Lesson 7 - Investigating Elastic Objects

Physics - KS3

Forces in Action

Mrs Wolstenholme

Elastic Deformation

Elastic deformation: an object returns to its original shape when forces are removed

Elastic object: undergoes elastic deformation

Could be stretching or compressing

Which of these is an elastic object?

Option 1

Plank of wood

Option 2

Brick

Option 3

Spring

Option 4

Glass

Elastic deformation is when an object .....

Option 1

changes shape permanently.

Option 2

breaks.

Option 3

returns to its original shape when the force is removed.

Option 4

never changes shape.

Two examples of elastic deformation are:

Option 1

Compressing

Option 2

Stretching

Option 3

Hiding

Option 4

Breaking

Complete the task

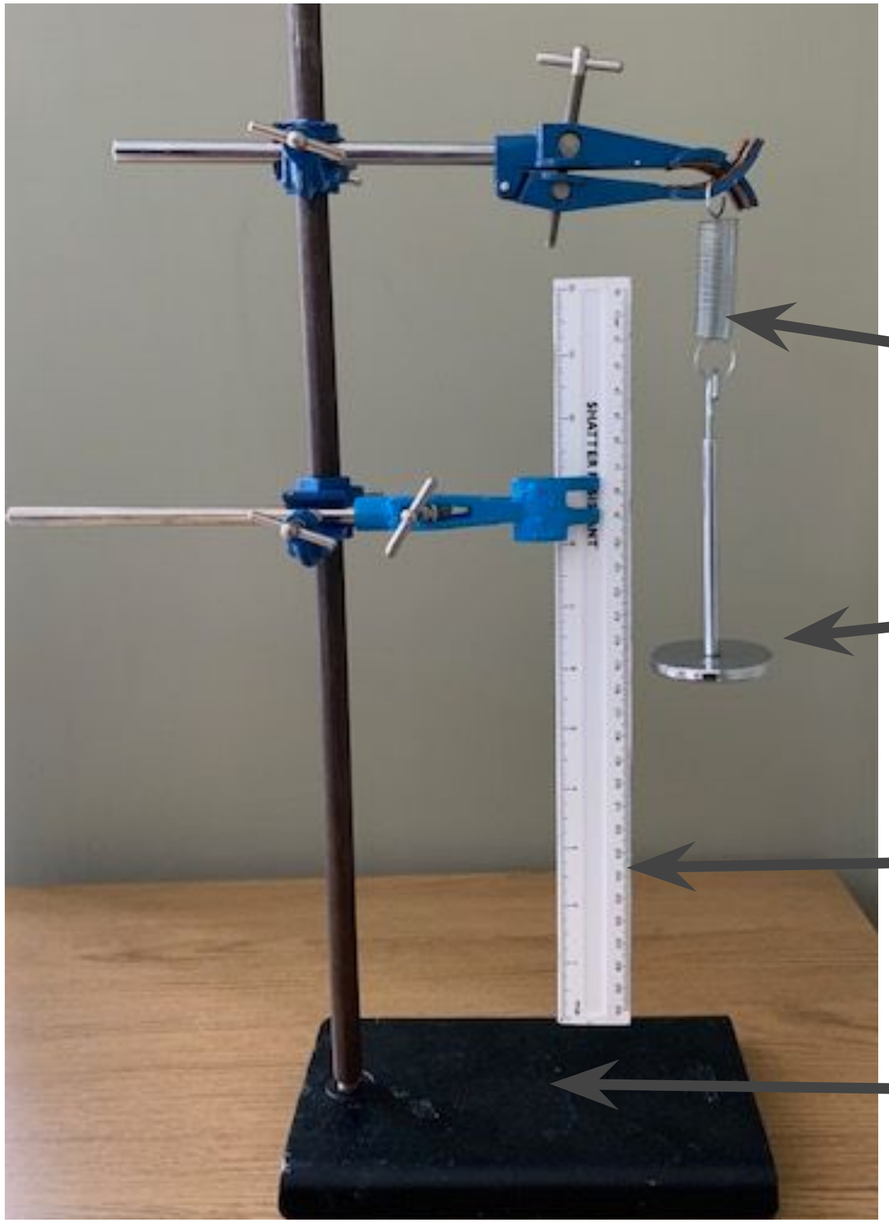
Elastic deformation

What happens to an object undergoing elastic deformation when the forces are removed?

What type of deformation does an elastic object undergo?

Could be stretching or _____

Investigate how force affects the extension of the spring



Credit: Andy Saville

Why do I line the zero on my ruler up with the bottom of the spring?

Option 1

So that I am measuring the length of the spring

Option 2

So that I am measuring the extension of the spring

Option 3

So that the wind doesn’t move the spring

Option 4

So that it is easier to see the spring

Why do I repeat?

Option 1

For fun!!

Option 2

To make sure my results are reproducible

Option 3

To help me spot anomalies

Option 4

Variables

Independent variable (the one we change)

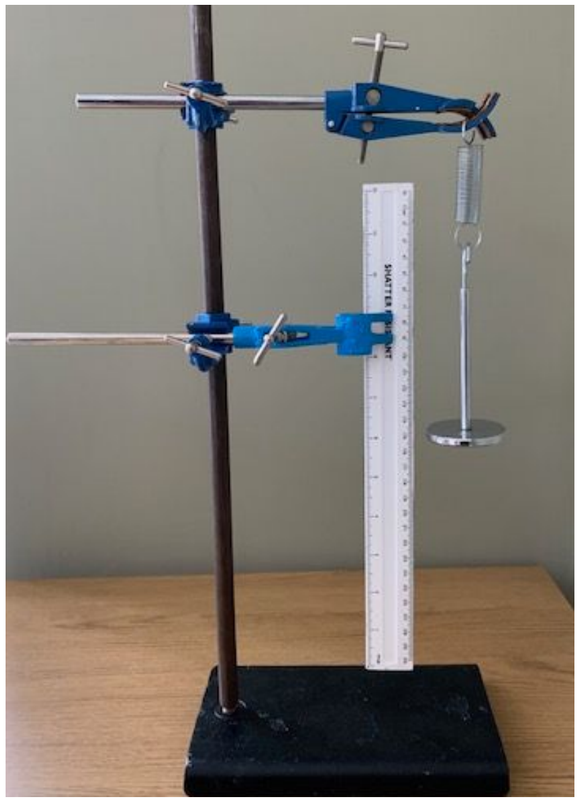
The force on the spring

Dependant variable (the one we measure)

The extension of the spring

Control variable (the ones we keep the same)

The spring, the position of the ruler



Credit: Andy Saville

In this investigation, the independent variable is:

Option 1

Extension of the spring

Option 2

Position of the ruler

Option 3

The spring

Option 4

Force on the spring

In this investigation, the dependent variable is:

Option 1

Extension of the spring

Option 2

Position of the ruler

Option 3

The spring

Option 4

Force on the spring

In this investigation, the control variables are:

Option 1

Extension of the spring

Option 2

Position of the ruler

Option 3

The spring

Option 4

Force on the spring

The independent variable is:

Option 1

The one we change

Option 2

The one we ignore

Option 3

The one we measure

Option 4

The ones that stay the same

The dependent variable is:

Option 1

The one we change

Option 2

The one we ignore

Option 3

The one we measure

Option 4

The ones that stay the same

On your own:

Independent variable (the one _____)

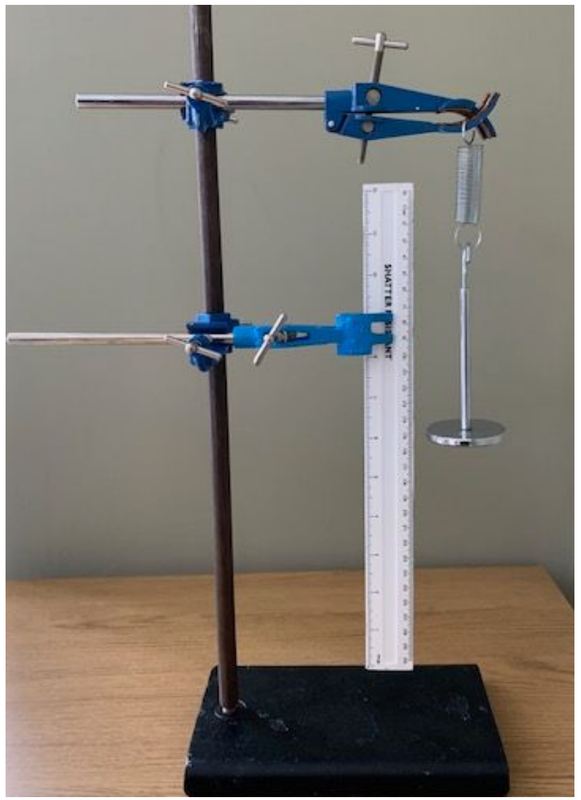
The:

Dependant variable (the one _____)

The:

Control variable (the ones _____)

The:



Credit: Andy Saville

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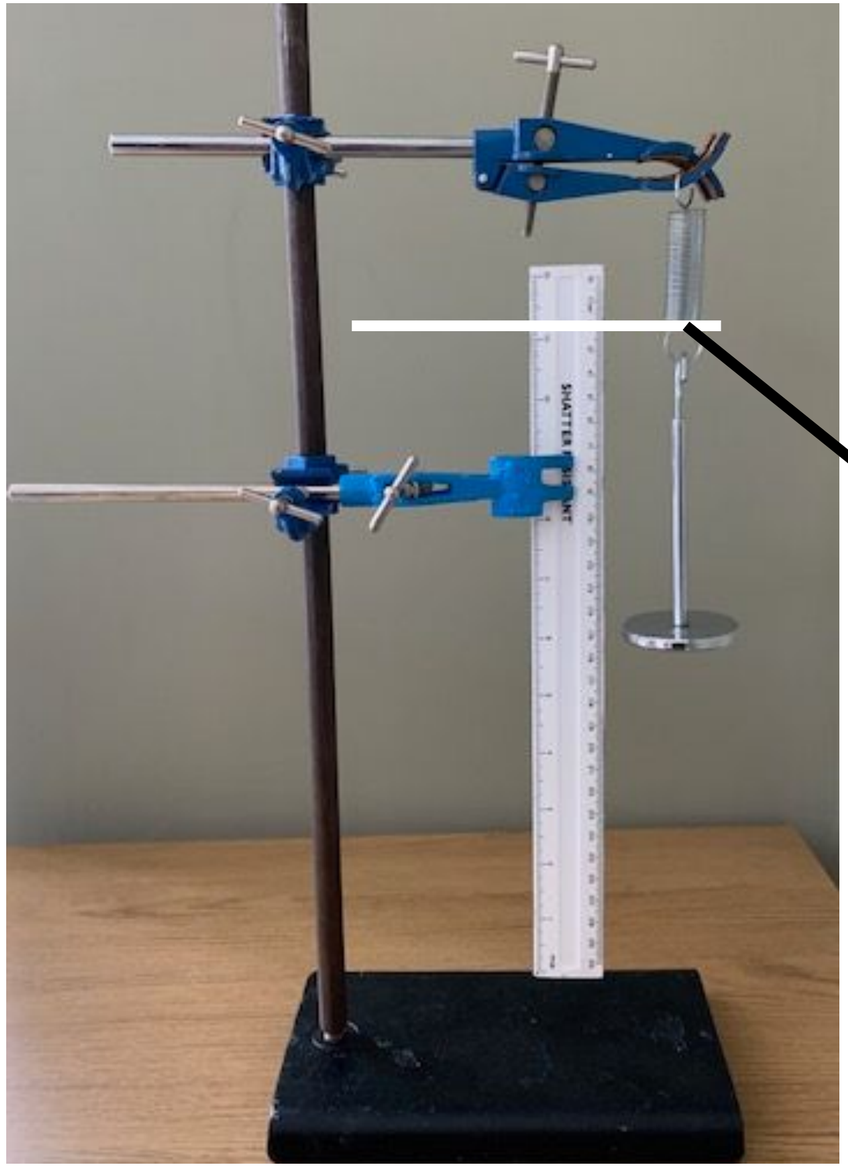
1. **Hang** a spring off a clamp and stand and clamp a ruler so the zero line is lined up with the bottom of the spring

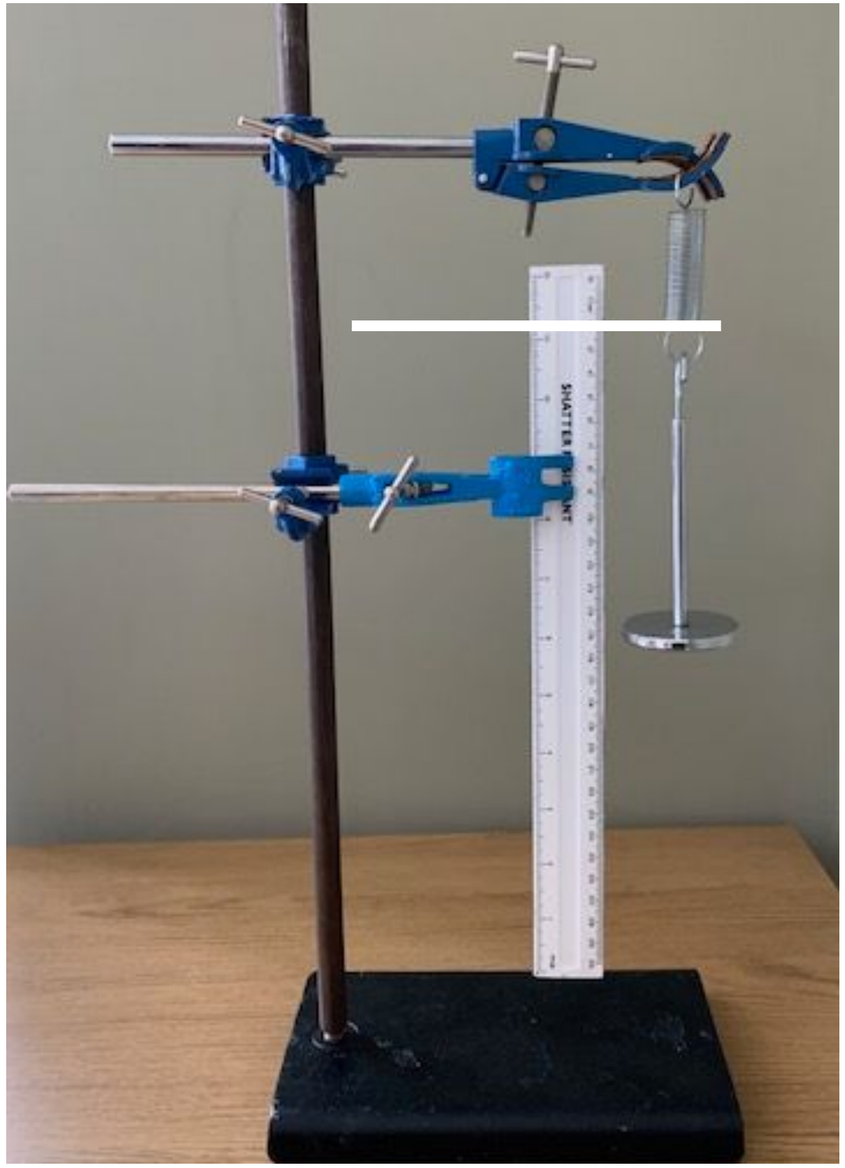


Credit: Andy Saville

2. Add 100 g mass on the bottom of the spring

3. **Record** the measurement from the base of the spring

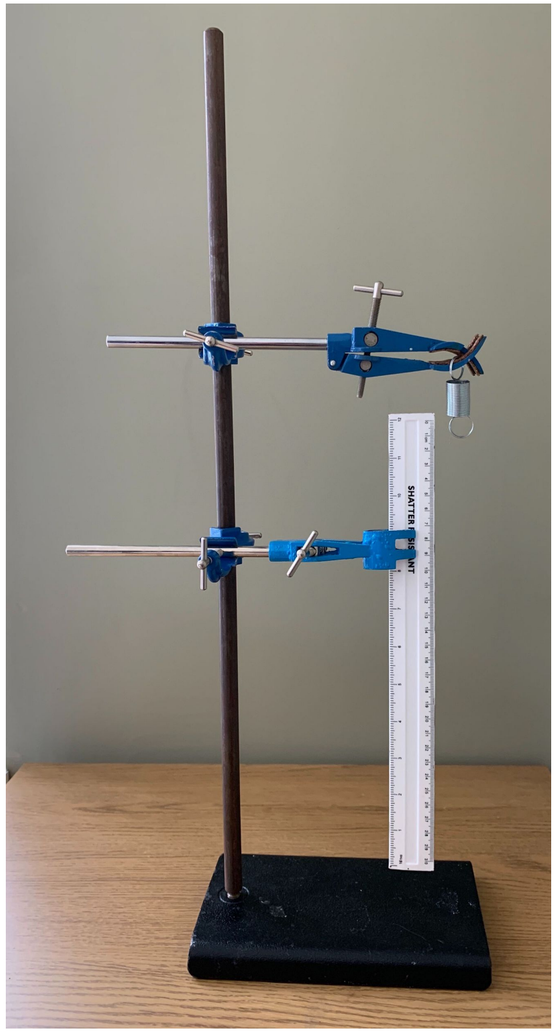
Force (N)	Extension (cm)			
	1	2	3	Mean
0	0			
1	12			
2				
3				
4				



Credit: Andy Saville

4. **Continue to add** 100 g masses and record the extension until you reach 800 g

Force (N)	Extension (cm)			
	1	2	3	Mean
0	0			
1	12			
2	24			
3	36			
4	48			

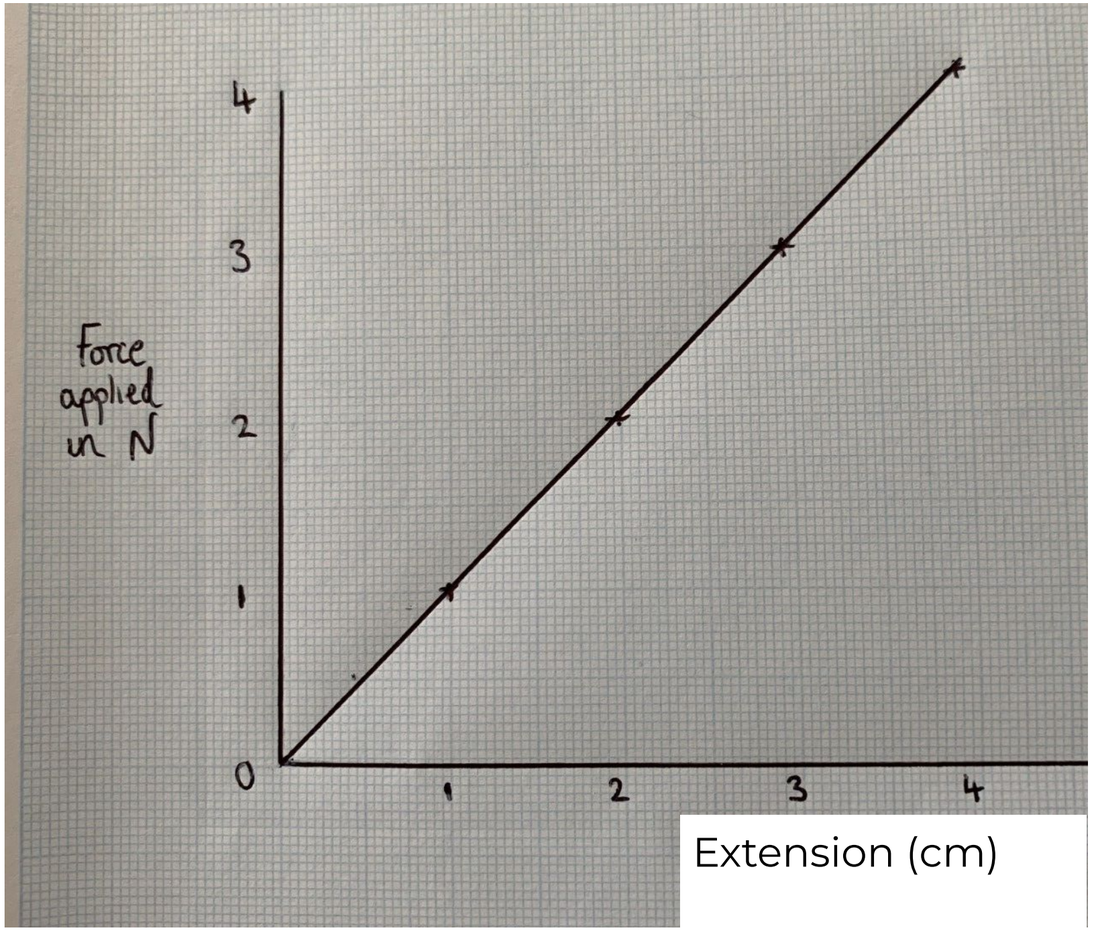


5. Remove the masses and repeat twice

Force (N)	Extension (cm)			
	1	2	3	Mean
0	0	0	0	
1	12	12	13	
2	24	24	26	
3	36	36	39	
4	48	50	50	

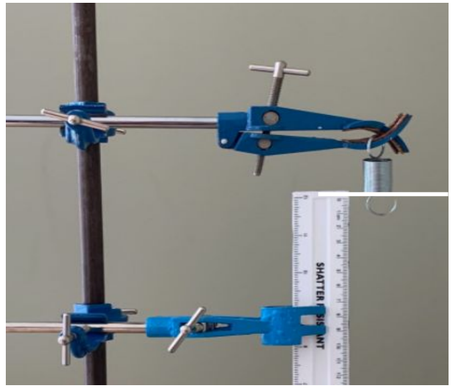
Credit: Andy Saville

6. **Plot** a force vs Extension graph



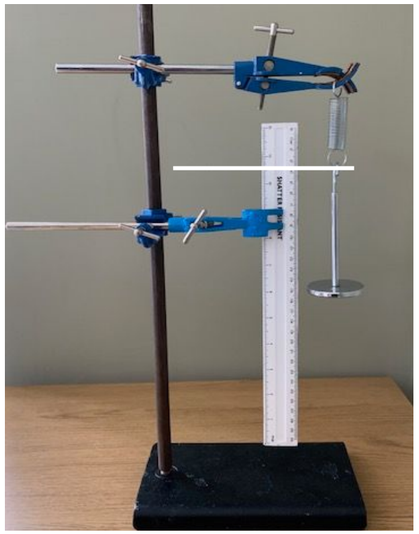
Method writing practice

Credit: Andy Saville



1

1. Hang a _____ off a clamp and stand and clamp a ruler so the _____ line is lined up with the _____ of the spring



2

2. Add _____ _____ on the bottom of the spring

Force (N)	Extension (cm)			
	1	2	3	Mean
0	0			
10	12			
20	24			
30	36			
40	48			

3

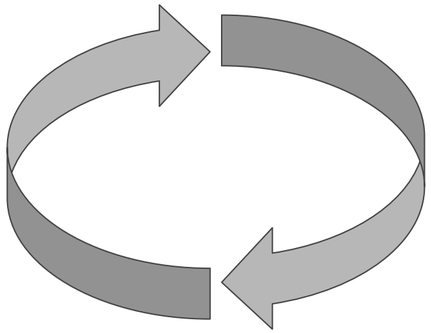
3. Record the measurement from the _____ of the spring

Method writing practice

4

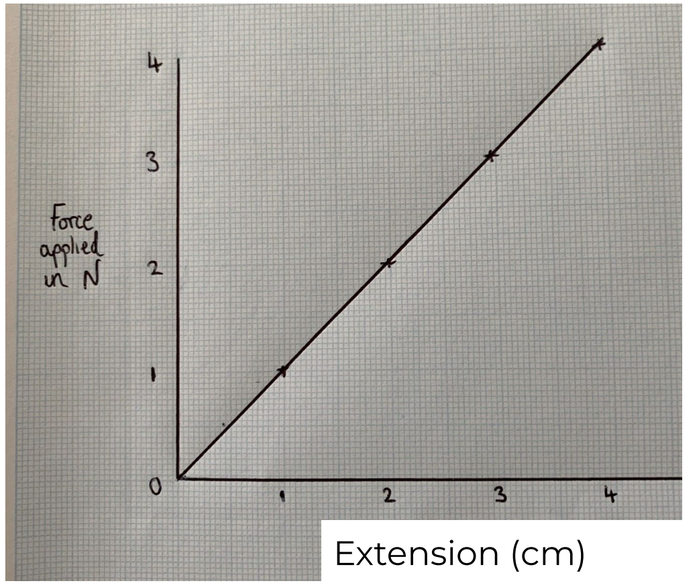
4. Continue to _____ and record the _____ until you reach _____ **g**

5



5. _____ the masses and _____ twice

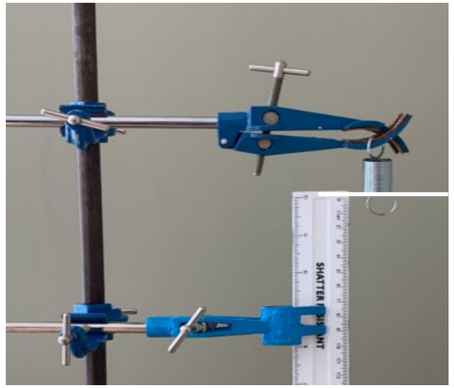
6



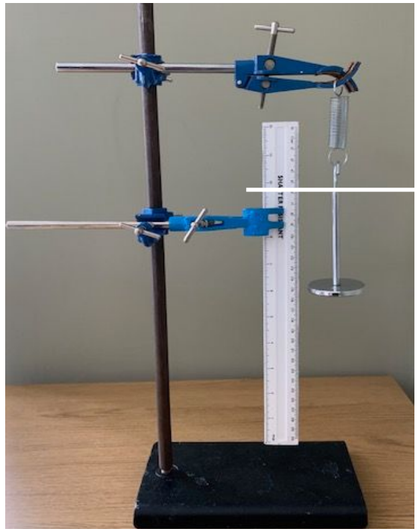
6. _____ a force vs Extension graph

Credit: Andy Saville

Method writing practice



1



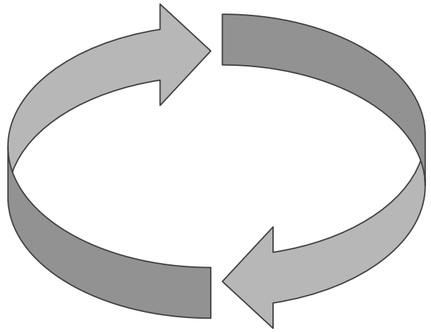
2

Force (N)	Extension (cm)			
	1	2	3	Mean
0	0			
10	12			
20	24			
30	36			
40	48			

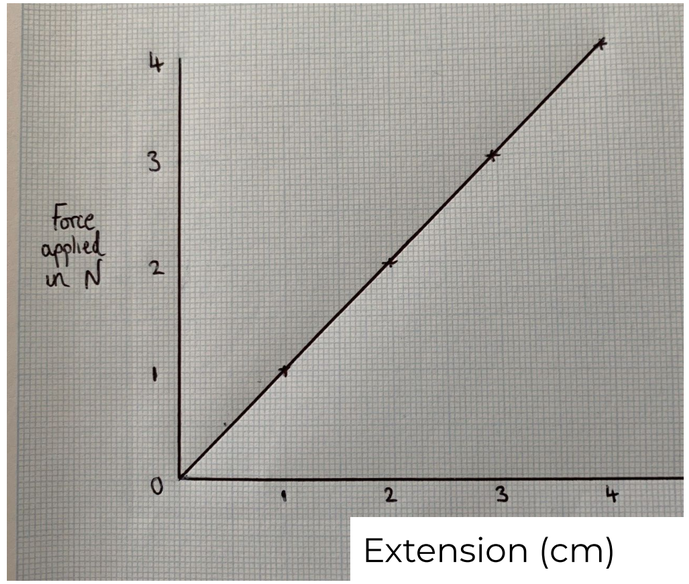
3

4

5



6



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