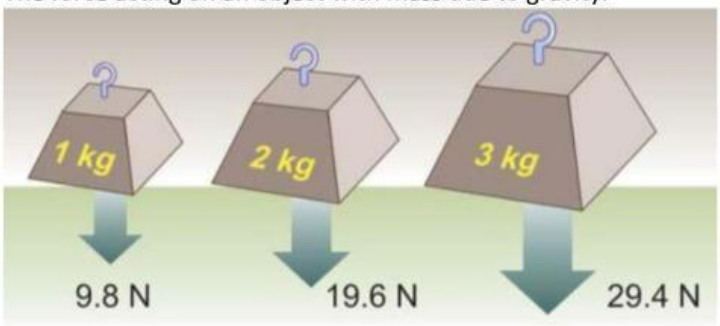
Mid-Term Review

Name: _____ Class: _____

Chapter 1

01 Complete the table below by choosing the correct name of force from the drop-down options .

Types of Forces	**Definition**
	The force that allows the object to move forward. 
	The force acting perpendicular to the surface where the object is placed. 
	The force that resists motion and results to heating. 
	The force acting on an object with mass due to gravity. 

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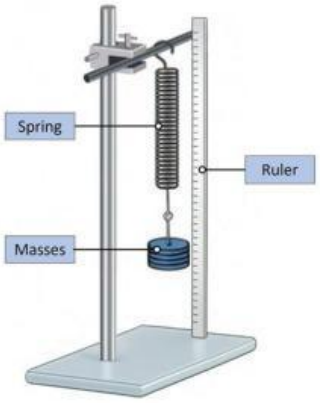
02 A student investigated how force affects the extension of a spring.

The figure below shows the set-up of the experiment.



02.1 Complete the sentences below by choosing the correct word from the drop-down options.

The force exerted on the spring is changed by the student.

So, the force exerted on the spring is a/an _____ variable.

The extension of the spring depends on the amount of force exerted on the spring.

So, the extension of the spring is a/an _____ variable.

The same spring was used for every force exerted on it.

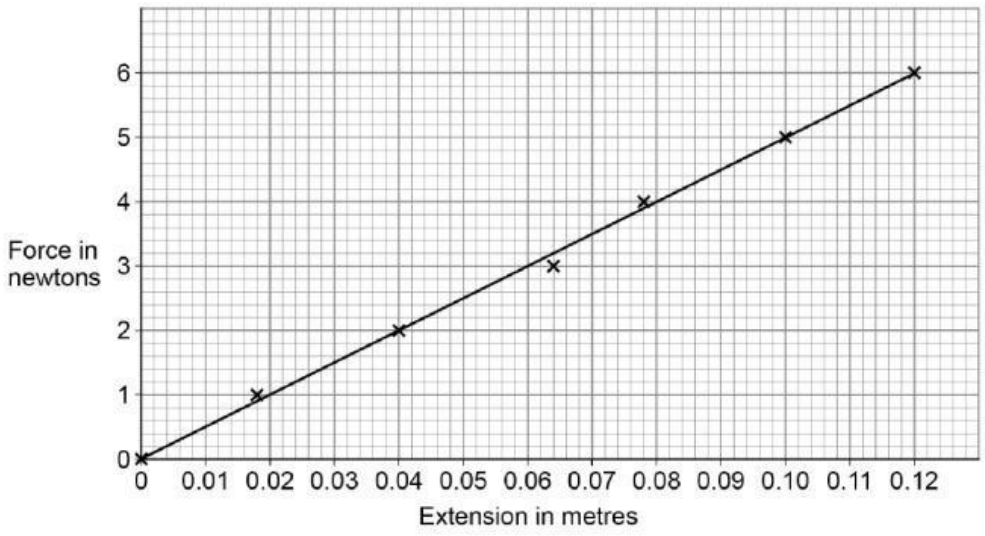
So, the spring constant of the spring is a/an _____ variable.

02.2 There are hazards when doing this experiment.

Match the correct safety precaution for each hazard identified below by drawing a line connecting the boxes.

Hazards		**Safety Precautions**	
Spring going into the eye	☐	☐	Place a foam under slotted masses
Hair gets caught in the spring	☐	☐	tie hair up
Slotted masses fall off the spring	☐	☐	wear safety glasses
Stand falls off bench or table	☐	☐	clamp the stand to the bench or table

02.3 The student obtained the result shown on the figure below.



Calculate the gradient of the spring by completing the equations below.

$$\text{gradient} = k = \frac{\Delta F}{\Delta e} = \frac{- \quad 0}{- \quad 0}$$

gradient = _____ N/m

02.4 Another spring was compressed by the student.

The spring constant of the spring is 300 N/m.

The compression of the spring is 0.020 m.

Calculate the force on the spring by completing the equation below.

Use the equation:

$$\text{force} = \text{spring constant} \times \text{compression}$$

force = N/m x m

Force = _____ N

02.5 Use the equation below and complete the sentence that follows by choosing the correct answer from the drop-down options.

$$\text{force} = \text{spring constant} \times \text{compression}$$

If the force applied to the spring increases, in order to keep the same compression, we need to use a spring with a _____ spring constant.

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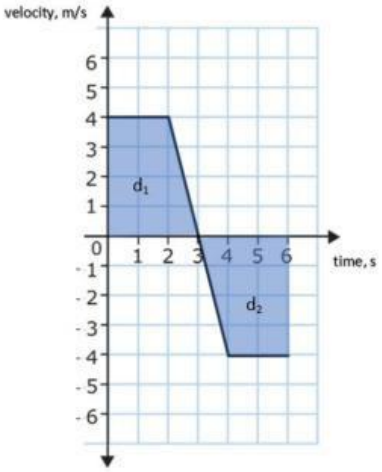
Chapter 2

01 The velocity-time graph for an object moving along a straight path is shown in the figure below.



01.1 What is the velocity of the object at 2 seconds?

velocity = _____ m/s

01.2 Determine the displacement travelled by the object in 3 seconds.

Complete the equations below with the correct numbers.

displacement = (x) + $\left(\frac{\text{x}}{2}\right)$

displacement travelled = _____ m

01.3 Explain why the displacement of the object from 0 seconds to 6 seconds is zero.

Use the figure above and complete the sentences below by choosing the answer from the drop-down options.

Displacement is a _____ quantity.

Displacement 1 (d_1) and displacement 2 (d_2) have the _____ magnitude
but the direction is _____.

02 The following are factors that affect the stopping distance of a car.

02.1 Identify whether the factors affect the thinking distance, the braking distance or both braking and thinking distances. Choose your answer from the drop-down options.

The condition of the car's brakes

The condition of the car's tyres

The driver being distracted

The steepness of the road

The tiredness of the driver

The driver taking drugs

The mass of the car

The speed of the car

The road is wet or icy

02.2 The brakes of a car are applied so the car stops safely.

The deceleration of the car is 2.0 m/s^2.

The mass of the car is 1500 kg.

Calculate the resultant force acting on the car during braking.

resultant force = mass x deceleration

= kg x m/s^2

resultant force = _____ N

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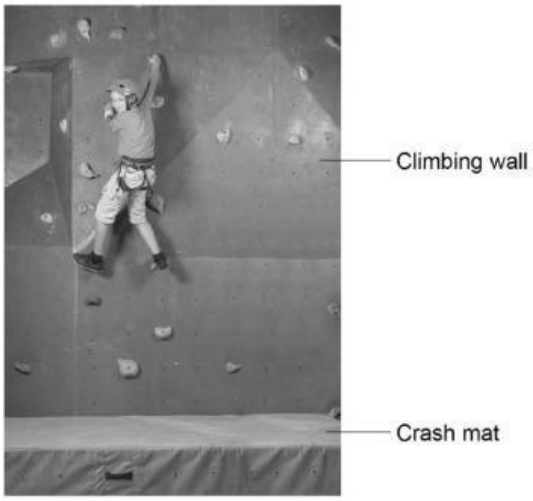
Chapter 3

The figure below shows a child on a climbing wall. There is a crash mat at the bottom of the wall.



Explain why the crash mat reduces the risk of injury if the child falls.

Complete the sentences below by choosing your answers from the drop-down options.

The crash mat compresses. The compression _____ contact time,

the rate of change in momentum will_____,

so, the impact force on the child will _____.

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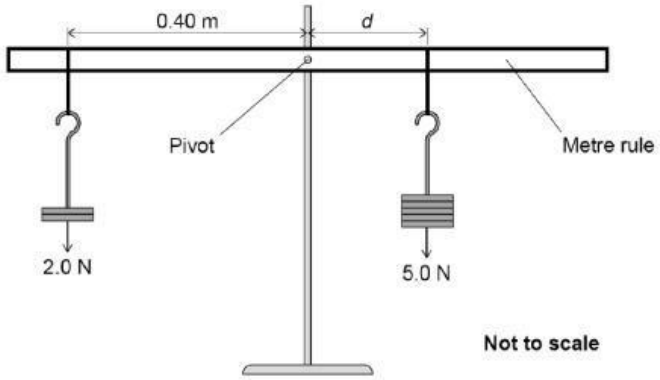
Chapter 4

01 A student investigated moments.

The figure below shows the equipment used.



The meter rule is balanced.

01.1 What is meant by moment of force?

Complete the sentence below by supplying the correct word on the underline.

Moment is the _____ effect of force.

01.2 Determine the distance **d** in the Figure.

Complete the equations by writing the correct numbers on the blank boxes.

Anticlockwise Moment = Clockwise Moment

$$F \times d = F \times d$$

$$2.0\ N \times 0.40\ m = 5.0\ N \times d$$

$$d = \frac{N \times 0.40\ m}{N}$$

distance = _____ m

01.3 The 5.0 N force has been increased.

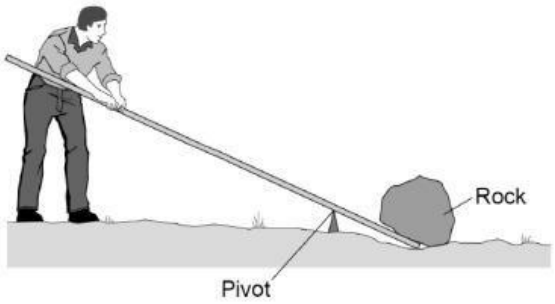
All forces act in the same direction as in the figure.

Give **two** changes the student could make to keep the meter rule stationary.

Complete the sentences by choosing the correct words from the drop-down options.

1. increase the magnitude of the _____ force.
2. _____ the distance of the 2.0 N from the pivot.

01.4 The figure below shows a man using a lever to move a heavy rock.



Explain how the lever is used as a force multiplier to move the heavy rock.

Complete the sentences below by choosing the correct answers from the drop-down options.

For the same moment,

as the distance of the force from the pivot increases, the force to be applied must _____,

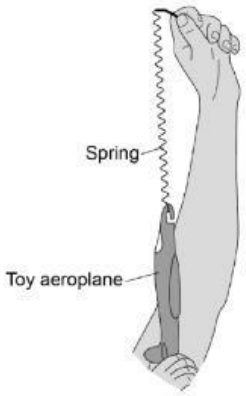
so, the force applied by the lever to the rock is _____ than the force applied by the man to the lever.

Mid-Term Review

Chapter 5

01 The figure below shows a toy aeroplane with a spring attached.

The aeroplane is pulled down so that the spring is stretched.



01.1 The aeroplane is released and moves vertically upwards. The aeroplane becomes detached from the spring as it moves upwards.

The kinetic energy gained by the aeroplane is 1.8 J

The mass of the aeroplane is 0.02 kg.

Calculate the speed of the aeroplane.

Complete the equations below by supplying the blank boxes with correct numbers.

$E_k = \frac{1}{2} mv^2$

1.8 J = ½ x kg x v^2

$$v = \sqrt{\frac{1.8\ \text{J}}{\text{kg}}}$$

speed = _____ m/s

01.2 The gravitational potential energy of the aeroplane at the maximum height is 1.8 J.

The mass of the aeroplane is 0.02 kg.

The gravitational field strength on Earth is 9.8 N/kg.

Calculate the maximum height reached by the areoplane.

Complete the equations below by supplying the blank boxes with correct numbers.

Ep = mgh

J = 0.02 kg x N/kg x h

$$h = \frac{J}{0.02\ \text{kg} \times \quad \text{N/kg}}$$

maximum height = _____ m

01.3 Explain how the maximum height of the aeroplane can be increased.

Complete the sentences below by choosing the correct answers from the drop-down options.

The aeroplane must be pulled further down so the extension of the spring will _____.

As a result, the elastic potential energy will _____.

The kinetic energy of the aeroplane will _____,

the gravitational potential energy of the aeroplane will _____,

so, the maximum height will also _____.