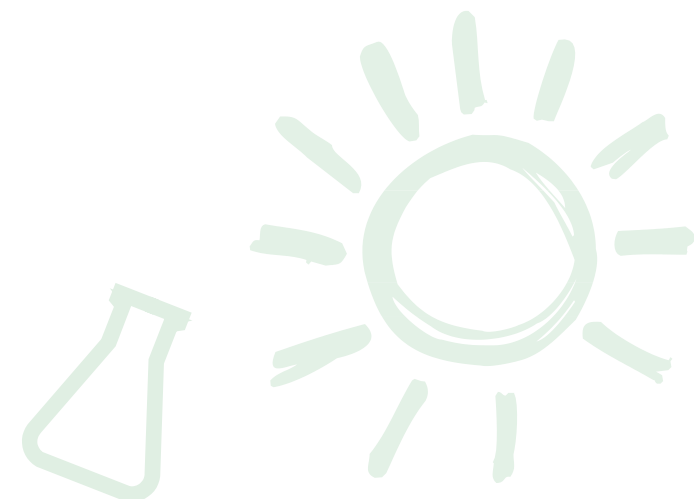




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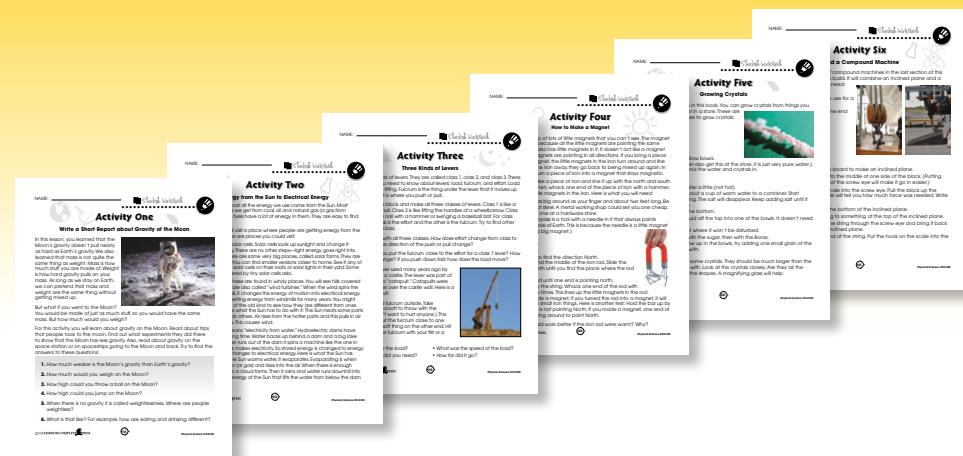
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# Electricity and Magnetism

1. Circle **T** if the sentence is True or **F** if it is False.

- T F a) Magnetic force pulls, but it can't push.
- T F b) A lightning bolt is a stream of electrons.
- T F c) Magnets don't have to touch to affect each other.
- T F d) An iron nail will stick to a magnet.
- T F e) Electrical wires can shock you when you touch them.
- T F f) Two things with minus charges push away from each other.

2. Use the words below to finish each sentence.

north pole      south pole      negative      positive  
 push      electrical spark      pull

- a) A flash of lightning is like a(n) \_\_\_\_\_, only bigger.
- b) Magnetic force can \_\_\_\_\_ or \_\_\_\_\_.
- c) The ends of a magnet are called the \_\_\_\_\_ and the \_\_\_\_\_.
- d) A(n) \_\_\_\_\_ charge connects to a negative charge.
- e) A(n) \_\_\_\_\_ charge is pushed away from a negative charge.



# Electricity and Magnetism

**A** lot of people didn't like Isaac Newton's ideas about gravity. He said gravity could pull on something across empty space without touching it. That was just too weird for some people. It sounded like magic.



But it's true. The Moon and the Earth are thousands of miles (kilometers) apart. If Earth's gravity didn't pull on the Moon, the Moon would just float away. There are two other forces that act without touching. They are **electric force** and **magnetic force**. The force of gravity only pulls. Electric and magnetic forces can push and pull.



Do you have **magnets** stuck to your fridge? This is because the outside of a fridge is made of iron. Iron is a type of metal. All things made of iron are pulled toward a magnet. Two magnets can push or pull each other. One end of a magnet is called the **north pole**. The other is called the **south pole**. The north pole of one magnet is pulled to the south pole of another. Two magnet poles that are the same

push each other away. So, the north pole of one magnet pushes away the north pole of another.



# Electricity and Magnetism

1. Put a check mark (✓) next to the answer that is the most right.

a) Which of these can pull but not push?

- A The force of magnets.
- B The force of positive charges.
- C The force of gravity.
- D The force of electrons.

b) What is a bolt of lightning?

- A The force of gravity.
- B The force of magnets.
- C Electrons moving through a wire.
- D A stream of electrons.

2. With a straight line, connect each word on the left with its meaning on the right.

- |   |                       |                                   |   |
|---|-----------------------|-----------------------------------|---|
| 1 | electrical force      | force between poles of magnets    | A |
| 2 | force of gravity      | electrons flowing in a wire       | B |
| 3 | magnetic force        | the pull of Earth on other things | C |
| 4 | current electricity   | the ends of a magnet              | D |
| 5 | north and south poles | force between charges             | E |



# Electricity and Magnetism

3. Answer the questions in full sentences.

- a) Explain what causes a bolt of lightning.  
 \_\_\_\_\_  
 \_\_\_\_\_
- b) Name the poles of a magnet. Use the names of the poles to explain when magnets push and when they pull.  
 \_\_\_\_\_  
 \_\_\_\_\_

### Extension & Application

4. Look for static electricity. Try rubbing a blown up balloon on something. Then, see if it will stick to the wall. Rub it on different things. Rub it on wool. Rub it on your hair. Rub it on a cat. Try other things.

- a) Which rubbing made the balloon stick? Which rubbing worked best?  
 \_\_\_\_\_  
 \_\_\_\_\_
- b) Was there electrical force when the balloon stuck to the wall? Explain.  
 \_\_\_\_\_  
 \_\_\_\_\_





# Getting a Little Help From Simple Machines

This is what you will need:

- A long flat board and a short square block. They should look like this:
- About 10 feet (3 meters) of string.
- A one-pint (500 ml) plastic water bottle. The bottle will have one pint or 16 oz. (500 ml) written on the label.
- A spring scale. The scale should be marked in ounces (ml). It should go up to at least 16 ounces (500 ml).

This is what you do:

1. Tie a small loop of string around the neck of the bottle.
2. Put the hook on the scale through the loop and lift the bottle. Read the weight of the bottle on the scale. Change the water level in the bottle until the weight is 16 ounces (500 ml).
3. Making an inclined plane: Put the small block under one end of the board.
4. Lay the bottle on the low end. Hook the scale hook through the loop of string on the bottle.
5. Pull the bottle up the inclined plane.
6. Read the scale to see how much force is needed to move the bottle.
7. Making a lever: Put the board, block, bottle, and scale on a table top like this:

8. Pull down on the scale. How much force is needed to lift the bottle? Is it less than 16 ounces (500 ml)?



# Word Search

Find all of the words in the Word Search. Words are written across, up, down, on an angle, and some are even written backwards.

- |           |              |                 |                |
|-----------|--------------|-----------------|----------------|
| amplitude | heat energy  | negative charge | stored         |
| balanced  | lever        | particles       | vapor          |
| charge    | light energy | positive        | wedge          |
| energy    | magnet       | properties      | wheel and axle |
| food      | mass         | screw           |                |
| force     | matter       | sound           |                |
| gravity   | motion       | sound waves     |                |

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



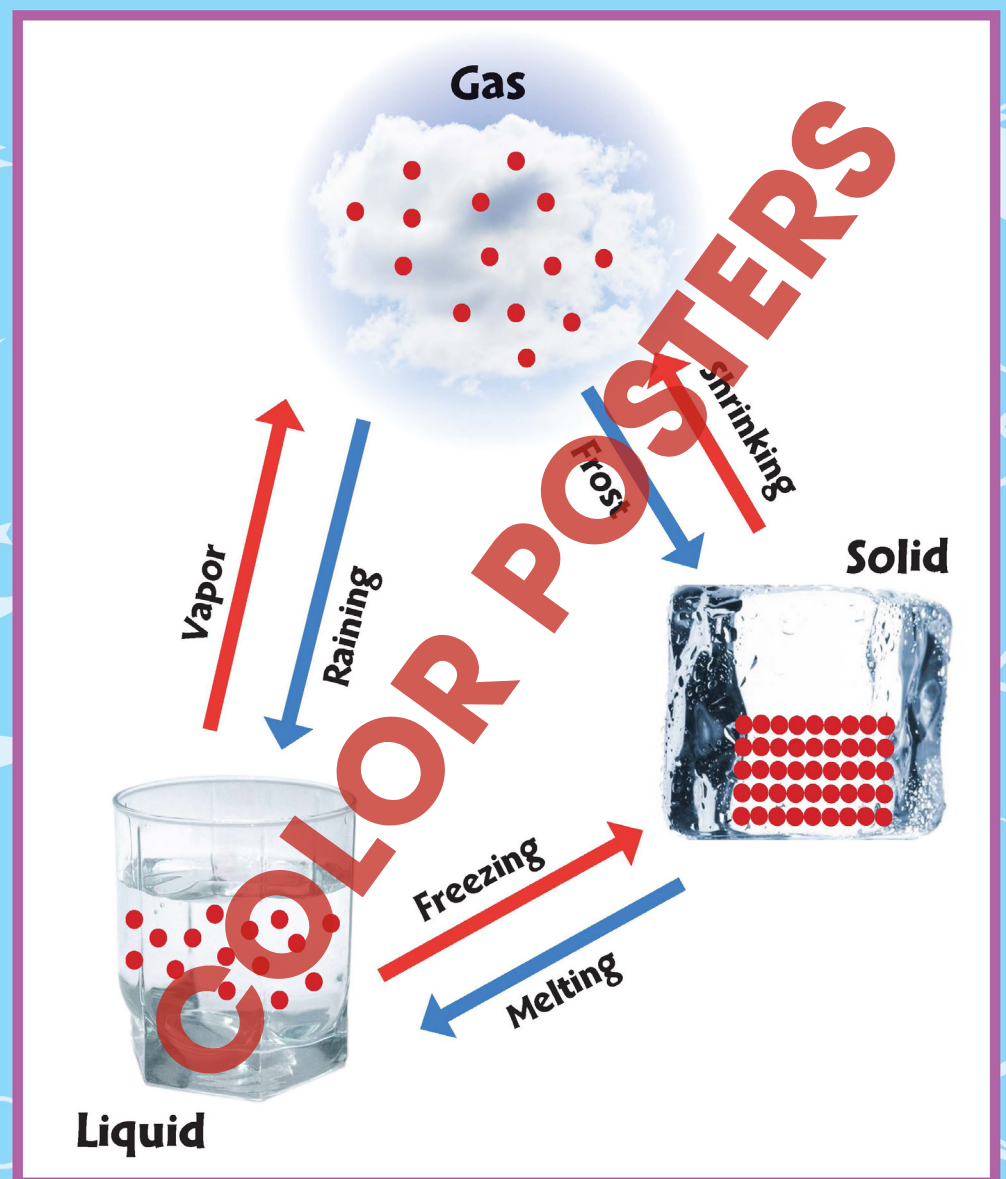
# Comprehension Quiz

## Part C

Answer each question in full sentences.

1. Wavelength and amplitude have to do with waves. Explain what wavelength means. Explain what amplitude means. 2
2. Explain two things that light can do when it meets a solid object. 2
3. Explain what happens when a bolt of lightning jumps from a cloud to the ground. 2
4. Explain how a solid, a liquid, and a gas are different. Talk about particles to explain the differences. 3
5. Explain how you would use two pulleys and a rope to lift a heavy object. 4

# Solid, Liquid, Gas



NAME: \_\_\_\_\_

After You Read 



# Electricity and Magnetism

1. Put a check mark (✓) next to the answer that is the most right.

a) Which of these can pull but not push?

- A The force of magnets.
- B The force of positive charges.
- C The force of gravity.
- D The force of electrons.

b) What is a bolt of lightning?

- A The force of gravity.
- B The force of magnets.
- C Electrons moving through a wire.
- D A stream of electrons.

2. With a straight line, connect each word on the left with its meaning on the right.

**EASY MARKING**

1	electrical force	force between poles of magnets	A
2	force of gravity	electrons flowing in a wire	B
3	magnetic force	the pull of Earth on other things	C
4	current electricity	the ends of a magnet	D
5	north and south poles	force between charges	E

1.

a)  C

b)  D

2.

1 E

2 C

3 A

4 B

5 D

**10**

3.

a) A cloud gets a large negative charge. A positive charge builds up in the ground under it. When electrons jump from the cloud to the ground, we see a lightning bolt.

b) North and south. A north pole and a south pole pull at each other. Two north poles or two south poles push each other away.

4.

a) Answers will vary, but may include: wool, hair

b) Yes there was force. Force is needed to keep the balloon stuck to the wall.

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