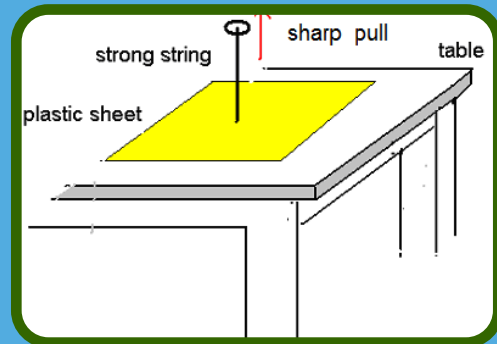
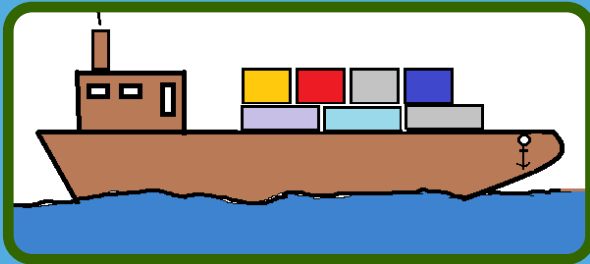
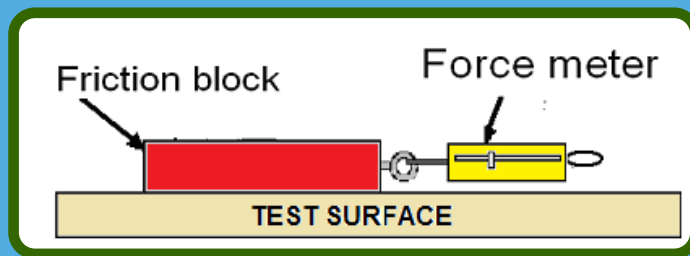




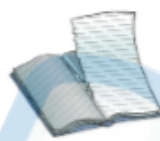
Science matters



Topic Forces in the World Around Us

Name _____ Class _____

Forces are important, aren't they? We may not be aware of it but we use forces every day to get things done.
Our everyday use of forces could include:-



- _____
- _____
- _____
- _____

You could say we are skilled at using forces. But what is a force?

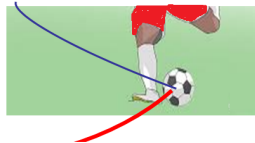
A force is a _____ or a _____.

When forces act on an object they always cause a change.

A force can change an objects:-



S _ _ _ _



D _ _ _ _ _



S _ _ _ _

Look at your piece of apparatus. What could it be used to measure?



This apparatus is called a _____.

Every time we measure we use a unit.

e.g. time _____, length _____, volume _____,
temperature _____.

From the force meter what is the unit for a force? _____.

Activity Measuring Forces.

Let's measure some forces using our force meters

FORCE NEEDED TO;-	SIZE OF FORCE (N)
Hold up a pencil case	N
Hold up a 1kg bag of ...	N
Tear a piece of paper	N
Pull a pencil case over the desk	N

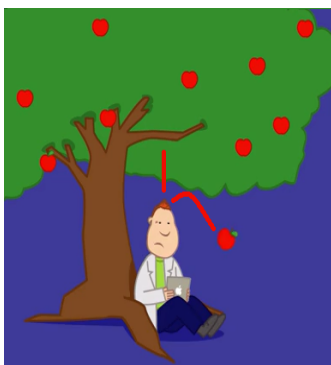
Forces Around Us.

Apart from the forces that we produce, there are other forces around us that make things happen and keep things working properly.

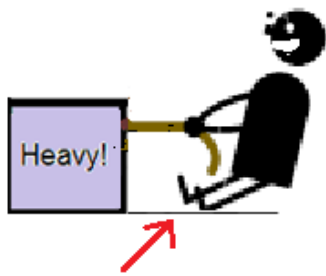
Look at the diagrams.

What is the cause of these forces?

Describe what is happening due to these forces.



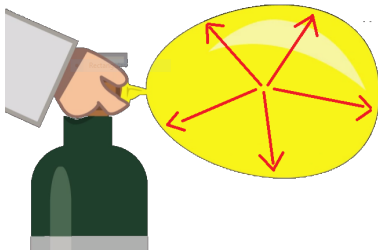
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Other forces around us could also include:-

UPTHRUST – a force that causes objects to float.

SURFACE TENSION -- a force on the surface of a liquid, this enable insects to 'walk' on water.

Investigating Forces

1. Friction

Friction forces can be large or small.

Friction is a force between two surfaces, this force can prevent the surfaces from _____ over each other.

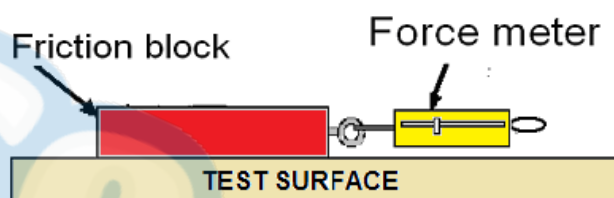
Lots of friction – lots of _____.

Little friction – lots of _____.

Friction is a force, so it is measured in _____ using a _____.

Activity Measuring some Friction forces.

Use different surfaces and find the force needed to overcome friction and make the block start to slide.



Friction force between block and ...	Friction force (N)
Desk top	
Floor	
Paper	

What I found out.

The amount of friction depends on the type of _____.

In my experiment the greatest amount of friction was between the block and _____.

The least amount of friction was between the block and

_____.

When you double the weight by using two blocks what happens to the friction force?

Activity **It all adds up!**

Try this - I think you will be surprised!



Word Box

Apart
Friction
Pull
Grip

Arrange the pages of the notebooks as shown below.



Now try to pull the books apart.

Finish the passage describing what happened and why.

The two notebooks were impossible to _____
_____. Friction is the force that causes the pages to
_____ each other.

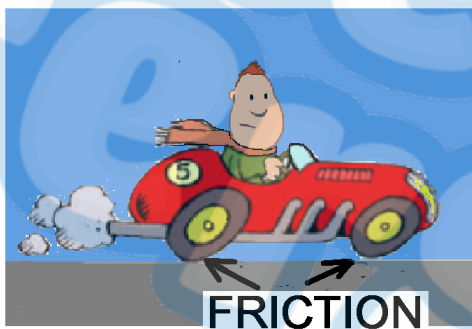
Since there are a lot of pages gripping each other then there is a large _____ force. This force prevents them being

_____.

Figure out the frictions – are they large or small?
Explain why? Are we after grip or slip?









Can you explain the role of friction in the situations below.



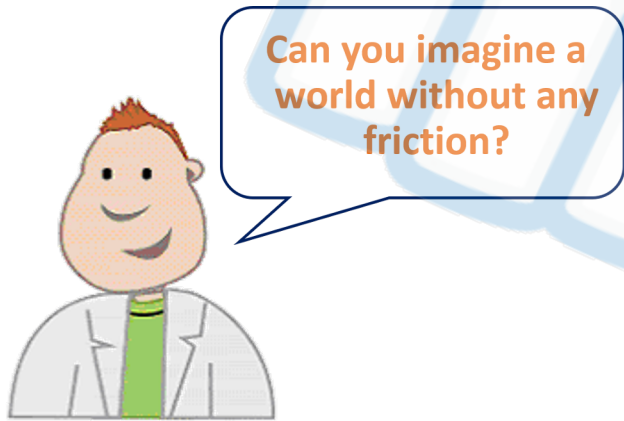
*Little Lots Grip Friction Sticking
Slipping Twist Glide*

A 100 meter sprinter may wear rubber soled running shoes?

Rubber soles provide _____ of _____ this prevents the sprinter _____ when running.

A ballroom dancer will wear smooth leather soled shoes?

Leather soles are smooth with _____ this allows the dancers to _____.



Write a few sentences to describe a world without friction.



*Walking Grip Slip Slide Moving
Stopping*

So friction is an **essential** everyday force. Friction is a force - so it is measured in _____ using a _____.

2. Gravity

If gravity has its way what goes up _____.

Gravity causes a force that pulls on things.

On Earth the force of gravity pulls objects down giving them their weight _____.

Weight is a downward force so it must be measured in _____.

Now **MASS** is the amount of 'stuff' in an object and mass is measured in _____.

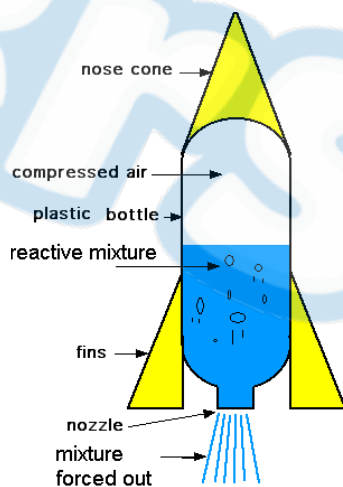
A 1kg bag of sugar has a weight on Earth of 10 N.

In outer space where there is **no gravity** a 1kg bag of sugar will weight _____.

Activity Bottle Rocket

Powerful rockets can provide the force needed to send satellites far out into orbit – out of gravity's reach. This place is called **zero-gravity**.

Now you will build and launch your own rocket. But how far will it travel?



Your rocket launch.

As the air was compressed the _____ built up in the bottle. Then suddenly the **mixture and the rubber bung** were forced down and out while the **rocket** was forced _____ and _____.

Why did the rocket launch upwards?



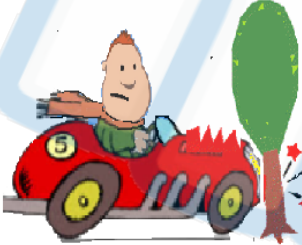

The upward force produced on the rocket was _____
than the force caused by _____.

Why did the rocket come back down again?

The upward force produced by the rocket stopped and _____
_____.

Gravity - yes or no?

Tick which
involve the
force of
gravity.

1		2	
<input type="checkbox"/>		<input type="checkbox"/>	
3		4	
<input type="checkbox"/>		<input type="checkbox"/>	



Can you imagine a world without any gravity?



Help words

*Up or down Pour Float
Essential Weight Hang Stand*

Write a few sentences to describe a world without gravity.

So gravity is an _____ force in our universe.

3. Air Pressure

Well, what is air pressure?

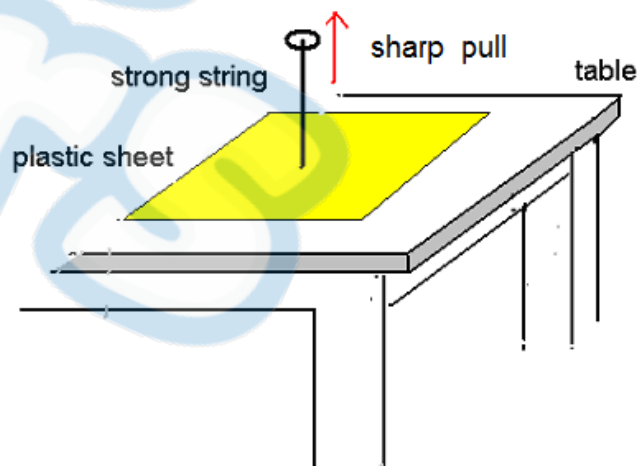


Due to air pressure, forces are acting on everything. Even us!

Do you imagine these forces to be large or small? _____.

Give a reason for your answer.

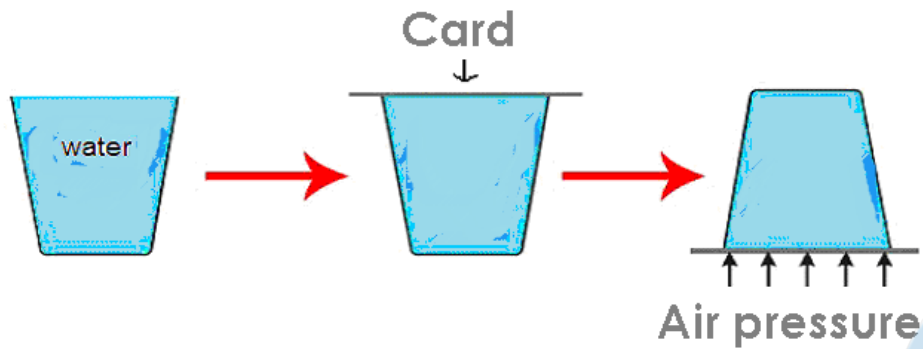
Activity Let's find out about Air Pressure.



Finish the passage describing what happened in this activity.

When given a sharp pull the sheet remained on the _____ - almost as if it was _____ to it. This happened because of the _____ amount of _____ forcing the sheet to the table. Wow!

Activity Air pressure forces it up!?



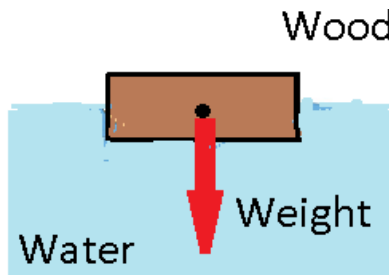
Describe what happened in this activity. Why did this happened?

So air pressure is all around us and it acts in _____.



Remember a force is a _____ or a _____ and we measure forces in _____ using a _____.

4. Upthrust – Floating and Sinking.



What force is pulling the wooden block down into the water?

Where does the force come from that causes it to float?

This upward force from the water is called **UPTHRUST**.

Draw this force on the block.

If the block floats what can be said about the size of the upward force (upthrust) and the downward force (weight).

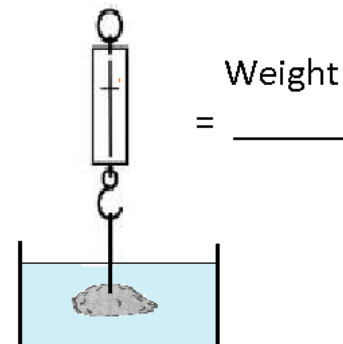
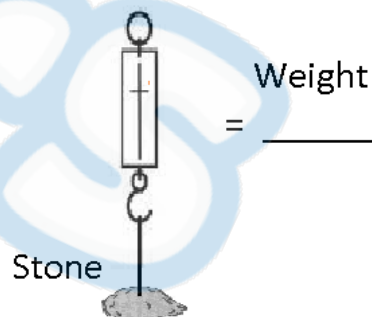
Weight is greater than the upthrust

Upthrust is greater than the weight

Tick the correct box

Weight and upthrust are equal

Upthrust's effect



What happens to the weight of the stone when it is submerged in the water? _____

Why does the reading of the weight of the stone go down?

Why will the stone not float?

The upthrust is not _____ to make it float.



When objects take up space in water the water pushes back - UPTHURST.
When more space is taken up there is more UPTHURST.

Activity

Make it Float – Increase the Upthrust



Help words

<i>Hollow</i>	<i>Shape</i>	<i>Shell</i>	<i>Equal</i>
<i>Space</i>	<i>Upthrust</i>	<i>Boat</i>	<i>Sink</i>
	<i>Weight</i>	<i>Float</i>	

Plasticine also sinks. How could we make it float?

CHANGE ITS _____ .

What shape of plasticine might float?

By changing the shape what happens to:-

Weight stays the same / becomes greater / becomes less

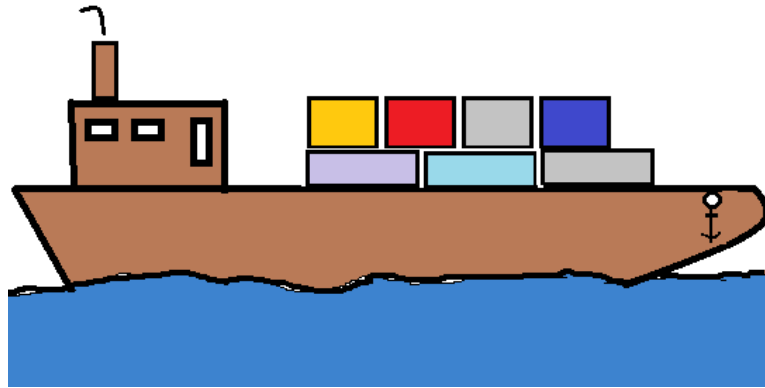
Upthrust stays the same / becomes greater / becomes less

When the weight of the plasticine and the upthrust from the water are _____ the plasticine will _____.

At the swimming pool have you noticed that when you push a swimming aid (float) under the water and let go it shoots out of the water.

This happens because the _____ is so much greater than the _____ of the float, as a result the float is forced up and out of the water.

Carrying Cargo



By shaping the plasticine into a 'boat' shape it will not only float but also carry cargo.

Describe the plasticine shape that carried the most weight (cargo).

Why do boats sink?

If boats take in water they become heavier and heavier until the weight is greater than the _____ and the boat starts to _____.

Ships have pumping systems (bilge pumps) that remove the water that is taken on board.

In this topic we have seen how important forces are - not only the forces that we produce to get things done - but also the everyday forces around us that keep our world and universe working properly.

The world around us is full of science - so truly science matters!

In the sections below draw and/or write to summarise 'Forces in the World Around Us'

FORCES

GRAVITY

FRICTION

UPTHRUST

AIR PRESSURE