

Edexcel IGCSE Physics

Chapter 1 - Forces and Motion

Practical Flashcards

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What apparatus are required for this experiment?



What apparatus are required for this experiment?

- Clamp stand
- Weights (10x 0.1kg masses)
 - Ruler
 - Spring
 - G clamp



What needs to be measured before the experiment is carried out?



What needs to be measured before the experiment is carried out?

The original length of the spring.



What is the independent variable?



What is the independent variable?

The force (weight) added to the spring.



What is the dependent variable?



What is the dependent variable?

The extension of the spring.



Briefly describe the procedure of the
experiment



Briefly describe the procedure of the experiment

1. Measure the initial length of the spring
2. Add one mass onto the end of the spring and record the extension
3. Continue to add masses and record the extension each time
4. Plot a graph of force against extension



How is extension calculated?



How is extension calculated?

Extension is calculated by subtracting the original length of the spring from the new length.



What should be recorded?



What should be recorded?

- The force added, in N
- The extension of the wire for every interval of force



How is the force calculated?



How is the force calculated?

The force is provided by the weight added to the spring.

Weight = mass x gravitational field strength

$$W = mg$$



What is the value of g , and why?



What is the value of g , and why?

$$g = 10 \text{ N/kg}$$

This is because the experiment takes place on the surface of Earth, where the value of g is 10 N/kg .



What condition must be met for the investigation to be valid?



What condition must be met for the investigation to be valid?

The spring should only deform elastically.
Before adding a new weight, all weights should be removed to ensure that the spring returns to its unstretched form.

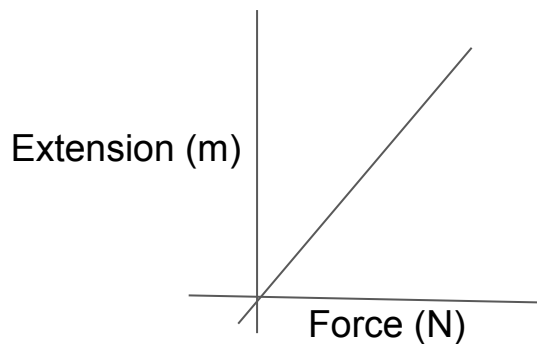


Describe a graph plotted from the results of this investigation



Describe a graph plotted from the results of this investigation

A force/extension graph should be plotted. It should show a directly proportional relationship.



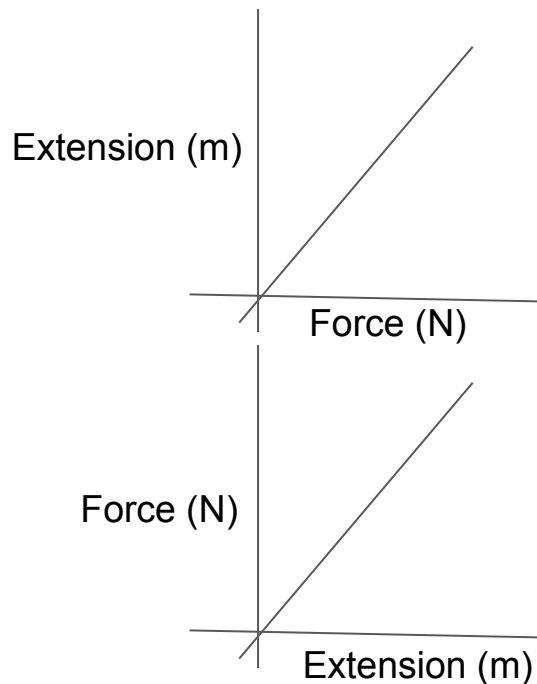
What does the gradient of the
force-extension graph represent?



What does the gradient of the force-extension graph represent?

It is the reciprocal of the spring constant, k .

If force is plotted on the y axis, the gradient is equal to the spring constant, k .



What law does this practical provide evidence for?



What law does this practical provide evidence for?

Hooke's law



State the principle of Hooke's law



State the principle of Hooke's law in words

The extension of an elastic object (eg. a spring) is directly proportional to the force applied to it, up to the limit of proportionality.



State the principle of Hooke's law in the form of an equation



State the principle of Hooke's law in the form of an equation

Force (N) = spring constant (k) x
extension (x)

$$F = kx$$



What else can be calculated using the graph?



What else can be calculated using the graph?

The elastic potential energy stored by the spring.



How is elastic potential energy calculated using the graph?



How is elastic potential energy calculated using the graph?

It is equal to the area under the graph.

$$E = \frac{1}{2} kx^2$$



What is the work done?



What is the work done?

Work is done when energy is converted from one form to another, so work done is equal to elastic potential energy stored.

$$W = \frac{1}{2} kx^2$$



How can you reduce errors in this experiment?



How can you reduce errors in this experiment?

Ensure all measurements are taken from eye level to avoid parallax error.



What precautions should students take when carrying out this method?



What precautions should students take when carrying out this method?

- Students should wear safety goggles, in case the spring snaps
- Avoid standing below where the masses hang in case they fall



What is the purpose of the G clamp?



What is the purpose of the G clamp?

It secures the clamp stand to the desk so the clamp and masses do not fall over and cause injury.

