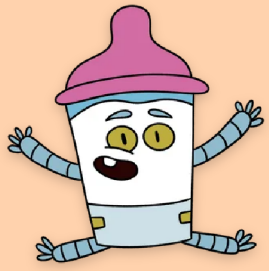
SCIENCE · FORCES AND MOTION · GRADES 1–3

# Push or Pull?

Sort eight actions into pushes and pulls, then draw a push and a pull you did today.

**Name:** _____ **Date:** _____



A **force** is a push or a pull. A **push** moves something away from you. A **pull** moves something toward you.

**1. Write each action in the right column.**

closing a door | moving a shopping cart | opening a drawer | walking a dog on a leash | ringing a doorbell | playing tug of war | zipping up a coat | kicking a ball

| Push | Pull |
|---|---|
| | |

**2. Draw a push you did today.**

**3. Draw a pull you did today.**

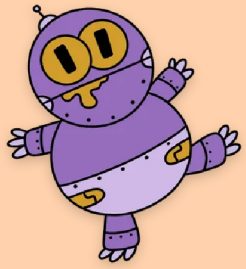


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SCIENCE · FORCES AND MOTION · GRADES 3–5

# Friction Test

Slide a block down a ramp onto four surfaces, measure how far it goes and find the most friction.



**Name:** _____ **Date:** _____

**Friction** is a force that slows things down when two surfaces rub together. **Set it up:** lean a book to make a short ramp. Slide a block or toy car down it onto each surface and measure how far it goes.

**My hypothesis: the block will slide farthest on** _____

| Surface | Try 1 (cm) | Try 2 (cm) | Try 3 (cm) |
|---|---|---|---|
| **Smooth table** | | | |
| **Carpet** | | | |
| **Sandpaper** | | | |
| **Towel** | | | |

**Most friction (shortest slide)** _____ **Least friction (longest slide)** _____

**Conclusion: when is friction helpful? When is it a problem?**

_____

_____



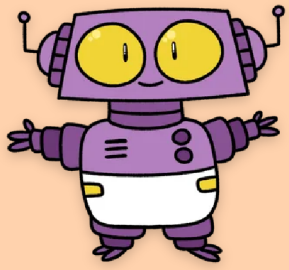
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SCIENCE · FORCES AND MOTION · GRADES 2–4

# Gravity: True or False?

Eight facts about gravity to mark true or false, then draw your classroom with no gravity.

**Name:** _____ **Date:** _____



**Gravity** is the force that pulls things toward each other. Earth's gravity pulls everything toward the ground.

**1. Circle True or False.**

| | | |
|---|---|---|
| Gravity pulls things toward the ground. | True | False |
| Gravity pulls a feather too, even though it is light. | True | False |
| Gravity keeps the moon going around Earth. | True | False |
| Gravity only works outdoors. | True | False |
| Without gravity, you would float. | True | False |
| The sun's gravity keeps the planets in their orbits. | True | False |
| Gravity pulls things up into the sky. | True | False |
| A ball you throw comes back down because of gravity. | True | False |

**2. Draw your classroom with no gravity.**



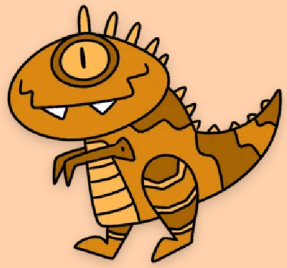
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SCIENCE · FORCES AND MOTION · GRADES 3–5

# Balanced or Unbalanced?

Circle balanced or unbalanced for six situations, then explain what unbalanced forces do to motion.

**Name:** _____ **Date:** _____



When forces are **balanced**, they cancel out and the object stays still or keeps moving the same way. When forces are **unbalanced**, the object speeds up, slows down or changes direction.

**1. Circle balanced or unbalanced.**

| | | |
|---|---|---|
| Two teams pull a rope and nobody moves. | balanced | unbalanced |
| A soccer ball starts rolling after a kick. | balanced | unbalanced |
| A book sits still on a desk. | balanced | unbalanced |
| A sled speeds up going down a hill. | balanced | unbalanced |
| A bike slows down when you stop pedaling. | balanced | unbalanced |
| A kite hangs still in a steady wind. | balanced | unbalanced |

**2. When forces are unbalanced, what happens to the way an object moves?**

_____

_____



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SCIENCE · FORCES AND MOTION · GRADES 3–5

# Paper Airplane Test

Fold two designs, fly each three times, measure the distance and name the forces at work.



**Name:** _____ **Date:** _____

**The challenge:** fold two different paper airplanes. Throw each one three times from the same line, the same way. Measure how far each flight went.

**Design A: draw your plane.**

**Design B: draw your plane.**

| Design | Flight 1 (m) | Flight 2 (m) | Flight 3 (m) | Longest |
|---|---|---|---|---|
| A | | | | |
| B | | | | |

**Conclusion: which design flew farther? Why? Name two forces that act on a flying paper airplane.**

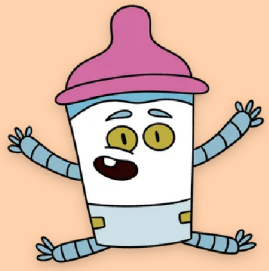


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ANSWER KEY · FORCES AND MOTION · GRADES 1–3

# Answer Key: Push or Pull?

Answers for grown-ups. Some questions have more than one good answer.



A **force** is a push or a pull. A **push** moves something away from you. A **pull** moves something toward you.

**1. Write each action in the right column.**

closing a door · moving a shopping cart · opening a drawer · walking a dog on a leash · ringing a doorbell · playing tug of war · zipping up a coat · kicking a ball

| Push | Pull |
|---|---|
| kicking a ball | opening a drawer |
| ringing a doorbell | walking a dog on a leash |
| closing a door | playing tug of war |
| moving a shopping cart | zipping up a coat |

**2. Draw a push you did today.**

**3. Draw a pull you did today.**

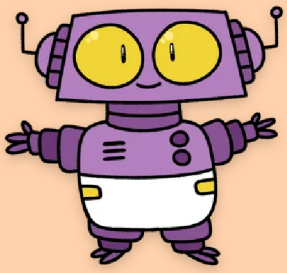


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ANSWER KEY · FORCES AND MOTION · GRADES 2–4

# Answer Key: Gravity: True or False?

Answers for grown-ups. Some questions have more than one good answer.



**Gravity** is the force that pulls things toward each other. Earth's gravity pulls everything toward the ground.

**1. Circle True or False.**

| | | |
|---|---|---|
| Gravity pulls things toward the ground. | **True** | False |
| Gravity pulls a feather too, even though it is light. | **True** | False |
| Gravity keeps the moon going around Earth. | **True** | False |
| Gravity only works outdoors. | True | **False** |
| Without gravity, you would float. | **True** | False |
| The sun's gravity keeps the planets in their orbits. | **True** | False |
| Gravity pulls things up into the sky. | True | **False** |
| A ball you throw comes back down because of gravity. | **True** | False |

**2. Draw your classroom with no gravity.**

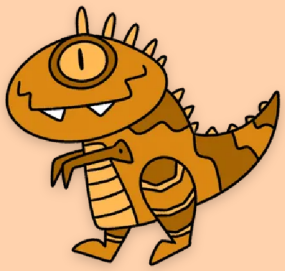


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ANSWER KEY · FORCES AND MOTION · GRADES 3–5

# Answer Key: Balanced or Unbalanced?

Answers for grown-ups. Some questions have more than one good answer.



When forces are **balanced**, they cancel out and the object stays still or keeps moving the same way. When forces are **unbalanced**, the object speeds up, slows down or changes direction.

**1. Circle balanced or unbalanced.**

| | | |
|---|---|---|
| Two teams pull a rope and nobody moves. | **balanced** | unbalanced |
| A soccer ball starts rolling after a kick. | balanced | **unbalanced** |
| A book sits still on a desk. | **balanced** | unbalanced |
| A sled speeds up going down a hill. | balanced | **unbalanced** |
| A bike slows down when you stop pedaling. | balanced | **unbalanced** |
| A kite hangs still in a steady wind. | **balanced** | unbalanced |

**2. When forces are unbalanced, what happens to the way an object moves?**



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