

Assessment tasks

6.1 Formal assessment





Physics

Acceleration - Newton's second law

Name: _____

Date: _____

Aim: To investigate the relationship between the net force and the acceleration of an object if the mass remains constant.

Investigative question:

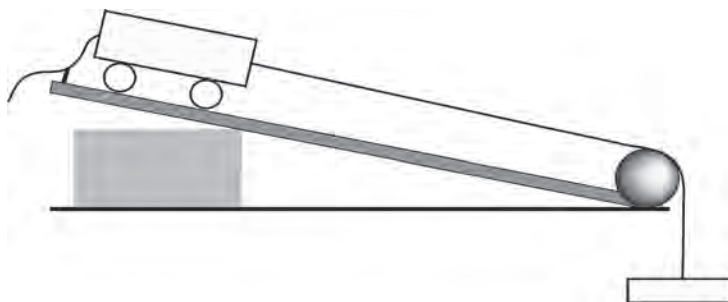
Hypothesis:

Variables:

Independent variable (Which is changed.)	Dependent variable (Which is measured.)	Controlled variable(s) (Which remain(s) the same.)

Apparatus:

- Trolley
- Trolley track
- Ticker timer and tape
- Rope
- Four mass pieces
- Hanger for mass pieces
- Brick



Method:

1. Place a trolley on a smooth runway and tilt the runway very slightly so that the slope compensates for the friction between the wheels and the runway. If pushed gently, the trolley should move at a constant velocity down the track.
2. Measure the mass of the trolleys.
3. Attach the ticker tape to the trolley and thread the tape through the ticker timer.
4. Attach a smooth pulley vertically to the bottom of the runway.
5. Tie a light thread to the trolley and allow the thread to hang freely over the almost frictionless pulley.
6. Tie a small hook to the other side of the thread, from which a mass piece can hang. Test the trolley without a mass piece to see if it will move at constant velocity.



- Place a mass piece on the hook and place the other three on the trolley.
- Switch the ticker timer on and allow the trolley to be pulled down the slope by the mass piece.
- Repeat the experiment at least three times, each time hanging another 100 g mass piece on the hook.
- Analyse the ticker tape, calculate the acceleration and tabulate the results.
- Draw a graph of force vs acceleration.

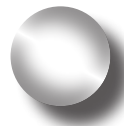
Results:

- Mass of the trolley and four mass pieces (= mass of the system)

- Complete the table by calculating a.

Mass of the hanging mass pieces	$F_{\text{net}} = \text{applied force} = \text{hanging weight (N)}$	Acceleration a ($\text{m}\cdot\text{s}^{-2}$) (Calculate from ticker tapes)
1	1	
2	2	
3	3	
4	4	

- The graph of acceleration vs force



4. Determine the slope or gradient of the graph.

5. Calculate the mass of the system by using the value of the gradient.

6. Compare your answer in Question 5 to the actual mass of the system and calculate the percentage accuracy.

Conclusions:
