**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_\_\_\_\_**

# Designing for Disaster Activity

**Objectives:** Investigate how engineers design buildings and structures to withstand earthquakes.

**Materials**: Computer with Internet access.

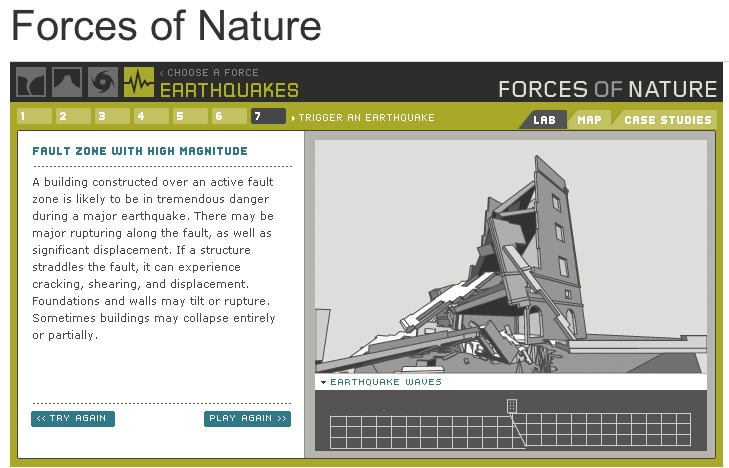
**Procedure:**

1. Go to National Geographic’s Forces of Nature site:

<https://www.nationalgeographic.org/interactive/forces-nature/>.

1. From the Forces of Nature page, go to the Earthquakes tab by clicking on the Earthquakes icon (4th at top).



1. Read and follow the instructions ON ALL 6 tabs/pages at the top. RAISE your hand once you have completed Tab 6 (do NOT close the tab—I need SEE your triangulated earthquake epicenter).
2. Go to Tab 7. Complete all 6 possible combinations of ground type and magnitude (use “Try again” to set up a new combination), reading the descriptions of what is happening each time, and **record** a brief description of the damage from each combination in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Combination** | **Ground Type** | **Magnitude** | **Description of Damage** |
| **1** |  |  |  |
| **2** |  |  |  |
| **3** |  |  |  |
| **4** |  |  |  |
| **5** |  |  |  |
| **6** |  |  |  |

1. From the simulation tests, which **ground type** results in the least amount of damage to the building regardless of magnitude?
2. From the simulation tests, which scenario (**combination of ground type and magnitude**) results in the most amount of damage to the building?

1. Go the San Francisco Earthquakes Living Lab: [http://www.exploratorium.edu/faultline/damage/building.html.](http://www.exploratorium.edu/faultline/damage/building.html)
2. Read the article, “Damage Control: Engineering”.
3. From the simulations you did in step 5 and what you have read, answer the following question:
   1. If you were to design a building in an earthquake area, what design features would you incorporate to **minimize** the amount of damage? List at least 3.
      1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Overall, thoroughly compare the impact of seismic waves on structures built on solid rock vs. on softer soils. Use specific information from the websites you have visited today!