Boston West Academy Science LTP

EYFS	Seasons	Space	Floating and sinking	Mini beasts	Humans	Animals and plants
Snap Science units progression of knowledge, MTP and STP and resources used Y1-Y6						
Year 1	**Seasonal changes**	**Human body and senses**	**Naming and describing materials.**	**Properties and uses of materials**	**Animals (vertebrates)**	**Identifying plants and their parts**
Year 2	**Local habitats**	**Choosing materials**	**Growing seeds and bulbs**	**Growing up (animals and humans)**	**Changing materials**	**Growing healthy plants**
Year 3	**Rocks**	**Light and shadows**	**Forces, friction and magnets**	**Movement and nutrition for the human body**	**Flowering plants and plant growth**	**Flowering plants life cycle**
Year 4	**Changes of state**	**Electricity: circuits**	**Human impact on the environment**	**Digestion and food chains**	**Sound**	**Classification of plants and animals**
Year 5	**Forces and mechanisms**	**Properties and uses of materials**	**Earth and space**	**Plant and animal life cycles**	**Separating mixtures and changing materials**	**Human growth**
Year 6	**Classification of living things**	**Evolution and inheritance**	**What light does**	**Human circulation**	**Electricity changing circuits**	**Body health**

Boston West Academy Science LTP

Our science curriculum is taught through the following concepts.

Biology 	Chemistry 	Physics 
Seasons Animals including humans Plants Environmental Evolution Classification	Materials	Light Sound Forces Electricity Earth in space

Conceptual knowledge develops from year to year and is connected between topics.

Biology progression of knowledge 		
Year	Module	Seasons
EYFS	Seasons	Know the names of the seasons. Identify environmental changes in each season. Weather and environmental changes. Know the months of the year where each season occurs. Identify what clothing/accessories to wear for each season.
1	Seasonal changes	There are different types of weather: rain: sun, wind, fog, snow, cloudy. There are 4 seasons across the year. Each season has its own weather patterns and natural events, which happen each year. In Autumn the weather becomes colder, leaves change colour and drop and daylight hours become shorter. Winter is the season that comes after Autumn. It has the coldest weather of the year. Some animals hibernate. In spring the temperature and daylight hours begin to increase, plants begin to grow and hibernating animals emerge. Summer is the warmest season of the year. The sun is highest in the sky in the summer. Many flowering plants produce fruits in the summer.
Year	Module	Animals including humans

Boston West Academy Science LTP

EYFS	**Animals/ Mini beasts/ Humans**	**Animals grow and change throughout their lives. Animals need food, water and shelter to survive. Identify the key changes of a lifecycle of a chick and a caterpillar. Identify the key features of a animals. Identify the names of minibeasts. Identify the features of different minibeasts. Talk about the different habitats of minibeasts.** **Use vocabulary to describe the changes of minibeasts(cocoon, egg, larva, butterfly, ladybird, caterpillar, pupa)** **Humans need to stay clean and hygienic to survive. Regular physical activity is important for good health. Regular teeth brushing is important for good oral hygiene. Humnas grow and change throughout their lives**
1	**Human body and senses**	**Humans are mammals. The main parts of the human body are the head, arms and hands, torso and legs and feet.** **Humans have five basic senses which help us to make sense of the world around us: sight, touch, hearing, smell and taste.** **Although humans are all the same generally, they vary in, for example, their skin, hair, eye colour, shoe size and fingerprint.**
	Animals (vertebrates)	**Vertebrates are animals that have a backbone.** **There are five vertebrate groups in the animal kingdom – mammals, amphibians, reptiles, birds and fish.** **Features of reptiles: eggs, claws, teeth, scaly skin and living on land.** **Features of birds: eggs, feathers, beaks, claws and wings.** **Features of amphibians: eggs, water and land living, changes to them as they grow.** **Features of fish: water living, scales, gills, teeth, fins and eggs.** **Features of mammals: hair or fur covering their bodies; give birth to live young; produce milk for their offspring; nurture offspring; look like a younger version of their parent; and range of movement.** **Animals can be groups by what they eat as carnivores, herbivores and omnivores.**
2	**Growing up (animals and humans)**	**Animals grow and change throughout their lives.** **All animals need food, water and air to survive.** **Humans need to eat food from the four main focus groups each day: fruit and vegetables; dairy; meat, fish, pulses and eggs; and starchy foods including bread, potatoes, pasta and rice.** **Humans need to stay clean and hygienic to be healthy.** **Regular physical activity is important for good health.**
3	**Movement and nutrition for**	**The different types of food we eat contain different nutrients. These are useful for our bodies in different ways.** **A healthy diet contains a balance of different nutrients.** **Some of the bones in our skeleton protect our vital organs. Other bones provide support so that our body can remain upright. Our joints allow us to move our bones so that our bodies can move.**

	the human body	Muscles work in pairs to move the bones in our skeleton. Vertebrate bodies are supported by an internal bony skeleton including a spine (made of many vertebrae). Invertebrates have no bony skeleton. Vertebrate skeletons all have a spine. The bones vary in size and shape.
4	Digestion and food chains	The digestion system breaks down food we eat into smaller pieces that our body can use for energy and growth and gets rid of waste. The main parts of the digestive system are the mouth, oesophagus, stomach, small intestine, large intestine, rectum and anus. Humans have different types of teeth: incisors, canines and molars. Teeth have different shapes to break up different foods. Incisors are used for cutting food, canines for tearing and molars for grinding. Food is chemically broken down in the stomach and small intestine, the large intestine absorbs water and the rectum stores poo. A food chain shows how energy and nutrients pass from one living thing to another as they eat or get eaten by each other. A producer (a plant) makes the food using water, air and the energy of the sun. This is passed to the consumer (a herbivore) that eats it. It is then passed to any animal (a carnivore) that eats the consumer. Animals have teeth appropriate to the food that they eat. Carnivores have sharp slicing teeth for eating meat. Herbivores have flat topped teeth for crushing plant matter.

5	Plant and animal life cycles	All living things have a life cycle which includes growth and reproduction, eventually ending in death and decay. Most animals reproduce sexually. This involves two parents, a male and a female. The sperm from the male fertilises the female egg inside her body. Female birds lay eggs with hard shells. These may or may not be fertilised. Mammals reproduce by sexual reproduction. Female mammals give birth to live young and produce milk to feed their young. Amphibians reproduce by sexual reproduction. Amphibian females' eggs are fertilised outside her body. Some amphibians go through a process of incomplete metamorphosis. The majority of insects go through a process of complete metamorphosis. Some insects go through a process of incomplete metamorphosis. Flowers contain male sex organs called stamens and female sex organs called carpel. Pollen must be moved to a part of the carpel called the stigma for reproduction to take place. This process is called pollination. Seeds are the product of sexual reproduction. The plants that grow from them are not identical to the parent plants. Asexual reproduction creates new plants that are identical to the parent.
	Human growth	From before they are born to puberty, from about age 12. There is a fast period of growth and the changes occur that prepare women to have babies. The female body changes as it goes through puberty, from about age 12. There is a fast period of growth and the changes occur that prepare women to have babies. The male body changes as it goes through puberty, from about age 12. There is a fast period of growth and sexual organs develop. The human body changes as it gets older. The human life cycle has different stages: gestation, infancy, childhood, puberty, adulthood, ageing and death.
6	Human circulation	Blood carries water and the nutrients from food that are used for energy, health and growth around the body. Blood is made up of plasma, red blood cells, white blood cells and platelets. The circulatory system pumps blood from the heart to the lungs, back to the heart and onto the rest of the body in figure of eight system. Blood passes through each side of the heart separately in one circuit. The heart is a muscle. It has two separate sides. One side pumps blood full of oxygen from the lungs, the other side pumps blood with the oxygen used up, from the body.

		Arteries are blood vessels that carry blood away from the heart. Veins carry the blood from the rest of the body back to the heart. Veins have valves to stop the blood from flowing backwards.
	Body health	A healthy diet helps maintain or improve general health in humans and other animals. When people do not eat a balanced diet they are at risk of malnutrition. Malnutrition can result in unplanned weight loss, muscle loss or vitamin and mineral deficiencies. Our pulse increases when we exercise to meet the increased need for oxygen in our muscles. Regular physical activity prevents obesity; keeps heart, lungs and muscles healthy; increases flexibility and strength; and helps to fight off infections. Drugs are any substances that alter the way the body works.
Year	module	**Plants**
EYFS	Plants	Identify the key changes of a bean plant through classroom observations. Identify the parts of a flowering plant (stem, leaf, flower and roots). Identify what seeds need to grow (water, warmth and light). The importance of what roots do (provide the plant with water and give it stability).
1	Identifying plants and their parts	The names of the parts of a flowering plant that grow above the ground are stem, leaf and flower. Roots grow under the ground and different plants have different roots. Some trees are flowering plants which have roots, stems, leaves and flowers. There are differences between deciduous and evergreen trees. There are similarities and differences between flowering plants.
2	Growing seeds and bulbs	Germination is when a seed starts to sprout and grow. Seeds need certain conditions to germinate. All require water, some require warmth, and most do not need light. Seeds come in a variety of sizes. The size of the seed does not determine how tall the mature plant that grows from it will be. Mature plants can grow from either seeds or bulbs.
	Growing healthy plants	Seeds germinate into seedlings and then grow into mature plants. Mature plants need light and water to grow healthily. Different mature plants require temperatures to grow healthily depending on the type of plant.
3	Flowering plants and plant growth	Leaves capture sunlight. The energy from the sunlight is used to produce the plant's food. Some of this food is used to make the plant grow. Roots anchor the plant into the soil. Roots absorb water and minerals from the soil. The water is transported to the leaves and flowers via small tubes within the stem. The stem also provides support for the plant and holds the leaves and flowers up.

		Leaves have tiny holes in them which allow air into the plant. The energy from the sunlight is used to turn air and water into the plant's food. When plants are overcrowded, they compete with each other for sunlight, water and nutrients. Plants which are able to get more sunlight, water and nutrients will grow faster and bigger than the others. Different plants live in different habitats. Plants are adapted to the habitat that they live in.
	Flowering plants life cycle	The flower produces the plant's seeds. A flower has a female part (called the carpel) which includes the ovary, which contains ovules; male parts (called stamen) which produce pollen; petals which surround the male and female parts; and sepals which cover the flower when it is in bud. Pollination is when the pollen from one flower is transferred to another flower. Animals, called pollinators, can transfer the pollen. Some flowers' pollen is transferred from one plant to another using the wind. After pollination, a fruit develops from the flower. The ovary swells up and becomes the fruit. Fruits contain at least one seed. Seeds are moved away from the plant that produced them, and this is called seed dispersal. They are moved away so they do not compete for space, sunlight, water and nutrients. Seeds are dispersed by wind, water, animals eating fruit, seeds becoming attached to an animal, and through explosions of seedpod (fruit).
5	Plant and animal life cycles	All living things have a life cycle which includes growth and reproduction, eventually ending in death and decay. Flowers contain male sex organs called stamen and female sex organs called carpel. Pollen must be moved to a part of the carpel called a stigma for reproduction to take place. This process is called pollination. Seeds are the product of sexual reproduction. They are genetically different to the parent plants. Asexual reproduction creates plants that are genetically identical to the parent.

Year	Module	Classification
4	Classification of plants and animals	Living things are classified into five groups. These include animals and plants. Classification is the process of grouping living things together based on how they look and how they're related to each other. Vertebrates are classified into five main groups: mammals, fish amphibians, reptiles and birds. Vertebrates have an internal backbone for support.

		Invertebrates are classified into three main groups: arthropods, molluscs and annelids. Using branching keys helps us to identify and name familiar and unfamiliar living things.
6	Classification of living things	Living things are classified into five groups, which are called kingdoms. They are plants, animals, fungi, protista and monera. Plants are divided into four smaller groups: flowering plants, ferns, mosses and conifers. Animals are divided into two groups vertebrates and invertebrates. Vertebrates are split into five smaller groups: mammals, birds, amphibians, reptiles and fish. Invertebrates are split into five smaller groups: molluscs, arthropods, flatworms, Echinodermata and annelids. Arthropods are split into four smaller groups: myriapods, insects, arachnids and crustaceans.

Year	Module	Evolution
6	Evolution and inheritance	A species is a group of organisms that can reproduce and have offspring which can also have offspring. There are similarities and differences between organisms from different species and between individuals of the same species. This is called variation. Any feature of an organism which helps its survival is called an adaptation. Organisms are adapted to live in specific habitats. If a habitat changes then an adaptations may no longer help it to survive. If all the animals of the same species die out then they have become extinct. Fossils provide evidence of organisms that lived millions of years ago. Some of the fossil species became extinct while others evolved into new species. Over millions of years, many organisms have changed. Evolution is the process where one species develops into another. Offspring are similar but not identical to their parents. If a habitat changes, those organisms which are best suited to the new habitat are more likely to reproduce. Their offspring are more likely to have the survival adaptations of their parents. This process is called natural selection. Charles Darwin and Alfred Wallace both proposed a mechanism for evolution which is called natural selection.

Boston West Academy Science LTP

Chemistry progression of knowledge

Year	Module	Materials
EYFS	Floating and sinking	To identify objects that float and sink in water. Use the key vocabulary of floating and sinking to describe what is happening. To know and test different materials that float and sink.
1	Naming and describing materials	Everything around us is made from materials. Some materials are natural materials, naturally sourced materials that are used without modification. Some materials are manufactured materials, made by changing natural source materials. Different materials have different characteristics. Materials should be used carefully and can often be reused or recycled. Objects can be sorted according to their source material.
	Properties and uses of materials	Objects can be made from more than one material, including recycled materials. Materials have physical properties that make them useful for different purposes.
2	Choosing materials	Objects can be tested and sorted according to the properties of the materials they are made from. Inventors discover new uses for materials and create new materials.
	Changing materials	Squashing, bending, stretching and twisting can change the shape of some materials. Different properties allow the shapes of materials to be changed in different ways. Object are made from materials with properties that make them fit for purpose.
3	Rocks	Rocks can be compared and grouped according to their appearance and simple properties. Rocks change over time depending on their physical properties. Soils are made from rocks and organic material. Specific properties of different soils affect whether they absorb and hold water or not. Fossils are formed when living things are trapped within rock. Human knowledge of the living world has been developed through the lives and work of fossil scientists such as Mary Anning.
4	Changes of state	A solid holds its shape. Liquids can be poured and will spread out. Both solids and liquids have a fixed volume.

		Water freezes at zero degrees Celsius. **Freezing/solidifying is when a liquid changes state into a solid. Melting is when a solid changes state into a liquid. Different materials melt at different temperatures. Melting and freezing are reversible processes.** **Air is a gas. Gases have substance (take up space) and have weight. Gases change in shape and volume to fill the space they are in.** **When water changes state from liquid into gas it becomes water vapour. This process is called evaporation.** **Liquids other than water evaporate too. Steam is the invisible gas produced by boiling water.** **When water vapour changes state from gas into liquid it becomes water. This process is called condensation.** **The Earth's water can be a liquid (water), a gas (vapour) and a solid (ice). Water in the environment evaporates into the air then the warm air cools as it rises, leading to condensation and the formation of clouds. Water droplets in the clouds fall as rain (or as snow or hail if cooled below freezing point). The water returns to the sea via streams, lakes and rivers to continue the water cycle.**
5	**Properties and uses of materials**	**Materials have physical properties that make them fit for certain purposes.** **Weathering, wear and tear can occur over time and this will have an impact upon a material's fitness for purpose.** **The properties of liquids include having a fixed weight, a fixed volume, an ability to flow, a level of viscosity and they take on the shape of a container.** **The viscosity of a liquid describes how thick or thin it is and how fast or slow it will flow.** **A thermal insulator is a material that does not transmit heat through it well.** **A thermal conductor is a material that transmits heat through it very well.** **A thermal insulator keeps hot things hot and cold things cold.** **Materials can be absorbent and can soak up and take in liquid.** **Some materials are permeable and let water pass through.** **Some materials are waterproof and do not let water pass through.**
	Separating mixtures and changing materials	**Solid dry mixtures of materials can be separated by sieving.** **Some solids dissolve in water while others do not.** **Solids that do not dissolve can be separated from a liquid by filtering.** **Solids which dissolve can be retrieved from a solution if the liquid is evaporated.** **Some changes of state are reversible and others are non reversable.** **Non-reversible changes result in the formation of new materials.**

Physics progression of knowledge		
		
Year	**Module**	**Light**
3	Light and shadows	Light comes from light sources. Dark is the absence of light. Nothing can be seen if there is no light. Objects are easier to see when there is more light. Shiny materials and objects are good reflectors of light. When there is less light more reflective materials are easier to see than less reflective ones. Shadows are formed when light is blocked. Objects made from opaque materials cast the darkest shadows. Shadows are the same shape as the objects that cast them. Light from the sun can be dangerous so we need to protect our eyes. The size and position of a shadow can be changed by moving the light source.
6	What light does	Light appears to travel in straight lines. We can see a light source because some of the light from the source enters our eyes. Light travelling in straight lines can be used to explain why a shadow is the same shape as the object that casts it and how the shape of shadows can be changed. Light is reflected from shiny surfaces in a predictable way because it travels in straight lines. We can see objects because they reflect some of the light that falls onto them into our eyes.

Year	Module	Sound
4	Sound	Sounds are made by something vibrating; this is the source. Different sources make different sounds. Vibrations travel from the source through a material to the ear so that we can hear them. Sounds can be quiet or loud; volume depends on the size of the vibrations. Sounds get fainter as the distance from the sound source increases. Sounds can be high or low in pitch. Pitch depends on the size of the object vibrating.

		The pitch of a note played on a stringed instrument depends on the length, thickness and tautness of the vibrating string.

Year	Module	Forces
3	**Forces, friction and magnets**	**A force is a push or pull that can make something move.** **The surface a spinning top is moving on affect how long it spins for.** **The surface on which an object rests affects how it slides.** **Magnets have a North and a South pole. Unlike poles attract and like poles repel each other.** **Some metals are attracted to a magnet and are known as magnetic. Other materials are not.** **The strength of magnets varies and can be tested using the idea that magnetic forces act at a distance.**
5	**Forces and mechanisms**	**Friction is a force that makes it harder to move an object across a surface or slows down an object moving over a surface.** **The unit of measurement of a force is Newtons (abbreviated to N).** **Gravity is a force that pulls all objects tot eh centre of the Earth.** **Air resistance is a force that slows down an object moving through air.** **The amount of air resistance depends on the surface area of the object.** **It is air resistance, not the object's weight, that affects how quickly an object falls.** **Water resistance is a force that slows down an object moving through water.** **The amount of water resistance depends on the shape of the object.** **A pulley mechanism used for lifting heavy objects (the load) by applying a pulling force at one end of the rope attached to the load which passes over a wheel.** **A lever is a long rigid arm that rests on a pivot. A force is applied to one part of the lever to lift the load at another point on the lever.** **A gear is a mechanism which consists of wheels with teeth that slot together. Gears change the direction of movement and the force required to make something move.**

Year	Module	Electricity
4	**Electricity: circuits**	**Many household devices and appliances run on electricity. Some plug into the mains and others run on batteries.** **An electrical circuit consists of a cell or battery connected to a component using wires.** **A switch can be added to a circuit to turn the component on and off.**

		If there is a break in a circuit, a loose connection or a short circuit, the component will not work. Metals are good electrical conductors. Non-metals are generally electrical insulators except for graphite (pencil lead), human tissue and water.
6	Electricity: changing circuits	Circuit diagrams using standard symbols are used to record circuits. Adding cells to a circuit makes a lamp brighter. A lamp gets brighter if the voltage in the circuit is increased. A lamp gets dimmer if thinner wires are used. If the voltage is increased in a circuit a buzzer makes a louder sound and a motor turns more quickly.

Year	Module	Earth in Space
EYFS	Space	Identify the names of all the planets in our solar system. To know key facts about some of our planets Earth, Mars, Neptune To know that we live on Earth. To know Ways to look after earth (recycling and solar power). Talk about the importance of orbiting of the sun (Days, seasons, months).
5	Earth and space	The main bodies that are found in space are the Sun, Moon, earth and planets. They are all spherical. The Earth and the other planets all orbit the Sun. The time it takes to complete one orbit is called a year. The other planets of our solar system also orbit the Sun at different distances and taking different times to complete one orbit. The Sun appears to move East to West in an arc across the sky from sunrise to sunset. Changes in shadows during the day can be explained by the changes in the position of the Sun. The Earth rotates on its axis and this causes day and night, the apparent movement of the Sun across the sky and changes in shadows. The Moon orbits the Earth every 28 days and rotates on its axis.