CAIE Physics IGCSE

Topic 1.2 - Motion

Flashcards

What are the 3 main components of motion?

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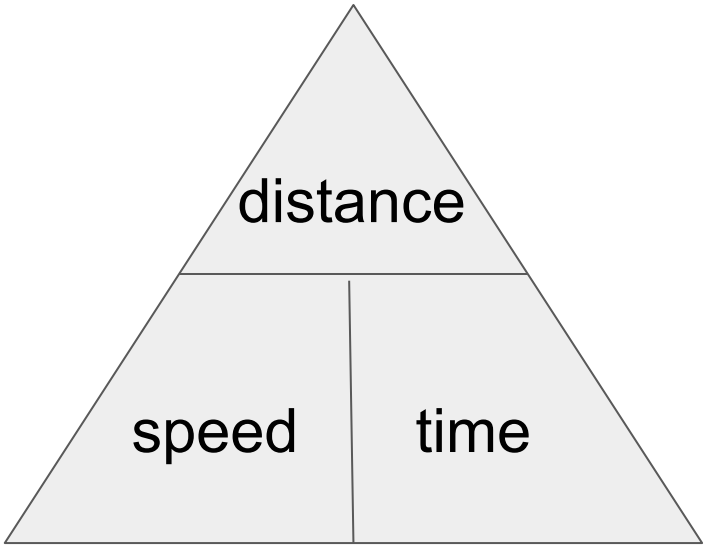
1. **Speed**
2. **Direction**
3. **Acceleration** (change in speed)

Give the equation for average speed.

Give the equation for average speed

average speed (m/s) = distance (m) ÷ time (s)



What is the difference between speed and velocity?

What is the difference between speed and velocity?

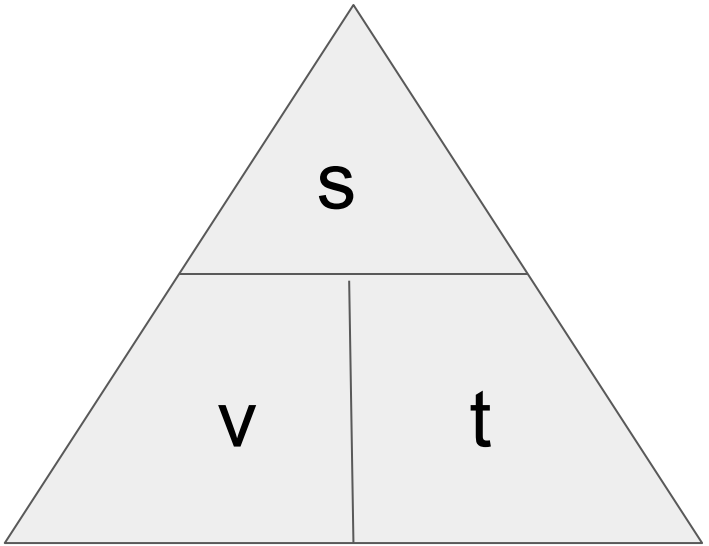
- **Speed** is **scalar**, so doesn't include direction.
- **Velocity** is a **vector**, so is the speed of movement in a certain direction.

Give the equation for velocity.

Give the equation for velocity

velocity (m/s) = displacement (m) ÷ time (s)

$v = s \div t$



What is the difference between distance and displacement?

What is the difference between distance and displacement?

- **Distance** is **scalar**, so doesn't include direction.
- **Displacement** is a **vector**; the distance travelled in a certain direction.

Give an equation for acceleration.
(supplement)

Give an equation for acceleration. (supplement)

$$\text{acceleration } (m/s^2) = \frac{\text{final velocity - initial velocity } (m/s)}{\text{time } (s)}$$

What is the gradient of a displacement-time graph?

What is the gradient of a displacement-time graph?

The **velocity**.

What does a curved line represent on a displacement-time graph?

What does a curved line represent on a displacement-time graph?

Acceleration (or deceleration when the curve's gradient is decreasing).

What is deceleration?
(supplement)

What is deceleration? (supplement)

Negative acceleration (slowing down, decreasing speed).

What does a horizontal line represent on a displacement-time graph?

What does a horizontal line represent on a displacement-time graph?

That the object is **at rest**.

How can velocity be calculated from a displacement-time graph?

How can velocity be calculated from a displacement-time graph?

By finding the **gradient** of a straight line section.

Gradient = change in Y ÷ change in X

What does the gradient of a velocity-time graph represent?

What does the gradient of a velocity-time graph represent?

Acceleration at that point.

What does the area under a velocity-time graph represent?

What does the area under a velocity-time graph represent?

The **displacement**.

What does a curved line represent on a velocity-time graph?

What does a curved line represent on a velocity-time graph?

Changing acceleration.

What does a speed-time graph look like when an object is moving with changing speed (accelerating)?

What does a speed-time graph look like when an object is moving with changing speed?

A **non-zero gradient**.

What does a positive gradient represent on a velocity-time graph?

What does a positive gradient represent on a velocity-time graph?

The object is **accelerating**.

What does a negative gradient represent on a velocity-time graph?

What does a negative gradient represent on a velocity-time graph?

The object is **decelerating**.

What state is an object in when the Y axis is at 0 on a velocity-time graph?

What state is an object in when the Y axis is at 0 on a velocity-time graph?

The object is **at rest**.

What is the value of acceleration due to gravity at the Earth's surface?

What is the value of acceleration due to gravity at the Earth's surface?

The acceleration of free fall = **9.81 m/s²**

What conditions are needed for an object to fall with the constant acceleration of ‘g’?

What conditions are needed for an object to fall with the constant acceleration of ‘g’?

They must be free falling in a **uniform gravitational field** in the **absence of air/liquid resistance.**

Explain how terminal velocity is reached. (supplement)

Explain how terminal velocity is reached (supplement)

- Initially, the only force is **weight** so acceleration is **9.8m/s^2**
- As it accelerates, speed increases, which increases air resistance.
- This decreases the resultant force (downwards), so acceleration decreases.
- Eventually, weight and air resistance are equal and opposite, so there is no resultant force, no acceleration, and terminal velocity is reached.