Elston Hall Learning Trust

Science Common Misconceptions per Topic

Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals including humans 	Some children may think: · Only four-legged mammals, such as pets, are animals · Humans are not animals · Insects are not animals · all 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group · Amphibians and reptiles are the same.	Some children may think: · An animal's habitat is like its 'home' · All animals that live in the sea are fish · Respiration is breathing · Breathing is respiration.	Some children may think: · Certain whole food groups like fats are 'bad' for you · Certain specific foods, like cheese are also 'bad' for you · Diet and fruit drinks are 'good' for you · Snakes are similar to worms, so they must also be invertebrates · Invertebrates have no form of skeleton.	Some children may think: · Arrows in food chains mean 'eats' · The death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain · There is always plenty of food for wild animals · Your stomach is where your belly button is · Food is digested only in the stomach · When you have a meal, your food goes down one tube and your drink down another · The food you eat becomes "poo" and the drink becomes "wee".	Some children may think: · a baby grows in a mother's tummy · a baby is "made".	Some children may think: · Your heart is on the left side of your chest · The heart makes blood · The blood travels in one loop from the heart to the lungs and around the body · When we exercise, our heart beats faster to work the muscles more · Some blood in our bodies is blue and some blood is red · We just eat food for energy · All fat is bad for you · All dairy is good for you · Protein is good for you, so you can eat as much as you want · Foods only contain fat if you can see it · All drugs are bad for you.

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Plants 	Some children may think: · Plants are flowering plants grown in pots with coloured petals and leaves and a stem. · Trees are not plants · All leaves are green · All stems are green · A trunk is not a stem · Blossom is not a flower.	Some children may think: · Plants are not alive as they cannot be seen to move · Seeds are not alive · All plants start out as seeds · Seeds and bulbs need sunlight to germinate.	Some children may think: · Plants eat food · Food comes from the soil via the roots · Flowers are merely decorative rather than a vital part of the life cycle in reproduction · Plants only need sunlight to keep them warm · Roots suck in water which is then sucked up the stem.	See Living Things and Their Habitats	See Living Things and Their Habitats	See Living Things and Their Habitats

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Living things and their habitats 	See Y1 Seasonal Changes.	Some children may think: · An animal's habitat is like its 'home' · Plants and seeds are not alive as they cannot be seen to move · Fire is living · Arrows in a food chain mean 'eats'	See Y3 Plants	Some children may think: · The death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain · There is always plenty of food for wild animals · Animals are only land-living creatures · Animals and plants can adapt to their habitats; however, they change · All changes to habitats are negative.	Some children may think: · All plants start out as seeds · All plants have flowers · Plants that grow from bulbs do not have seeds · Only birds lay eggs.	Some children may think: · All micro-organisms are harmful · Mushrooms are plants.

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Materials (including Y3 Rocks, Y4 states of matter and Y6 Evolution) 	Some children may think: · Only fabrics are materials · Only building materials are materials	Some children may think: · Only writing materials are materials · The word rock describes an object rather than a material · Solid is another word for hard.	Some children may think: · Rocks are all hard in nature · Rock-like, man-made substances such as concrete or brick are rocks · Materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' · Certain found artefacts, like old bits of pottery or coins, are fossils · a fossil is an actual piece of the extinct animal or plant	Some children may think: · 'solid' is another word for hard or opaque · Solids are hard and cannot break or change shape easily and are often in one piece · Substances made of very small particles like sugar or sand cannot be solids · Particles in liquids are further apart than in solids and they take up more space · When air is pumped into balloons, they become lighter · Water in different forms – steam, water, ice – are all different substances · All liquids boil at the same temperature as water	Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g., cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed. Some children may think: · Thermal insulators keep cold in or out · Thermal insulators warm things up	Some children may think: · Adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life · Offspring most resemble their parents of the same sex, so that sons look like fathers · All characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited · Cavemen and dinosaurs were alive at the same time.

			· Soil and compost are the same thing.	(100 degrees) · Melting, as a change of state, is the same as dissolving · Steam is visible water vapour (only the condensing water droplets can be seen) · Clouds are made of water vapour or steam · The substance on windows etc. is condensation rather than water · The changing states of water (illustrated by the water cycle) are irreversible · Evaporating or boiling water makes it vanish · Evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material.	· Solids dissolved in liquids have vanished and so you cannot get them back · Lit candles only melt, which is a reversible change.	

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Light 	Taught in Y3 onwards.	Taught in Y3 onwards.	Some children may think: · We can still see even where there is an absence of any light · Our eyes 'get used to' the dark · The moon and reflective surfaces are light sources · a transparent object is a light source · Shadows contain details of the object, such as facial features on their own shadow · Shadows result from objects giving off darkness	Revisited in Y6	Revisited in Y6	Some children may think: · We see objects because light travels from our eyes to the object.

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Electricity 	Revisited in Y4.	Revisited in Y4.	Revisited in Y4.	Some children may think: · Electricity flows to bulbs, not through them · Electricity flows out of both ends of a battery · Electricity works by simply coming out of one end of a battery into the component.	Revisited in Y6.	Some children may think: · Larger-sized batteries make bulbs brighter · a complete circuit uses up electricity · Components in a circuit that are closer to the battery get more electricity.

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Forces & Magnets 	Revisited in Y3.	Revisited in Y3.	Some children may think: · The bigger the magnet the stronger it is · All metals are magnetic.	Revisited in Y5.	Some children may think: · The heavier the object the faster it falls, because it has more gravity acting on it · Forces always act in pairs which are equal and opposite · Smooth surfaces have no friction · Objects always travel better on smooth surfaces · a moving object has a force which is pushing it forwards and it stops when the pushing force wears out · a non-moving object has no forces acting on it · Heavy objects sink and light objects float.	Revisited in cross-curricular project Engineers.

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Sound 	Revisited in Y4. Opportunities in Music to apply cross-curricular key terms.	Revisited in Y4. Opportunities in Music to apply cross-curricular key terms.	Revisited in Y4. Opportunities in Music to apply cross-curricular key terms.	Pitch and volume are frequently confused, as both can be described as high or low. Some children may think: · Sound is only heard by the listener · Sound only travels in one direction from the source · Sound can't travel through solids and liquids · High sounds are loud and low sounds are quiet.	Opportunities in Music to apply cross-curricular key terms.	Opportunities in Music to apply cross-curricular key terms.

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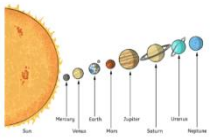
Earth and space 					Some children may think: · The Earth is flat · The Sun is a planet · The Sun rotates around the Earth · The Sun moves across the sky during the day · The Sun rises in the morning and sets in the evening · The Moon appears only at night · Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.	Revisit the Moon in Light learning.

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Seasonal Changes 	Some children may think: · It always snows in winter · It is always sunny in the summer · There are only flowers in spring and summer · It rains most in the winter.	See Living Things and their habitats.	See Living Things and their habitats.	See Living Things and their habitats.	See Living Things and their habitats.	See Living Things and their habitats.