**FAULT BLOCK ACTIVITY NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**BACKGROUND**

One of the most frightening and destructive phenomena of nature is a severe earthquake and its terrible aftereffects. An earthquake is a sudden movement of the Earth, caused by the abrupt release of strain that has accumulated over a long time. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface slowly move over, under and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free. If the earthquake occurs in a populated area, it may cause many deaths and injuries and extensive property damage.

Today we are challenging the assumption that earthquakes must present an uncontrollable and unforecastable hazard to life and property. Scientists have begun to estimate the locations and likelihoods of future damaging earthquakes. Sites of greatest hazard are being identified, and designing structures that will withstand the effects of earthquakes.

**COLORING KEY**

* Rock Layer X - green
* Rock Layer Y - yellow
* Rock Layer Z - red
* River - blue
* Road - black
* Railroad tracks - brown
* Grass - green

**INSTRUCTIONS FOR CONSTRUCTING FAULT MODEL**

1. Color the fault model that is included on the last page according to the color key provided above.
2. Paste or glue the fault model onto a piece of construction paper.
3. Cut out the fault model and fold each side down to form a box with the drawn features on top.
4. Tape or glue the corners together. This box is a three-dimensional model of the top layers of the Earth's crust.
5. The dashed lines on your model represent a fault. Carefully cut along the dashed lines. You will end up with two pieces.
6. Tape or glue a piece of construction paper on the side of the two fault blocks along the fault face. This will help with the demonstration.

**NORMAL FAULT**

* 1. Locate points A and B on your model.
  2. Move point B so that it is next to Point A.
  3. Observe your model from the side (its cross-section).
  4. Draw the normal fault as represented by the model they have just constructed.

**NORMAL FAULT QUESTIONS:**

* 1. Which way did point B move relative to point A?
  2. What happened to rock layers X, Y and Z?
  3. Are the rock layers still continuous?
  4. What likely happened to the river? the road? the railroad tracks?
  5. Is this type of fault caused by tension, compression or shearing?
  6. Explain that this type of fault is known as a normal fault.

Many normal faults are found in Nevada. This is because Nevada is located in a region called the Basin and Range Province where the lithosphere is stretching

**THRUST FAULT**

1. Locate points C and D on your model.
2. Move Point C next to point D. Observe the cross-section of your model.
3. Draw the thrust fault as represented by the model they have just constructed.

**THRUST FAULT QUESTIONS:**

* 1. Which way did point D move relative to point C?
  2. What happened to rock layers X, Y and Z?
  3. Are the rock layers still continuous?
  4. What likely happened to the river? the road? the railroad tracks?
  5. Is this type of fault caused by tension, compression or shearing?
  6. Explain that this type of fault is known as a thrust fault.

An example of a thrust fault is the fault in which the Northridge earthquake occurred. The thrusting movement raised the mountains in the area by as much as 70 cm.

**STRIKE-SLIP FAULT**

1. Locate points F and G on your model.
2. Move the pieces of the model so that point F is next to point G.
3. Draw an overhead view of the surface as it looks after movement along the fault

STRIKE-SLIP QUESTIONS

* 1. If you were standing at point F and looking across the fault, which way did the block on the opposite side move?
  2. What happened to rock layers X, Y, and Z?
  3. Are the rock layers still continuous?
  4. What likely happened to the river? the road? the railroad tracks?
  5. If the scale used in this model is 1 mm = 2 m, how many meters did the earth move when the strike-slip fault caused point F to move alongside point G? (Note that this scale would make an unlikely size for the railroad track!) If there were a sudden horizontal shift of this magnitude it would be about five times the shift that occurred in the 1906 San Andreas fault as a result of the San Francisco earthquake.
  6. Is this type of fault caused by tension, compression or shearing?
  7. Explain that this type of fault is known as a strike-slip fault.

A strike-slip fault can be described as having right or left-lateral movement. If you look directly across the fault, the direction that the opposite side moved defines whether the movement is left-lateral or right-lateral.

The San Andreas fault in California is a right-lateral strike-slip fault.

