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SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

PRESENTED BY: girlstart

Sliding Science

Explore the earthquake Richter Scale to visualize how the Earth's movements cause landslides. Design a model town to simulate the effects a sand landslide, gravel landslide or water landslide has on a community and Earth's surface.

TEKS:

3.7B Investigate rapid changes in Earth's surface such as volcanic eruptions, earthquakes, and landslides.

4.2 & 5.2 The student uses scientific methods during laboratory and outdoor investigations.

4.3 & 5.3 The student uses critical thinking and scientific problem solving to make informed decisions.

5.6A Identify events that occur on a regular basis such as in daily, weekly, lunar and seasonal cycles.

Materials:

- 2 straws
- 3-4 Lego "houses"
- 9" x 13" Aluminum pan
- Glue
- Large paper clip
- Manilla folder
- Plastic ruler
- Poster board
- Rocks
- Sand
- Sand paper
- Scissors
- Scotch tape
- Tablespoon
- Timer or stopwatch

How To Make Your Town Model

1. Cut out one 2½" x 8" piece of sand paper and a 3½" x 8" piece of poster board. Fold each side of the poster board strip up about ½ inch to form the walls of the slope. Glue the sand paper to ramp with the rough side facing up. Place this ramp on one of the short sides of your aluminum pan so that it goes towards the middle of the pan like a slide and tape it so it stays in place.
2. Place your Lego houses in the pan opposite from your sand paper ramp.
3. Cut out earthquake scale (page 3) and glue along the long side of the Manilla folder with the "Level 1" square in the bottom left corner.
4. Tape a straw on each short end of your Manilla folder and set the aluminum pan in between them.

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How to Make Your Earthquake

1. Place a tablespoon of sand at the top of the ramp and place the paperclip on “Level 1” on the Manilla folder. This marks the level of your “earthquake”.
2. Place the Manilla folder with the paperclip lined up along the edge of a table. Gently pull and push the folder for 10 seconds, making sure that the paperclip never goes past the side of the table.
3. Evaluate the damage that was caused to your “town”. Did your houses survive or were they wiped out?
4. Repeat steps 1-3 for Levels 2-5 and then do all 5 levels using rocks.
5. Which caused more damage: Level 1 or Level 5? Were rocks more harmful to your town or was sand?

Why Does it Work?

Moving the pan back and forth represents movement of the Earth and when the Earth moves, debris like the sand and rocks starts to shift and fall closer to the Earth’s center as a result of gravity. The amount of movement affects how much debris is shifted and the amount of debris affects how much damage is done to a certain area.

Career Connection:

Astronomers study planets, moons, stars, galaxies, meteors, comets and their interactions with each other. They must have an in depth knowledge of physics to understand how forces such as gravity change throughout space. Astronomers work together sharing their knowledge in order to better understand how the universe works at microscopic and macroscopic levels.

Resources: http://video.nationalgeographic.com/video/player/environment/environment-natural-disasters/landslides-and-more/landslides.html
http://science.howstuffworks.com/nature/natural-disasters/earthquake6.htm
http://science.howstuffworks.com/environmental/earth/geology/landslide.htm

Level 5
Level 4
Level 3
Level 2
Level 1

Modified Mercalli Scale		Richter Magnitude Scale
I	Detected only by sensitive instruments	1.5
II	Felt by few persons at rest, especially on upper floors; delicately suspended objects may swing	2
III	Felt noticeably indoors, but not always recognized as earthquake; standing autos rock slightly, vibration like passing truck	2.5
IV	Felt indoors by many, outdoors by few, at night some may awaken; dishes, windows, doors disturbed; autos rock noticeably	3
V	Felt by most people; some breakage of dishes, windows, and plaster; disturbance of tall objects	3.5
VI	Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small	4
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos	4.5
VIII	Panel walls thrown out of frames; fall of walls, monuments, chimneys; sand and mud ejected; drivers of autos disturbed	5
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked; underground pipes broken	5.5
X	Most masonry and frame structures destroyed; ground cracked, rails bent, landslides	6
XI	Few structures remain standing; bridges destroyed, fissures in ground, pipes broken, landslides, rails bent	6.5
XII	Damage total; waves seen on ground surface, lines of sight and level distorted, objects thrown up in air	7
		7.5
		8

Richter Scale

Level	x Level 1
1	-
2	10 x level 1
3	100 x level 1
4	1,000 x level 1
5	10,000 x level 1
6	100,000 x level 1
7	1,000,000 x level 1
8	10,000,000 x level 1
9	100,000,000 x level 1

Images from: kgs.ku.edu