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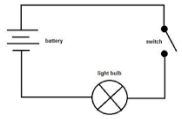
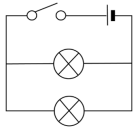
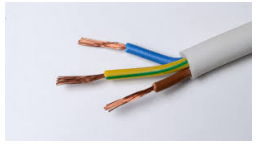
Year 4 Science Knowledge Goals Autumn 1 - **Electricity**

	**Electricity** is created by generators which can be powered by gas, coal, oil, wind or solar. The electrical energy can be converted into other types of energy such as light, heat, movement or sound.
	A circuit is a complete path around which electricity can flow, it must include a source such as a battery
	In a parallel circuit, the electrical current may flow along multiple paths before returning to the power source. The Voltage in a parallel circuit is the same across all of the loads in the circuit.
	Some materials let electricity pass through them easily. These materials are known as **electrical conductors.** Many **metals,** such as **copper, iron and steel,** are good **electrical conductors.** That is why the parts of electrical objects that need to let electricity pass through are always made of metal. Metal is used in plugs to allow electricity to transfer from the wall socket, through the plug, and into a device such as a radio or TV.
	Some materials do not allow electricity to pass through them. These materials are known as **electrical insulators.** **Plastic, wood, glass** and **rubber** are good **electrical insulators.** That is why they are used to cover materials that carry electricity. The plastic covering that surrounds wires is an electrical insulator. It stops you from getting an electrical shock.

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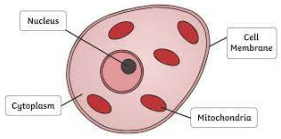
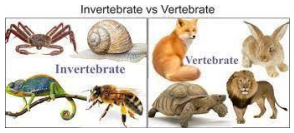
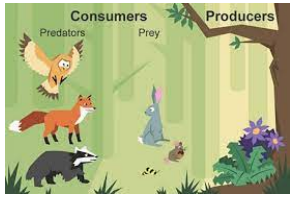
Year 4 Science Knowledge Goals Autumn 2 - **Habitats**

	An **organism** is a term for any living thing. Organisms usually have five basic needs. They need air, water, nutrients (food), energy and a place to live. However, not all living things need all these at the same time.
	A **vertebrate** is an animal with a backbone such as fish, amphibians, birds and mammals **Invertebrates** are animals that do not have a backbone. They either have a soft body, like worms and jellyfish, or a hard outer casing covering their body, like spiders and crabs.
	As a year passes, regular changes occur in the weather. This cycle of weather changes is divided into four parts, known as the **seasons.** The four seasons are winter, spring, summer, and autumn, or fall. **Hibernation** is a way that some animals deal with the harshness of winter. They curl up in a safe place and stay there until winter ends. Hibernating animals seem almost dead. They barely breathe, and their body temperature is near the freezing mark. In warmer weather they return to their regular activities.
	**A producer** is the name given to a living thing that produces its own food, rather than consuming another living thing. Producers are typically green plants who make their own nutrients by photosynthesis. Producers are eaten by primary consumers - the first **consumer** in a **food chain**.

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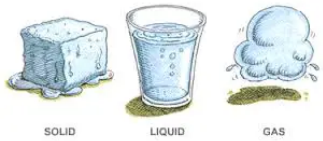
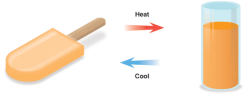
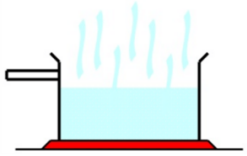
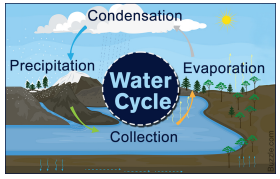
Year 4 Science Knowledge Goals Spring 1- **States of Matter**

	Matter makes up our planet and the whole universe. On Earth, all matter exists in one of three main states: **solid, liquid or gas.** A solid can hold its shape (for example, water in solid form is ice). A liquid like water forms a pool: it flows or runs but it can't be stretched or squeezed.
	A **gas** can flow, expand and be squeezed; if it is in an unsealed container it escapes (water in gas form is steam).
	**Reversible changes** occur when materials can be changed back to how they were before the reaction took place.E.g. When ice melts to form water. It could be frozen back to ice again. An **Irreversible change** means when materials cannot be changed back to how they were before.E.g. When a pice of wood is burned to form ash. It cannot be made wood again
	**Evaporation** occurs when a liquid turns into a gas. When a liquid is heated at a certain temperature it changes state and becomes water vapour.
	**The water cycle** is the process of water moving around between the air and land. Or in more scientific terms: the water cycle is the process of water evaporating and condensing on planet Earth in a continuous process. This process has been happening continuously for millions of years and without it, there would be no life on Earth

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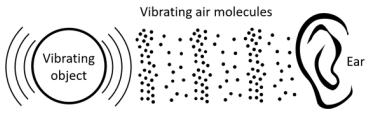
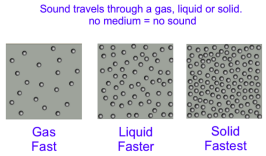
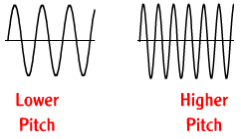
Year 4 Science Knowledge Goals Spring 2 - **Sound**

	**Sounds** are made when objects vibrate. The vibration makes the air around the object vibrate and the air vibrations enter your ear. You hear them as sounds.
	Sound travels fastest through solid materials like metal and wood.It travels quite fast through liquids like water.It still travels through gases like the air. Sound does not travel at all when there is no air, like in space. This is called a vacuum and would be completely silent.
	**Pitch** is the quality of a sound (high or low) and depends on the speed of the vibrations. Different materials produce different pitches; if an object vibrates quickly we hear a high-pitched sound and if an object vibrates slowly we hear a low-pitched sound.
	The loudness of sound is measured in units called **decibels (dB)**. For example, the humming of a refrigerator is 40 decibels and normal conversation is approximately 60 decibels.
	A **fair test** is a test that controls all but one variable when attempting to answer a scientific question. Only changing one variable allows the person conducting the test to know that no other variable has affected the results of the test.

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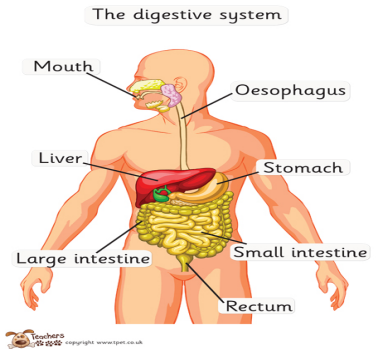
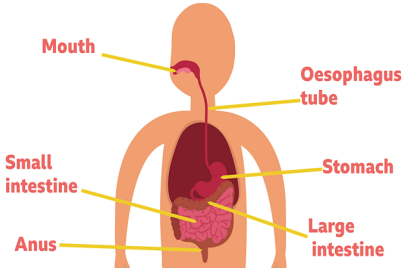
Year 4 Science Knowledge Goals Summer 1 - **Animals including humans**



The food that we eat has to be broken down into other substances that our bodies can use, and any waste removed. This is called digestion.

The **digestive system** is the system for digestion in the human body, it describes how we break down our food.



The journey of food through the digestive system is as follows:

1) The mouth

Food enters the digestive system as soon as you put it in your mouth. This is where food is broken down by your teeth, mixed with saliva and swallowed.

2) The stomach

Once you have swallowed your food, it travels down your oesophagus into your stomach where the food is churned with stomach acid to kill any germs which may be on it.

3) The intestines

Your body has two sets of intestines:

- **Small intestines**: where food is broken down and nutrients are absorbed into the blood.

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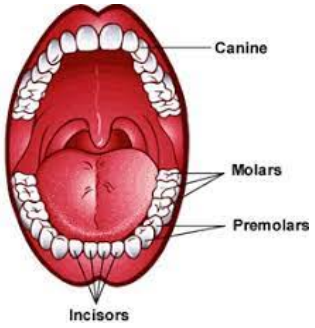
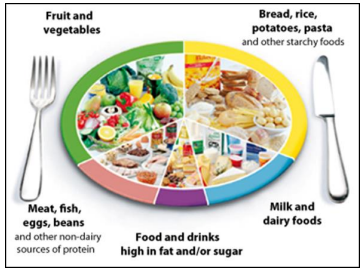
	· **Large intestines**: where water is absorbed into the blood. Any food that can't be absorbed is then stored in your anus until you go to the toilet.
	Humans have three main types of **teeth:** **1. Incisors** Incisors help you bite off and chew pieces of food. **2. Canines** These teeth are used for tearing and ripping food. **3. Molars** These help you crush and grind food.
	Good **nutrition** means your body gets all the nutrients, vitamins, and minerals it needs to work its best. There are two main types of nutrients, macronutrients and micronutrients. The three main categories of macronutrients include carbohydrate, protein, and fat. The two types of micronutrients are vitamins and minerals, and these are extra molecules that cells need to make energy.

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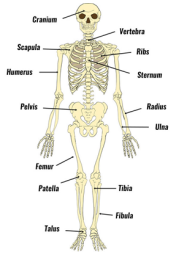
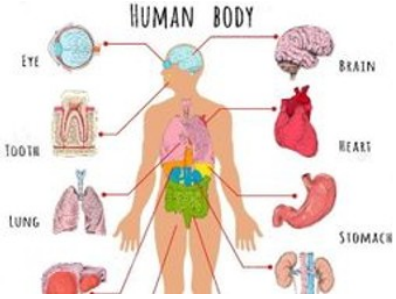
Year 4 Science Knowledge Goals Summer 2 - **Healthy living**

	**Mrs Nerg** is an acronym that is used to explain the seven characteristics of **living things**. The letters in the name Mrs Nerg stand for; Movement, Respiration, Sensitivity, Nutrition, Excretion, Reproduction and Growth.
	**Bones** provide the structure for our bodies. The adult human skeleton is made up of 206 bones. These include the bones of the skull, spine (vertebrae), ribs, arms and legs. Bones are made of connective tissue reinforced with calcium and specialised bone cells. Most bones also contain bone marrow, where blood cells are made.
	An **organ** is the name of a group of different tissues working together to perform a job inside the body. Organs are grouped together into organ systems - for example, the digestive system or circulatory system. Some of the most vital organs in our body are: **<u>Kidneys</u>** The kidney is a small organ, well, it is actually a pair. They are small, bean-shaped organs that are tucked into the sides of our abdomen. **<u>Heart</u>**

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	The heart is definitely one of the most important organs in our bodies. It is the pump that allows blood to flow around your body. It is located in the centre of the chest and is about the size of your fist. Not only that, but it pumps blood around each of the veins and arteries of your body to make sure that each muscle and organ is provided with oxygen and nutrients. **Liver** Our liver is located in the upper right part of our abdomens, and it has around 500 functions in the body! Just a few of those functions are that it stores energy in the form of glycogen, cleans the blood in your body and produces the fluid used in digesting food. **Brain** The brain is located inside our skull, at the top of our heads, and it is like a central computer for all the other functions in our body It is the organ which sends messages to the rest of the body (using the spinal cord to send the message incredibly quickly). Without the brain, all of your muscles and organs would not function at all.
	Eating a **balanced diet** is important for our health. Enjoy food from each of the five food groups and you'll be getting a fantastic mix of the best nutrients and vitamins. 1) **Carbohydrates** - give you energy, calcium and B vitamins. These could be servings of pasta, rice, oats, potatoes and sweet potatoes or noodles, yam, couscous, bread, barley and rye. Breakfast cereals are also a carbohydrate and many contain extra iron too 2) **Protein -** Think of proteins as building blocks for the body – they help it grow and repair itself. Protein is found in meat, fish and eggs, while nuts, beans, lentils, peas, dahl, Quorn and soya are great vegetable proteins. These foods also provide us with iron and other vitamins and minerals. 3) **Dairy products -** Packed with calcium, protein and vitamins such as vitamins A, D and B12, dairy products keep our bones and teeth healthy. Our bodies easily absorb the calcium from these foods, such as milk, yoghurt, fromage frais and cheese.

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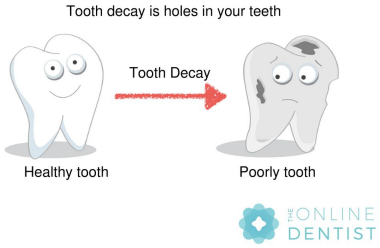
	4) **Fruit and vegetables -** fresh, frozen, tinned, dried and juices – are brilliant for our diets. They're full of health-giving vitamins, antioxidants and fibre – that keep us feeling full and our digestive systems healthy – plus they're low in calories. By eating a wide variety of fruit and veg, you'll be getting a range of the important nutrients they contain. 5) **Fats and sugars-** It's important not to have too many foods from this group as they give us a lot of energy from calories but not much nutrition. Try to keep foods such as butter, margarine, cooking oils and salad dressings to a minimum and save chocolate, crisps, sugary soft drinks, sweets, jam, cream, cakes, pudding, biscuits and pastries for the occasional treat.
Tooth Decay 	**Tooth decay** is damage to a tooth that can happen when decay-causing bacteria in your mouth make acids that attack the tooth's surface, or enamel. This can lead to a small hole in a tooth, called a cavity. If tooth decay is not treated, it can cause pain, infection, and even tooth loss.