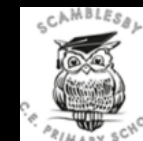


SCAMBLESBY CE PRIMARY SCHOOL: MEDIUM TERM-PLANNING Y3/4 SCIENCE



Milestone 2

Working Scientifically

- Ask relevant questions.
- Set up simple, practical enquiries and comparative and fair tests.
- Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.
- Gather, record, classify and present data in a variety of ways to help in answering questions.
- Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.
- Identify differences, similarities or changes related to simple, scientific ideas and processes.
- Use straightforward, scientific evidence to answer questions or to support their findings.

Light (Autumn Term)

Investigate light and seeing

This concept involves understanding how light and reflection affect sight.

Milestone 2:

- Recognise that they need light in order to see things and that dark is the absence of light.
- Notice that light is reflected from surfaces.
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
- Recognise that shadows are formed when the light from a light source is blocked by a solid object.
- Find patterns in the way that the size of shadows change.

Vocabulary

Light, dark, shadow, reflection, transparent, translucent, opaque

Session	Learning objective	Learning Question / Success Criteria	Lesson outline
1	to know we need light to see things	What is light? SC: I can name different sources of light. (Basic) SC: I know the light travels in straight lines. (Advancing) SC: I can explain how we see objects. (Deep)	Sort objects into natural and man-made sources of light Describe darkness True or false: The Sun is the only natural source of light in our solar system
2	to know which surfaces reflect light	Which surfaces reflect light? SC: I can name surfaces that reflect light. (B) SC: I can explain the importance of wearing reflective clothing when it is dark. SC: I can explain how mirrors work. (D)	Observe, describe and label the effects of reflection and experiment with light reflecting from different surfaces. Always, sometimes or never: Dark surfaces do not reflect light as well as those that are light.

3	to know that the sun can be dangerous and there are ways we can protect our eyes	How do we protect ourselves from the sun? <i>SC: I know how to protect myself from the sun. (B)</i> <i>SC: I know can describe the harmful effects of the sun. (A)</i> <i>SC: I can persuade people on how to keep themselves safe in the sun.</i>	Name safety rules to avoid damaging our eyes with light from the sun. Apply this to explain how to safely view a solar eclipse. Investigate different types of sunglasses and recommend the best type to protect your eyes.
4	to investigate which materials block light to create shadows to find patterns when investigating how shadows change size (sunny day!)	How are shadows caused? <i>SC: I know which materials will create a shadow. (B)</i> <i>SC: I know which materials won't create a shadow. (A)</i> <i>SC: I can explain how shadows change size. (D)</i>	Session 1 Observe and record the effect of blocking light with opaque, translucent and transparent objects and describe what is happening. Explain practical uses of shadows True or false: Night-time is a shadow Session 2 Observe and record the length of shadows at different times of day. Explain why shadows change size What is the relationship between the height of a light source and the object that is causing the shadow?
Assessment	Rising Stars: Year 3, Tests 1 – 4 (choice of), Y3/4 Milestone 2 Light Unit Analysis and Powerpoints		

Sound (Autumn Term)

Investigate sound and hearing

This concept involves understanding how sound is produced, how it travels and how it is heard.

Milestone 2	Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear.
Vocabulary	Sound, loud, quiet, vibration, wave, high, low, pitch, ,absorb

Session	Learning Objective	Learning Question / Success Criteria	Lesson Outline
1	to explain and describe sources of sound	How are sounds made? <i>SC: I can name some sources of sound. (B)</i> <i>SC: I can explain how sound is made through vibrations. (A, D)</i>	
2	to know how different sounds travel to know how the pitch of sounds can be changed.	How does sound travel? <i>SC: I know that sound travels in waves (B)</i> <i>SC: I can draw a diagram that shows how vibrations move through the air. (A)</i> <i>SC: I can explain how to change the pitch of a sound. (D)</i>	

Assessment	Rising Stars: Year 4, Tests 1 – 4 (choice of), Y3/4 Milestone 2 Sound Unit Analysis and Powerpoints
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Electricity (Autumn Term)

Understand electrical circuits

This concept involves understanding circuits and their role in electrical applications.

Milestone 2		- Identify common appliances that run on electricity. - Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. - Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. - Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. - Recognise some common conductors and insulators, and associate metals with being good conductors.	
Vocabulary		Battery, bulb, circuit, lamp, switch, filament, wires, conductor, insulator, voltage, buzzer	
Session	Learning Objective	Learning Question / Success Criteria	Lesson Outline
1	to know common appliances that run on electricity	How do appliances work? <i>SC: I can name appliances that run on electricity. (B)</i> <i>SC: I can name appliances that run on high and low voltages. (A)</i> <i>SC: I can explain the advantages and disadvantages of battery powered cars. (D)</i>	
2	to know how to create a simple series circuit and label the components	How does a battery power a lamp? <i>SC: I can make a simple circuit with a cell, wires and a lamp. (B)</i> <i>SC: I can make a simple circuit with extra components (eg: buzzer). (A)</i> <i>SC: I can explain how electricity flows through the circuit. (D)</i>	
3	to know how switches work	How does a switch work? <i>SC: I can describe the effective of using a switch. (B)</i> <i>SC: I can draw a simple circuit and label a switch. (A)</i> <i>SC: I can explain the function of a switch. (D)</i>	
4	to know common insulators and conductors	What are insulators and conductors? <i>SC: I can observe and record how different materials act as conductors or insulators. (B)</i> <i>SC: I know the effect of good and bad conductors and insulators. (A)</i> <i>SC: I can experiment with materials to test. (D)</i>	
Assessment	Rising Stars: Year 4, Tests 1 – 4 (choice of), Y3/4 Milestone 2 Electricity Unit Analysis and Powerpoints		
States of Matter and Materials (Spring Term)			
Investigate materials			
This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.			
Milestone 2		- Compare and group materials together, according to whether they are solids, liquids or gases. - Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. - Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	
Vocabulary		Solid, liquid, gas, particles, states of matter, cooling, melting, freezing, boiling, evaporation, condensation, precipitation	

Session		Learning Objectives		Learning Question / Success Criteria		Lesson Outline	
1	to know how materials group into solids, liquids and gases	How can we sort solids, liquids and gases? SC: I can name solids, liquids and gases. (B) SC: I can explain some properties of solids, liquids and gases. (A) SC: I can compare solids, liquids and gases and group them in different ways. (D)					
2	to know that heat can change a solid into a liquid	How can we change a solid into a liquid? SC: I know that heating ice will turn it from a solid to a liquid. (B) SC: I can measure temperatures and record observations to demonstrate how a solid can become a liquid. (A) SC: I can change a solid into a liquid by conducting investigations with measurable variables. (D)					
3	to know that liquids can be changed into a solid	How can we change a liquid to a solid? SC: I know that freezing water will turn it into a solid. (B) SC: I can measure temperatures and record observations to demonstrate how a liquid can become a solid. (A) SC: I can change a liquid into a solid by conducting investigations with measurable variables. (D)					
4	to know how evaporation and condensation plays a part in the water cycle process	How does the water cycle work? SC: I can explain the main sections of the water cycle. (B) SC: Using accurate scientific / geographical vocabulary, I can explain the water cycle. (A) and (D)					
Assessment		Rising Stars: Year 4 Tests 1 – 4 (choice of), Y3/4 Milestone 2 States of Matter Unit Analysis and Powerpoints					
Forces and Magnets (Spring Term)							
Understand movement, forces and magnets. This concept involves understanding what causes motion							
Milestone 2		• Compare how things move on different surfaces. • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing.					
Vocabulary		Force, push, pull, friction, surfaces, balanced, unbalanced, fair test, hypothesis, magnet, attract, repel, north pole and south pole					
Session		Learning Objective		Learning Question / Success Criteria		Lesson Outline	
1	to know how objects move on different surfaces to know that forces can be a push or pull	How do objects move on different surfaces? SC: I know that movement is caused by a push or a pull force. (B)		Have a range of toys and objects on tables/outside for children to play with. How do they move? How can you change speed? Introduce the vocabulary of push/pull/twist and force. Children to add arrows and vocab on whiteboards.			

	to know that forces can be balanced or unbalanced	SC: I know how to make objects move faster or slower on a surface and can devise an investigation to prove my hypotheses. (A) SC: I can change variables in an investigation to prove / disprove a hypothesis. (D)	Explore how objects move on different surfaces – does a ball roll better on grass or pavement?
2	to know that friction is a force that acts between two objects	What is friction? SC: I know that friction is a force created by two objects rubbing against each other. (B) SC: I know how to increase / reduce friction. (A) SC: I can change variables in an investigation to prove / disprove a hypothesis. (D)	Session 1: Jelly experiment for children to do in pairs Give Cubes of jelly to transfer with chopsticks between two bowls – time. Then add olive oil to reduce the friction between the chop sticks and jelly. Time the difference. What did we notice? Session 2: Car and ramp experiment: Use different materials but keep the ramp at the same height. Children to write up the experiment to include a hypothesis and how they will make it a fair test.
3	to know how objects attract and repel magnets to know that magnets have two poles to know which poles will attract or repel	What is a magnet? How do magnets work? SC: I can explain how a magnet works. (B) SC: I can investigate the magnetic properties of a range of materials. (A) SC: I can explain the concepts of 'North' and 'South' in the context of magnetism. (D)	Show children magnets and show how they work. Explain that there are two poles – north and south Share https://www.bbc.co.uk/bitesize/topics/znmmn39/articles/zhj9r2p Activity: children to sort materials into magnetic and non magnetic then explain how magnets attract and repel.

Assessment

Rising Stars: Year 3, Tests 1 – 4 (choice of), Y3/4 Milestone 2 Forces and Magnets: Unit Analysis and Powerpoints

Plants (Summer Term)

Understand plants

This concept involves becoming familiar with different types of plants, their structure and reproduction.

Milestone 2

- Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers.
- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.
- Investigate the way in which water is transported within plants.
- Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Vocabulary

Root, stem, leaves, nutrients, soli, transported, life cycle, pollination, seed dispersal, anther, stigma, style, ovary, stamen, sepal, ovule

Session	Learning Objective	Learning Question / Success Criteria	Lesson Outline
1	to know and describe the functions of different parts of flowering plants	What are the different parts of plants and what are their functions? SC: I can name and explain the function of roots, stems, leaves and flowers. (B) SC: I can identify ideal conditions for plant growth. (A)	Start experiment to explore best conditions for growth, set up and record as a class over the coming weeks. Children to write plan and fair test, set up observation sheets. Complete this as a class. Watch the following and discuss: https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-what-do-plants-need-to-survive/zkw2gwx

		<i>SC: I can explain the importance of leaves for plants' growth and survival. (D)</i>	https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-parts-of-a-plant/zvdkpg https://www.youtube.com/watch?v=UPBMG5EYydo Basic: label plant and write functions. Children to draw their own or use a diagram. Advancing: Explain how leaves are important in creating food for a plant. Prove or disprove that roots act like straws.
2	to know how water is transported in plants	How is water transported in plants? <i>SC: I know that roots and stems transport water and nutrients to the rest of the plant. (B)</i> <i>SC: I can demonstrate that water is transported through stems using food colouring. (A)</i> <i>SC: I can conduct an investigation to compare water transportation in different plants. (D)</i>	Watch: https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-how-does-water-get-from-the-roots-to-the-leaves/zdtfjyh Set up experiment using white flowers, celery and food colouring. Children to write up experiments in books – what do they predict will happen? with a labelled diagram. Advancing: Can you change the colour of celery? Prove it. Children to carry out experiment independently.
3	to know the life cycle of flowering plants	What is the life cycle of a flowering plant? <i>SC: I can sequence the life cycle of a flowering plant. (B)</i> <i>SC: I can name the processes involved in the life cycle of a flowering plant. (A)</i> <i>SC: I can name, label and annotate a diagram of the flower of a plant and explain how new plants can be made. (D)</i>	Lesson 1: parts of a flower – dissect to look and then children to draw and label or make/use flower parts and photograph. Watch: https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-the-anatomy-of-the-flower/zjmhkmm Advancing: Compare the parts of two different flowers Lesson 2: Life cycle of flower – practical session on pollination – act out the process – Watch: https://www.bbc.co.uk/teach/class-clips-video/science-ks1-ks2-ivys-plant-workshop-what-is-pollination-and-how-does-it-work/zv4df4j Basic: children to draw and label the process. Advancing: Suggest reasons why people are worried about the falling number of bees in the UK. Explain why a flower that is not pollinated will not reproduce.
Assessment	Rising Stars: Year 3, Tests 1 – 4 (choice of), Y3/4 Milestone 2 Plants Unit Analysis and Powerpoints		
Animals including humans Evolution (Summer Term)			
Understand animals and humans This concept involves becoming familiar with different types of animals, humans and the life processes they share.			
Milestone 2	- Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat. - Identify that humans and some animals have skeletons and muscles for support, protection and movement. - Describe the simple functions of the basic parts of the digestive system in humans. - Identify the different types of teeth in humans and their simple functions. - Identify how plants and animals, including humans, resemble their parents in many features. - Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.		
Vocabulary	Nutrition, vitamins, minerals, fats, carbohydrates, dairy, fibre, vegetables, fruit, digestion, stomach, oesophagus, intestines, bile, blood, teeth, incisors, molar, canine, predator, prev. consumer, producer		

Session	Learning Objective	Learning Question / Success Criteria	Lesson Outline
1	to know that animals, including humans, need the right types of nutrition	What is nutrition? SC: I can list nutritious and innutritious food and drink. (B) SC: I can group foods into different groups. (A) SC: I can explain the benefits of a healthy diet. (D)	Class discussion: What is nutrition? Can anyone identify the different types of nutrition we need? Does anyone know the different food groups? Do we understand what we mean by a balanced diet? Bitesize: https://www.bbc.co.uk/bitesize/topics/zjr8mp3/articles/zhkbn9q Share a range of foods/packets and see if the children can put them into the right food group. Explain what each food group gives humans and why they are all important. In science book (double page): Create a 'poster' that explains which food groups contain which food and what they provide us with. Use the food group as a subheading then draw/write examples. Advancing: Suggest foods that someone with vitamin C deficiency could eat. What might cause some children in countries at war become ill?
2	to construct and interpret food chains	What is a food chain? SC: I can interpret food chains. (B) SC: I can create a food chain. (A) SC: I can create a food chain, identifying it starting with green plants (producers), and annotating with details about herbivores, carnivores, prey and predators. (D)	Watch the videos and/or use the powerpoint in the folder on desktop. https://www.bbc.co.uk/bitesize/clips/zws87hv https://www.bbc.co.uk/bitesize/clips/zjshfg8 https://www.bbc.co.uk/bitesize/clips/z2vs34j You could get the children to 'be' different animals and find their prey etc to create food chains. Then, in books– can they draw and label a range of food chains? Some children might find it easier to cut out the mini pictures Label with producer, consumer, predator, prey and show how the energy flows with arrows. Can they explain why chains always start with sunlight? Can they identify why water is important? Advancing: Explain how water is important in a food chain. Describe how energy flows through a food chain.
3	to know the main bones and joints in the human body	What are the names of the bones in our body? SC: I can name the main parts of the skeletal system and identify the function of the skull, spine and rib cage. (B) SC: I can describe how bones, tendons and muscles work together. (A) SC: I can create a model to show how muscles, tendons and bones work. (D)	Children to draw round one person in each group – can they draw where the different bones go and label them? Then give the bones with the labels to put in the correct place. Label small skeleton in book. Advancing: explain the role of muscles in the human body
4	to know the parts and functions of the digestive system	How does our digestive system work? SC: I can explain the main process of digestion. (B) SC: I can suggest reasons why humans may have digestive issues. (A) SC: I can identify ways that humans can ensure they have an effective digestive system. (D)	https://www.bbc.co.uk/bitesize/topics/z27kng8 Operation Ouch Series 2 Ep 8 4.50mins (stomach) Series 2 Ep 4 4.50mins (swallowing) Series 4 Ep 4 (poo) Series 9 Ep 3 (tongue) Could create our digestive system using: Do try this at home Series 1 ep 5 Need: tights, food bags, plastic bottle, biscuits, bread, water, green (bile) colouring, red (blood) colouring, coffee (brown), tray, plates, bowl, potato mashers. Make a digestive system. create an explanation text with labelled diagram of the digestive system and explanations of each part. Advancing: suggest reasons why humans may have digestive issues.

5	to know the different types and function of human teeth	What is the function of our teeth? <i>SC: I can identify the location and function of molars, incisors and canines. (B)</i> <i>SC: I can compare the teeth of herbivores and carnivores, identifying what they tell us about diet. (A)</i> <i>SC: I can suggest ways that we can look after our teeth. (D)</i>	Ouch Series 6 Ep 5 Could: Create a model of the mouth with teeth using mini marshmallows Photo and labels in book Advancing: how do we take care of our teeth? Operation Ouch Series 2 Ep 1 4.10min
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Assessment	Rising Stars: Year 3, Tests 1 – 4 (choice of), Y3/4 Milestone 2 Animals inc. Humans: Unit Analysis and Powerpoints
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Living Things and their Habitats (Summer Term)

Investigate living things

This concept involves becoming familiar with a wider range of living things, including insects and understanding life processes.

Understand evolution and inheritance

This concept involves understanding that organisms come into existence, adapt, change and evolve and become extinct.

Milestone 2	- Construct and interpret a variety of food chains, identifying producers, predators and prey. - Recognise that living things can be grouped in a variety of ways. - Explore and use classification keys. - Recognise that environments can change and that this can sometimes pose dangers to specific habitats. - Identify how animals and plants are suited to and adapt to their environment in different ways.
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Vocabulary	Habitat, adaptation, vertebrate, invertebrates, classification, animals, birds, amphibian, reptile, fish
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Session	Learning Objective	Learning Question / Success Criteria	Lesson Outline
1	to group and classify living things	How can we group living things? <i>SC: I know that living things can be classified into different groups. (B)</i> <i>SC: I can identify common characteristics of mammals, reptiles, amphibians etc. (A)</i> <i>SC: I can create Venn diagrams and Branching diagrams to categorise living things. (A)</i>	MRS GREN – produce writing in book Small table of plants and animals
2	to name and describe a range of habitats to know how animals and plants are adapted to different habitats	How do plants and animals adapt to their habitat? <i>SC: I know that some living things only grow in certain habitats and locations. (B)</i> <i>SC: I can match living things to their habitats and can explain adaptations that have been made over millions of years. (A and D)</i>	Sorting vertebrates into 5 groups (photos in small groups) Then sort animals into different habitats (large paper with different habitats). Children then choose a habitat to investigate and write about one or two animals that live there and how they are adapted to that environment.
3	to know how plants and animals resemble their parents in many features	How do plants and animals resemble their parents? <i>SC: I can observe and describe similarities differences between living things and their offspring. (B)</i> <i>SC: I can observe and describe similarities differences between living things and their offspring and can name offspring that are not identical to their parents. (A and D)</i>	

4	to know that living things have changed over time	<i>How have living things changed over time?</i> <i>SC: I can identify examples of evolution. (B)</i> <i>SC: I can describe how plants and animals may evolve through adaptation to their environment. (A)</i> <i>SC: I know that animals have changed over millions of years and can suggest reasons / evidence to prove it. (D)</i>	
Assessment	Rising Stars: Year 4, Tests 1 – 4 (choice of), Y3/4 Milestone 2 Living Things and their Habitats: Unit Analysis and Powerpoints		



LIGHT

KNOWLEDGE ORGANISER



V3

Overview



- Light is a form of energy that makes it possible to see.
- Light is given off some objects (for example the Sun). Darkness is when there is no light.
- Light can reflect off surfaces (e.g. mirrors)
- Objects can be labelled as transparent, translucent, or opaque, depending on the amount of light that they let through.
- Shadows are formed when light is blocked by an opaque object.

Light – Key Terms



Dark

- Darkness is the absence of light. In other words, where there is no light, it is dark!
- Human vision is unable to see colours when there is high levels of darkness (too little light).
- At nighttime, the sky is darker because there is a lack of light from the sun.



Absorption

- When light hits an object, it may be absorbed into the object.
- This means that it doesn't bounce off or pass through the object.
- Some examples of materials/objects that absorb light include wood, brick and stone.



Reflection

- Light may also reflect off the surface of an object.
- This means that light bounces off the object, sending it in another direction.
- Some examples of materials/objects that reflect light include mirrors or polished metal surfaces.



Transmission

- Light can also be transmitted through certain objects.
- This means that it passes through the object. It can be seen from the other side of the object.
- Some examples of materials/objects that transmit light include windows and clean water.

Transparent, Translucent and Opaque



When light hits an object, it can be absorbed by the object, reflect (bounce off) the object, or (transmit) pass through an object.

The three key terms below tell us how much light objects let through them.

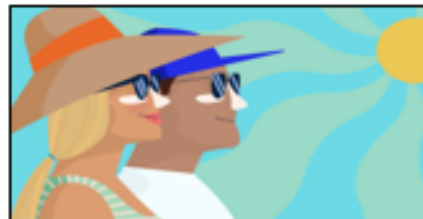
Transparent – Transparent objects allow all of the light to pass through them. This means that we can clearly see through them.

Translucent – Translucent objects only allow some light to pass through them. This means that we can partially see through them.

Opaque – Opaque objects do not allow any light to pass through them. This means cannot see through them at all.

Protection from Light

Some types of light (e.g. light from the sun) can be dangerous for our eyes and skin. This is because they contain UV rays that can cause damage. There are several things that we can do to protect ourselves in the sun.



1. Wearing sunglasses – Sunglasses reduce the amount of light (and also the UV rays) that reaches our eyes.
2. Covering up – Clothes can help to block some of the UV rays that can damage our skin.
3. Sun cream – This stops our skin from absorbing as many UV rays, protecting it from harm.

Transparent Objects

Windows

Water

Air

Translucent Objects

Frosted Glass

Tracing Paper

Flower Petals

Plastic Milk Carton

Opaque Objects

Table

Sofa

Brick



SOUND

KNOWLEDGE ORGANISER



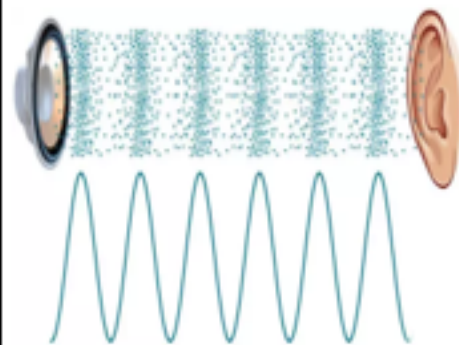
Y4

Overview



- Sounds are made when objects vibrate.
- Vibrations travel from objects in waves to our ears, allowing us to hear sound.
 - Weak vibrations make a gentle soundwave which do not travel as far as strong vibrations. This is why sounds have different volumes.
- Sounds can be high pitched or low pitched. Tight, short frequency waves make a high-pitched sound, while more loose waves make low-pitched sounds.

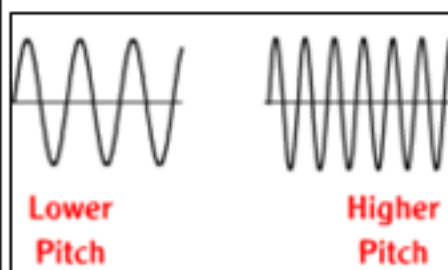
How Sounds are Made



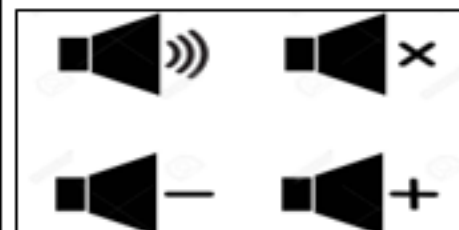
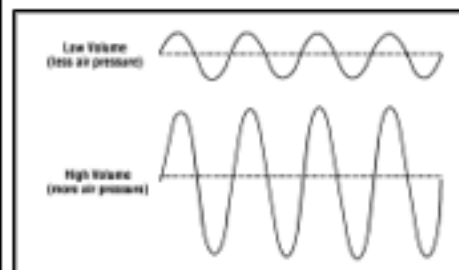
- Sounds are created when something vibrates (shakes back and forth).
- This creates soundwaves which travel to the ears of the listener.
- When a bell is struck, the metal of the bell vibrates. These vibrations create waves in the air (sound waves).
- When they reach our ears, they make our eardrums vibrate, and we hear the sound of the bell ringing.

Pitch

- Pitch is the highness or lowness of sounds.
- Pitch is caused by the frequency of vibrations (how many times vibrations go back and forth per second).
- The higher the rate of vibrations, the higher the pitch.
- Lower pitch sounds have a lower rate of vibrations.
- Humans can hear a large range of pitches, high-pitch sounds e.g. a mouse squeak to low-pitch sounds e.g. the rumble of an earthquake.
- However, some sounds are too high or low-pitched for us to hear.



Volume



- Volume is the loudness of a sound.
- The volume of a sound depends on the amount of energy that the vibrations contain.
- Vibrations with lots of energy create large soundwaves.
- When these large soundwaves arrive at your ears, they push harder on your eardrums.
- This is why when we strike a drum harder (with more energy) it is louder than when we strike it more softly.
- Our ears can detect a wide range of loud and quiet sounds, from rumbling jet engines to leaves rustling.



ANIMALS including Humans KNOWLEDGE ORGANISER



Vs

What you should already know...



- Animals can be split into different groups (e.g. birds/fish & carnivores/omnivores)
- All animals have basic needs that have to be met in order for them to survive: water, food, shelter, oxygen, temperature
- Animals have different stages in their lives – birth, growth, reproduction and death.
- Humans (and most other animals) need to stay healthy, by exercising, eating a balanced diet, and being hygienic.

Nourishment



-Unlike plants, animals cannot create their own food. They get nutrition from what they eat.

-This is because animals do not have chlorophyll, or chloroplasts in their cells, like plants do.

-Therefore, plants are called producers and animals are called consumers.

-The different nutrients that animals get depends on their diet. For example, a cheetah gets lots of protein in its diet because it is a carnivore (eats meat).



Types of Nutrition

Carbohydrates



-Carbohydrates give the consumer energy.

-Foods that have lots of carbohydrates in are often called 'starchy' foods.

-Carbohydrate-rich foods include pasta, rice, oats, breads, breakfast cereals and barley.

Protein



-Protein helps the body (especially the muscles) to repair itself.

-Protein-rich foods include meat, eggs & nuts.

Fat



-Fats also give consumers lots of energy. However, too much fat is not healthy!

-Butter, cakes & fast food contain lots of fat.

Fibre



-Fibre helps our digestive systems to work well.

-Fibre is often found in high-carbohydrate foods like bread, cereal, potatoes, and some fruits.

Vitamins and Minerals



-There are many different vitamins and minerals that perform hundreds of roles in the body.

Fruit and vegetables are vitamin/mineral-rich.

Skeletons and Muscles

Skeleton

-Humans (and many other animals) have a system of bones called a skeleton.

-Skeletons help to support your body – they give it its shape.

-Skeletons are also important for movement. Muscles are attached to bones.

-Finally, skeletons help to protect important parts of the body. E.g. the ribs protect the heart and lungs.



Muscular System

-Humans (and many other animals) also have a system of muscles in their bodies.

-The main purpose of muscles is for movement. As they contract, muscles move parts of the body around.

-Muscles are also important for maintaining posture, helping humans/ animals to sit, stand, and walk.

-Some muscles (e.g. the heart) move by themselves – they are involuntary.

Amounts of Nutrition

Mouse
0.004kg per day



Deer
4kg per day



Tiger
13kg per day



Blue Whale
3,300kg per day



Electricity



Motor

Bulb & holder

Buzzer

Battery holder

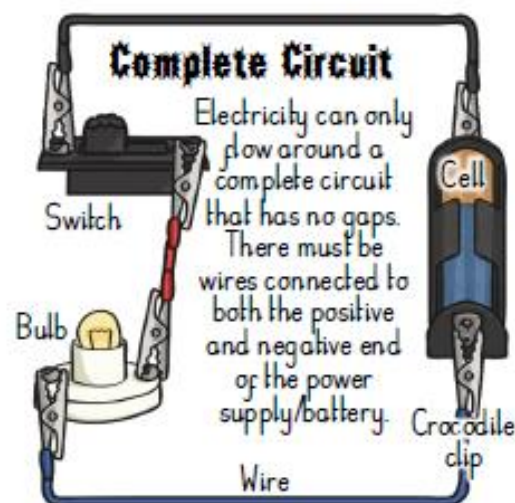


Wires

Crocodile Clips

Switch

Cell (battery)

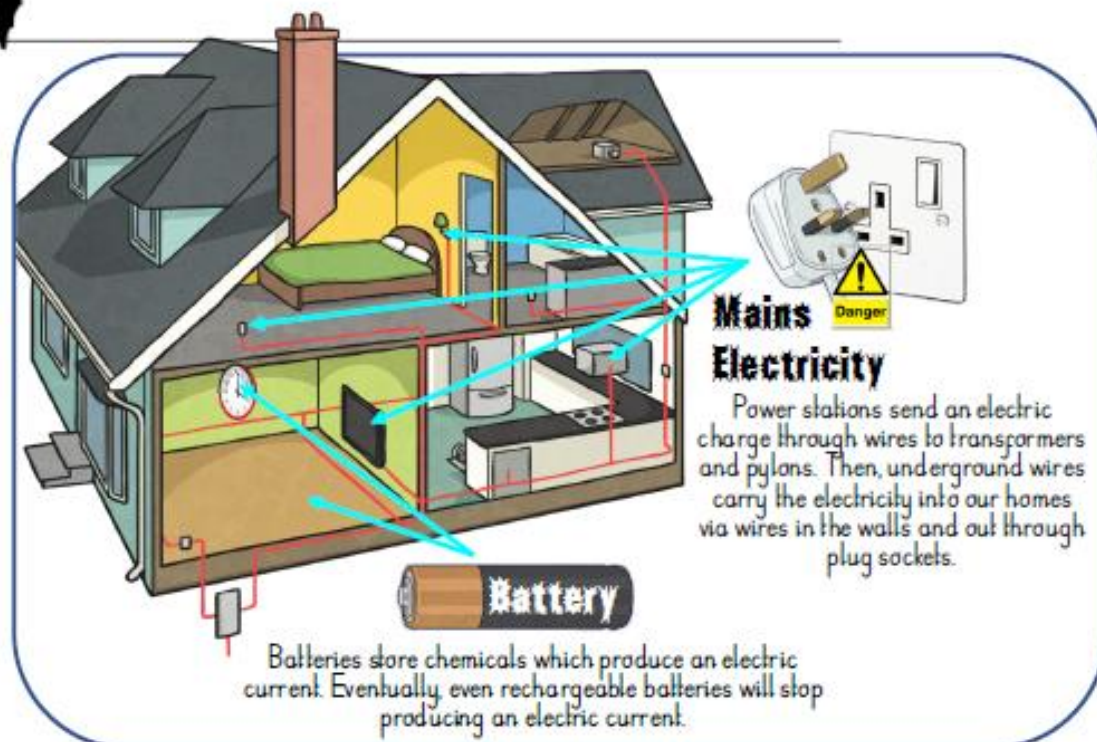


Complete Circuit

Electricity can only flow around a complete circuit that has no gaps. There must be wires connected to both the positive and negative end of the power supply/battery.

Wire

Crocodile clip



Mains Electricity

Power stations send an electric charge through wires to transformers and pylons. Then, underground wires carry the electricity into our homes via wires in the walls and out through plug sockets.

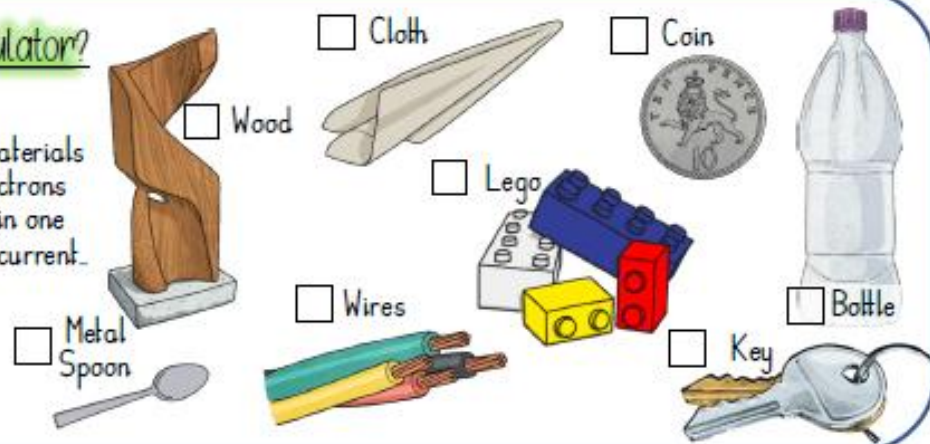
Battery

Batteries store chemicals which produce an electric current. Eventually, even rechargeable batteries will stop producing an electric current.

Is it a conductor or insulator?

Conductor of electricity are materials that are made up of free electrons which can be made to move in one direction, creating an electric current.

Insulator have no free electrons and so no electric current can be made.



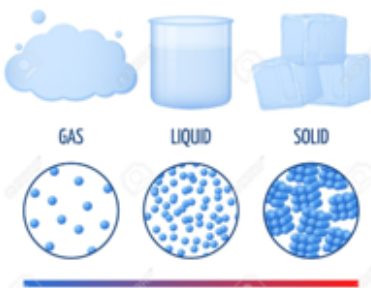


STATES OF MATTER KNOWLEDGE ORGANISER

Scamblesby CE Primary School:
BADGERS CLASS

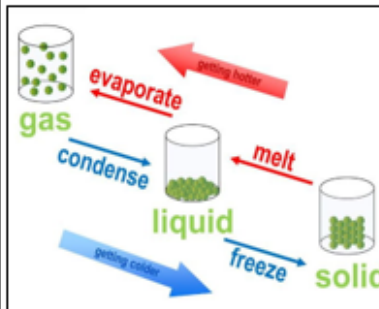


Overview



- Matter makes up our planet and the whole Universe.
- There are three main states of matter – solids, liquids and gases.
- Matter can change state, depending on its temperature.
- Several processes describe the processes of changing states, e.g. melting, evaporation, freezing and condensation.
- The water cycle depends upon some of these processes.

Changing States of Matter



States of matter can change, depending upon the temperature of the matter.

-Melting is the process of changing a solid into a liquid.

-Evaporation is the process of changing a liquid into a gas.

-Condensation is the process of changing a gas into a liquid.

-Freezing is the process of turning a liquid into a solid.

Solids, Liquids and Gases

All matter exists in three states: solids, liquids and gases.

SOLIDS

- Solids hold their shape
- Solids are rigid

- Solids have a fixed volume

Examples include ice cubes, rock, glass and most metals.



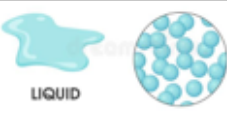
LIQUIDS

- Liquids do not hold their shape

- They are not rigid

- However, they have a fixed volume.

Examples include water, oil, blood and milk



GASES

- Gases do not hold their shape

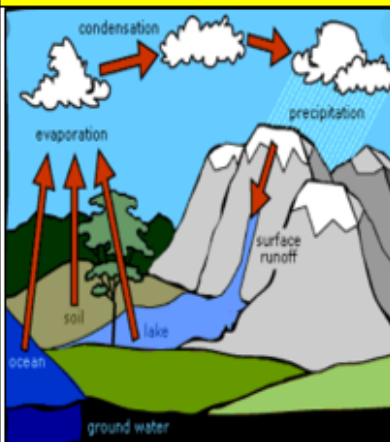
- They are not rigid

- They do not have a fixed volume.

Examples include oxygen, carbon dioxide and helium.



Role in the Water Cycle



Changing states of matter play an important part in the water cycle:

EVAPORATION

Energy from the sun heats up the surface of the Earth. This causes the temperature in rivers, lakes and oceans to rise, and evaporate into the air.

CONDENSATION

As the water vapour rises, it cools in the higher air and turns back into liquid – condensation. This creates clouds.

PRECIPITATION

When too much water has condensed, the clouds become too big for air to hold them. Precipitation occurs.

Solids

Wood

Ice Cube

Glass

Liquids

Coffee

Water

Shower Gel

Gases

Carbon Dioxide

Air

Oxygen



LIVING THINGS and their HABITATS



Vertebrates can be further categorised into 5 groups:

BIRDS

- have feathers & wings →
- lay eggs
- have 2 legs
- ear holes instead of ears.
- warm-blooded

REPTILES

- have scales, not fur.
- have dry skin.
- usually lay eggs, sometimes live young
- ear holes instead of ears.
- 4 legs or no legs
- cold-blooded.

MAMMALS

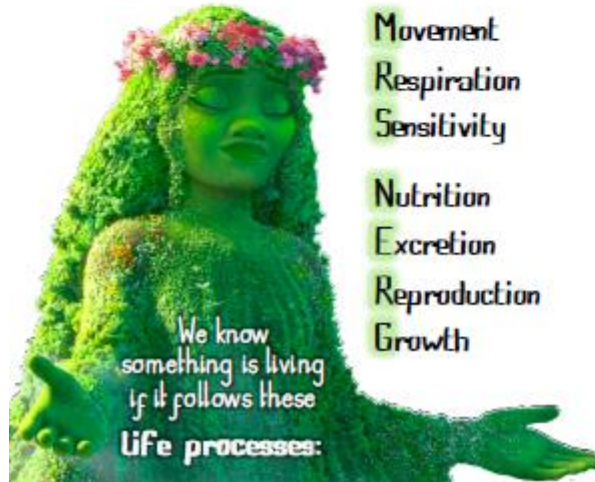
- have hair or fur
- give birth to live young
- mammal mothers nurse their young with milk.
- have lungs and need air to breathe.
- mammals that live on land have 4 legs, and ones that drink out.
- warm-blooded

AMPHIBIANS

- live on land & in water.
- webbed feet.
- breathe with lungs & gills.
- cold-blooded
- moist smooth skin, (no hair or fur)
- 4 legs (sometimes none)
- lay many eggs.

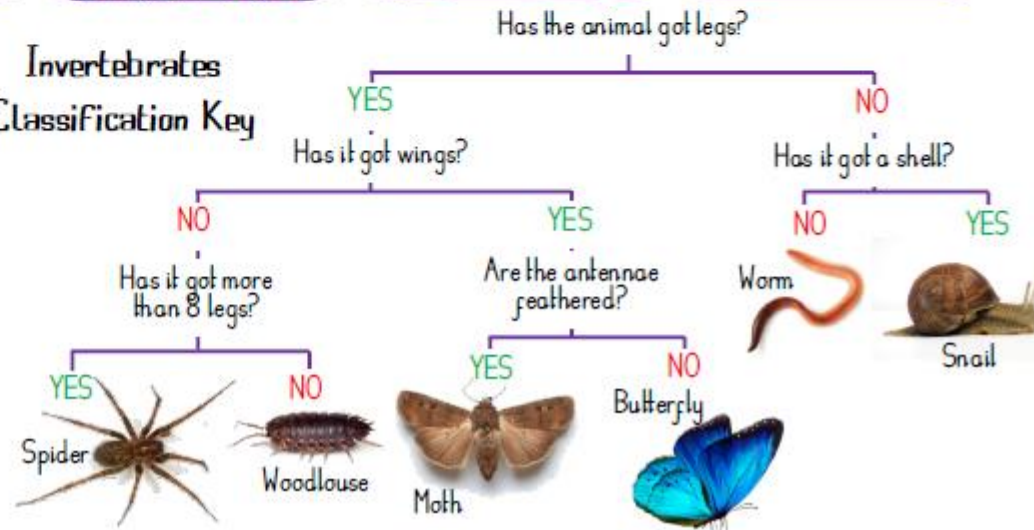
FISH

- breathe underwater, using gills, not lungs.
- live in water
- have scales and fins. (no hair or fur)
- cold-blooded.
- lay MANY eggs.



- Movement
- Respiration
- Sensitivity
- Nutrition
- Excretion
- Reproduction
- Growth

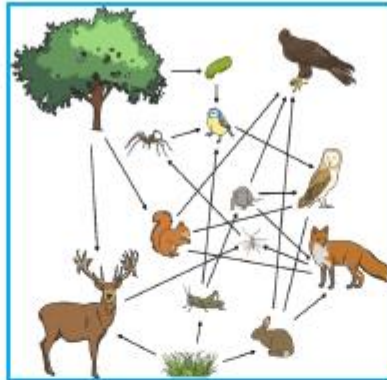
Invertebrates Classification Key





ANIMALS INCLUDING HUMANS

FOOD WEB



Consumers get their energy from eating other organisms either plants, meat or both.

Producers make their own energy using the sun through photosynthesis.

Producer



Primary Consumer



Secondary Consumer



Tertiary Consumer



FOOD CHAINS



Herbivore

Herbivores eat only plants.



Detritivore

Detritivores eat dead organisms.



Omnivore

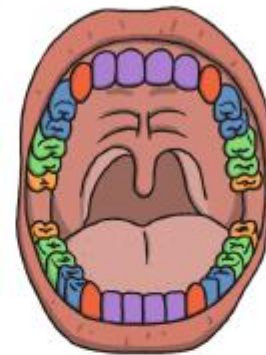
Omnivores eat both plants and meat.



Carnivore

Carnivores eat only meat.

THE DIGESTIVE SYSTEM



- Canine
- Molars
- Premolars
- Incisors
- Wisdom Teeth



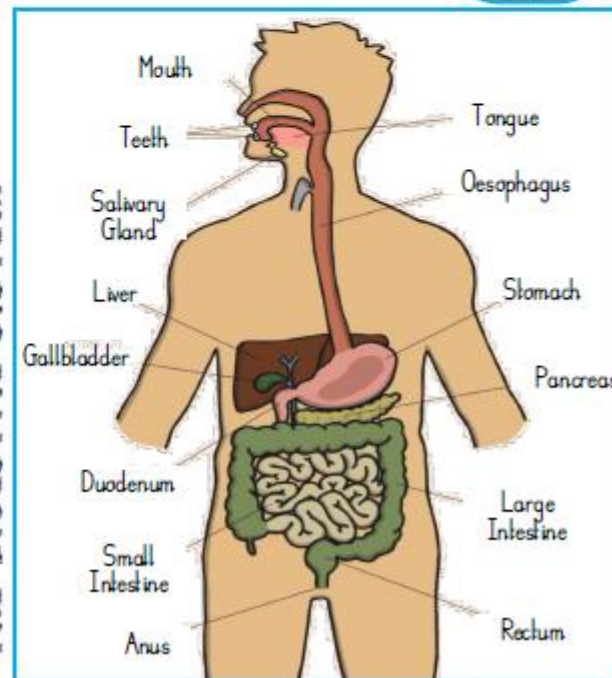
Canines



Molars & Pre-molars



Incisors





FORCES AND MAGNETS

KNOWLEDGE ORGANISER



V3

Overview

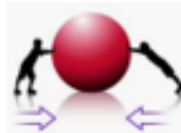


- Forces are pushes and pulls which make things move and stop moving.
- Most forces need contact between objects, but magnets can act at a distance.
- Magnets are made of materials that create a magnetic field (the area in space where the force of magnets can be detected).
- Magnets have at least one north pole and one south pole.
- Magnets can attract or repel one another. They attract some materials & not others.

Forces

What are forces?

- A force is the push or pull of an object in a particular direction.
- Forces are shown by arrows in diagrams. The bigger the arrow, the bigger the force. The direction of the arrow shows the direction of the force.



Pushes and Pulls



- A push is the force that moves an object away from something.

- A pull is the force that brings an object towards something.



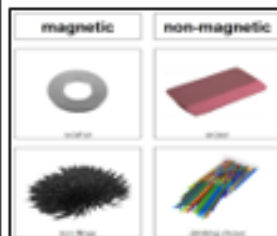
- A push and a pull are opposite forces, moving objects in different directions.

Balanced and Unbalanced Forces

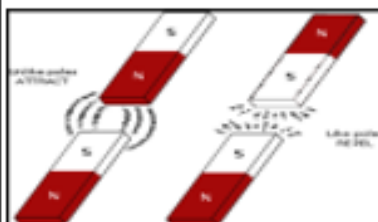
- If two forces are balanced, they are the same size but are acting in opposite directions. If the two forces are acting on an object, then its motion will not change.

- When two forces acting on objects are not equal in size, they are called unbalanced. Unbalanced forces change the way and/or speed that something is moving, e.g. they can make objects speed up/slow down.

Magnets



- A magnet is an object that is made of materials that create a magnetic field.
- Magnets create a 'magnetic force' – this is a force that causes objects to attract (pull closer together) or repel (push further apart).
- Unlike most other forces, 'magnetic force' does not require objects to touch one another – magnets can act at a distance.

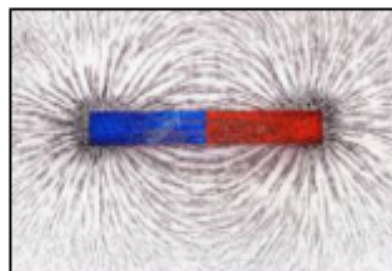


- Magnets have two poles – a north pole and a south pole.

- The north pole of one magnet will repel the north pole of another magnet. However, it will attract the south pole of another magnet.

Magnetic Fields

- A magnetic field is the area in which a magnetic force can be felt. A magnet will only attract or repel a magnetic object when it enters its magnetic field.



- Magnetic fields cannot be seen with the human eye. However, spreading iron filings over the magnetic field allows us to see the magnetic field, as the filings cling to it.

- Magnetic fields can pass through air. Some can even have an effect through solids and liquids (depending on the strength of the magnet).

Magnetic Materials

Iron

Steel

Nickel

Cobalt

Gadolinium

Non-Magnetic Materials

Copper

Gold

Rubber

Wood

Leather



PLANTS

KNOWLEDGE ORGANISER

Scamblesby CE Primary School:

What you should already know...



- Plants are a large group of living things that use sunlight to make their own food.
- There are many, many different kinds of plants, including trees, vines and grasses.
- Plants have lots of different parts, for example stems, leaves and roots.
- Some trees lose their leaves in the winter (deciduous). Some keep their leaves through the year (evergreen).
- Some plants are 'flowering plants' – they grow flowers on them.

What Plants Need to Grow



Water and Nutrients

Like animals and humans, plants need water and nutrients to survive.

- Plants are able to get water from the soil through their roots.
- They can also catch water on their leaves.



Temperature

- Plants need the temperature to be just right for them to grow properly.
- If it is too hot, they may burn and wilt. If it is too cold, they may freeze and die. This is why there are less plants at the poles and the deserts.



Light

Plants need lots of sunlight to help them grow.

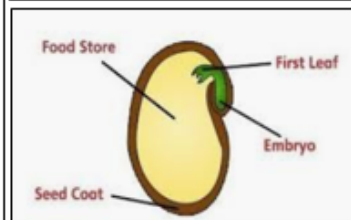
- Plants do not eat food. They instead use sunlight to make their own food.
- Too little light will leave plants weak.



Space and Time

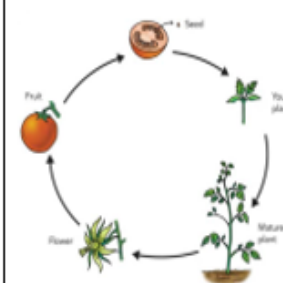
- Plants need room for their roots and stems to be able to grow. Without enough room, they may not grow large enough.
- Plants also need time – it can take days, months or even years for them to grow.

Growth from Seeds/Bulbs into Mature Plants



- Germination is the name for when a plant starts to grow. A plant is germinating when its seed begins to sprout.
- Inside a seed/bulb is the baby plant (an embryo). Seeds have a tough layer on the outside to protect the plant (the seed coat).
- Seeds and bulbs do not need sunlight in order to grow. They already have their own food store inside them!
- However, they do need the right conditions to grow. Normally, they need water, air and the right temperature. This can often be found in well-watered soil!

Plant Life Cycle



Plants have a clear life cycle that helps them to keep reproducing:

Seeds/bulbs – Plants begin life as seeds or bulbs. They need soil, air and water to grow.

Seedling – Plants grow into young plants. They now need light, temperature, water, space and time to keep growing.

Flowering/Fruit – Plants grow flowers and fruits. These produce seeds. When the plant dies or is pollinated, the seeds find their way to the soil. The process starts again!

Smaller Plants

Dandelion – about 25 centimetres

Dwarf Evergreen Shrub – about 1 metre

Sunflower – 1-3 metres

Taller Plants

Titan Arum Flower – up to 3.5 metres

Spruce (Christmas Tree) – up to 30 metres

Giant Redwood Tree – 100 metres+

