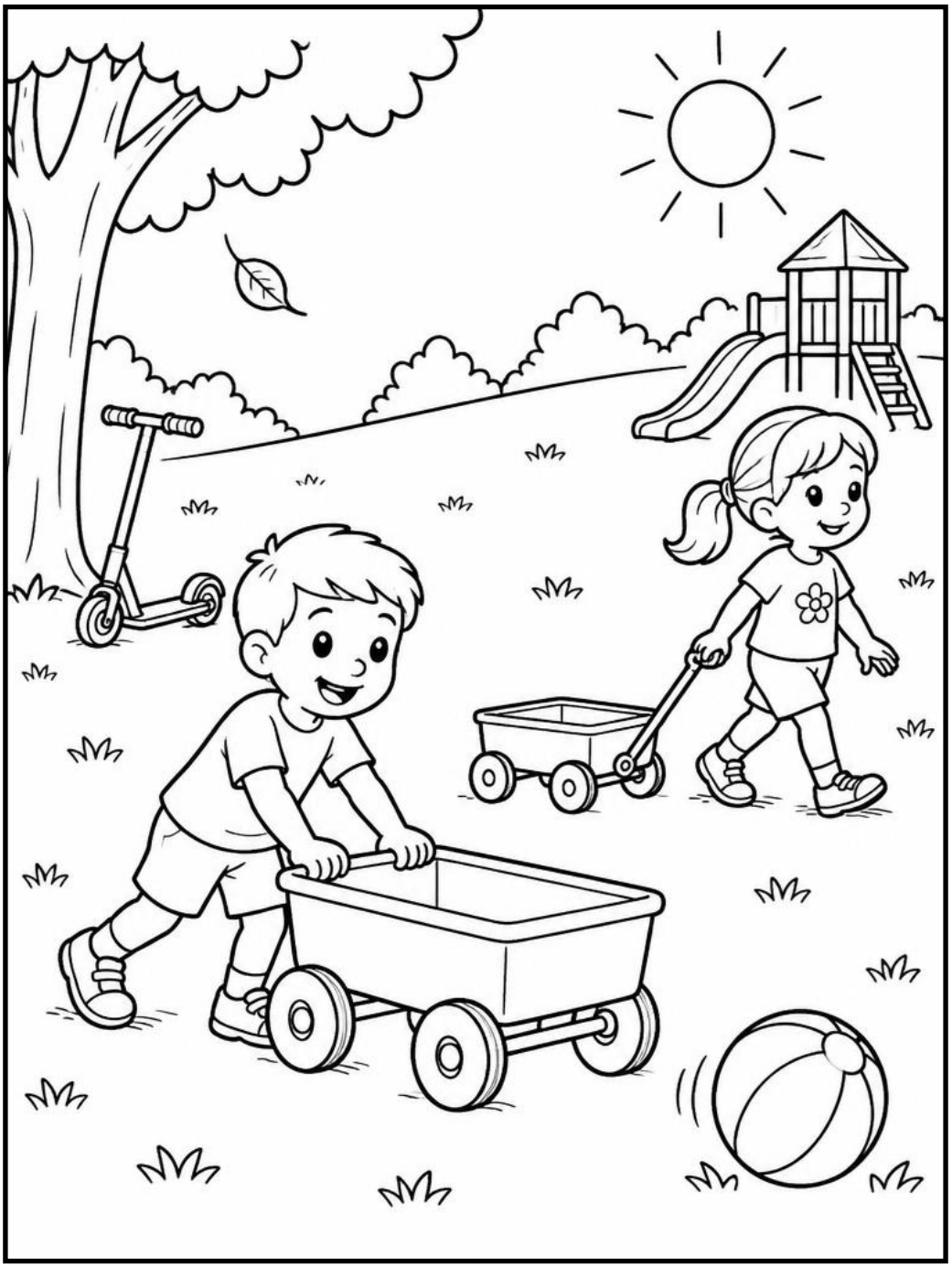
Forces & Motion

Pushes, Pulls, Gravity & Friction

Learning Pack · Color It. Learn It. Explore It.

Ages 6–10 · Grades 1–4 (approximate) · Physical Science / STEM · 30–75 minutes

Name: _____



Inside: facts · vocabulary · push or pull · force arrows · gravity · friction test · quiz · answer key · notes

What you will learn

Learning objectives

- ☐ Explain that a force is a push or a pull.
- ☐ Tell how forces can change the way an object moves.
- ☐ Recognize gravity as a force.
- ☐ Explain how friction affects movement.
- ☐ Compare the results of a simple fair test.

Five forces facts

Fact 1: What is a force?

A force is a push or a pull. Forces can change how fast something moves, which way it moves or its shape. A force does not always make something move, because other forces can balance it.

Fact 2: Forces change motion

When the forces on an object are unbalanced, it can speed up, slow down or change direction. When the forces are balanced, a moving object keeps going at the same speed in the same direction. It does not need a forward push to keep going.

Fact 3: Gravity

Gravity is a pull between objects that have mass. Earth's gravity pulls things toward the center of Earth, so a dropped object falls down. Gravity works everywhere in space, not just on Earth.

Fact 4: Friction

Friction is a force between two surfaces that are touching. It resists them sliding, or starting to slide, against each other. Friction helps us walk and helps bikes stop. It can also slow moving things down.

Fact 5: Scientists test fairly

In a fair test you change one main thing and keep everything else the same. To compare surfaces, use the same toy car and let it go from the same spot each time. Results can differ with different objects and conditions.

Sources (checked October 2026)

Facts 1, 2, 4: The Physics Classroom, physicsclassroom.com/class/newtlaws/Lesson-2/Types-of-Forces and /Lesson-1/Newton-s-First-Law
Fact 3: NASA Space Place, What Is Gravity?, spaceplace.nasa.gov/what-is-gravity/en/
Fact 5: general science-practice guidance for fair testing (no single source).

Forces & motion words

Force	A push or a pull.
Push	A force that moves something away from you, like pushing a door open.
Pull	A force that moves something toward you, like pulling a drawer open.
Motion	Changing position over time, compared with a place that stays still.
Speed	How fast something moves.
Gravity	A pull between objects that have mass. Earth's gravity pulls things down.
Friction	A force between touching surfaces that resists sliding or starting to slide.
Direction	The way something moves, or the way a force acts.
Balanced forces	Forces that cancel each other out. The object keeps doing what it was doing: staying still, or moving at the same speed in the same direction.

Your turn: write a sentence using two vocabulary words.

Push, pull and force direction

Name: _____ Date: _____

Activity A: Push or pull?

Look at each picture. Write PUSH or PULL on the line.



1. Push or pull? _____



2. Push or pull? _____



3. Push or pull? _____

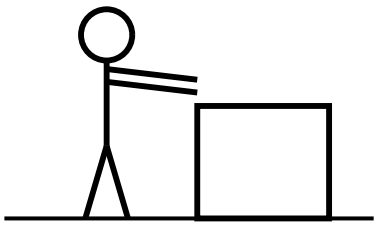


4. Push or pull? _____

Activity B: Draw the force arrow

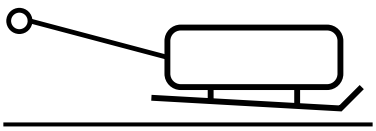
Draw one arrow in each box to show which way the named force acts.

5.



The person pushes the box to the right. Draw the push arrow.

6.



The rope pulls the sled to the left. Draw the pull arrow.

7.



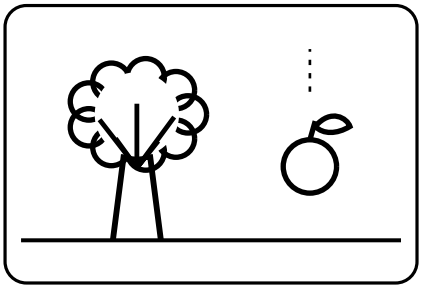
Draw the direction of Earth's gravity on the falling apple.

Gravity and friction investigation

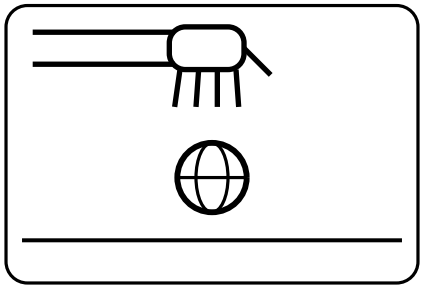
Name: _____ Date: _____

Activity A: Gravity in action

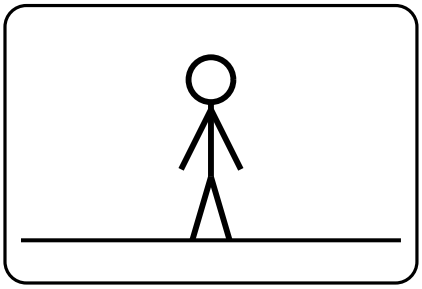
In which direction does Earth's gravity pull each object? Draw an arrow on the apple, the ball and the person.



1. An apple falling from a tree



2. A ball just dropped



3. A person standing still

Activity B: How does the surface change how far a toy car rolls?

You need: one small toy car, one short, steady ramp (a board on two books), a smooth floor, a towel, a ruler or tape measure and an adult.

1. Set up the ramp on the floor at one fixed height. Mark a start line near the top.
2. Put the smooth surface at the bottom. Let the same car go from the start line. Do not push it.
3. Measure from the bottom of the ramp to where the car stops. Do this 3 times.
4. Lay the towel flat at the bottom. Keep the ramp and start line the same. Repeat 3 times.

Surface	Trial 1	Trial 2	Trial 3
Smooth floor			
Towel			

Which surface let the car travel farther? _____

What did you keep the same to make this a fair test?

_____

No materials? Use this made-up sample data (not a real experiment):

Smooth floor: 92 cm, 88 cm, 95 cm Towel: 31 cm, 35 cm, 29 cm

Different surfaces can make a rolling toy car slow down at different rates.

Forces & motion quiz

Name: _____ Date: _____

Fill in the circle next to the best answer.

1. What is a force?

- ◯ a) A push or a pull
- ◯ b) A kind of light
- ◯ c) Something only machines make

2. What can unbalanced forces do to an object?

- ◯ a) Nothing at all
- ◯ b) Change its speed or direction
- ◯ c) Make it disappear

3. Near the ground, which way does Earth's gravity pull a dropped ball?

- ◯ a) Up, toward the sky
- ◯ b) Down, toward Earth
- ◯ c) Sideways

4. What does friction do?

- ◯ a) It pulls everything toward Earth
- ◯ b) It only happens in space
- ◯ c) It resists surfaces sliding against each other

5. What makes a test fair?

- ◯ a) Changing one thing and keeping the rest the same
- ◯ b) Using a different car for each surface
- ◯ c) Pushing the car harder each time

Bonus: A soccer ball rolls across flat grass and slowly stops. Name one thing that helps slow it down.

_____

_____

_____

Answer key

Activity A: Push or pull? (page 4)

1. Push 2. Pull 3. Push 4. Pull (shopping cart, wagon, door, drawer)

Activity B: Draw the force arrow (page 4)

5. Arrow points right, from the person toward the box. 6. Arrow points left, along the rope. 7. Arrow points straight down, toward the ground.

Gravity in action (page 5)

1, 2 and 3: every arrow points down, toward the ground (toward the center of Earth). Gravity still pulls on the person even though they are standing still; the ground pushes back up, so they do not fall.

Friction investigation (page 5)

Results will vary. Often the car rolls farther on the smooth floor than on the towel, because the towel makes the car slow down faster. With the sample data, the smooth floor gave the longer distances (about 88–95 cm) and the towel the shorter ones (about 29–35 cm). Kept the same: the car, the ramp height, the start line, letting go without pushing and where you measure from.

Quiz (page 6)

1. a) A push or a pull
2. b) Change its speed or direction
3. b) Down, toward Earth
4. c) It resists surfaces sliding against each other
5. a) Changing one thing and keeping the rest the same

Bonus (answers will vary): the grass pushes against the ball as it rolls (rolling resistance), and the air pushes against it too (air resistance). Gravity alone is not the reason it stops on flat ground.

Teacher and parent notes

Who it is for

Ages 6–10 (about grades 1–4). Time: 30–75 minutes, depending on the activities selected.

Suggested order

1) Read the five facts. 2) Vocabulary. 3) Push or pull. 4) Force arrows. 5) Gravity in action. 6) Friction investigation or the sample data. 7) Quiz. 8) Color the cover.

Making it a fair test

Use the same car and the same ramp, keep the ramp height fixed, let the car go without pushing, measure from the same point each time and repeat each surface three times.

Safety

Adult supervision. Use only lightweight toy cars and keep ramps low and steady, on the floor or a flat protected surface. Avoid sharp or heavy objects. Keep small toy parts away from very young children. Never throw objects or roll cars at other people or toward faces. No climbing on furniture; keep the area clear of tripping hazards.

Discussion questions

Can a force act without making something move? Why does a ball fall when you drop it? How can friction help us? What makes a science test fair?

A note on the science

Balanced forces mean zero net force: an object can be still or keep moving at a steady speed in a straight line. Unbalanced forces change speed or direction. Falling objects also meet air resistance, not just gravity. Friction can be helpful (walking, braking) or unhelpful (wearing out parts). The rolling-car test compares how surfaces slow a rolling car; it does not directly measure sliding friction.