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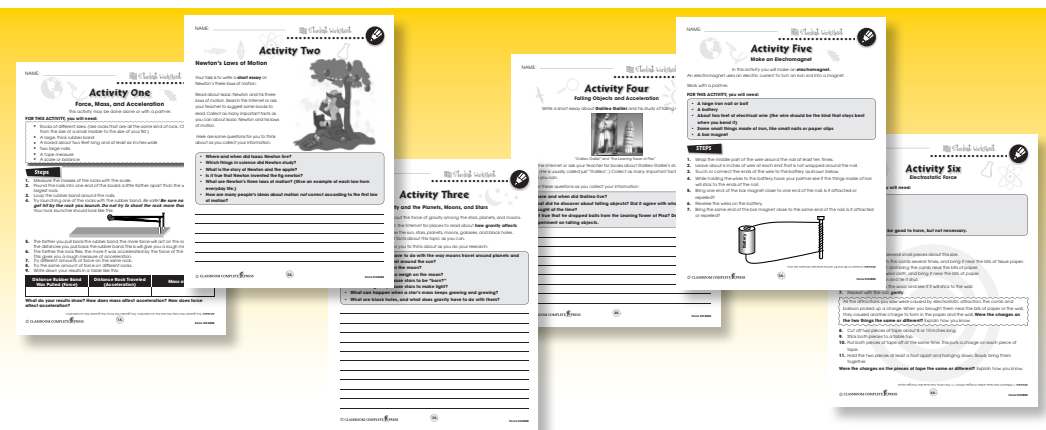
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**FREE!**

**6 Bonus Activities!**

**3 EASY STEPS** to receive your 6 Bonus Activities!

- Go to our website:  
[www.classroomcompletepress.com/bonus](http://www.classroomcompletepress.com/bonus)
- Click on item CC4508 – Force
- Enter pass code CC4508D





## Kinds of Force

1. **Circle** the word True if the statement is true. **Circle** the word False if it is false.

- a) A force cannot move something without touching it.  
True      False
- b) Air resistance makes things move faster.  
True      False
- c) Gravity is a force.  
True      False
- d) Things made of matter have mass.  
True      False
- e) When something is sliding down a hill, friction slows it down.  
True      False

2. Put a check mark (✓) next to the answer that is most correct.

a) Which describes all forces?

- A a push or a pull  
 B invisible energy  
 C a thing that moves  
 D something that does work

b) Which force makes things fall to Earth?

- A friction  
 B gravity  
 C air resistance  
 D magnetic force

c) Which force only acts between things that are touching?

- A friction  
 B gravity  
 C magnetic force  
 D electrostatic force



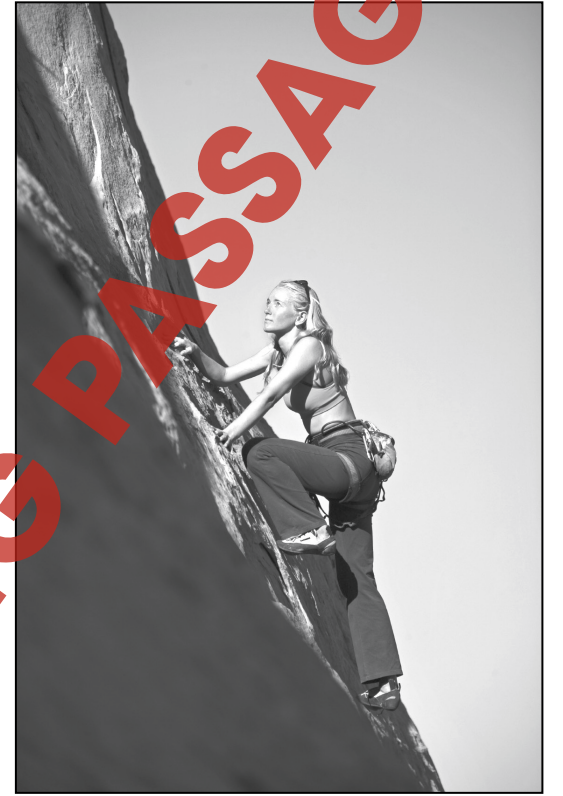
## Kinds of Force

**W**e can divide forces into two kinds. Some forces are **contact forces**, and other forces exert **force at a distance**. "Contact" means things must touch for one thing to exert a force on the other. "Force at a distance" means a force acts on something without touching it.

Contact forces make the most sense to us. We push on something with our hands and it moves away from us. We pull on something and it follows us. We feel the push or pull and see the motion.

Contact forces don't always cause motion. No matter how hard you push on the side of a house, it won't move. You can pull on a locked door and it won't open. It sounds funny, but this is because no matter how hard you pull, the door pulls back just as hard!

Another contact force is the force of friction. This is the force that acts between two things that are touching and sliding past each other. The force of friction is large between rough surfaces and small between smooth surfaces. Friction always acts against **sliding motion**. If the force of friction is large enough, the thing won't slide at all.



## Kinds of Force

1. **Circle** the word True if the statement is true. **Circle** the word False if it is false.

- a) Air resistance is a contact force.  
True      False
- b) Gravity is a force that can act at a distance.  
True      False
- c) When you push on a wall, the wall pushes back.  
True      False
- d) Friction makes things move faster.  
True      False
- e) Gravity is the force of attraction between one bit of matter and another bit of matter.  
True      False

2. a) **Circle** the words or group of words that are contact forces.

friction                      gravity                      air resistance  
magnetic force              electrostatic force

b) **Underline** the words or group of words that are forces that can act without touching.

friction                      gravity                      air resistance  
magnetic force              electrostatic force

## Kinds of Force

Answer the questions in complete sentences.

3. What is a contact force? Give an example of a contact force.

\_\_\_\_\_

4. What is force at a distance? Give an example of a force that acts at a distance.

\_\_\_\_\_

### Extension & Application

5. **Name, describe, or draw** something that is moving that has **at least three** forces acting on it. One of the three forces must be a force that acts **at a distance**. Draw arrows to show the directions in which the forces are acting. Write the name of each force next to its arrow. If you do not draw the moving thing, tell which direction the thing is moving (left, right, up, or down). Then tell which way the arrows would point.





## Activity Two

### The Force of Air Resistance

Learn about the force of air resistance. When things fall they are acted on by two forces: **gravity** and **air resistance**. The force of gravity is the same on all objects. This means that, if there were no air, everything would fall the same way. That is, everything would fall with the same acceleration. It's hard to believe, but a feather and a rock would hit the ground at the same time if there were no air! This has been proved by dropping things in a container that has had the air pumped out of it.

You will need to do this activity with a partner.

**FOR THIS ACTIVITY, you will need:**

- A stopwatch
- Several of the following things:

a feather                      a coin                      a sheet of paper  
a balloon                      a block of wood                      a lead weight, like a fishing weight  
a dried pea or bean

**STEPS:**

1. One person drops each object from a height. Drop all objects from the same height.
2. The other person uses the stop watch to measure how long it takes the object to fall.
3. Try different sizes of the same thing. For example, cut the paper into smaller pieces to see if size changes the time to fall.

**Remember:** The *longer* it takes something to fall the *greater* is the air resistance.

**QUESTIONS:**

1. How does mass affect air resistance?  
\_\_\_\_\_
2. How does the amount of surface affect air resistance?  
\_\_\_\_\_
3. You may have seen helium balloons. They don't fall at all, but rise into the air.
  - a) Does this mean helium balloons have no mass? \_\_\_\_\_
  - b) Do they have negative mass? \_\_\_\_\_
  - c) Do they have negative air resistance? \_\_\_\_\_

Reading about the "buoyant force" will help you answer these questions.



## Word Search Force

Find all of the words in the Word Search. Words are written horizontally, vertically, diagonally, and some are even written backwards.

acceleration	electrical	friction	mass	pole
air	charge	grams	matter	positive
attraction	electrostatic	gravity	negative	repel
balanced	exert	magnet	net	south
contact	force	magnetic	north	weight

B	S	O	U	T	H	G	I	E	W	C	D	F	G
H	S	J	K	L	M	M	N	L	P	Q	R	S	T
V	A	B	A	L	A	N	C	E	D	W	X	Z	B
E	M	T	C	A	T	N	O	C	C	E	D	F	G
V	A	H	J	K	T	L	M	T	C	N	P	R	Q
I	G	A	C	C	E	L	E	R	A	T	I	O	N
T	N	R	S	E	P	T	O	O	E	A	I	O	O
A	E	P	S	V	L	F	W	S	X	P	R	Z	I
G	T	O	B	M	C	E	D	T	C	T	E	F	T
E	G	S	H	J	A	K	C	A	H	L	X	L	C
N	O	I	T	C	A	R	T	T	A	N	E	M	I
P	Y	T	I	V	A	R	G	I	R	Q	R	R	R
S	T	I	V	W	X	N	Z	C	G	I	T	B	F
C	D	V	F	G	H	J	E	K	E	L	C	M	N
P	Q	E	L	O	P	C	I	T	E	N	G	A	M
R	B	S	C	T	D	V	F	W	G	X	H	Z	L



## Comprehension Quiz

### Part C

Answer the questions in complete sentences.

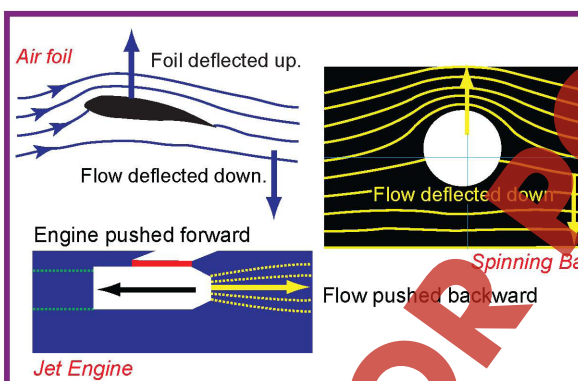
1. Name **two** forces acting on a falling object. Tell the **direction** in which each force acts. 3  
\_\_\_\_\_  
\_\_\_\_\_
2. When an arrow is used to show a force, what **two** things does the arrow show about the force? 3  
\_\_\_\_\_  
\_\_\_\_\_
3. Tell what a **contact** force is. Give two examples of contact forces. 3  
\_\_\_\_\_  
\_\_\_\_\_
4. Give an example of something that is acted on by **balanced** forces. Name the forces that are in balance. 3  
\_\_\_\_\_  
\_\_\_\_\_
5. Name the **two poles** of a magnet. When do two poles attract each other? When do two poles repel each other? 3  
\_\_\_\_\_  
\_\_\_\_\_

SUBTOTAL: /15

## Isaac Newton

### First law of motion:

An object at rest remains at rest, and an object in motion continues to move in a straight line with a constant speed unless an unbalanced force acts upon it.



### Second law of motion:

The acceleration of an object equals the net force on that object divided by its mass.  
 $a = F/m$  or  $F = ma$



### Third law of motion:

For every action force there is an equal reaction force in the opposite direction.



