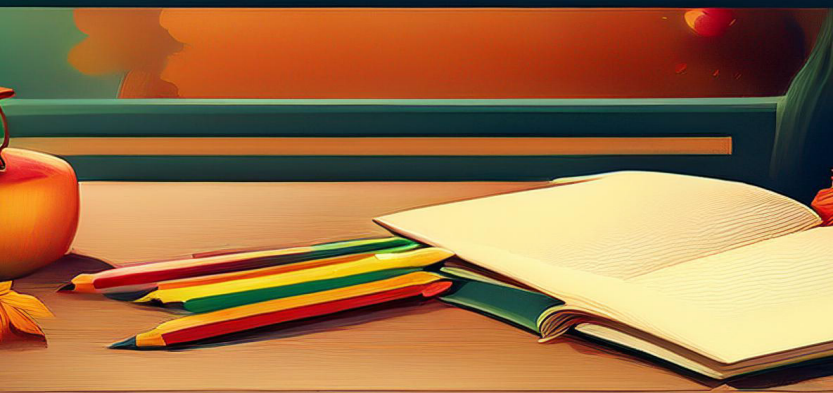


SCIENCE AUTUMN 1 KNOWLEDGE ORGANISERS



Y5 SCIENCE KNOWLEDGE ORGANISER

TOPIC: Unit 1 [Autumn]

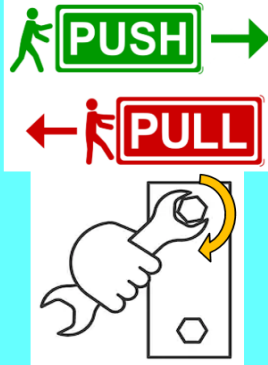


What do forces do?

They can change an object's:

- Speed
- Direction
- Shape

They are always a push, pull or turn.

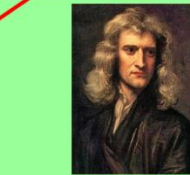


This is a forcemeter [or a newtonmeter]. It measures forces.

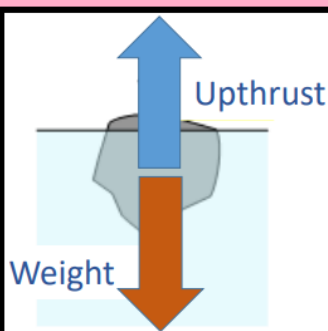
Spring – this stretches as you add more force

Measuring Scale (in Newtons [N])

Hook



Newton's are named after Sir Isaac Newton, who came up with the theory of Gravity.



We show forces with arrows.

The arrows show us the size and direction of the forces.



Properties describe what a material is like and why we use them for **different tasks**



Glass is transparent



Cotton wool is soft



Rope is flexible



Thermal conductors

Some materials let heat move through them easily (they conduct heat well). These materials are called **thermal conductors**.

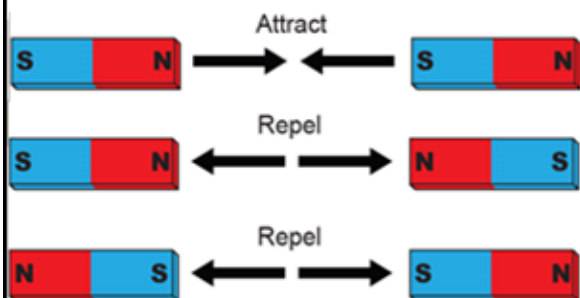
Metals are the best conductors.



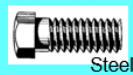
Thermal insulators

Other materials do not let heat move through them easily (they do not conduct heat well). These materials are called **thermal insulators**. Examples include **wood, rubber, plastic and cloth**.

Magnetic Pairs



ONLY IRON AND STEEL OBJECTS ARE MAGNETIC!



Steel



Iron

Copper



Gold



Aluminium



What properties do rocks have?

There are many different types of rock, and they have different uses. The uses of different rocks depend on their **properties**. Rocks are made of different **grains** that fit together. Each grain is made of one chemical. The chemicals in rocks are called **minerals**. Rocks are **mixtures** of different minerals.

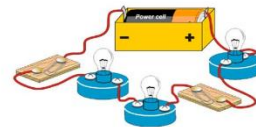
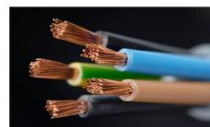
A rock's structure controls:

- How hard it is
- If it is permeable
- If it is resistant to acid



Materials that let electricity through them are called **electrical conductors**

Materials that don't let electricity through them are called **electrical insulators**



Which materials are the best electrical conductors?

Materials that are metallic

Which materials are electrical insulators?

Materials that are not metallic like rubber or wood

Y6 SCIENCE KNOWLEDGE ORGANISER

TOPIC: Unit 1 [Autumn]



You can sort animals using more than one feature!

	Soft Body	Hard Body
Have a shell	 Snail	 Hermit Crab
No shell	 Octopus	 Beetle

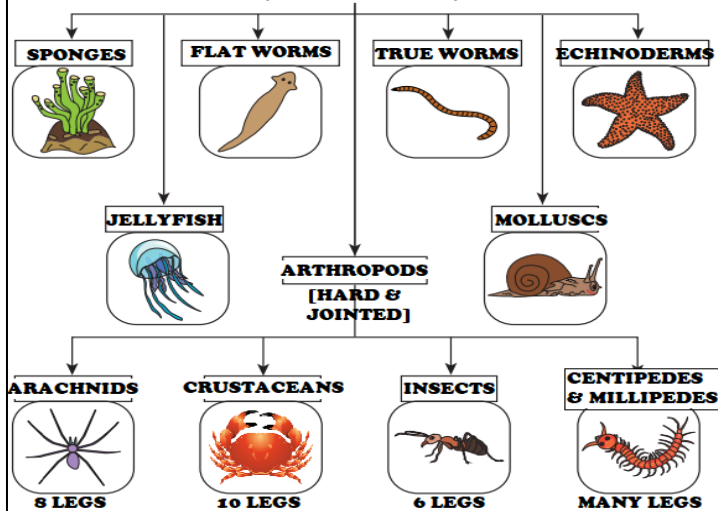
VERTEBRATES

Animals with backbones

 Amphibians <ul style="list-style-type: none"> -Have wet skin -Lay soft eggs in water 	 Birds <ul style="list-style-type: none"> -Have feathers -Lay hard eggs 	 Fish <ul style="list-style-type: none"> -Have gills and scales -Lay soft eggs in water 	 Mammals <ul style="list-style-type: none"> -Have fur or hair -Feed live young with milk 	 Reptiles <ul style="list-style-type: none"> -Have scales -Lay leathery eggs
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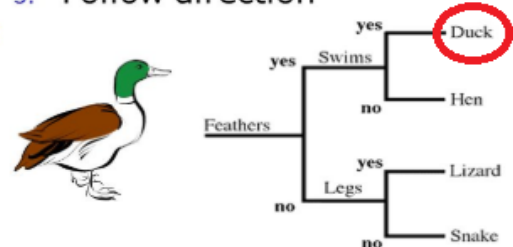
Invertebrates

(without backbone)

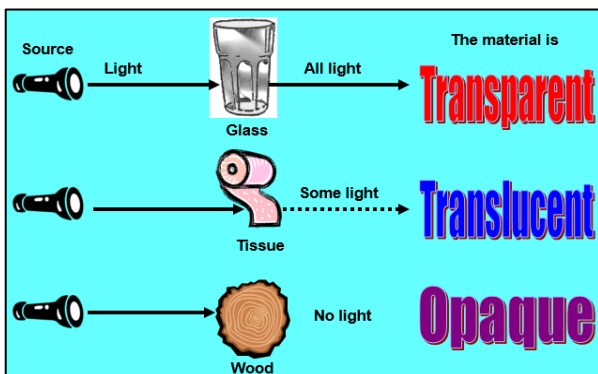


HOW TO USE A KEY

- Look at the statement / question
- Select either (a) or (b)
 - Which describes the organism?
- Follow direction



Key Vocabulary	Definition
Classify	Put things into groups based on similarities and differences
Variation	The differences between living things
Carl Linnaeus	Man who developed our current way of classifying living things
Light Source	An object that produces light. Examples include fire, a torch, a candle and the Sun.
Reflect	When light bounces off an object. We can see most objects because they reflect light.
Soundproof	When soft materials are be used to block or absorb sound

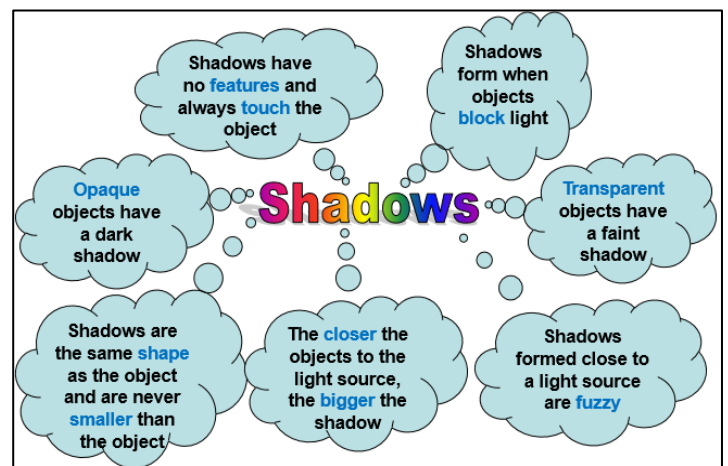


What causes sound?

- Sound is caused when object **move**
- We call these tiny movements **vibrations**
- On a drum, the **skin** vibrates
- On a guitar the **strings** vibrate
- On a trumpet, the **air** vibrates

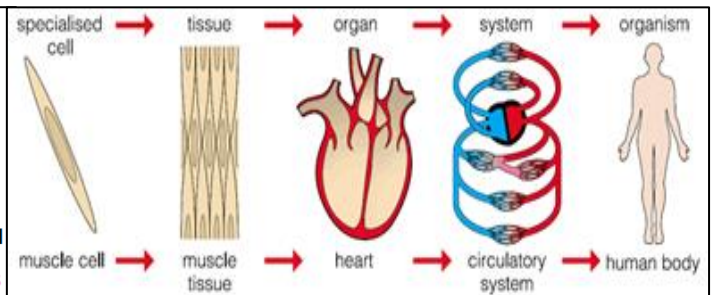
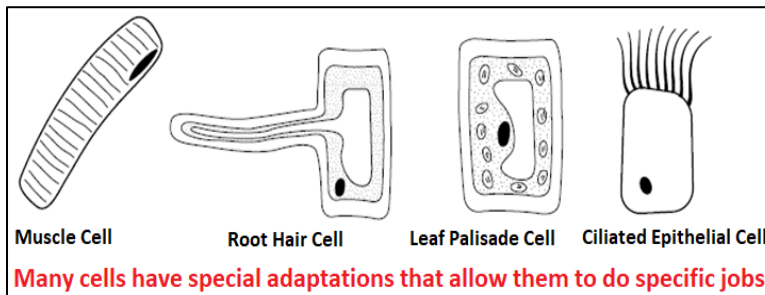
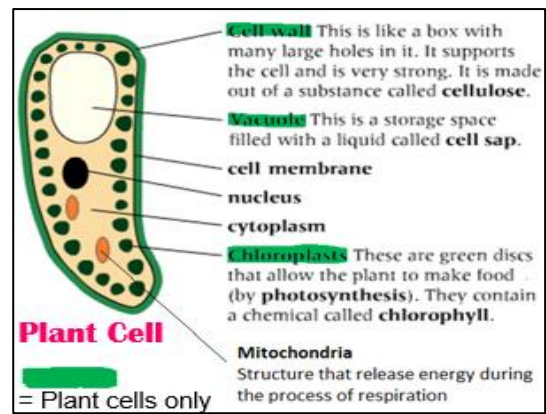
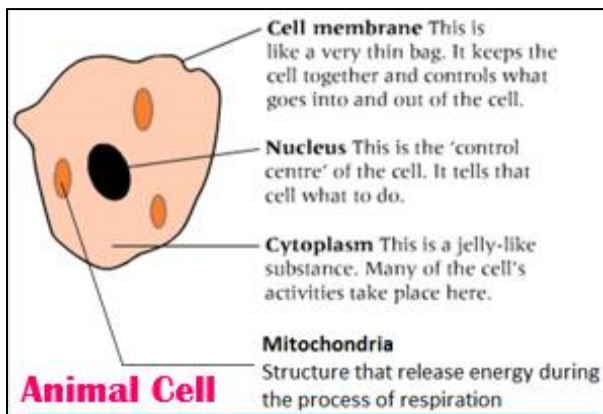
How does sound travel?

- What can sound travel through?
 - Sound can travel through any material. Solids are fastest.
- Why can't sound travel through space?
 - There's no air in space and sound can only travels through a material
- How does sounds get into your body?
 - The sound vibrations travels through the air into your ears

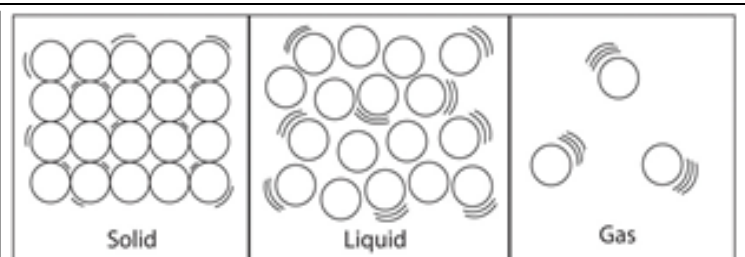
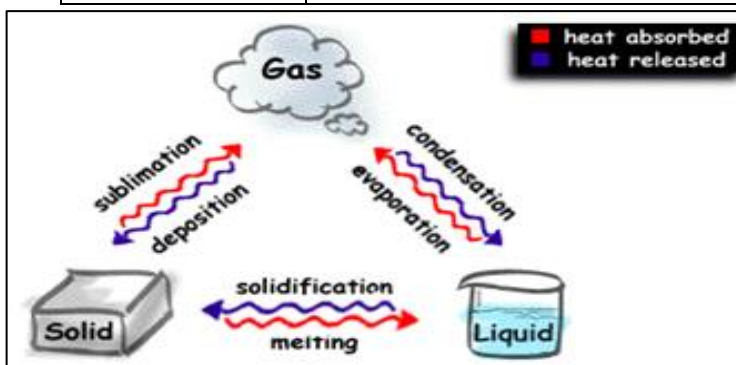


Y7 SCIENCE KNOWLEDGE ORGANISER

TOPIC: Unit 1 [Autumn]



Key Vocab	Definition
Particle	The smallest units of all materials. The particle arrangement differs between solid, liquid and gas.
Diffusion	The movement of particles from an area of high concentration to an area of low concentration, until they are evenly spread.
Brownian Motion	The random movement of particles in liquids and gases that spreads out smells.
Gas Pressure	A force created by the collisions of gas particles with an object. It can be increased by compressing or heating.
Friction	The forces that opposes movements between touching surfaces. This can be reduced by using a lubricant [like oil], smoothing a surface or reducing surface contact [with ball bearings]
Drag	The scientific term to describe air and water resistance, the forces that slow down materials as they move through those substances.
Streamlined	A pointed, often flattened shape that reduces drag to increase speed. Similar to aerodynamic. Can be seen on vehicles and fast-moving animals like fish and birds, but also on man-made vehicles
Hooke's Law	When an elastic object [like a spring] is stretched, its extension is proportional to the force applied. Double the force = double the extension.



Particle models of each state of matter

Forces always work in opposite pairs.



Reaction force / Upthrust



Gravity [Weight]

The balance between these forces controls how the object acts.

Balanced forces = Stationary or moving at a constant speed

Unbalanced forces = A change of speed or direction of movement

You cannot see a force but often you can see what it does. When a force is exerted on an object, it can change the object's:

- speed
- direction of movement
- shape (for example, an elastic band gets longer if you pull it)

Contact forces [touch to affect objects]

- Friction
- Air & Water Resistance
- Upthrust

Non-contact forces [Don't touch objects]

- Magnetism
- Static Electricity
- Gravity

Y8 SCIENCE KNOWLEDGE ORGANISER

TOPIC: Y8 Unit 1 [Autumn]



Evolution

1) Animals of the same types are similar but have differences [variations]. Some are helpful.

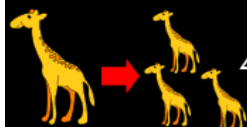


2) There is competition within each species for food, living space, water, mates etc., and the risk from predators and disease

Boo hoo!



3) The "better adapted" members of these species are more likely to survive - this is called "Survival of the Fittest" or Natural selection



4) These survivors will pass on their better genes to their offspring who will also show this beneficial variation. This continues for many generations.

5) Over millions of years, animals change for the better. This is **evolution**!

How can we show reactions?

Word Equation:

Iron + Sulphur → Iron Sulphide
[Reactants] [Products]

Symbol Equation:

Fe + S → FeS
- FeS is the **Chemical Formula** for Iron Sulphide

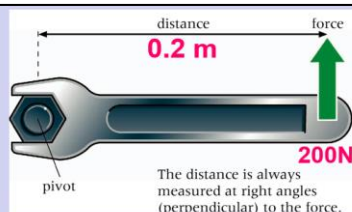
Genetic scientists use **Punnet squares** as **another way** to determine combinations of chromosomes and genetic characteristics from each parent

		Possible chromosomes from the egg	
		X chromosome	Y chromosome
Possible chromosomes from the sperm	X chromosome	XX	XY
	Y chromosome	XX	XY

Hazard Symbols for dangerous chemicals

	Explosive		Highly Flammable		Oxidising - adds oxygen to reactions
	Gas stored under pressure		Corrosive - burns materials		Toxic - highly poisonous
	Serious health risk		Low health risk		Causes damage to the environment
	Biohazard - Living material risk				

Chemical Reaction	An irreversible change where particles change order and combination. A physical change does not change the order and combination of atoms, and can usually be easily reversed. Mass is not lost or gained in reactions.
Combustion	The chemical name for burning of a fuel. Oxygen is needed in this reaction which produces heat and light, and always produces water and carbon dioxide.
Exothermic Reaction	A chemical reaction that gives out heat energy that can be measured as a temperature increase. This is opposite to endothermic reactions which take in heat energy and cause a temperature decrease.
Thermal Decomposition	A chemical reaction where heat is used to break a chemical down into simpler ones. This process is used in the production of cement from limestone.
Variation	The differences between living things.
Discontinuous / Continuous	Discontinuous variations cannot be measured, such as blood group and eye colour. Continuous variation can be measured, such as height and weight
Biodiversity	This amount of different types and number of living things found in a location.
Extinction	When a species of animals ceases to exist. This is often caused by habitat change or the activity of human beings.
Species	A single type of living thing that is able to produce offspring that can also reproduce.
Depth Pressure	As depth increases, the amount of particles above pushes down to cause pressure and denser areas. This is why mountaineers need to take oxygen up mountains and submarines struggle to go deep underwater.
Density	Density is a measure how much mass takes up how much space [volume]. Items with a density of less than 1g/cm ³ will float in water. Densities of more than 1g/cm ³ will sink in water. Density [g/cm ³] = Mass [g] ÷ Volume [cm ³].
Drag	The scientific term to describe air and water resistance, the forces that slow down materials as they move through those substances.
Streamlined	A pointed, often flattened shape that reduces drag to increase speed. Similar to aerodynamic. Can be seen on vehicles and fast-moving animals like fish and birds, but also on man-made vehicles



How do you calculate a turning force?

A turning force is called a **moment**

Moment of force = Force X Distance

200N x 0.2m = 40 N m [Newton metres]

Pressure = Force [N] ÷ Area [m² or cm²]

The units for pressure are:

N per m² or N/m²
N per cm² or N/cm²

1 N/m² = 1 **Pascal [Pa]**

