Vocabulary Activity

ACROSS

3. fault
4. seismology
5. focus
8. epicenter
10. P waves
11. S waves
12. gap hypothesis
13. seismogram

DOWN

1. deformation
2. elastic rebound
6. seismic waves
7. seismograph
9. seismic gap

SciLinks Activity

1. Answers may vary. Sample answer: The earthquake occurred in Eastern New Guinea.
2. Answers may vary. Sample answer: The earthquake happened on October 22, 2003, at 11:45 AM.
3. Answers may vary. Sample answer: The magnitude of the earthquake was 6.3.
4. Answers may vary but should include a description appropriate to the magnitude of the earthquake. Sample answer: This earthquake would definitely have been felt by people and probably caused quite a bit of damage to buildings that were not earthquake-resistant. There may be some cracking of the ground in the area, and there were probably some broken underground pipes.

Performance-Based Assessment

FORM A HYPOTHESIS

6. Sample hypothesis: I could inflate and seal the plastic bags to use them as shock absorbers.

ANALYZE THE RESULTS

9. The first design kept the box in the same place when the book was gently shaken.
10. Answers may vary. Sample answer: Our design was good for gentle shaking, but a lot of shaking caused the structure to fall apart.

DRAW CONCLUSIONS

11. a. Answers may vary. Sample answer: The inflated bags worked well as shock absorbers for very gentle shaking.
    b. Answers may vary. Sample answer: The slick surface between the plastic bags and the textbooks caused the books and the box to slide off.
12. Answers may vary. Sample answer: Rubber bands could be placed on the top and bottom of the plastic bags to add traction and to prevent the books and the box from sliding off.

Quake Challenge

ANALYZE THE RESULTS

1. Answers may vary. Sample answer: Structures that had a wide base generally withstood the earthquake. Structures that used triangles in the design also were successful.
2. Answers may vary. Sample answer: By experimenting with different design shapes, such as cubes or triangles, we could find the most stable structure.

DRAW CONCLUSIONS

3. Buildings designed in earthquake zones areas should have wide and flexible foundations. The building should also be reinforced to prevent collapse.
4. Answers may vary. Accept all reasonable answers. Sample answer: Rocks and gelatin have very different physical properties, such as hardness and density. Seismic waves may have different effects on rock than shaking does on gelatin.
5. Answers may vary. Accept all reasonable answers. Sample answer: By changing the design of our marshmallow-and-toothpick building, we can come up with better designs for buildings.

Modeling Seismic Waves

MATERIALS

4. P waves are represented in step 2; S waves are represented in step 3.

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Earthquake Waves

PROCEDURE

3. Austin: 150 s; Bismarck: 168 s; Portland: 120 s

ANALYZE THE RESULTS

1. San Diego, California
2. Sample answer: Seismologists require at least three intersecting circles to determine the epicenter of an earthquake. The first two circles intersect in two places. When a third circle is used, all three circles intersect in only one place near the epicenter.

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