area:</b> Earth Science	<b>Course Name:</b> Science	<b>Period:</b> N/A
<b>Unit Title:</b> Natural Disasters		<b>Approximate Time Frame:</b> 2019-2020 School Year

**Essential Vocabulary:**

EDP Based Vocabulary:

- Ask
- Imagine
- Plan
- Create
- Improve

Content Based Vocabulary:

- Sturdy
  - it would hold up and it was strong
- Durability
  - its sturdy and stood up
- Wind Advisory
  - is sustained winds of 25-39 mph and/or gusts to 57 mph. Downed tree
  - limbs and local power outage are likely (no electricity)
- High Wind Warning
  - is sustained winds of 40 mph or greater, or gusts of 58 mph or greater. Widespread power outage (no electricity for more people) and many downed branches or whole trees may occur.
  - <https://bereadylexington.com/high-winds/>
  - <https://www.kplctv.com/2019/10/17/high-winds-early-morning-storm-cause-damage-a-cross-parts-southwest-louisiana/>
- Structurally Sound
  - <https://www.youtube.com/watch?v=MDHFJG1no6I>
- Earthquakes
  - [https://www.youtube.com/watch?v=4Y-62Ti5\\_6s](https://www.youtube.com/watch?v=4Y-62Ti5_6s)
- Intro to 3rd world countries
  - <https://www.youtube.com/watch?v=gNr9pXqsZHY>

**STAGE 1: DESIRED RESULTS**

**NGSS Standard(s)**

Earth Science  
3-ESS3 Earth and Human Activity

**Performance Expectation(s)**

3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather related hazard.

Dimension	Name and NGSS code/citation	Matching student task or question directly from the activity
<b>Science and Engineering Practices (SEPs)</b>	<p>3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time or cost.</p> <p>3-5 ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>3-5 ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p>	<ul style="list-style-type: none"> <li>● EDP Process: <ul style="list-style-type: none"> <li>○ Ask</li> <li>○ Imagine</li> <li>○ Plan</li> <li>○ Create</li> <li>○ Improve</li> </ul> </li> <li>● Engineering Notebook</li> </ul>
<b>Disciplinary Core Ideas (DCIs)</b>	<p>3-ESS3 Earth &amp; Human Activity</p> <p>3-ESS3-B - Natural Hazards: A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.</p>	<ul style="list-style-type: none"> <li>● Students will be working on four components related to natural disasters through four separate lessons (wind, high wind, earthquakes, and hurricanes) that involve them learning about the natural process of what the earth and humans go through naturally. The four lessons will build up to complete a unit that involves various natural disasters.</li> </ul>
<b>Crosscutting Concepts (CCCs)</b>	<p>Cause &amp; Effect</p> <ul style="list-style-type: none"> <li>● 3-ESS3-1 Cause &amp; effect relationships are routinely identified, tested, and used to explain change</li> </ul> <p>Influence of Engineering, Technology, and Science on society and the natural world.</p> <ul style="list-style-type: none"> <li>● 3-ESS3-1 Engineers improve existing technology or develop new ones to increase their benefits (e.g. better artificial limbs), decrease known limbs (e.g. seat belts in cars), and meet societal demands (e.g. cell phones).</li> </ul> <p>Science is a Human Endeavor</p> <ul style="list-style-type: none"> <li>● 3-ESS3-1 Science affects everyday life</li> </ul>	<ul style="list-style-type: none"> <li>● Students will be applying background knowledge of different natural disasters through informational text and applying cause &amp; effect comprehension strategies through writing.</li> <li>● Students will also be analyzing effects of disasters on people around the world and how it affects them and their environment</li> <li>● Students will also be using math concepts related to area/perimeter to help them in designing their structures.</li> </ul>

<p><b>Learning Goal (Student Learning Objectives):</b> (Skills, content knowledge and understandings, values, etc.)</p>	<p><u>Students will be able to...</u></p> <p>Lesson 1:</p> <ul style="list-style-type: none"> <li>design and build a house, 9" or taller, with four sides and a roof that will withstand the wolf trying to blow it down (using a hand fan) for 10 seconds.</li> </ul> <p>Lesson 2:</p> <ul style="list-style-type: none"> <li>design and build a structure that a family of at least 3 people can live with, with at least one adult. The structure must withstand the force of a strong wind (hair dryer) for 10 seconds. You must use the available supplies and stay within your budget of \$20.</li> </ul> <p>Lesson 3:</p> <ul style="list-style-type: none"> <li>design and build a 3 story, 2 foot tower that will withstand a simulated earthquake for 20 seconds.</li> </ul> <p>Lesson 4:</p> <ul style="list-style-type: none"> <li>design and build a 14 inch structure that is at least 8 inches off the ground that can withstand a simulated hurricane (a large foil pan filled with water with a fan on high speed) for 20 seconds.</li> </ul>
<p><b>Essential Question(s):</b></p>	<ul style="list-style-type: none"> <li>Why do buildings and structures, especially in Third World Countries, collapse under so little pressure?</li> <li>How can these buildings and structures be built more stable?</li> </ul>
<p><b>Enduring Understandings (Big Ideas):</b> (Broad understandings that are not tied to place, time, specific people, etc.)</p>	<p>Buildings need to be structurally sound to avoid a collapse when a disaster occurs (such as high winds, hurricanes and earthquakes).</p>
<p><b>Other Standards/Benchmarks:</b></p>	<p><u>Problem Statement:</u> Buildings that are not structurally sound get destroyed, especially in Third World countries.</p> <p><u>Language Arts:</u></p> <ul style="list-style-type: none"> <li>RI.3.8 Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).</li> </ul> <p><u>Writing:</u></p> <ul style="list-style-type: none"> <li>W.3.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</li> </ul> <p><u>Math:</u></p> <ul style="list-style-type: none"> <li>3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.</li> </ul> <p><u>Social Studies</u></p> <ul style="list-style-type: none"> <li>SS.3.4.16.3 Analyze effects of disasters on people around the world</li> </ul> <p><u>Art:</u></p> <ul style="list-style-type: none"> <li>Use the elements and principles of art and design, including, value (i.e., tints and shades, analogous colors), line, rhythm, movement, proportion, and balance</li> </ul>

## Stage 2: ASSESSMENT EVIDENCE

<p><b>Summative Assessment/ Performance Task</b></p>	<p>*Write a scenario here first (a brief narrative to draw students in) that is focused on the problem (problem statement). Make it relevant and engaging. *This should be an engineering design challenge that leads to the problem statement. The culminating performance may be the hō'ike and include the engineering notebook completed by each student.</p> <p>How would you feel if the roof of your house blew away or the wall fell in during (high winds, a hurricane or an earthquake)?</p> <ul style="list-style-type: none"> <li>• Engineering Design Notebook</li> <li>• Peer Review</li> <li>• Final Design Group Presentations</li> <li>• End of Year Ho'ike</li> </ul>
<p><b>Rubric(s) for Summative Assessment/Performance Task:</b> (Attach documents)</p>	<p>*Attach any rubrics for products and presentations, team work, individual work, etc.</p> <p>A copy of the master rubric has been added into the folder for access.</p>
<p><b>Formative Assessments:</b></p>	<p>*Explain any informal, formative assessments (i.e. discussion participation, group participation, visual observations), and also attach any worksheets (could be the pages in the Engineering Notebook). Quizzes? Exit slips for the day? Reflection questions in a Journal?</p> <ul style="list-style-type: none"> <li>• Discussion, videos, books</li> <li>• Working with a partner</li> <li>• Visual observations</li> <li>• EDP booklet</li> <li>• Next year, I plan to do reflection questions (What did you enjoy about this EDP lesson? What can Mrs. Guro do differently to improve this lesson? Which design worked better for you and why? Any other thoughts/comments?)</li> <li>• Next year, I also plan to have students record themselves on video (using Flipgrid), explaining what they did, why they chose to design and build the way they did,, and whether or not they were successful. If they were not successful, what would they do differently and why?</li> </ul>
<p><b>Engineering Notebook (With pages dated)</b> (Attach notebook template documents by the steps of the EDP, including any final reflection and communication pages)</p>	<p>*Attach templates for the engineering notebook and any rubrics or criterion checklists to assess the notebook and evidence of meeting the Performance Expectations of the NGSS (Stage 1) and the student learning objectives (Stage 1)</p> <p>A copy of the master EDP Student Notebooks and Rubric has been added into the folder for access.</p>

### Stage 3: LEARNING PLAN:

Include brief narrative of activities, instructions, groupings, differentiated instructional and engagement strategies, and digital literacy tool(s).

The daily activities should address all aspects of the EDP, plus the communication/sharing\*\* process:

#### ASK (give a time frame for each activity)

Give a brief narrative (1-2 paragraphs of how an EDP stage is being addressed for this activity), and add in any essential questions for the lesson, instructions, groupings, differentiation, etc. if desired. This can actually be in the individual teacher lesson plans which may differ from class to class, even in the same grade level.

#### Scenario:

Students will design and build a 2 foot structure with three stories using 8 craft sticks, 8 straws, 6 5x7 inch pieces of oaktag, 12 index cards and 48 inches of masking tape that can withstand a simulated earthquake for 20 seconds, as many Third World countries do not have earthquake proof buildings, so when an earthquake hits, buildings are destroyed and lives are lost. Students will have 2 days to build the structure.

#### Purpose:

Students will realize the importance of a structurally sound building. In Japan, some buildings are being rebuilt to make it earthquake proof. But in Third World Countries, they do not have the resources or finances, so their buildings are flimsy and subpar to our standards, which is why it is quickly destroyed when an earthquake hits.

#### IMAGINE

Students will watch videos on what happens during an earthquake and the destruction that an earthquake can cause. They will also read books on earthquakes, learning how an earthquake occurs, where it is likely to occur, how the magnitude of an earthquake is measured, and what to do if an earthquake hits.

#### PLAN

Students will sketch two designs and use a Pugh Chart to determine their best design. They will list the materials/supplies they will need and write out the steps for executing the design.

#### CREATE

Students will build their structure meeting the criteria and test whether it withstood a simulated earthquake for 20 seconds. They will fill out their Scoring Sheet and Test Data in their EDP booklet, noting their Observations and their Reflection.

#### IMPROVE

Students will sketch a different design and explain why they are making the change. They will again list the materials/supplies they will need and write out the steps for executing the design. Students will then get a chance to do a second build, and test whether this structure met the specifications. They will fill out their Scoring Sheet and Test Data in their EDP booklet, noting their Observations and their Reflection.

#### COMMUNICATE\*\*

Students will share with the other 3rd graders. If time permits (for our students and another grade level), students will share with another grade level.

#### Materials, Equipment and Resources Needed to Implement Unit

#### Materials:

- 8 straws

- 8 craft sticks
- 12 index cards
- 6 5x7 inches of oak tag
- 48 inches of tape
- scissors
- yardstick

Videos:

- [https://www.youtube.com/watch?v=4Y-62Ti5\\_6s](https://www.youtube.com/watch?v=4Y-62Ti5_6s)
- <https://www.youtube.com/watch?v=gNr9pXaszHY>
- <https://www.youtube.com/watch?v=XT3i0fE0mTA>
- Bill Nye Earthquake video
- National Geographic: Earthquakes 101 video

Books:

- Earthquakes by Seymour Simon
- Volcano and Earthquake by Susanna Rose