

California Content Standards — Grade 8

Motion

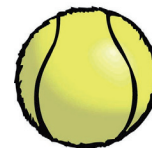
1.0 The velocity of an object is the rate of change of its position. As a basis for understanding this concept:

1.d Students know the velocity of an object must be described by specifying both the direction and the speed of the object.

Galileo's Gravitational Experiment

Materials:

- Tennis Ball
- 1 sheet of paper



Method:

1. Hold the tennis ball and the paper the same distance from the floor.
2. Predict which item will hit the floor first.
3. Let go of each item at the same time.
4. Observe what happens.
5. Next screw the ball of paper into a ball.
6. Predict which item will hit the floor first.
7. Drop both items from the same height and at the same time.
8. Observe what happens.

Why does the tennis ball reach the ground before the sheet of paper?

Because the sheet of paper has a wider surface area and therefore there is more air resistance

Why do the tennis ball and ball of paper reach the ground at the same time?

Because there is the same amount of air resistance applied to both items

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Questions

1. What are measurable quantities that require both magnitude and direction called?

Vector quantities

2. What are the four main vector quantities?

Displacement, Velocity, Acceleration, Force

3. What does an arrow pointing in the direction of motion usually represent?

The velocity of an object

4. What is the length of the arrow proportional to?

How fast the object is moving

5. If the arrow is very short, is it more likely that the object is moving quickly or slowly?

Slowly

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Literacy Link

Describe three ways to change the velocity of a moving car.

Example:

Because velocity is a vector it has both magnitude and direction. Therefore it is possible to change the magnitude by speeding up or slowing down the car as well as changing the direction.



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Amanda walks 8 meters East, 2 meters South, 8 meters West, and finally 2 meters North. Her walk lasted for 30 seconds.

Determine the average speed and the average velocity.

Amanda walked a distance of 20 meters in 30 seconds; thus, her average speed was 0.66 m/s.

Her position is unchanged, so the displacement is 0 meters, her average velocity is 0 m/s.

Richard, her husband, asks if she can pick up some things from several stores that day.

They are all quite close but have different opening times.

Below is her route:

- Store 1: 220 yards East
- Store 2: 60 yards West of store 1
- Store 3: 100 yards East of store 2

Amanda walks for 3 minutes 10 seconds.

Fill in the gaps below:

Amanda walked a distance of 380 yards in 190 seconds; thus, her average speed was 2.0 y/s.

Her position is changed, the displacement is 260 yards EAST, her average velocity is:

$$(260 \text{ y, EAST}) / (190 \text{ secs}) = 1.37 \text{ y/sec, EAST}$$