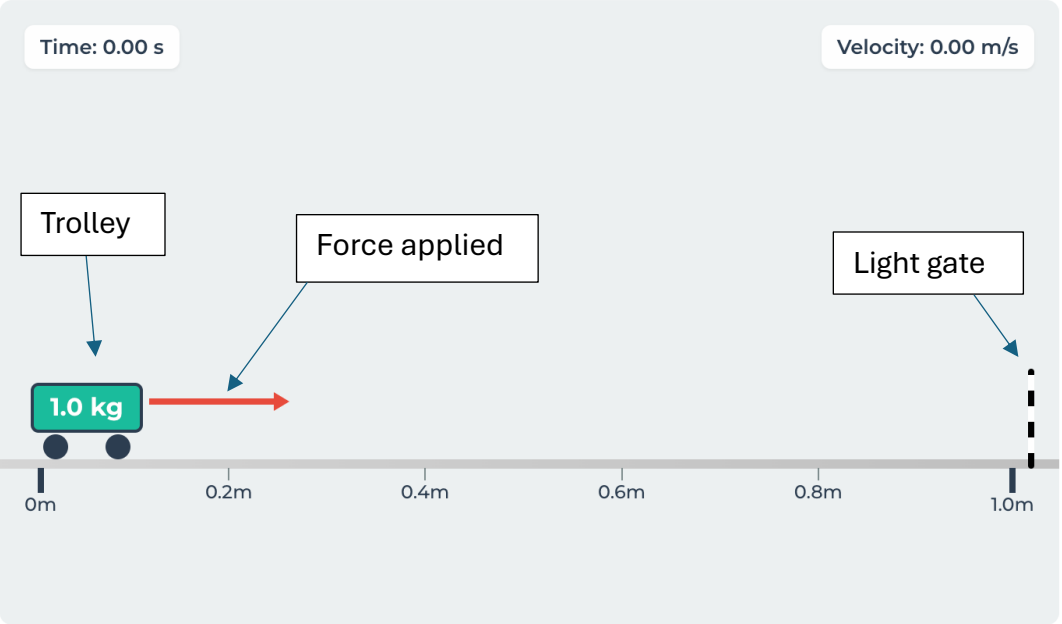
Investigating Newton's Second Law

Force and Acceleration

Aim:

You are investigating how the force applied on an object affects the acceleration



Method:

1. A trolley of a known mass is placed on a track. Keep the mass unchanged.
2. A force is applied to the trolley – normally this is a small mass on a string over a pulley at the end of the track
3. Release the trolley from the start of the track. Record the time taken to reach the end and the final velocity recorded by the light gate.
4. **Acceleration = change in velocity/time.** Calculate this and enter it in your results table
5. Repeat this step two times and calculate an average acceleration.
6. Now adjust the force on the trolley and collect three new accelerations.
7. You should have data for at least five different applied forces.

Prediction:

What effect do you think the applied force will have on the average acceleration of the trolley?

Results:

Mass of Trolley (kg)	Force applied (N)	Acceleration (m/s^2)			Average Acceleration (m/s^2)
		Trial 1	Trial 2	Trial 3	

Analysis:

Plot a graph to show your results. Plot the **Average acceleration (m/s^2)** on the horizontal axis and the **Force applied (N)** on the vertical axis.

What relationship between **Force** and **Acceleration** does your graph show?

How does this compare with your prediction?