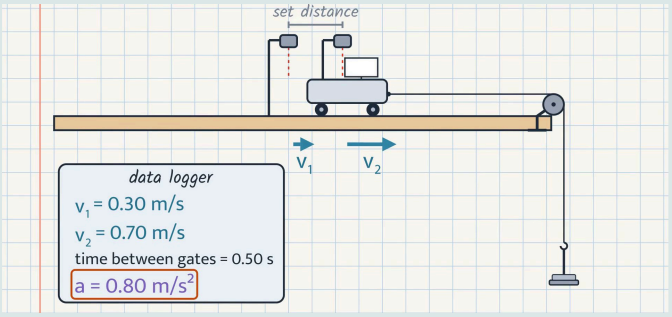
Trolley practical

Required practical: force, mass and acceleration

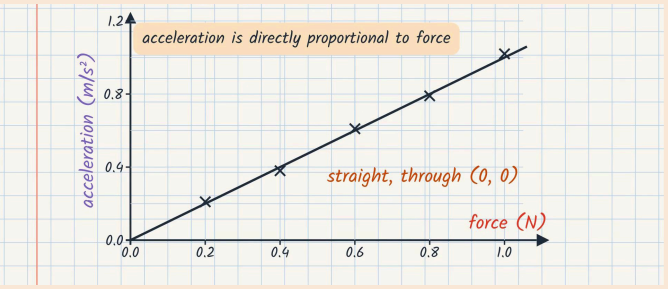
sansara academy
Summary sheet

1 Set-up



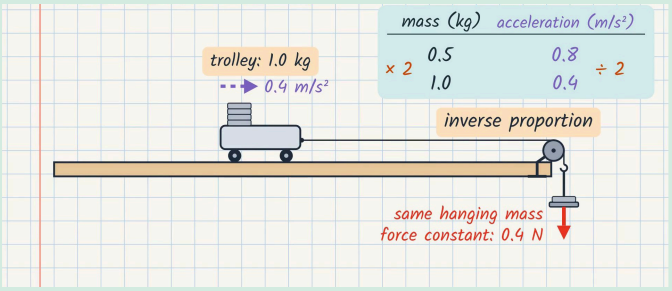
- Trolley on a flat bench, string over a **pulley** to a **mass holder**. The **weight** of the hanging masses is the force that accelerates the system.
- A **card** on the trolley passes two **light gates**; a data logger works out the acceleration. Use a soft landing box and keep your feet clear.

2 Varying the force



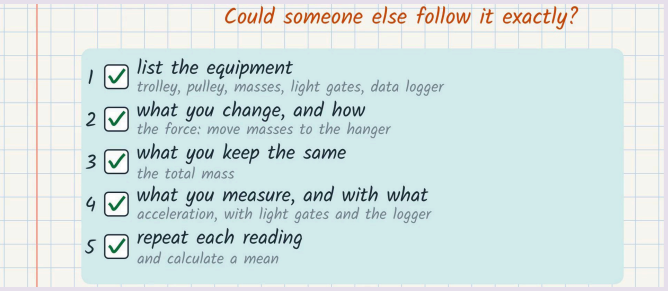
- Independent: **force**. Dependent: **acceleration**. Control: **total mass**.
- Move one mass at a time from the trolley to the hanger. A graph of acceleration against force is a **straight line through the origin**: a is directly proportional to F.

3 Varying the mass



- Keep the hanging mass the same (constant force) and add masses to the trolley.
- Bigger mass, smaller acceleration: double the mass (0.5 to 1.0 kg) and the acceleration roughly halves (0.8 to 0.4 m/s²). **Inverse proportion**.

4 A top-mark method



- Name the **equipment**, what you **change and how**, what you **keep the same**, what you **measure and with what**.
- **Repeat** each reading and calculate a **mean**. "Time it with a stopwatch" on its own is too vague.

$$F = m\,a$$

resultant force = mass × acceleration

Exam tip

Move masses from the trolley to the hanger: the total mass stays constant, so only the force changes.

Check yourself

- 1 In the force test, what is the control variable?
- 2 Why are light gates better than a stopwatch?

Answers: 1. The total mass (trolley + hanger + masses) 2. No human reaction time, so the timing is more precise