Contents

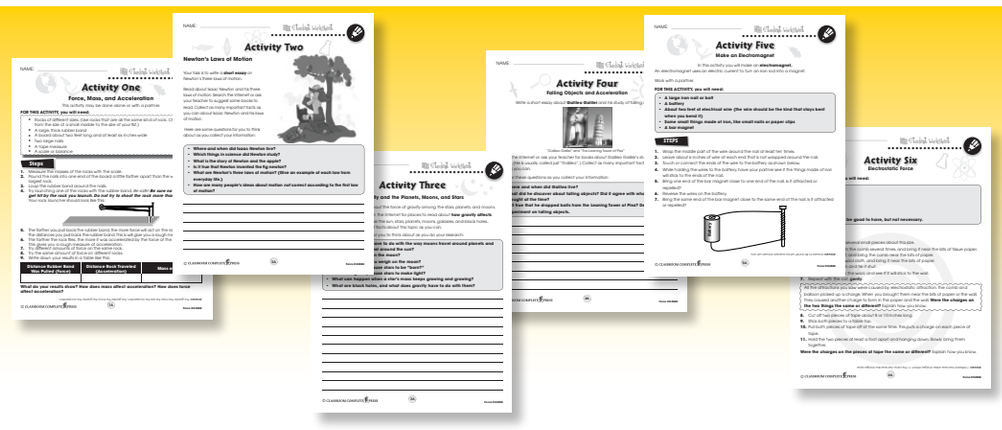
TEACHER GUIDE

STUDENT HANDOUTS

FREE! 6 Bonus Activities!

3 EASY STEPS to receive your 6 Bonus Activities!

- Go to our website: **www.classroomcompletepress.com\bonus**
- Click on item CC4508 – Force
- Enter pass code CC4508D



NAME: _____

Before You Read

More Than One Force

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

a) When an arrow is used to show a force, what two things do the arrow tell about the force?

- ○ **A** direction and speed
- ○ **B** speed and kind of force
- ○ **C** kind of force and amount of force
- ○ **D** amount of force and direction

b) What are the main forces acting on a falling rock?

- ○ **A** speed and gravity
- ○ **B** gravity and air resistance
- ○ **C** air resistance and air pressure
- ○ **D** air pressure and speed

c) If you used an arrow to show forces acting on a moving car, which force would be shown by an arrow pointing down?

- ○ **A** gravity
- ○ **B** friction
- ○ **C** air resistance
- ○ **D** magnetic force

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

a) A force can push but not pull.
True **False**

b) Friction is a contact force.
True **False**

c) Gravity can either push or pull.
True **False**

d) Air resistance is a force that acts against motion.
True **False**

e) More than one force can act on something at the same time.
True **False**

PRE-ASSESSMENT

NAME: _____

Reading Passage

More Than One Force

STOP

Name two forces acting on a falling stone. What is the direction of the net force on the stone as it begins to fall?

_____

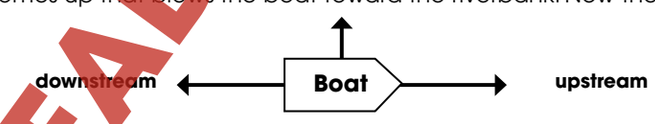
_____

Here is another net force problem. A woman is rowing a boat upstream in a river. Her rowing applies a force to the boat in the upstream direction. The river current applies a smaller force in the downstream direction. The force arrows will look like this:

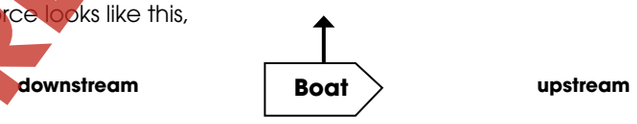
The net force arrow will look like this:

So the boat moves slowly upstream.

Then the woman runs into some bad luck. She comes to a part of the river where the current is stronger. Now the force of the current is the same as the force of her rowing. To make things worse, a wind comes up that blows the boat toward the riverbank. Now the force arrows look like this:



So now the net force looks like this,



and the boat moves toward the riverbank.

READING PASSAGE

After You Read

NAME: _____

More Than One Force

1. What is the direction of the net force in each question below? Circle your answer.

a) What is the direction of the net force on water as it goes over a waterfall?

up **down** **no net force**

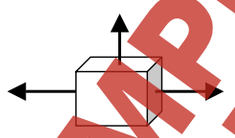
b) What is the direction of the net force of a large building?

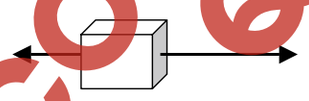
up **down** **no net force**

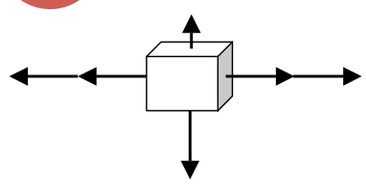
c) What is the direction of the net force on a rocket as it takes off?

up **down** **no net force**

2. Three boxes are shown below. The forces acting on the boxes are shown by arrows. Circle the word that tells which direction each box will move.

a)  **left** **right** **up** **down**

b)  **left** **right** **up** **down**

c)  **left** **right** **up** **down**

COMPREHENSION QUESTIONS

After You Read

NAME: _____

More Than One Force

Answer the questions in complete sentences.

3. What do the words **net force** mean?

_____

_____

4. A large rock on top of a windy hill has four different forces acting on it, but it is not moving. What is the net force on the rock?

_____

_____

Extension & Application

5. A fish is swimming up a river against the current.

The fish is acted on by four forces. One of these is the **buoyant force**, which is the force that pushes up on things that are in water. Show the **four** forces on the fish by drawing an **arrow** for each force. Write the **names** of the forces next to the arrows.

SHORT ANSWER QUESTIONS

Hands-On Activity #3

Activity Three

Balanced and Unbalanced Forces

In this activity you will see how motion changes when forces are unbalanced. This is when the net force is *not* zero. You will also see that motion does not change when forces are balanced. This is when the net force *is* zero. The two forces you will combine to make the net force are the force of **gravity** and the **buoyant force.**

The BUOYANT FORCE is the force that pushes up on objects that are under water. When the buoyant force is *greater* than the force of gravity, the object will float. This is why wood floats.

FOR THIS ACTIVITY, you will need:

- A pot of water
- A spring scale
- Several of these objects:

a piece of wood	a hollow ball, like a table tennis ball or a tennis ball
an egg	a stone
a metal object, like a pair of pliers, a lead fishing weight, or a large bolt	

- A spring scale looks like this:

STEPS:

1. Put each of the objects in the pot of water, hold the object on the bottom, and let go.
2. Does it float or sink?
   - If it **floats,** how fast does it move to the top?
   - If it **sinks,** how fast does it sink?
   - What does the speed of rising or sinking tell you about the **direction** and **amount** of the net force?
   - On which object is the net force closest to being balanced?
3. Tie a string to each of the objects that sank.
4. Weigh them on the spring scale.
5. Now weigh them again while they are hanging in the water.
   - Is the weight different in water?
   - How much **buoyant force** is acting on the object?

HANDS-ON ACTIVITIES

After You Read

NAME: _____

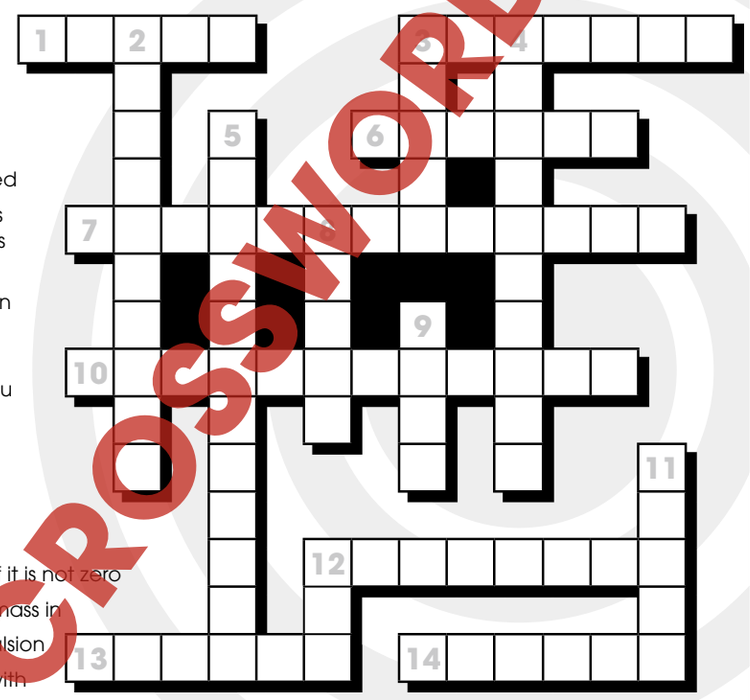
Crossword Puzzle!

Across

1. If it's not the north pole it must be the ____ pole
3. It's what makes you fall
6. What scientists call "stuff"
7. The kind of force between electrical charges
10. The kind of motion with increasing speed
12. This kind of charge is marked with a minus sign
13. It can pick up an iron nail
14. The force of Earth's gravity pulling on you is your ____

Down

2. What a net force is if it is not zero
3. What you measure mass in
4. The opposite of repulsion
5. The kind of motion with decreasing speed
8. Push away
9. Something all matter has
11. Gravity can ____ a force at a distance
12. Combining all the forces acting on something gives the ____ force



CROSSWORD

NAME: _____

After You Read

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)

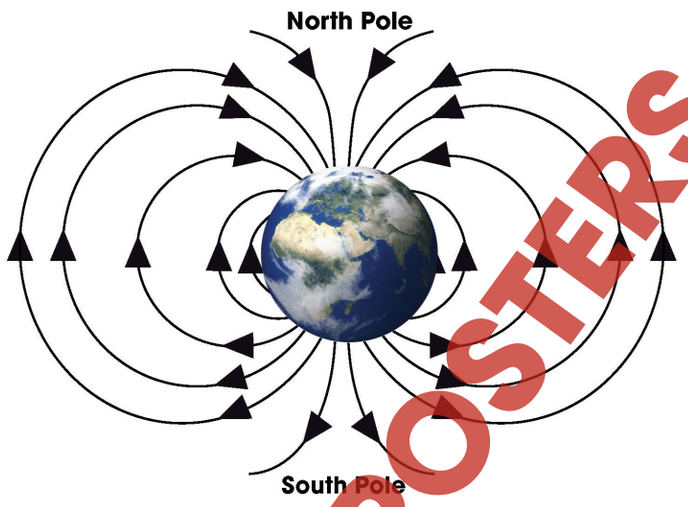
4. Give an example of something that is acted on by **balanced** forces. Name the forces that are in balance. (3)

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

ASSESSMENT

Earth's Magnetic Field



These are the magnetic lines of force of Earth's magnetic field.

Earth's magnetic field causes the aurora borealis, also called the northern lights.

COLOR POSTERS

NAME: _____

After You Read

More Than One Force

Answer the questions in complete sentences.

3. What do the words **net force** mean?

_____

_____

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_____

_____

Extension & Application

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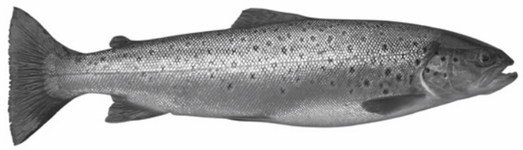

upstream →

EASY MARKING ANSWER KEY

3.
The force you get when you combine (or add together) all forces acting on something.

4.
Zero

5.
Push of current or water resistance

Gravity

Buoyant force

Fish's push

11

Answers will vary

12

Answers will vary.

1.
Mass does not affect air resistance.

2.
Surface increases air resistance.

3.
a) No

b) No

c) No
(Helium balloons are acted on by the buoyant force of air.)

13

2.
The greater the speed of rising or sinking, the greater the net force. Closest to being balanced on the egg

5.
Yes, weight is different in the water. Buoyant force is weight in air minus weight in water.

14

5.
No

7.
Magnet has more force

15

EZ

Across:
1. south
3. gravity
6. matter
7. electrostatic
10. acceleration
12. negative
13. magnet
14. weight

Down:
2. unbalanced
3. grams
4. attraction
5. deceleration
8. repel
9. mass
11. exert
12. net

16