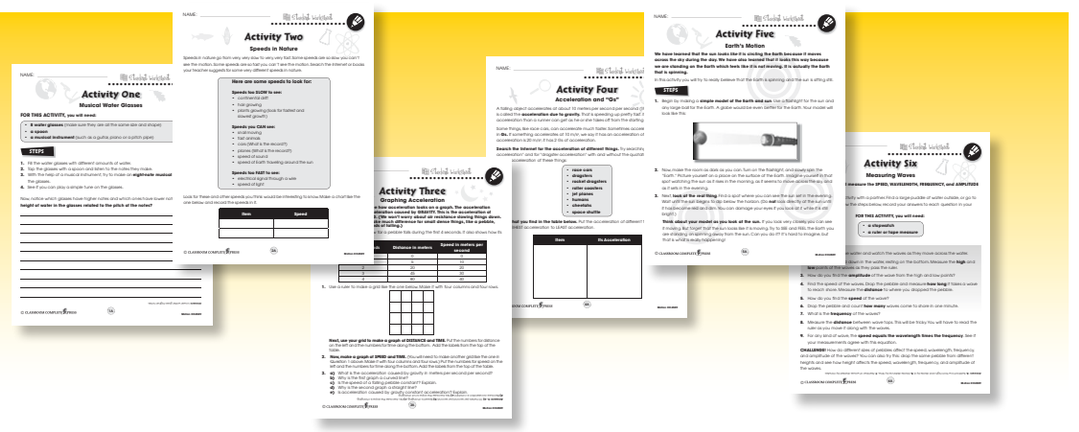
Contents

TEACHER GUIDE

STUDENT HANDOUTS

EASY MARKING™ ANSWER KEY

MINI POSTERS



Before You Read NAME: _____

How to Graph Motion

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

a) To find something's speed we must know how far it went and how long it took to get there.
True **False**

b) A graph shows how one thing changes when another thing changes.
True **False**

c) Speed can be measured in feet per mile.
True **False**

d) When speed changes, we say it is constant.
True **False**

e) If something moves 2 feet in 2 seconds, its speed is 1 foot per second.
True **False**

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

a) Which of these is a measure of speed?

- ○ **A** mass multiplied by force
- ○ **B** distance multiplied by mass
- ○ **C** distance divided by time
- ○ **D** force divided by distance

b) All of these are changes in motion, *except*:

- ○ **A** acceleration
- ○ **B** rotation
- ○ **C** velocity
- ○ **D** vibration

c) What is constant speed?

- ○ **A** speed that doesn't change
- ○ **B** speed of something moving very slowly
- ○ **C** speed of something that is acted on by a force
- ○ **D** speed that changes by the same amount each second

Reading Passage NAME: _____

How to Graph Motion

We can find how long it took Josh to travel any distance. Choose a distance, like100 meters. Move straight across from the 100 meter mark to the sloping line. When you get to the line move straight down to the bottom line and read the time. You should come to 100 seconds. So Josh's speed was 1 meter per second at that point too (100 ÷ 100 = 1).

We say that the line for this graph has a **slope** of 1 meter per second. To find the slope at a point on any line graph, divide the number on the left for that point by the number along the bottom for that point. The line is a straight line, so we say it has a **constant** slope. The slope of a distance and time graph is speed. If the slope is constant, the graph shows that something is traveling at a constant speed. The steeper the slope, the faster is the speed.

STOP

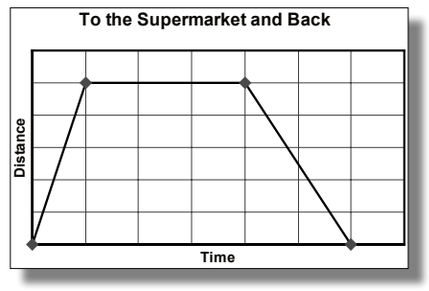
Look at the second graph again. How long did it take Josh to walk 50 meters on his way from the school to the park?

_____

_____

Here is a third graph. This graph shows the speed of a man in a car driving from home to a supermarket and then coming back home.

The first section shows his speed going to the store. The flat part shows time was passing, but the car was not moving. The last part is sloped the other way because he was traveling in the opposite direction. The slope is less because he was slowed by heavy traffic.



NAME: _____ After You Read

How to Graph Motion

1. Look at the graph below. It is a graph of Nicole's neighborhood with a park near the center. If Nicole starts at the park and walks 200 meters east and 300 meters south, where will she be? Put a checkmark beside the correct answer.

Nicole will be at:

- ○ Point A
- ○ Point B
- ○ Point C
- ○ Point D

2. To make a graph of **speed**, which measurement would you put on the left, and which measurement would you put along the bottom? Put a check mark next to the answer that is correct.

_____ A time on the left and acceleration on the bottom

_____ B distance on the left and force on the bottom

_____ C distance on the left and time on the bottom

_____ D velocity on the left and acceleration on the bottom

After You Read NAME: _____

How to Graph Motion

Answer the questions in complete sentences.

3. The slope of the line below is equal to speed.

a) Which measurement goes along the left side?

_____

b) Which measurement goes along the bottom?

_____

4. On a graph of speed, what does a **steep slope** show about the speed?

_____

5. On a graph of speed, what does a **gentle slope** show?

_____

Extension & Application

6. The table below shows the distance at different times for a motorcycle traveling on a highway.

Time, in hours	Distance, in miles
0	0
1	50
2	100
3	150
4	200

a) On the grid on the next page, **draw a graph** of the motorcycle's speed. Write the numbers and labels along the left side and the bottom. (Use a ruler to complete your graph.)

b) What is the motorcycle's speed?

_____

Hands-On Activity # 2

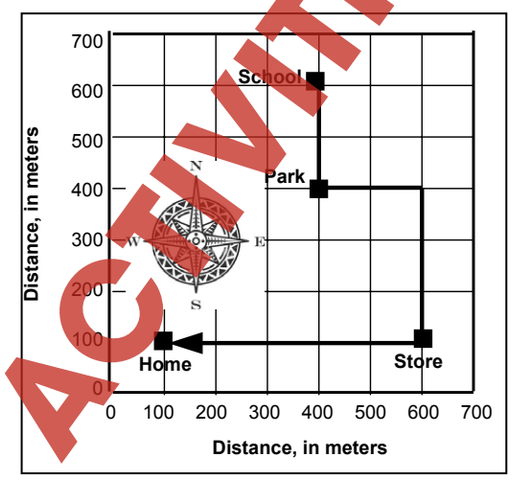
Treasure Map Game

This activity is for two people or two teams of people.

FOR THIS ACTIVITY, you will need:

- paper
- a pencil
- a compass
- a long tape measure

You will try to find your way as if you were walking on a large graph, like the one to the right. The goal is to find a prize by following directions or reading a map.



STEPS:

1. One person or team makes a map like the one above, or writes directions for finding a prize.
2. First decide on a path from a starting point to a place where a prize will be hidden.
3. Measure distances with the tape measure along each section of the path. The directions should all be either NORTH, EAST, SOUTH, or WEST. Use the compass to find the directions. Have about four sections in the path.
4. The directions might be something like this: **"Go 30 feet north, turn left, and go 90 feet west. Turn left again, and go 60 feet south. Turn right, and go 60 feet west. Do you see the prize?"** The directions can be written or they can be shown on a map.
5. The other person or team tries to find the prize by following the map or the directions. They use a compass but *not* the measuring tape. They will find distances by counting their steps. Before they start they will have to measure the length of one step. Then they will figure out how many steps to take for each distance on the map.
6. Take turns hiding a prize and looking for it.

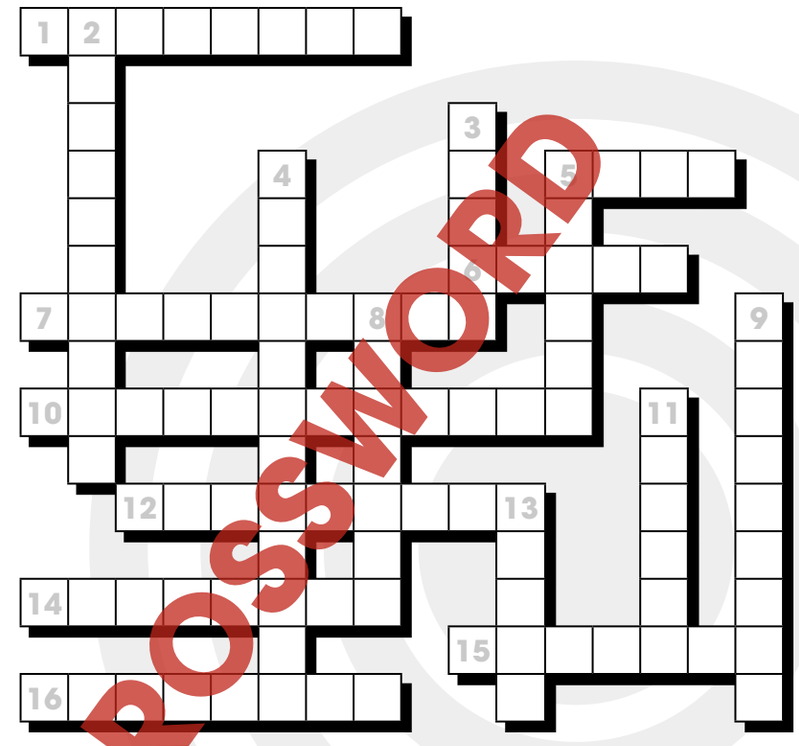
Here is another way to do the game: One person hides the prize and makes the map. All the other people try to follow the map to the prize. The winner is the person who ends up closest to the prize. The winner gets to hide a prize next.

After You Read

NAME: _____

Crossword Puzzle!

Word List
acceleration
resistance
distance
medium
friction
frequency
seismic
gravity
velocity
deceleration
pitch
graph
mass
motion
rotations
speed
wavelength



Across

1. A force that resists motion.
5. A measure of how much stuff is in something.
6. The frequency of a musical note.
7. The distance between the high points of two waves.
10. A speeding up motion
12. Spins
14. Speed in a given direction.
15. The kind of waves caused by earthquakes.
16. Divide it by time to get speed.

Down

2. Falling things are slowed down by air _____.
3. Steady speed is a straight, sloping line on a _____ of distance and time.
4. A slowing down motion.
5. A change of position.
8. The force that makes things fall.
9. The number of vibrations per second.
11. What waves travel through.
13. Distance divided by time.

After You Read

NAME: _____

Comprehension Quiz

24

Part A

Circle the word True if the statement is true. Circle the word False if it is false. 7

1) Speed is time divided by distance.
   True **False**
2) Velocity is speed in a given direction.
   True **False**
3) Things in motion decelerate because of the force of friction.
   True **False**
4) All sounds come from something that is vibrating.
   True **False**
5) The slope of a distance and time graph is speed.
   True **False**
6) The more mass a thing has, the more a force will change its motion.
   True **False**
7) Sound can travel across empty space.
   True **False**

Part B

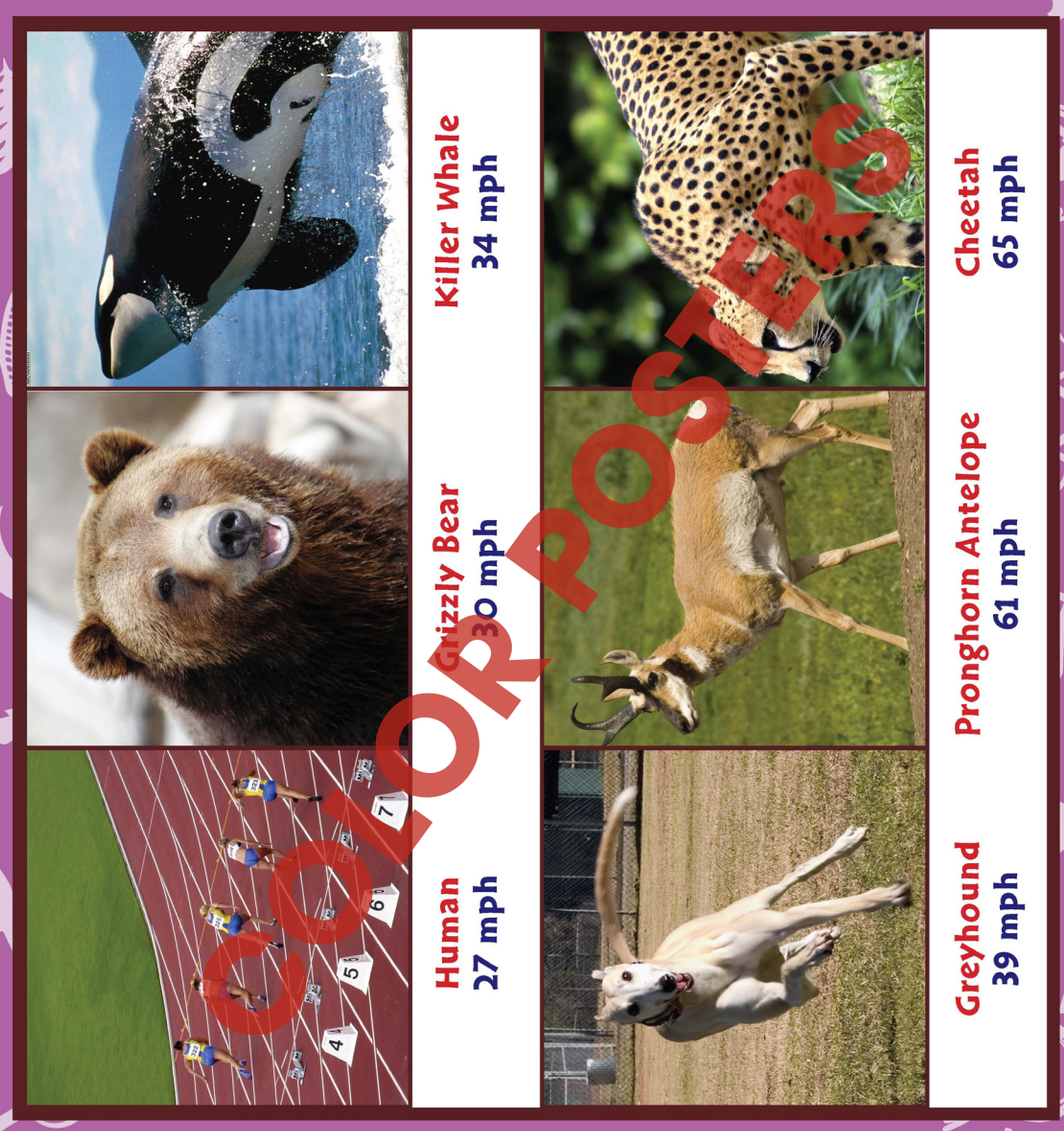
3

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

1. **What is a measure of the height of a wave on water?**
   - ○ **A** amplitude
   - ○ **B** frequency
   - ○ **C** medium
   - ○ **D** wavelength
2. **Which kind of motion does a rock have just after it dropped from a high bridge?**
   - ○ **A** constant speed
   - ○ **B** constant velocity
   - ○ **C** constant acceleration
   - ○ **D** constant deceleration
3. **Which two things could you graph to show speed?**
   - ○ **A** force and mass
   - ○ **B** velocity and time
   - ○ **C** distance and time
   - ○ **D** mass and distance

SUBTOTAL: /10

Animal Speeds



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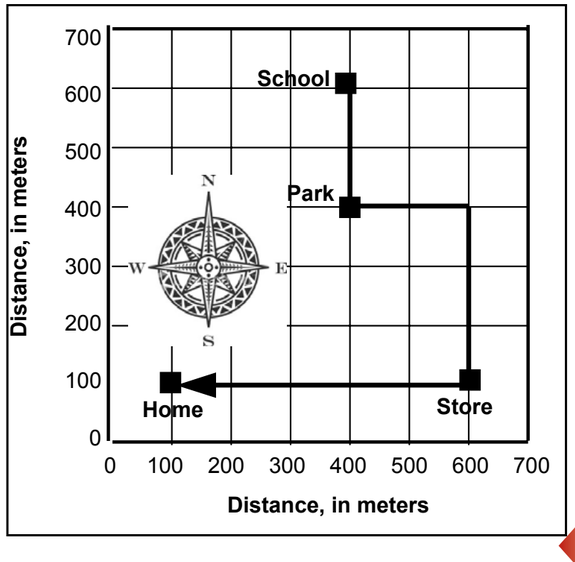

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Answers will vary

Part A

3.

The change of direction was the change of the wheel's motion. The force was the force of hands.

Part B

2.

Spinning sped up

3.

Spinning slowed down

4.

Change in motion was acceleration when arms came in and deceleration when arms went out. Force was force of arms acting against centrifugal force.

Answers will vary

Shorter string gives higher pitch. Half the length raises the pitch one octave.

EZ

Across:

1. friction
5. mass

6. pitch
7. wavelength

10. acceleration
12. rotations
14. velocity
15. seismic

16. distance

Down:

2. resistance

3. graph
4. deceleration
5. motion
8. gravity
9. frequency
11. medium
13. speed