SCIENCE FUSION Physical Science

HOLT McDOUGAL

PowerNotes

Unit 1 **Lesson 1** Motion and Speed

Location, location, location

How can you describe the location of an object?

- **Position** describes the location of an object.
- Comparisons using known objects or locations often are used to describe position.
- A **reference point** is a location to which you compare other locations.

How can you describe the location of an object?

- Describe the positions of the different parts of the zoo.

MOVE It!

What is motion?

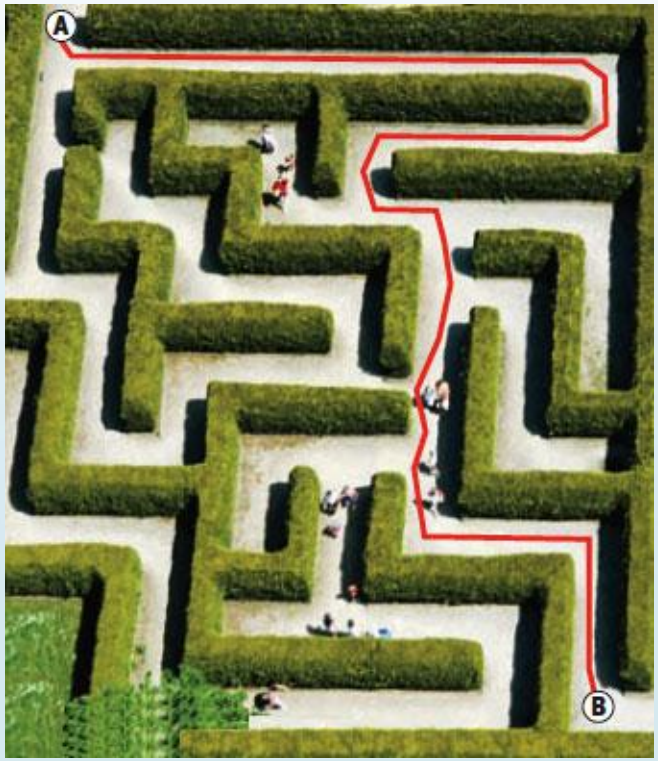
- **Motion** is a change in position over time.
- Even when motion is not observed directly, starting points and end points can indicate motion has occurred.

How is distance measured?

- Distance can be measured as a straight line between two positions.
- Distance can also be measured as the total length of a certain path between two positions.
- The standard unit of length for distance is the meter (m).

How is distance measured?

- Which distance is greater: a straight line from A to B or the total length of the path below?



What is speed?

- **Speed** is a measure of how far something moves in a given amount of time.
- Speed measures how quickly or slowly an object changes its position.
- Fast objects move farther than slower objects in the same amount of time.

What is average speed?

- *Average speed* is a way to calculate the speed of an object that may not always be moving at a constant speed.
- Average speed describes the speed over a stretch of time rather than at any exact moment in time.

Speed It Up!

How is average speed calculated?

- Speed can be calculated by dividing the distance an object travels by the time it takes to cover that distance.
- speed = distance/time
- $s = d/t$

How is average speed calculated?

- If two objects travel the same distance, the object that takes less time has the greater speed.
- An object with a greater speed travels farther in the same time than an object with a lower speed travels.
- The standard unit for speed is meters per second (m/s).

Fast Graphs

How is constant speed graphed?

- Distance-time graphs are used to plot the distance an object travels over time.
- The distance of an object away from a reference point is plotted on the *y*-axis. Time is plotted on the *x*-axis.
- Objects moving at a constant speed make a straight line on the graph.

How is constant speed graphed?

- The slope, or steepness, of the line is equal to the average speed of the object.
- Average speed can be calculated by dividing the change in distance by the change in time for that time interval.
- slope = change in *y*/change in *x*

How are changing speeds graphed?

- On a distance-line graph, a change in the slope of a line indicates a change in speed.
- If the line gets steeper, the object's speed has increased.
- If the line gets less steep, the object has slowed down.
- A flat line indicates zero speed.

Follow Directions

What is velocity?

- A **vector** is a quantity that has both size and direction.
- **Velocity** is speed in a specific direction.
- Objects can have the same speed but different velocities because of their direction of travel.

What is velocity?

- Average velocity depends on the distance from the starting point to the final point.
- Average velocity can be 0 km/h if you travel at a certain speed to one point and then travel back to the starting point.