



Elaborate: Investigation

“Strong Wind, Gentle Breeze”

Force Module

This inquiry-based investigation provides students with the opportunity to demonstrate scientific reasoning and processing skills as they work in pairs as a class to experiment with force.

This offline investigation can be completed after participation in the online Engage, Explore, and Explain.

Teacher objective: To demonstrate that the force used in blowing a tinfoil ball has a direct relationship to the amount the ball moves.

Student objective: Upon completion of this activity, students will be able to explain and demonstrate the relation of force to movement with 80% accuracy.

Estimated time for activity: 25 minutes

Materials:

- Length of string, approximately four feet long
- One metal washer
- Aluminum foil
- Tape



Procedure:

1. Pre-make a foil ball on a string to hang from a doorway. Follow these steps:
 - a. Tie washer to one end of the string.
 - b. Tape the other end of the string to the top of the door frame. The washer should be at mouth level for your students.
 - c. Mold foil around the washer to make a ball approximately 2” in diameter.
2. Lead the class in a discussion that reviews force.
3. Explain that the amount of force we use to do work varies. Have students blow air through their lips. Tell them they can feel how much force they are using by putting a hand a few inches in front of their face. Have them blow softly. Tell them that blowing softly uses a little force like a gentle breeze. Next, have them blow hard. Tell them that blowing hard uses a lot of force like a strong wind.
4. After students have felt the force of their breath on their hands, show them that they can also feel how much force they are using by placing a hand just below their ribs on their diaphragm. Encourage them to describe the difference in the feel of their diaphragm when they blow with hard force (diaphragm is hard and pushes out) and when they blow with gentle force (diaphragm is softer and collapses).
5. Explain that this activity will show another way to see how much force they are using. Review procedures and directions for student handout.
6. Students conduct the investigation. Circulate and assist with completion of the handout.
7. Students share with peers so results can be compared through scientific communication.



**Teacher background & discussion points:**

Force is simply described as a push (moving something away from you), or a pull (moving something toward you). Think about what happens when you walk; you use your feet to push away from the ground. When opening the car door, you apply a pull to bring the door toward you, which opens it. On Earth, an object's position or motion will not change without a force being applied to it.

Review:

At the conclusion of the lesson, remember to review the following key points:

- Scientists learn through observation.
- Gravity is a force that pulls the tinfoil balls toward the ground.
- Students use their breath as a soft force (gentle breeze) and a hard force (strong wind) to move the foil ball.
- Collecting, recording, and sharing data are important science process skills.

Accommodations:

If students have difficulty modifying the amount of force they use or recording their results, a variety of accommodations can be employed.

- Another student can hold his/her hand behind the tinfoil ball, and the student who is blowing can try to make the ball touch the hand.
- The teacher can demonstrate how to fill out each section of the data sheet.
- The activity can be completed with a science buddy from an older grade.
- Student answers can be given orally or dictated to a teacher.



Name: _____

Date: _____

Strong Wind, Gentle Breeze

Prepare: Get ready to make a gentle breeze and a strong wind.

Try It! Take turns moving the foil ball with a gentle breeze and a strong wind.

Record Your Data:

I made a **gentle breeze**.

My diaphragm felt: hard soft

When I blew, the ball looked like this:

I made a **strong wind**.

My diaphragm felt: hard soft

When I blew, the ball looked like this: