

**Department of Conservation**Grade 2 Lesson Sequence: It’s All My Fault!

***California Next Generation Science Standards:***

**2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.** *[Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]*

***California Environmental Principles and Concepts:***

**Principle I—People Depend on Natural Systems.** The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

**Principle II—People Influence Natural Systems.** The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human society.

**Principle III—Natural Systems Change in Ways that People Benefit from and Can Influence.** Natural systems proceed through cycles that humans depend upon, benefit from and can alter.

**Principle IV—There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing Between Systems.** The exchange of matter between natural systems and human societies affects the long-term functioning of both.

**Principle V—Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors.** Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes.

**Anchoring Phenomenon for learning sequence:** *Earthquakes are a rapid event that causes slow changes to the Earth’s surface.*

**Lesson Summary**

* **Lesson 1: Earth’s Layers**
* **Lesson 2: Earthquakes and Faults**
* **Lesson 3: Landslides**
* **Lesson 4: Liquefaction**
* **Lesson 5: Tsunamis**

**Lesson 1- Earth’s Layers**

**Learning Objective**: Students will build a model of Earth’s layers to better understand how plate tectonics create earthquakes.

**Investigative Phenomenon for lesson**: *Our Earth has many layers in the soil.*

**Guiding Questions:** *What exactly is our Earth made of?*

**Lesson Implementation Timeframe:** 45 minutes

**Classroom Resources and Materials:**

* *It’s All My Fault L1 PowerPoint* presentation
* Red, orange, yellow, brown, blue and green modeling clay for each team of six students
* 1 paper plate for each team of six students
* 12 inches of dental floss for each team of six students

**Procedures:**

***Engage:***

1. **Display slide 1.** Welcome students and share with them that they will be investigating the Earth’s surface like scientists in this series of lessons.
2. **Display slide 2.** Tell students to make observations of the pictures in the PowerPoint slide. Ask the students, “What exactly is an earthquake?” Write down student answers. Share with students that they will be building a model of Earth’s layers to better understand how plate tectonics (Earth’s layers) create earthquakes.
3. **Display slide 3.** Ask students, “What is our planet made of?” Accept all student answers. Explain to students that they will be making a model of the Earth’s layers.

***Explore: Place your students in teams of 6.***

1. **Display slide 4.** Identify the materials that each group will need to make a model of the Earth’s layers.

***Materials (for each team)***

* Red modeling compound
* Orange modeling compound
* Yellow modeling compound
* Brown modeling (slides 4-11) compound
* Blue modeling compound
* Green modeling compound
1. **Display slide 5.** Tell the first team member to use the red modeling compound and make a small ball. This ball represents the Inner Core of the Earth. Scientists believe the Inner Core is a solid ball of mostly iron and nickel.
2. **Display slide 6.** Instruct the second team member to use the orange modeling compound and wrap a thick layer around the Inner Core. This layer represents the Outer Core. Scientists believe the Outer Core is made of super-heated liquid molten lava. This lava is believed to be mostly iron and nickel.
3. **Display slide 7.** Ask the third team member to use the yellow modeling compound and wrap a thick layer around the Outer Core. This layer represents the Mantle. Scientists believe the Mantle is made of super-hot, thick, liquid rock.
4. **Display slide 8.**Tell the fourth team member to use the brown modeling compound. This time put large, thin pieces over the Mantle with cracks in between. This layer represents the Crust. The Crust layer is solid rock and is made of plates that float on the Mantle.
5. **Display slide 9.** Instruct the fifth team member to use the blue modeling compound and put thin, large pieces over some of the Crust. This represents our oceans. Oceans cover 70 percent of our Earth.
6. **Display slide 10.** Ask the sixth team member to use the green modeling compound and cover the exposed Crust pieces with thin pieces. This represents land on Earth. Land makes up 30 percent of our planet.
7. **Display slide 11.** Tell each team to use dental floss to slice their model in half. Ask each team to identify each layer. *link to video:* [*https://www.youtube.com/watch?v=K9vtd4PLCDI*](https://www.youtube.com/watch?v=K9vtd4PLCDI)

***Explain:***

1. **Display slide 12**. Review the layers of the Earth with students and explain how the top layer of the plates (crust) are moving slowly over the Mantle.
2. **Display slide 13*.*** Ask students to make observations of the map. Explain how each purple line identifies a plate boundary. Identify by outlining with a finger the African plate in the middle of the map. Ask a student to identify by outlining with their figure the North American plate in the top, left hand side of the map. Ask additional student volunteers to identify the remaining plate boundaries including the Pacific, Juan De Fuca, Cocos, Nazco, Caribbean, and South American plates. These are the main plates that influence earthquakes where students live in California.

***Elaborate:***

1. **Display slide 14.**Introduce students to the San Andreas fault. Tell students that the San Andreas Fault is where two plates meet. Remind students the crust layer is made up of plates of solid rock that float on the mantle. You can look at a map to find the San Andreas Fault. Click here to access the map. [Fault Map of California](http://maps.conservation.ca.gov/cgs/fam/app/)(<http://maps.conservation.ca.gov/cgs/fam/app/>). Zoom in using the “+” arrow for a closer view of California and the fault lines that exist. Locate the fault line in red that starts near the Salton Sea in southern California and travels parallel to the coast to the San Francisco area. Using the pointer (arrow), select anywhere along the fault line in red and a textbox will indicate the zone name, “San Andreas fault zone”. Identify names of additional fault zones using the pointer (arrow). Fault zones are areas where earthquakes can occur.

***Evaluate:***

1. **Display slide 15.** Ask students to label the layers and describe what scientists think they are made of.

Student answers:

* *Inner Core of the Earth. Scientists believe the Inner Core is a solid ball of mostly iron, and nickel.*
* *Outer Core. Scientists believe the Outer Core is made of super-heated liquid molten lava. This lava is believed to be mostly iron, and nickel.*
* *Mantle. Scientists believe the Mantle is super-hot, thick, liquid rock.*
* *Crust. The Crust layer is solid rock and is made of plates that float on the Mantle.*

**Lesson 2 - Earthquakes and Faults**

**Learning Objective:**  Students will understand how the layers of the Earth are related to earthquakes.

**Investigative Phenomenon for lesson:** Plate movement of the crust is the cause of earthquakes.

**Guiding Questions:** *How do the layers of the Earth relate to earthquakes? Why do earthquakes happen only in some areas? What causes earthquakes?*

**Lesson Implementation Timeframe:** 45 minutes

**Classroom Resources and Materials:**

* It’s All My Fault L2 PowerPoint presentation
* 1 paper plate per student
* 1 graham cracker per student, broken in half
* 2 cans of spray cheese

***Procedures:***

***Engage:***

1. **Display slide 1.** Welcome students.

1. **Display slide 2.** Ask students to discuss the following question, “What do you remember about the crust and plates and how are the layers of the Earth related to earthquakes?” Accept all student answers.

***Explore:***

1. **Display slide 3.** Share with students that they will make a model of how the Earth’s crust move. Tell students that each group will need a paper plate with a 3” by 4” rectangle of spray cheese in the center. Each student will need a graham cracker that is broken in half. Place the pieces of graham cracker together on top of the spray cheese to start.
2. **Display slide 4.** Ask students to model a divergent boundary by moving the graham cracker pieces apart. Discuss the information about divergent boundaries from slide 4.
3. **Display slide 5.** Instruct students to model a convergent boundary by pressing them together until one graham cracker moves under the other. Discuss the information about convergent boundaries from slide 5.
4. **Display slide 6.** Tell students to model another type of convergent boundary by pressing the graham crackers pieces together so that they both come up together forming a “tent”. Discuss the information about this type of convergent boundary from slide 6.
5. **Display slide 7.** Ask students to model a transform boundary by sliding one piece of graham cracker forward and the other backward. Discuss the information about transform boundaries and how it is related to earthquakes from slide 7.

*For an additional explore activity, go to the Kids Geozone Egg Tectonics Page at <http://www.conservation.ca.gov/cgs/information/kids_geozone/Pages/egg_tectonics.aspx>*

***Explain:***

1. **Display slide 8.** Ask students to observe the picture of the San Andreas Fault. Ask students, “What is a fault?” Explain to the students that a fault is a fracture in the earth’s crust along which one side has moved relative to the other side. Faults can be very small or hundreds of miles long. The earth's crust is composed of huge plates that are in slow but nearly constant motion. Part of California is on the Pacific Plate, and part is on the North American Plate. The San Andreas Fault, which runs from the Salton Sea in Imperial County to Cape Mendocino in Humboldt County, is the boundary between these plates.
2. **Display slide 9.** Instruct students to observe the picture of the freeway damaged by an earthquake. Explain to students that sometimes one block of the earth’s crust moves up while the other moves down, sometimes they move horizontally in opposite directions (that's what's happening with the San Andreas Fault; Los Angeles is creeping closer to San Francisco). Some faults are well known and easy to spot, such as the San Andreas. Others are underground, with nothing on the surface revealing their presence (a blind thrust fault). The 1994 Northridge earthquake was caused by a blind thrust fault.
3. **Display slide 10.**The Pacific and North American plates move past each other about 1.5 inches a year. The friction between the plates causes stress, which is released when the blocks of crust slip suddenly along a fault. Earthquakes occur when the two sides of a fault slip suddenly against each other. That releases waves of energy that travel through the ground, causing the shaking you feel.

***Elaborate:***

1. **Display slide 11.** Ask students to draw the three types of transform faults: reverse fault, normal fault and strike-slip fault. Tell students to label the type of transform fault and include arrows to describe the direction the plate is moving during an earthquake. The reverse fault describes when the earth is compressed and causes one part of the plate to slide up and the other part of the earth is pushed underneath. A normal fault is caused by the plate moving away and down relative to the other plate. A strike-slip fault occurs when the plates slide past each other

***Evaluate:***

1. **Display slide 14.** Ask students to look at the Earthquake Basics Poster. Tell students that they will create their own Earthquake Basics Poster that describes the different types of plate boundaries: divergent, convergent and transform. Assess whether students have made a connection between the movement of the crust and earthquakes. <http://www.conservation.ca.gov/cgs/information/outreach/Documents/discovery_basics.pdf>

**Lesson 3 - Landslides**

**Learning Objective:** Students will investigate the changes to Earth that can result from earthquakes; specifically landslides.

**Investigative Phenomenon for lesson:** *Landslides can result from earthquakes.*

**Guiding Questions:** *What are some of the results of earthquakes?*

**Lesson Implementation Timeframe:** 45 minutes

**Classroom Resources and Materials:**

* It’s All My Fault L3 PowerPoint presentation
* 1 muffin tin for each group of students
* Sand
* Potting soil
* Rocky soil
* Spoons

***Procedures:***

***Engage:***

1. **Display slide 1.** Welcome students.
2. **Display slide 2.** Share with students that slow movement of the plates are a change that creates stress between plates and faults over time. Remind them that fast change happens when the faults slip suddenly and create earthquakes. Let them know that now you’ll look at the types of changes that are the result of earthquakes.
3. **Display slide 3.** Ask students to discuss what they believe has happened. *Accept all student answers and write them on chart paper or somewhere visible.*

***Explore:***

1. **Display slide 4.** Give each student team a muffin tin that has three different types of soil: sand, potting soil and rocky soil.
* Ask students to use the spoons to dump each type of soil into an empty space in the muffin tin and observe how each soil feels. Ask students the following questions for each type of soil:
* Is it soft?
* Is it rough (coarse)?
* How does the soil move when dumped into the muffin tin? Is it fluid like a liquid or does it move in clumps?

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Sand** | **Potting Soil** | **Rocky Soil** |
| **Is it soft?** | *Yes* | *Yes* | *No* |
| **Is it rough (coarse)?** | *Yes* | *No* | *Yes* |
| **How does the soil move when dumped into the muffin tin?** | *Soil moves fast.*  | *Soil moves slowly and in clumps especially if moist.*  | *Large rocks move fast and dirt moves slow.*  |

1. **Display slide 5.** Tell students to make observations of the two types of landslides. Ask students, “why are the landslides different? *The soil or surface of the land is different*. Explain to the students that landslides can be caused by earthquakes and weather like rain. Share with students that they will be learning more about the types of landslides.

***Explain:***

1. **Display slide 6.** Explain to students that there are many different types of landslides. Point to each of the pictures and ask students to notice similarities and differences among the different types of landslide. Share with students that they will learn about four specific ones: rock slide, earth flow, debris slide and rock fall.
2. **Display slide 7.** Rock slides involve bedrock in which the rock that moves remains largely intact for at least a portion of the movement. Rock slides commonly occur on relatively steep slopes in competent rocks. Share with students the information in the slide to describe a rock slide.
3. **Display slide 8.** Earth flow is a specific type of soil flow landslide where the majority of the soil materials are fine-grained (silt and clay) and cohesive (stick together). Movement occurs on many areas and looks like the flow of a thick lumpy liquid.

Earth flows typically are started by periods of prolonged rainfall and sometimes don’t start until well after a storm or the rainy season has passed. They are characteristically slow moving, in the millimeters or centimeters per day range, and may continue to move for a period of days to weeks after starting.

Share with students the information in the slide to describe an earth flow.

1. **Display slide 9.** Debris slides are coarse-grained soil that form from in-place weathering of relatively hard rock. Because the soil is coarse, overall strength of the debris slide mass generally is higher than that of earth flows, but there may be a very low strength zone at the base of the soil or within weathered bedrock. Debris slides typically move initially as shallow intact slabs of soil and vegetation, but break up after a short distance into falls and flows.

A single heavy rainstorm or series of storms may deliver enough rain to trigger debris slides. Individual debris slides may move at rates ranging from meters per day to meters per minute. Debris slide scars are extremely steep and therefore are very sensitive to renewed disturbance. Natural erosion at the base of debris slide scars may trigger additional slides. Cutting into the base of a debris slide scar may also trigger renewed slides. Even without additional disturbance, debris slide scars tend to ravel and erode, leading to small rock falls and debris slides from the same slope.

Share with students the information in the slide to describe a debris slide.

1. **Display slide 10.** A rock fall is a type of landslide where a mass of rock detaches from a steep slope by sliding, spreading or toppling and descends mainly through the air by falling, bouncing or rolling. Intense rain, earthquakes or freeze-thaw wedging may trigger this type of movement.

Rockfalls occur on steep slopes of hard, fractured rock. The scar left by a rockfall on the slope may be no more apparent than an area of rock that is less weathered than the surrounding rocks. Rockfall deposits are loose piles of rubble that may be easily removed by erosion.

Though infrequent, moderate- to large-volume rockfalls can be extremely dangerous and sometimes fatal. Large slabs of rock impacting a hard ledge after a long drop can rapidly break apart, leading to air entrainment and long runouts, induced airblasts, airborne projectiles (flyrock) and severe dust clouds.

Share with students the information in the slide to describe a rockfall.

1. **Display slide 11.** Tell students that each landslide is classified into one of four categories based on how recent the activity. The landslide activity categories are graphically portrayed with the colors used to delineate landslide activity on the maps. The designation of activity shows an estimate of how recently the landslide moved, but also suggests the type of hazard represented. More recently active landslides are more likely to continue to fail, or to fail completely. Older landslides are less likely to move as single slide masses, but may be the source of smaller slides.

Review the four categories of landslides by asking students to make observations of the four pictures: active/historic, dormant/young, dormant/mature, and dormant old. Sharewith students the descriptions for each type of landslide activity.

|  |  |
| --- | --- |
| **Landslide Activity Category** | **Description** |
| **Active/Historic** | There is evidence of a recent or existing landslide. |
| **Dormant/Young** | There is evidence that the landslide is fresh (new). There may be some erosion from weathering. |
| **Dormant/Mature** | There is evidence of erosion from weathering that has occurred over a long period of time. Dense vegetation may occupy the location of the landslide. |
| **Dormant/Old** | There is evidence of substantial, long-term erosion from weathering that may cause significant land features like gullies or canyons. |

***Elaborate:***

1. **Display slide 12.** Share with students that they can identify where landslides and landslide activity exist near them on a map [*http://maps.conservation.ca.gov/cgs/lsi/*](http://maps.conservation.ca.gov/cgs/lsi/)

Locate a landslide near your school and community.

1. **Display slide 13.** Ask students to make a prediction by identifying the type of landslide (rock slide, earth flow, debris slide and rock fall) that may have existed on the map. Instruct students to make a model of the landslide. *You can identify the type of landslide that exists on the map. Identify some key features or components in the student models: slope, type of soil, and arrows*

***Evaluate:***

1. **Display slide 14.**Ask students to share his/her model with another classmate and provide positive feedback using the following sentence frame:
* *I like your model because the \_\_\_\_\_\_\_\_\_\_\_ (feature of model) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*
* *The \_\_\_\_\_\_\_\_\_\_\_\_(feature of model) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.*

*Model how to use the sentence frame by sharing the following example, “I like your model because the steep slope (feature of model) is a feature of a rock fall.”*

**Lesson 4 – Liquefaction**

**Learning Objective:** Students will investigate the changes to Earth that can result from earthquakes; specifically, liquefaction.

**Investigative Phenomenon for lesson:** *Liquefaction can result from earthquakes.*

**Guiding Questions:** *How does the soil in an area affect the changes that happen after an earthquake?*

**Lesson Implementation** Timeframe: 45 minutes

**Classroom Resources and Materials:**

* It’s All My Fault L4 PowerPoint presentation
* Large metal pan
* Water
* Sand
* Brick
* Mallet

 ***Procedures:***

***Engage:***

1. **Display slide 1.** Welcome students.
2. **Display slide 2.** Tell students to look at the pictures on the slide and ask them “What happened here (in the picture)?” Explain to the students that the fallen buildings and broken up sidewalks are all a result from an earthquake.

***Explore:***

1. **Display slide 3.** Share with students that they will be conducting an experiment called “Shaky Sediments!”. To conduct the investigation, provide the following instructions:
* *Use a metal pan, add water to the bottom and fill the rest with sand.*
* *Place a brick (your building) in the sand.*
* *Tap the sides of the pan repeatedly with a mallet to simulate an earthquake. DO NOT use a hammer! It will dent your pan! The water will rise to the top and your building will begin to tilt.*

*To repeat the experiment (or for teacher preparation), watch the exploration being conducted by the Exploratorium staff.* [*https://www.youtube.com/watch?v=Kkgt-cPjBwA*](https://www.youtube.com/watch?v=Kkgt-cPjBwA)

***Explain:***

1. **Display slide 4.** Explain to students that liquefaction occurs when loose, water-saturated sediments lose strength and fail during strong ground shaking. Liquefaction is defined as the transformation of granular material from a solid state into a liquefied state as a consequence of increased pore-water pressure. Try this activity for an additional opportunity to further explore liquification:

<http://www.conservation.ca.gov/cgs/information/kids_geozone/Pages/shake_rattle_liquefy.aspx>

***Elaborate:***

1. **Display slide 5***.* Use an online map to look for liquefaction areas in California. Use the layers buttons to select the liquefaction map. Identify where the school and community is located on the map. Tell students to look for liquefaction hazard areas near their community. Ask students to explain liquefaction by telling them to identify the cause, effect and why it occurs in a few sentences.

*Example explanation: Liquefaction occurs when the surface of the earth acts-like a liquid because the dirt and rock are not bound tightly together during an earthquake.*

***Evaluate:***

1. **Display slide 6.** Tell students to create a table (handout) in their science notebooks with the following headings, landslide and liquefaction. There are three questions students need to fill in the chart to compare the causes and effects of landslides and liquefaction.

|  |  |  |
| --- | --- | --- |
|  | ***Landslides*** | ***Liquefaction***  |
| ***Causes*** | *Earthquakes, freezing, Lots of (extensive) rain* | *Earthquakes* |
| ***Effect***  | *Loss of vegetation, human injury, property damage* | *Loss of vegetation, human injury, property damage* |
| ***Why does it happen?*** | *The landscape becomes unstable because of the shaking from an earthquake, freezing between crevices and/or rain loosens the soil.*  | *The landscape acts-like a liquid because the dirt and rock are not bound together tightly.*  |

**Lesson 5 - Tsunamis**

**Learning Objective:** Students will investigate the changes to Earth that can result from earthquakes; specifically tsunamis.

**Investigative Phenomenon for lesson:** *Tsunamis can result from earthquakes.*

**Guiding Questions:**  *How can ocean areas be affected by earthquakes?*

**Lesson Implementation** Timeframe: 45 minutes

**Classroom Resources and Materials:**

* It’s All My Fault L5 PowerPoint presentation
* Clear plastic bottles filled halfway with water, one for each student team.
* Blue food coloring
* Paper plate for each student team
* 5 marbles for each student team

***Procedures:***

***Engage:***

1. **Display slide 1.** Welcome students.
2. **Display slide 2.** Instruct students to make observations of the pictures and ask, “What happened here?” Accept all student answers.

***Explore:***

1. **Display slide 3.** Share with students that they will be making some waves. Create student groups of three to four students. Provide the following instructions to the students:
* Fill a clear bottle halfway with water.
* Add 1 drop of blue food coloring.
* Hold the bottle sideways and give a tap on one end. Ask students to make observations and pay special attention to the motion of the water.
* Instruct students to conduct the investigation again and identify any patterns or similarities in the motion of the water.
* Tell students to draw a model of their observations.



Before: Small wave

(red arrow)

After: Larger wave

(red arrow)

1. **Display slide 4.** Share with students that they will be exploring wave energy. Create student groups of three to four students. Provide the following instructions to the students:
* Collect a paper plate and 5 marbles for each team.
* Line up 4 marbles around the inside rim of the plate (see picture in slide).
* Use the 5th marble to hit the first marble in line. Make observations.
* After students make observations, ask students to discuss what happened when the 5th marble hit the first marble. *The scientific principle demonstrated in the experiment is the law of inertia (Newton’s 1st law): objects will remain at rest or in a uniform motion in a straight line unless acted upon by an external unbalanced force. Waves apply the law of inertia because it transfers energy through the water.*
1. **Display slide 5.** Look at the image in the slide. Ask students, “What shape does a wave make *(The wave has a crest and a trough)*? How do you know that energy exist in a wave (*An ocean wave can push you down with a force*)?”

**Explain:**

1. **Display slide 6.** Explain to students that energy in an Ocean wave moves in a circular motion. Identify in the slide/image the circular patterns in the wave. Highlight the shape of the wave and identify the crest and trough. Remind the students that in their previous activity, they made observations of energy transfer from one marble to the next. This also happens with Ocean waves. The energy and force from wind moves the wave in circular motion towards the beach.
2. **Display slide 7.** Earthquakes can also provide the energy to make ocean waves.

Ocean waves created by an earthquake are called a tsunami. A tsunami is a wave, or series of waves, generated by an earthquake, landslide, volcanic eruption, or even large meteor hitting the ocean (The Japanese word tsu means “harbor”; nami means “wave”). What typically happens is a large, submarine earthquake (magnitude 8 or higher) creates a significant upward movement of the sea floor resulting in a rise or mounding of water at the ocean surface. This mound of water moves away from this center in all directions as a tsunami. A tsunami can travel across the open ocean at about 500-miles per hour, the speed of a jet airliner. As the wave approaches land and as the ocean shallows, the wave slows down to about 30 miles-per-hour and grows significantly in height (amplitude). Although most people think a tsunami looks like a tall breaking wave, it actually resembles a flood or surge.

Explain to students that a tsunami is a wave, or a series of waves generated by an earthquake, landslide, volcanic eruption, or even a large meteor hitting the ocean. An enormous wave is created that often causes a large amount of damage near the beach area.

***Elaborate & Evaluate:***

1. **Display slide 8.** Use the online map to look for tsunami hazard areas in California. First look at the area where you live using the online map. The red line will show you how far a tsunami will flood a certain area. [*http://www.conservation.ca.gov/cgs/geologic\_hazards/Tsunami/Inundation\_Maps/Pages/Index.aspx#Interactive*](http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Pages/Index.aspx#Interactive)

Ask students, “Are we in a tsunami hazard area? Why or why not?”

1. **Display slide 9.** Ask students if they would know what to do if a tsunami threatened to come ashore. Indicate to the students that they will have the opportunity to learn how be prepared for a tsunami. Watch video: <https://www.youtube.com/watch?v=dkRaC-S5RH8>
2. **Display slide 10.** Share with students some examples of posters that help others learn how to be prepared for a tsunami by highlighting the examples in the slides. More examples of infographics are found at <http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Pages/TsunamiEducation.aspx>

Tell students to create an infographic or public service announcement to share with the class that describes a tsunami and what people should do if there is a warning.

Ask students to share their infographics or public service announcement with the class.

1. **Display slide 11.** Conclude this learning sequence for students by sharing that “Earthquakes are a result of slow movement by the tectonic plates that create stress at faults. Faults can slip suddenly causing fast movement in the earth. Results of earthquakes can be fast. They include landslides, liquefaction and tsunamis.