National Curriculum Objectives	Core Knowledge	Vocabulary	
 Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. 	The universe: an extent almost beyond imagining The 'Big Bang' one theory; Galaxies: Milky Way and Andromeda Our solar system Sun: source of energy (heat and light) The eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto [Note that, in 2006, Pluto was classified	Day, night Earth, Sun, axis, rotation, light source Moon, phases of the Moon, waxing, waning, crescent, gibbous Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, dwarf planet, astronomy planets, solar system, rotate, orbit, axis, spherical, energy, eclipse, geocentric, heliocentric. star,	
• Describe the idea of the Earth's rotation to explain day	dwarf planet]; Planetary motion: orbit and rotation	Key Scientists Linked Texts	
and night and the apparent movement of the sun across the sky.	 How day and night on Earth are caused by the Earth's rotation How the seasons are caused by the Earth's orbit arour the sun, tilt of the Earth's axis Gravity, gravitational pull: Gravitational pull of the mo (and to a lesser degree, the sun) causes ocean tides or Earth Asteroids, meteors ('shooting stars'), comets, Halley's Comet How an eclipse happens Stars and constellations Exploration of space: Observation through telescopes Rockets and satellites: from unmanned flights to Apoll 11, first landing on the moon, Space shuttle 	Universe) Tim Peake (First British ESA astronaut) Katherine Johnson (Worked with NASA) George's Secret Key to the Universe (Lucy and Stephen Hawkin with Christophe Galfard) Hidden Figures (Simon Bartram) Curiosity: the Story of a N Rover (Markus Motum) Cosmic (Frank Cottrell Boy	
Prior Learning	Key Questions	Future Learning	
 Sun: source of energy, light, heat Moon: phases of the moon (full, half, crescent, new) (Y2) The eight planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune) o Note that, in 2006, Pluto was classified as a dwarf planet. (Y2) Stars - Constellations: the Plough, the sun is a star. (Y2) Earth and its place in the solar system o The Earth moves around the Sun; the sun does not move (Y2) o The Earth revolves; one revolution takes one day (24 hours) o Sunrise and sunset o When it is day where you are, it is night for people on the opposite side of the Earth(Y2) 	 How does temperature/day length/year length change you get closer/further to the sun? How does distance from a light source affect how mud light hits an object? How does speed/size of a meteorite affect the size of moon crater formed? If the moon became heavier as a result of meteorite collisions what would happen to its position relative to Earth? Why do we have day/night/months/years/seasons? Why does shadow size change over the course of a da 	 Gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (KS3) Our Sun as a star, other stars in our galaxy, other galaxies. (KS3) The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. (KS3) The light year as a unit of astronomical distance. (KS3) 	
Comparative & Fair tests Identify & Classify	Observation over time	Research BIG Question: Assessmen Opportunity	
How does the length of daylight hours change in each season? How could you organise all the objects in the solar system into groups?	Can you observe and identify all the phases in the cycle of the Moon? Is there a pattern between t size of a planet and the time takes to travel around the S	it Jocelyn Bell Burnell discover? moving and how do we know	

	Year 4 – Ecology		
National Curriculum Objectives	Core Knowledge	Voca	bulary
 Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that 	 Habitats, interdependence of organisms and their environment The concept of a 'balance of nature' (constantly changing, not a static condition) The food chain: producers, consumers, decomposers Ecosystems: how they can be affected by changes in 	producer, predator, prey, consumer, decomposer, ecosystem, rainfall, food supply, fossil. human impact, greenhouse effect, climate change, natur reserves, deforestation, pollution, emissions, smog, wate pollution, industrial waste, run off, greenhouse gases (carbon dioxide, methane, ozone	
this can sometimes pose danger to living things.	environment (for example, rainfall, food supply, etc.) and by	Key Scientists	Linked Texts
	 man-made changes Fossils and how they can tell us about the environment long ago Man-made threats to the environment: Air pollution: emissions, smog; Water pollution: industrial waste, run-off from farming Measures we can take to protect the environment (for example, concentration, remained) 	Cindy Looy (Environmental Change and Extinction) Jaques Cousteau (Marine Biologist)	The Vanishing Rainforest (Richard Platt) The Morning I Met a Whale (Michael Morpurgo) Journey to the River Sea (Eva Ibbotson) The Great Kapok Tree
Prior Learning	example, conservation, recycling) Key Questions	Future Learning	
 Living Things in their Environments – Plants. Habitats: rainforest, desert, meadow and underground habitats. Plants: Environmental change (Y2) Living Things in their Environments – Animals. Food chains, oceans and undersea habitats, deep ocean habitats and habitat destruction and damage; classification of animals (Y2) Cycles in Nature: Seasonal cycles and plants, animal migration. Life cycles of a plant and a frog. (Y3) Insects: Characteristics of insects, habitats, classifying insects, helpful and harmful insects, life cycles, social insects. (Y3) 	 What food chains and webs are there in our local habitat? How does energy move through the food chain? How does removal of one species from an environment, affect others? (keystone species) How does environmental change affect different organisms? What are the most important things we could do to improve our outside area? (big hotels, pond, compost, wildflowers) How does human activity affect our environment? (ferries on the Solent? Sandown Airport? KFC?) 	 Evolution; Fossils, adaptation, characteristi passing through generations, Mary Anning, Wallace, Charles Darwin, Darwin's sketches finches.(Y5) Classification of Living Things; Classifying organisms, plant and animal cells, fungi, promonera, taxonomy, Latin names, vertebrat t? 	
Comparative & Fair tests Identify & Classify	Observation over time Pattern Seeking	Research	BIG Question: Assessment Opportunity
Does the amount of light affect how many woodlice move around?Can we use the classification keys to identify all the animals that we caught pond dipping?How does the average temperature of the pond water change in each season?Can we use the classification keys to identify all the animals that we caught pond dipping?	How does the variety of invertebrates on the school field change over the year? How has the use of insecticides affected bee population?	Why are people cutting down the rainforests and what effect does that have?	Are living things in danger?

			Year 4	– Light		
	National Curricu	lum Objectives	Core Kn	owledge	Voca	bulary
 recognise that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye explain that we see things because light travels 		 The speed of light: light travels at an amazingly high speed. Light travels in straight lines (as can be demonstrated by forming shadows). Transparent and opaque objects Reflection: Mirrors: plane, concave, convex; use of 		Light source, dark, reflect, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow, block transparent, translucent, absorb, emitted, scattered, refraction, light waves, transmit, absorb, luminous, Retir Optic nerve, Lens, Iris, Cornea, Object, Eye, Image, Brain, Sclera, Pupil, Muscle, Eyelids		
	-	our eyes or from light sources	•	and some microscopes	Key Scientists	Linked Texts
•	 to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. 		 The spectrum: use a prism to demonstrate that white light is made up of a spectrum of colours. Lenses can be used for magnifying and bending light (as in magnifying glass, microscope, camera, telescope, binoculars). 	Thomas Young (Wave Theory of Light) Ibn al-Haytham (Alhazen) (Light and our Eyes)	The Dark (Lemony Snicket) The King Who Banned the Dark (Emily Haworth-Booth)	
			 Vision: how the eye works Parts of the eye: corner Optic nerve Farsighted and nearsignees 	ea, iris and pupil, lens, retina ghted	Percy Shaw (The Cats Eye) Patricia Bath (pioneered laser cataract eye	
	Prior Le	arning	Key Questions		surgery) Future Learning	
 Prior Learning The Human Body – naming the parts of the body; the five senses & associated body parts; understanding sensory impairment (Y1) 		 How does the size of a shadow? How does the distance object change the size How does the distance size of the screen affe How good are mirrors What happens to light water? How is this affer talc in the water? 	n object affect the size of a e between the light and the	 Light waves: the similarities and differences between light waves and waves in matter; ligl waves travelling through a vacuum; speed of the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface; use of ray model to ex imaging in mirrors (KS3) The human eye (KS3) 		
2,2	Comparative & Fair tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question: Assessment Opportunity
How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface?Can you identify all the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together?		Does the temperature of a light bulb go up the longer it is on? How does my shadow change over the day?	Is there a pattern to how bright it is in school over the day? And, if there is a pattern, is it the same in every classroom?	Why do some people need to wear glasses to see clearly? How do our eyes adapt to different conditions?	Why does my shadow change length over the course of a day?	

	Year 4 – Sound		
National Curriculum Objectives	Core Knowledge	Voca	bulary
 identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear 	 Sound is caused by an object vibrating rapidly. Sounds travel through solids, liquids and gases. Sound waves are much slower than light waves. Speed of sound: Concorde 	Amplitude, volume, quiet, loud, ear, pitch, high, low, faster, slower, particles, instruments, sound wave, vibration, echo, intensity, reflection, absorption, ear drum, bones, hammer, anvil stirrup, larynx, vocal chords	
 find patterns between the pitch of a sound and 	 Qualities of sound: Pitch: high or low, faster vibrations = 	Key Scientists	Linked Texts
 find patterns between the piter of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases. 	 higher pitch, slower vibrations = lower pitch; Intensity: loudness and quietness Human voice: Larynx (voice box); vibrating vocal chords: longer, thicker vocal chords create lower, deeper voices Hearing: how the ear works Sound as vibration Outer ear, ear canal Eardrum Three tiny bones (hammer, anvil and stirrup) pass vibrations to the cochlea 	Aristotle (Sound Waves) Galileo Galilei (Frequency and Pitch of Sound Waves) Alexander Graham Bell (Invented the Telephone) James West Co-invented the electret microphone used in telephones, hearing aids	Moonbird (Joyce Dunbar) The Pied Piper of Hamelin (Natalia Vasquez)
Prior Learning	Auditory nerve Key Questions	Future Learning	
 The Human Body – naming the parts of the body; the five senses & associated body parts; understanding sensory impairment (Y1) 	 How can you change the volume of a sound? How does the type of material affect how well is blocks a sound? How does thickness of material affect how well it blocks a sound? Which materials vibrate better and produce louder sounds? Can we identify any patterns? Which materials make the best string telephone components? (tin cans, paper cups, plastic cups, wire, cable, string, plastic or elastic – predict and test) Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water? 	Sound waves: frequencies of sound waves, measure	
Comparative & Fair tests Identify & Classify	Observation over time Pattern Seeking	Research	BIG Question: Assessment Opportunity
How does the volume of a drum change as you move further away from it?Which material is best to use for muffling sound in ear defenders?How does the length of a guitar string/tuning fork affect the pitch of the sound?	When is our classroom the quietest?Is there a link between how loud it is in school and the time of day? If there is a pattern, is it the same in every area of the school?	Do all animals have the same hearing range?	How can we make different sounds?

			uman Body	1	
National Curriculum Objectives		Core Knowledge			bulary
 identify that humans and some other animals have skeletons and muscles for support, protection and movement. 		 The muscular system: Involuntary and voluntary muscles. The skeletal system : Skeleton, bones, marrow Musculo-skeletal connection Skull, cranium Spinal column, vertebrae Joints Ribs, rib cage, sternum Scapula (shoulder blades), pelvis, tibia, fibula Broken bones, X-rays 		Skeleton, Bones, Cranium, spinal columns, vertebrae, spine ball & socket, hinge, scapula, spinal cord, radius, femur, ulna, sternum, pelvis, clavicle, humerus, rib, mandible, sku tibia, patella, fibula, kneecap, metatarsals, phalanges, carpals, tarsals, pelvis, maxilla, internal/external skeleton, Vertebrate, invertebrate, brain, nerves, reflexes, ligaments tendons, cartilage, support, protection, movement, antagonistic pairs sense organs, eye, ear, mouth, skin, nose receptor cells, sensitive, light, sound, chemicals, touch, pressure, pain, temperature, muscles, signals, messages	
		The nervous system: brain, sp	inal cord, nerves, reflexes	Key Scientists	Linked Texts
				Ivan Pavlov (Digestive System Mechanisms) Joseph Lister (Discovered Antiseptics)	Bones (Steve Jenkins) Illuminatomy (Kate Davies) Anatomicum (Jennifer Paxton)
Pric	Prior Learning Key Questions		uestions	Future Learning	
systems, exercise, eating, circulatory preventing illness The Human Body: digestive system,	Prior LearningKey Questionshe Human Body: The skeletal and muscular /stems, exercise, digestive system and healthy ating, circulatory system, nervous system, reventing illness, germs and disease. (Y2) he Human Body: Cells, organ systems, the igestive system, teeth and senses, a healthy diet, itamins and minerals (Y3)• Why do we need a skeleton? • What types of skeleton are there? • Can something survive without a skeleton? • What happens if we break a bone? • What happens if we break a bone? • How do we move? • Are bones that are bigger, stronger? • Why do muscles get tired? • Can we 'break' muscles?		 The Human Body: Circulation - The circulatory system, the heart, the blood vessels, the blood, blood pressure and heart rate; The respiratory system Process of taking in oxygen and getting rid of carbon dioxide (Y5) The Human Body: Hormones and reproduction; Humar growth stages, adolescence and puberty, The human reproductive system, The endocrine system and glands. The skeletal and muscular systems: the structure and functions of the human skeleton, to include support, protection, movement and making blood cells; biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles; the function of muscles and examples of antagonistic muscles. (KS3) 		
Comparative & Fa tests	ir O Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question: Assessment Opportunity
Iow does the angle thatHow do the skeletons ofour elbow/knee is bentdifferent animals compare?ffect the circumference ofour upper arm/thigh?		How does our skeleton change over time? (from birth to death)	Do male humans have larger skulls than female humans?	Why do different types of vitamins keep us healthy and which foods can we find them in?	Why do animals have skeletons? What is a healthy diet and why is it important?

Year 4 – Classification of Plants and Animals				
National Curriculum Objectives	Core Knowledge	Vocabulary		
 Recognise that living things can be grouped in a variety o ways. Explore and use classification keys to help group, identify name a variety of living things in their local and wider environment. Recognise that environments can change and that this can be added and the second second	share, for example: Cold-blooded or warm-blooded. Vertebrates (have backbones and internal skeletons) or invertebrates (do not have backbone or internal skeletons). Children should become familiar with examples of animals in each	classification, habitat, environment, organisms, plants (flowerin nonflowering), animals, vertebrates, invertebrate, fish, amphibians, reptiles, mammals, Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate herbivore, carnivore, omnivore, evolution, adaptations, characteristics		
sometimes pose dangers to living things.	• Fish: aquatic animals, breath through gills, cold-blooded, most	Key Scientists Linked Texts		
	 have scales, most develop from eggs that the female lays outside her body Amphibians: live part of their life cycle in water and part on land, have gills when young, later develop lungs, cold-blooded, usually have moist skin Reptiles: hatch from eggs, cold-blooded, have dry, thick, scaly skin Birds: warm-blooded, most can fly, have feathers and wings, most build nests, hatch from eggs, most baby birds must be fed by parents and cared for until they can survive on their own (though some, like baby chickens and quail, can search for food a few hours after hatching) Mammals: warm-blooded, have hair on their bodies, parents care for the young, females produce milk for their babies, breathe through lungs, most are terrestrial (live on land) though 	David Attenborough Animalium (Jenny Broom) Henry Turner - zoologist Botanicum (Kathy Willis) The Variety of Life (Nicola Davies) Creature Features (Natasha Durley)		
Prior Learning	some are aquatic. Key Questions	Future Learning		
 Living Things in their Environments – Plants. Habitats: rainforest, desert, meadow and underground habitats. Plants: Environmental change (Y2) Living Things in their Environments – Animals. Food chair oceans and undersea habitats, deep ocean habitats and habitat destruction and damage; classification of animals Cycles in Nature: Seasonal cycles and plants, animal migration. Life cycles of a plant and a frog. (Y3) Insects: Characteristics of insects, habitats, classifying insects, helpful and harmful insects, life cycles, social inse (Y3) 	 Why do some animals eat other animals? What habitats do we have locally? Can we use the classification keys to identify all the animals that we caught pond dipping? Do all plants and animals stay in the same habitat throughout the year? Can you compare and contrast the living things observed? Can you use classification keys to name unknown living things? How can we classify living things found in different habitats 	 Evolution; Fossils, adaptation, characteristics passing throug generations, Mary Anning, Alfred Wallace, Charles Darwin, Darwin's sketches of finches. (Y5) Classification dipping? Classification of Living Things; Classifying organisms, plant and animal cells, fungi, protists, monera, taxonomy, Latin names, vertebrates. (Y6) e and contrast the living things observed? sification keys to name unknown living things? sify living things found in different habitats 		
Comparative & Fair dentify & Class tests	by Observation over time Pattern Seeking	Research BIG Question: Assessment Opportunity		
 Compare and contrast the living things observed Use classification keys name unknown living things Classify living things for in different habitats b on their features 	living things found in different habitatsthings found in different habitats based on their features?	 Use secondary sources to find out about human impact, both positive and negative, on environments. I'm thinking of a living thing Write a branching database for a variety of living things 		