

Moving the Earth

Summary

Students use their hands to investigate how earthquakes and uplift change the Earth's surface.

Time Frame

1 class periods of 30 minutes each

Group Size

Individual

Materials

No materials are needed.

Background for Teachers

Fault movement can be primarily horizontal or vertical depending upon the forces causing it. In California's San Andreas fault the movement is horizontal. In Utah, the fault movement is predominantly vertical. In this activity students will use their hands to demonstrate fault movement. Hands work well because the bone structure simulates the uneven fault surface and friction that hang up the fault until the forces are strong enough to overcome them which causes rapid earthquake movement.

Instructional Procedures

Ask the students what causes earthquakes. Listen to all responses.

Confirm the idea that earthquakes happen when the Earth moves.

Ask students how the Earth moves. Listen to all answers.

Ask students to use their two hands to demonstrate how Earth movement causes earthquakes.

Select 2 to 3 students to demonstrate to the class how they are moving their hands to simulate earthquake movement. Have the selected students explain what would happen on the Earth's surface as a result of the movement they are demonstrating.

Explain to students that earth movement happens along faults. The place where their two hands rub together represents the fault. Faults are the cracks in the Earth's surface where the Earth moves as pressure from within the Earth is applied or released.

Explain to students that they will explore the movement and pressures involved in different types of faults by using their hands.

Model the faults and have students join into the demonstration of these faults. Consider removing your rings if it will make conducting this activity more comfortable.

Side-to-side movement (lateral faulting) is the type of faulting that occurs on the San Andreas Fault. Demonstrate the side to side movement.

Place the sides of the hands together with the thumbs folded underneath.

Begin even and firm contact with the index fingers between the base of the thumbs.

Lay the hands out in front of the body to represent a flat surface.

Press the hands together applying as much pressure as can be maintained.

As you slowly release the pressure, slide your hands past each other.

One hand will move toward the body and the other will move away.

Discuss the demonstration. Where did the students feel the pressure? What happened as their hands moved? Was the movement smooth?

Ask students to describe what would happen to the land masses during this type of movement.

How would the surface of the Earth change? [As the hands slide past each other, the movement may be jerky or hesitant, depending upon the contact of different parts of the hand. You may feel vibrations and see the displacement of the two sides. These events occur during lateral faulting. Shaking will occur. The 1906 San Francisco earthquake is an example of lateral fault movement.]

Many resources, including grade level appropriate books, are available about the San Francisco earthquake. You may want to make some of these available to students.

Tell the students they will demonstrate another kind of fault. (Reverse fault)

Make fists and press them together in front of the body.

The fists should fit together so that the knuckles fit into the indentations of the other hand tightly.

The pressure is not released in this fault.

Keeping the pressure as constant as possible, slowly let one hand slide up from 3 to 5 cm.

The raised hand may look like a cliff. It may also buckle or bend over the other hand slightly.

Discuss the demonstration. Where did the students feel the pressure? What happened as their hands moved? Was the movement smooth?

Ask students to describe what would happen to the land masses during this type of movement.

How would the surface of the Earth change?

Discuss the feelings and differences in this fault as compared to the first fault.

Finally, you will demonstrate they type of fault that is the most common in Utah. (normal fault).

Place your hands into the same beginning position as was used in the second fault.

Press the fists together tightly. This fault occurs when the pressure is released slowly and one hand slips down about 3 to 5 cm.

The straight fingers and knuckles of the non-moving hand are now similar to a fault cliff.

The feeling of this process differs from the reverse fault.

Discuss the demonstration. Where did the students feel the pressure? What happened as their hands moved? Was the movement smooth?

Ask students to describe what would happen to the land masses during this type of movement.

How would the surface of the Earth change?

The mountain chains often contain the fault lines that allow the valleys to down shift in the event of earthquake activity. This heightens the mountains by lowering the valleys. Discuss and compare this with the other faults that have been explored.

Ask the student to summarize what happens to the Earth's surface during earthquakes and uplift. Develop the idea that earthquakes and uplift change the Earth's surface, creating mountains, valleys, depressions where new lakes can form, and canyons.

Ask students to describe how earthquakes and uplift change landforms.

Assessment Plan

Ask the students to write a paragraph explaining how earthquakes change landforms. Use the rubric below to evaluate their writing.

Rubrics

[Science Writing Rubric](#)

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