

### Photo Description



A child wearing a red shirt and khaki pants is jumping high in the air over an orange cone during an outdoor activity. Other children watch from the background. The child's feet are off the ground, showing how their body moved upward through the air.

### Scientific Phenomena

**Anchoring Phenomenon:** A child jumping and temporarily leaving the ground.

**Why This Happens:** When the child's muscles push down hard against the ground, the ground pushes back up with equal force. This upward push is stronger than the pull of gravity for a moment, so the child's body moves upward into the air. Once the child stops pushing and is in the air, gravity pulls them back down to the ground. This demonstrates the fundamental principle that forces cause objects to move, and that balanced and unbalanced forces determine motion.

### Core Science Concepts

- \* Force is a push or pull. The child's leg muscles push against the ground to make the jump happen.
- \* Motion is when something changes position or location. The child moves upward into the air, showing motion caused by force.
- \* Gravity always pulls objects downward. Even though the child jumps up, gravity will eventually bring them back to the ground.
- \* Objects need a force to start moving, stop moving, or change direction. The child's muscles provide the force needed to jump; gravity provides the force that brings them down.

#### Pedagogical Tip:

First graders learn best through direct experience. Rather than only discussing the concept, allow students to jump themselves and observe their classmates. Ask them to notice what their legs do before jumping and what happens when they land. This kinesthetic connection helps cement understanding of force and motion in developmentally appropriate ways.

#### UDL Suggestions:

Provide multiple means of engagement: Some students may prefer jumping, while others might roll a ball, push a toy car, or throw a beanbag to explore forces. Offer choice in how students demonstrate their understanding of jumping—through movement, drawing, dictation, or simple writing. For students with mobility differences, jumping can be replaced with other movements like arm reaches, spinning in a chair, or pushing objects across a table.

## Discussion Questions

1. What did the child's legs do to make their body jump up? (Bloom's: Understand | DOK: 1)
2. Why does the child come back down to the ground instead of floating in the air? (Bloom's: Understand | DOK: 2)
3. If the child pushed their legs even harder, what do you think would happen to their jump? (Bloom's: Analyze | DOK: 2)
4. How is jumping different from running? What forces are the same or different? (Bloom's: Analyze | DOK: 3)

## Extension Activities

1. Jump Challenge Obstacle Course: Set up cones, lines on the ground, and low barriers. Have students jump over and around obstacles while you observe how they adjust their force and motion. Ask: "How did you change your jump to go over the tall cone?"
2. Compare Different Movements: Have students explore different ways to move (walking, running, hopping on one foot, crawling, rolling). Discuss which movements require the most force and why. Create a class chart showing "Pushes We Use" for each movement.
3. Force Exploration Station: Provide various objects (balls, blocks, toy cars, bean bags) and let students push, pull, and throw them. Have them observe which objects need more or less force to move and record observations through drawings or simple dictation.

## NGSS Connections

Performance Expectation:

K-PS2-1: Plan and conduct an investigation to provide evidence that vibrations make sound and that vibrations can make other objects move.

(Note: While this PE focuses on sound, the broader K-PS2 standard addresses forces and motion fundamentals.)

Disciplinary Core Idea:

K-PS2.A | Objects can be moved in a variety of ways, such as pushing, pulling, and by releasing or throwing them.

Crosscutting Concepts:

\* Cause and Effect | The child's leg muscles cause a force that results in the motion of jumping.

\* Patterns | Students can observe patterns in jumping motion across multiple trials.

## Science Vocabulary

- \* Force: A push or pull that makes something move, stop, or change direction.
- \* Push: A force that moves something away from you.
- \* Jump: To push off the ground with your legs and move upward into the air.
- \* Gravity: An invisible force that pulls everything toward Earth and brings things back down.
- \* Motion: When something moves or changes position from one place to another.
- \* Obstacle: Something in the way that you have to go over, under, or around (like the cone in the photo).

### External Resources

#### Children's Books:

- Push and Pull\* by Lola M. Schaefer (explores forces in everyday activities)
- Jumping\* by Leslie Pate Mackeen (celebrates movement and jumping)
- Move!\* by Steve Jenkins (interactive book about different types of motion)

#### YouTube Videos:

- \* "Forces and Motion for Kids" by Crash Course Kids | Explains how forces cause motion with fun, animated examples. (<https://www.youtube.com/watch?v=akSp8gFNIXE>)
- \* "Gravity and Motion" by National Geographic Kids | Shows how gravity affects jumping and movement with real-world examples. (<https://www.youtube.com/watch?v=ycHqxIWyWjI>)