

An Invisible Pull

Purpose

Students will demonstrate that things on Earth are pulled toward it by Earth's gravity, and that Earth's gravity pulls any object toward it without touching it.

Materials

For the teacher: chalkboard eraser

For each group of 3 students: chalkboard eraser

Activity

A. An Invisible Force

1. Divide the class into groups of three students and distribute a chalkboard eraser to each group.
2. Have students put the erasers on their desks, and ask: "Can these erasers move themselves? What must happen to make the eraser move?"
3. Have each group test ways to make the eraser move.
4. Conclude with students that the eraser must receive a push or pull in order for it to move. Explain to students that a push or pull on an object is called a force.
5. Hold an eraser up to the class. Have students tell you what would happen if you let go.
6. Direct students to drop their erasers on the floor.
7. Ask the students: "Why did the erasers fall?" Discuss students' answers.
8. Guide students to an understanding that a force must have been applied to the erasers when they were released from their hands.
9. Ask students: "Did you push the eraser to the floor?"
10. Ask students: "Since you didn't push your eraser, what pulled your eraser to the floor?" Explain that the force that pulled the eraser to the ground is called gravity.

B. Look: No Hands!

1. Give students time to experiment with moving the eraser across the table, and dropping the eraser as they look for differences between the forces that cause the eraser to move.
2. Ask students: "Could you move the eraser across the table without anything touching it? After you released the eraser, was anything touching it as it fell?"

(continued)

MEETING
INDIVIDUAL



NEEDS

Have students who need a challenge investigate the gravitational pull on planets other than Earth. What does the pull depend upon?

connecting
across the
curriculum



English/ Language Arts

Direct students to read a biography of Isaac Newton, such as Michael White's *Isaac Newton: Discovering Laws That Govern the Universe*. Instruct students to write a review of the book.

Standards Links
5.1.3, 5.3.11

Activity (continued)

3. Tell students that earlier they had agreed that gravity had pulled the eraser to the ground. Ask: “Can gravity pull objects towards Earth without touching them?”
4. Ensure students understand that Earth’s gravitational pull is a force that acts without touching objects itself. (The acceleration due to gravity at Earth’s surface is 9.8 m/s^2 .)


C. Only Erasers?


1. Ask students: “Are objects other than erasers affected by Earth’s gravity? What other objects are affected by gravity?”
2. Discuss students’ answers and guide them to conclude that all things on Earth are pulled toward it by gravity.
3. Explain to students that all objects in the universe have a gravitational pull.

Questions for Review


Basic Concepts and Processes


At the conclusion of the activity, ask questions such as the following:

 If you are sitting on a tree limb that breaks, what will happen?

 How do you know?

 Explain why planes do not float into space.

 When you drop an object, can you see the force that pulls it down?

 Explain your answer.
