

## Investigation of the force-extension graph for a spring

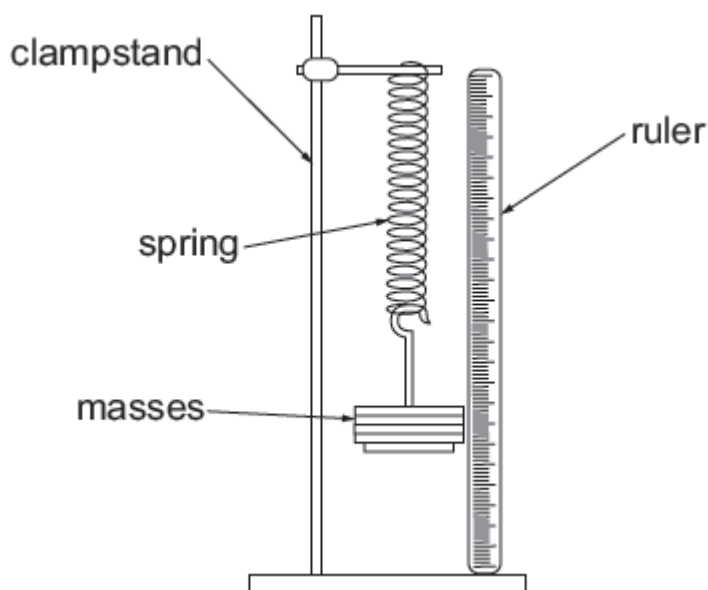
### Introduction

When a force is applied to a spring its length increases. The extension of the spring is found by subtracting the original length of the spring from its length with the force applied. Hooke's Law states that the extension is directly proportional to the force applied provided that the elastic limit is not exceeded. You will investigate if the spring obeys Hooke's law.

### Apparatus

spring  
100g mass hanger  
6 × 100g masses  
clamp stand, boss and clamp  
metre ruler  $\pm 1$  mm

### Diagram of Apparatus



### Method

1. Record the original length of the spring.
2. Suspend the spring from the clamp and attach the 100g mass hanger.
3. Record the new length of the spring.
4. Add a further 100g to the spring and record the new length.
5. Repeat steps 2-3 until a total mass of 700g has been added.
6. Repeat steps 1-5 once more.

## Analysis

1. Calculate the mean length for each mass added.
2. Calculate the extension for each mass added.
3. Plot a graph of force ( $y$ -axis) against extension ( $x$ -axis). ( $100\text{ g} = 1\text{ N}$ )
4. Determine whether the spring obeys Hooke's law or not.