

1. Position: "You Are Here"

Position is your location compared to a **Reference Point** (a fancy word for a landmark).

- **Real-Life Example:** If you tell your friend, "I'm at the park," they might not find you. If you say, "I am **10 feet North of the big oak tree**," you've given your exact position!
 - **The Math:** We use distance (inches, feet, meters) to describe how far we are from the reference point.
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2. Direction: "Which Way?"

Direction is the path an object takes. We usually use "Compass Terms" or "Relative Terms."

- **Compass Terms:** North, South, East, West.
 - **Relative Terms:** Up, Down, Left, Right.
 - **Real-Life Example:** A quarterback doesn't just throw the ball hard; they throw it in a specific **direction** so the receiver can catch it. If the direction is off by even an inch, it's an incomplete pass!
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3. Speed: "The Fast and the Curious"

Speed is the measure of how fast an object moves across a distance in a certain amount of time.

The Magic Formula:

To find speed, we use this simple math:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

Real-Life Computational Thinking:

Imagine two brothers, Dash and Slow-Mo, racing to the ice cream truck 100 meters away.

- **Dash** gets there in **10 seconds**.
- **Slow-Mo** gets there in **20 seconds**.

Let's do the math:

- **Dash's Speed:** $100\text{m} \div 10\text{s} = 10$ meters per second (m/s)
- **Slow-Mo's Speed:** $100\text{m} \div 20\text{s} = 5$ meters per second (m/s)

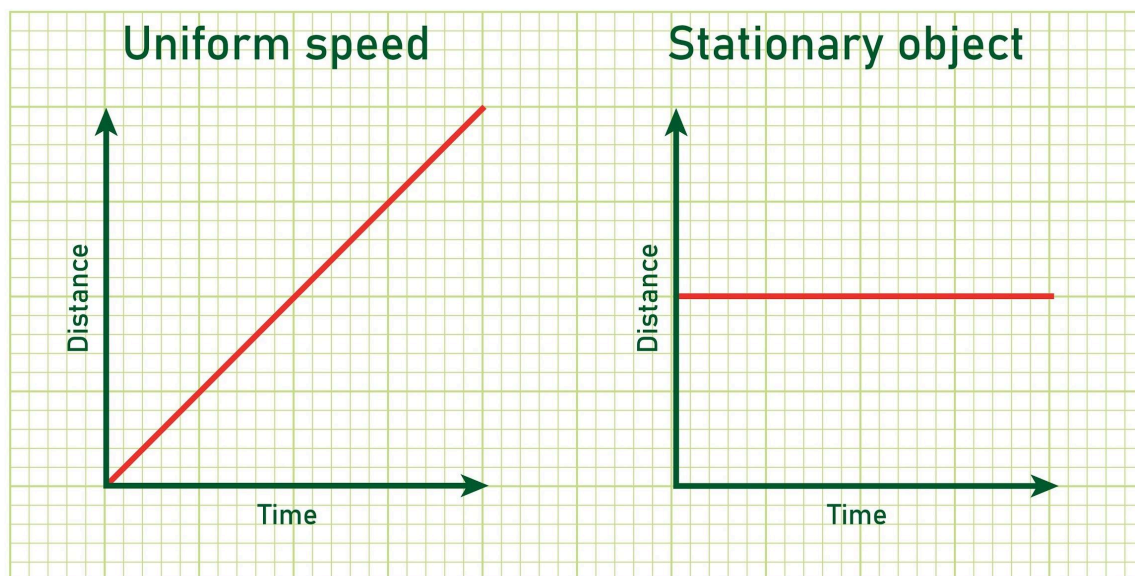
The Inference: Because Dash has a higher "meters per second" number, he is the faster mover!

4. Predicting Motion (Computational Thinking)

If we know the **speed**, we can predict the future! 🌐

- **The Scenario:** A school bus travels at a constant speed of **30 miles per hour (mph)**.
- **The Question:** How far will it travel in **3 hours**?

- **The Math:** $30 \text{ mph} \times 3 \text{ hours} = 90$ miles.



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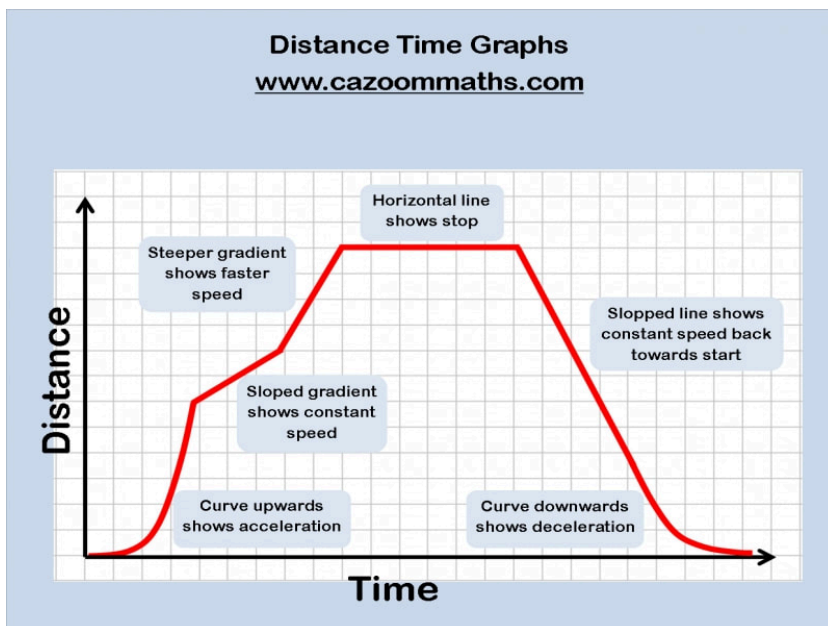
Adventure Investigation: "The Snail vs. The Ant"

You can do this in your backyard or driveway!

1. **Mark a Start and Finish line** 1 meter apart (that's your **Distance**).
2. **Use a stopwatch** to time how long it takes a bug (or a toy car) to cross.
3. **Calculate:** Divide 1 meter by the number of seconds.
4. **Compare:** Which bug has the higher speed? If you changed the **Direction** to an uphill slope, how would **Friction** and **Gravity** affect your speed math?

Practice Problems (Printable)

1. **The Soccer Kick:** A ball travels **20 meters** in **2 seconds**. What is its speed?
 - *Math:* $20 \div 2 = \underline{\quad}$ m/s.
2. **The Bike Ride:** You ride your bike **East** at a speed of **5 mph**. Where will you be in **2 hours**?
 - *Math:* $5 \times 2 = \underline{\quad}$ miles to the **East**.
3. **The Walking Cat:** A cat walks **12 feet** in **4 seconds**. What is the cat's speed?
 - *Math:* $12 \div 4 = \underline{\quad}$ feet per second.



Question 1: The distance-time graph shows class 8A's journey to the zoo.
They stopped for a picnic on the way to the zoo.

(a) What time did the bus leave school?

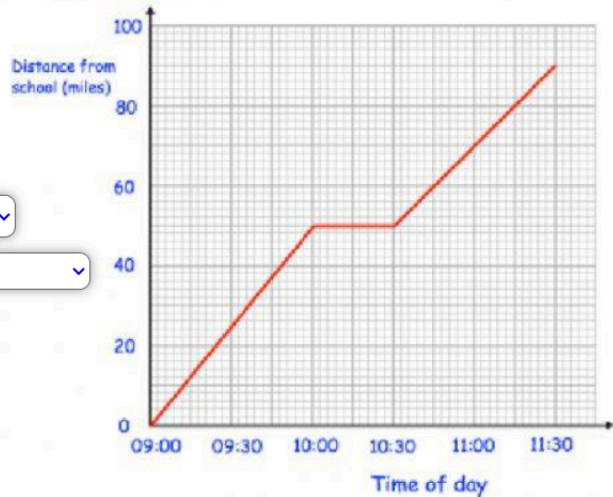
(b) What time did they stop for a picnic?

(c) How far had they travelled when they stopped for a picnic?

(d) How long did they stop for?

(e) What time did they arrive at the zoo?

(f) How far is the zoo from school?



Question 2: Emma travelled to her Grandmother's house and back.
The distance-time graph shows information about her journey.

(a) What time did Emma begin her journey?

(b) How far was Emma from home at 8am?

(c) How long did Emma stay at her Grandmother's house?

(d) What time did Emma leave her Grandmother's house?

(e) How far was Emma from home at 11:45?

(f) How far did Emma travel in total?

