

## WORLD'S MOST DYNAMIC FORCE

### Performance Standard 12E/11A.F

Students will apply the processes of scientific inquiry to examine the large (and small) scale dynamic forces, events and processes that affect Earth's land and populations accordingly:

- *Knowledge*: Distinguish the major types of interactions of Earth's components, incorporating the differences between short-term interactions (i.e., within a normal human life span) and long-term (within a time span much greater than a normal human life span.)
- *Application*: Research short-term or long-term interactions for creation of an Earth advertising brochure.
- *Communication*: Present research findings about these dynamic forces on Earth for impact comparisons.

### Procedures

1. ***In order to know and apply concepts that describe the features and processes of the Earth and its resources (12E) and the processes, concepts and principles of scientific inquiry (11A)***, students should experience sufficient learning opportunities to develop the following:
  - Formulate inquiry questions associated with large-scale dynamic forces on Earth and how they affect people around the world.
  - Research sources of scientific information related to posed questions associated with earthquakes, volcanic eruptions, tsunami, hurricanes, tornadoes, floods, as well as, tectonic plate movement, glaciation, erosion weathering and solar-object collisions.
  - Determine criteria for measuring impact of dynamic forces (impact on land area or populations, duration, etc.)
  - Conduct inquiry investigation which will relate the impact of the varying kinds of dynamic forces.
  - Collect research for analysis to resolve proposed hypothesis statements.
  - Communicate the findings associated with research of dynamic forces.
  - Analyzing logical explanations of dynamic forces for comparative impact.
  - Generate further questions for future investigations to examine the Earth's dynamic forces.

Note to teacher: This activity relates to knowledge associated with the standard 12 E, while addressing the performance descriptors for stage E within standard 11A. A curricular unit may incorporate the performance descriptions from 13B which address the interactions of technology in science and societal situations (investigating ways that technology has changed the impact of the Earth's dynamic forces—for warning systems, prevention, research, etc.) or the interactions of societal decisions in science and technology innovations and discoveries (investigation policies about housing in areas that are particularly threatened by hurricanes, floods, etc.)
2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Provide each student a copy of the "Long and Short of It" task sheet as a introduction to the Earth's dynamic forces. Students should classify the 10 items as long-term or short-term interactions of the Earth's components and provide their explanation of the differences between their impacts. Encourage questions about how to determine the impact of the force. (Does it threaten more people? Does it affect a greater portion of the Earth? Does it last longer? etc.) From this listing, students should rank the destructive impact of the forces; they should be encouraged to list additional forces, if applicable.
4. Direct students to create advertising brochures about their selected or designated Dynamic Force. Determine the requirements for the information that can be included in the brochure (historical examples, scientific explanation, geographic probabilities, etc.) Their brochures will be used for a campaign to determine the World's Most Dynamic Force. These brochures should be displayed and students should present their marketing campaigns. Students should vote on the Most Dynamic Force and provide explanations for their selection.
5. Evaluate each student's work using the Science Rubric as follows and add the scores to determine the performance level:
  - *Knowledge*: The major types of Earth's interactive forces are characterized and distinguished correctly.
  - *Application*: The information for the Dynamic Force brochure is presented creatively and correctly.
  - *Communication*: The explanation of the student's own Dynamic Force's impact was thorough and accurate; the explanation of the selection of the most dynamic force was rational and complete.

**Examples of Student Work not available****Time Requirements**

- One class period for interaction list introduction and ranking
- 2-3 class periods for research and creation of brochure
- 1-2 class periods for presentations, selection and explanation of World's Most Dynamic Force.

**Resources**

- Copies of "Long and Short of It" task sheets
- Research resources for Dynamic Forces
- Brochure materials: paper, markers, photographs, maps, etc.
- Science Rubric

Name \_\_\_\_\_ Date \_\_\_\_\_

### THE LONG AND THE SHORT OF IT

Place an "X" in the correct column to show whether each item listed is a short-term or long-term interaction of the Earth's components.

INTERACTION	SHORT-TERM	LONG-TERM
1. Asteroid impact on earth		
2. Volcanic eruption		
3. Mississippi River flood		
4. Earthquake		
5. Glaciation		
6. Tsunami (tidal wave)		
7. Erosion		
8. Hurricane damage of sea coast		
9. Tornado touchdown		
10. Plate tectonics		

Can you think of additional interactions that should be included on this list? Name them.

Explain the difference between short-term and long-term interactions of the Earth's components and provide one example of each.

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