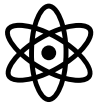
THE BOWLAND FEDERATION OF SCHOOLS

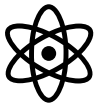
SCIENCE CURRICULUM NARRATIVE

THE NATIONAL CURRICULUM	
Purpose of study A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.	**Aims** The national curriculum for science aims to ensure that all pupils: ♣ develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics ♣ develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them ♣ are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

KEYSKILLS – WORKING SCIENTIFICALLY

KEYSTAGE 1					
					
Asking simple questions and recognising that they can be answered in different ways	Observing closely, using simple equipment	Performing simple tests	Identifying and classifying	Using their observations and ideas to suggest answers to questions	Gathering and recording data to help in answering questions.

LOWER KEYSTAGE 2							
							
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

UPPER KEYSTAGE 2							
							
Plan enquiries, including recognising and controlling variables where necessary	Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work	Take measurements, using a range of scientific equipment, with increasing accuracy and precision	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models	Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions	Present findings in written form, displays and other presentations	Use test results to make predictions to set up further comparative and fair tests	Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments

KEYSTAGE 1 TOPICS						
Title	**Seasonal Changes and Weather**		**Plants and Including Trees**		**Animals Including Humans**	
CONCEPT	Seasonal Changes Day to Night		Living things, Biology		Natural world, process, changes,	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Seasons and weather** What are the four seasons? What's the weather like in Autumn, Winter, Spring and Summer? **Day to Night** Why does day become night?		**Structure of plants** What are the parts of a plant? **Wild and common plants** What are wild plants and where do you find them? What are common plants and where do you find them? **Trees** What makes a tree? What trees live around my school? What's the difference between the trees?		**Animals** What is an animal? What type of animals are there? What is similar and what is different? **Eating** What does food tell us about an animal? **Senses** What makes me an animal? What senses do I have?	
VOCABULARY	**High Frequency** Dawn Dusk Mild Rotate Soaked Weather	**Subject Specific** Month Season Spring Summer Autumn winter	**High Frequency** Bud Trunk Branch Bark Seed wild	**Subject Specific** Nutrients Stem Deciduous Evergreen	**High Frequency** Blood Senses Young Feathers Fur scales	**Subject Specific** Mammal Amphibian Reptile Herbivore Carnivore Omnivore

Title	Introduce Everyday Materials		Living things and their Habitats		Animals including Humans	
CONCEPT	Physical properties, materials,		Alive, dead, habitats		Offspring, adults, survival,	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Materials** What are materials? What are things made of in school? **Properties** How can I describe materials? Which materials are waterproof, and which are not? Which materials are transparent, and which are opaque? **Use what you know** What's the best material for job? Why?		**Characteristics of living things** What is alive and what is not? What do all living things have in common? **Location of living things** Where do plants and animals live? What plants and animals live in our local environment? **How living things are connected** What are food chains? How are they connected? Why do plants and animals need each other?		**Animals and change** Remember – What is an animal? How do animals change as they mature? How do we change as we mature? **Air, water and food** What do all animals need to stay alive? **Health and food** Keeping healthy: Why do we exercise? Keeping healthy: Why do we eat different types of food?	
VOCABULARY	**High Frequency** Absorb Rough Smooth Waterproof Metal plastic	**Subject Specific** Materials Properties Flexible Transparent Opaque Physical	**High Frequency** Thrive Depend Producer Consume Pray Predator	**Subject Specific** Oxygen Nutrition Respiration Sensitivity Reproduction Excretion	**High Frequency** Healthy Survive Exercise Heart Lungs Muscles	**Subject Specific** Hygiene Larva Pupa Vertebrates Invertebrates Metamorphosis

Title	Use of everyday Materials		Introduce Plants	
CONCEPT	Solid objects, state, suitability,		Biology, living things	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Materials** What are materials used for? Categorise and compare wood, metal, plastic and glass. Categorise and compare ceramics, rock, paper and card and fabric. **Changes** What happens when we squash, bend, twist or stretch a material? **Purpose** What's the right material for the job? What's the most absorbent material? Who invented waterproofing?		**Growing from a seed** How do seeds germinate and what happens? **Growing from a bulb** What happened when bulbs sprout? **Healthy plants** What do plants need to survive and be healthy? What can happen if plants do not get the things they need? What do I notice about plants around school? How are they healthy? How are they unhealthy? **Show what you know** How do seeds and bulbs grow? What do plants need to be healthy?	
VOCABULARY	**High Frequency** Artificial Brittle Extracted Fabric Manufactured Natural	**Subject Specific** Ceramic Durable Inflexible Reflective Rigid Translucent	**High Frequency** Wither Dormant Mature Bulb Anchor Sustain	**Subject Specific** Germination Perennial Cardon dioxide Glucose Clone

KEYSTAGE 2 TOPICS						
Title	**Rocks**		**Animals including Humans**		**Forces and Magnets**	
CONCEPT	Physical properties, matter, chemistry, minerals, earth surface		Humans, nutrition, skeleton, muscles		Magnetic forces, attraction, repel, poles	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Types** How are rocks formed? What types of rocks are there? **Change** Can rocks change? How can we test a rock to see if it limestone or chalk? **Soil** Is soil just dirt? What makes soil? **Fossils** How are fossils formed?		**Food** What effect does the food have that we eat? **Skeleton** Where is my skeleton and what does it do? **Muscles** Where are my muscles and what do they do?		**Contact forces and friction** What are contact forces? How do surfaces affect the motion of an object? How does friction affect moving objects? **Non-contact force** What is a non-contact force? How is this different to a contact force? **Magnetic force** How do magnets attract and repel? Which materials are magnetic? Forces and magnetism summary	
VOCABULARY	**High Frequency** Cemented Compacted Decay Prehistoric Soil Transform	**Subject Specific** Fossil Igneous Magma Metamorphic Minerals Sedimentary	**High Frequency** Minerals Skeleton Skull Voluntary Involuntary Nerves	**Subject Specific** Biceps Triceps Vertebrae Vitamins Proteins Carbohydrates	**High Frequency** Consequence Contact Force Attract North South	**Subject Specific** Magnet Resistance Friction Repel Pole Magnetic field

Title	Light		Plants		Living Things and Their Habitats	
CONCEPT	Physics, light and waves, magnets, electricity, earth in space.		Life, growth, pollination, seed transportation		Biology, living things.	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Seeing** Do we need light to see things? **Shadows** How are shadows formed? **Changing variables** What happens to the size of a shadow when the object moves closer to, or away from, the light source?		**Flowering plants** What are the parts of a flowering plant? What do they do? **Food and survival** Do all plants need the same thing to survive and grow? How do leaves make food for plants? How does water move through a plant? **Flower function** What do flowers do? What is pollination?		**Living things** What are the characteristics of living things? **Vertebrates and invertebrates** What animals are vertebrates? What animals are invertebrates? **Plants** What groups are plants classified in? **Classification keys** What is classification? How do I use a key? **Environmental changes** What happens if the environment in a habitat changes?	
VOCABULARY	**High Frequency** Absent Cast Impenetrable Reflect Shadow Source(light)	**Subject Specific** Constant Dependent Independent Illuminate Translucent Variable	**High Frequency** Adapt Essential Glucose Transport Variety Vital	**Subject Specific** Transpiration Stoma Pollination Stamen Pistil Photosynthesis	**High Frequency** Classification Environment Interdependence Interact Beneficial Hierarchy	**Subject Specific** Vertebrate Invertebrate Biotic Ecosystem Species Niche

Title	States of Matter		Animals including Humans		Electricity	
CONCEPT	Composition, behaviour and properties of matter, and of the elements of the Earth and its atmosphere.		Teeth, digestion, food chains, biology, living things		Sources, components,	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Know about states of matter** What are solids, liquids and gases? What is matter? What does 'state' mean? **Work scientifically with states of matter** Melting: how do materials change state? Evaporating: how do materials change state? Condensing: how do materials change state? **Retrieve** Summary: How do materials change their states of matter?		**Teeth and eating** What type pf teeth do humans have? How does our mouth and teeth help with digestion? Can teeth tell us what animals eat? **The digestive system?** What are the parts of the digestive system? How does the digestive system work? **Food chains** What are food chains? How do I construct a food chain? How are teeth, digestion and food chains connected?		**Sources of electricity** What appliances use electricity? What sort of power makes them work? **Components** What are the components in a simple series circuit? **Apply it** What are the effects of changing circuits components and batteries?	
VOCABULARY	**High Frequency** Permanent Particle Solid Liquid Gas Vapour	**Subject Specific** Evaporate Condense Melt Matter State Volume	**High Frequency** Expel Compact Digestion Acid Stomach Intestines	**Subject Specific** Incisor Canine Molar Enzyme Saliva Peristalsis	**High Frequency** Associate Identify Portable Effect Appliance Series	**Subject Specific** Component Electrical insulator Electrical conductor Circuit Hypothesis Variable

Title	**Sound**		**Properties and changes of materials**		**Introduce Animals, including humans**	
CONCEPT	Physics, sounds		Composition, behaviour and properties of matter, and of the elements of the Earth and its atmosphere		Biology, living things	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Properties** What is sound? **Movement** How does sound travel? **Pitches and loudness** What is the pitch and loudness of a sound?		**Properties, mixture & solutions** What properties do materials have? How do we use them? What is a solution and what is a mixture? **Separation of materials** How can we separate materials from a mixture? How can we separate materials from a solution? **Reversible and irreversible changes** What changes are reversible? What changes are irreversible?		**Life** What is the human timeline? **Growth** How do we change into adults? **Compare** How does human and animal lifespan compare?	
VOCABULARY	**High Frequency** Produce Property Source Frequent Regular Affect	**Subject Specific** Vibrate Pitch Volume Medium Vacuum Sound wave	**High Frequency** Property Particle Separate Combine Recover Comparative	**Subject Specific** Atom Molecule Chemical Physical Reversible Reaction	**High Frequency** Development Diverse Unique Generation Mature Equipped	**Subject Specific** Adolescence Puberty Gestation Embryo Foetus Womb

Title	Forces		Earth and Space		Living Things and Their Habitats	
CONCEPT	Matter, forces and motion, sound, light and waves, electricity and magnetism and Earth in Space		Matter, forces and motion, sound, light and waves, electricity and magnetism and Earth in Space		Biology, living things, reproduction	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Non-contact and contact forces** Remember gravity When is friction helpful or when is it not? **Resistance** What's the effect of air resistance? What's the effect of water resistance? **Inspirational scientist** Who was Galileo Galilei? **Levers, pulleys and gears** How do levers help us? How do pulleys and gears help us?		**The position, relationship and movement of planets/spherical bodies** What are the planets in our solar system? How does our view of the moon change in the lunar month? **The effect of the earth's rotation, tilt and orbit has on day, night and seasons** Why does the rotation of the Earth result in day and night? Why is the Earth's tilt (axis) responsible for the seasons?		**Life cycles** Life cycle differences – what's the difference between a mammal and an amphibian? What's the difference between an insect and a bird? What is similar and what is different between the life cycles of a mammal, an insect, an amphibian and a bird? **Inspirational scientist** Summer birds – who was Maria Merion and what did she do? **Reproduction** The science of life – how do living things reproduce? Plants and animals: What's the life process of reproduction?	
VOCABULARY	**High Frequency** Opposite Reaction Advantage Displace Weight Mass	**Subject Specific** Pulley Gear Pivot Fulcrum Lever Upthrust	**High Frequency** Luminous Phenomenon Attraction Approximately Relative Apparent	**Subject Specific** Orbit Axis Crescent Gravitational Waxing Waning	**High Frequency** Deduce Process Re-form Transform Adolescence Contrast	**Subject Specific** Embryo Sexual Metamorphosis Incubate Biochemical Fertilisation

Title	Living Things and Their Habitats		Light		Animals, Including Humans	
CONCEPT	Cells and life systems, Life cycles and inheritance, Living thing and their environments, Variation, adaption and evolution, Health and disease		Sound, light, waves		Blood, blood vessel, the heart, exercise	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Pioneering scientists** Who was the scientist Carl Linnaeus and what did he do? **Classification** How do we classify vertebrates? How do we classify invertebrates we know? How do we classify invertebrates we don't know? **Apply** What animals can I classify? What animals and plants exist in my local environment?		**Properties of light** How does light travel? What colour is light made from? **Reflection** How does light help us to see objects? Which surfaces make the best reflectors? **Colour** Why do we see objects as a particular colour? **Refraction** What happens to the appearance of objects when placed in water?		**Blood and blood vessels** What is blood made of and why do we need it? Why do bodies need nutrients and how are they transported? What is the circulatory system? **The functions of the heart** What is our heart like inside? How does it work? Who influenced what we know about the circulatory system? **Body function: the effect of exercise, drugs and lifestyle** What can we do to keep healthy?	
VOCABULARY	**High Frequency** Characteristic Interdependence Specific Categorise Primitive Hierarchy	**Subject Specific** Fungus Arthropod Taxonomy Kingdom Phylum Genus	**High Frequency** Impurity Emit Absorb Constituent Filter Artificial	**Subject Specific** Refraction Incidence Spectrum Prism Lux Pigment	**High Frequency** Cell Chamber System Circulation Vessel Clot	**Subject Specific** Plasma Platelet Artery Capillary Vein Ventricle

Title	**Animals, Including Humans – Water Transportation**		**Electricity**		**Evolution and Inheritance**	
CONCEPT	Living things, water, transportation		Voltage, electricity, circuits		Biology	
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	**Digestion and circulation** Remember circulation and digestion: how are these two systems connected? **Removal of waste** Where are the kidneys and what do they do? **Keeping healthy** How do kidneys keep us healthy?		**Do-it** What is electricity? How does it work? How do we build and represent a series circuit? **Test-it** What are the components in a series circuit? How does the number of cells and voltage affect components in a circuit? **Diagnose-it** What are the effects and consequences of changing circuit components and batteries?		**Change over time** How have living things changed over time? How has life evolved over time? **Biological change** What is DNA and what does it do? Working scientifically? Are all offspring identical to their parents? **Theories of evolution** Darwen and Wallace – what evidence did they scare to argue the case of evolution? Survival of the fittest – how have animals adapted and evolved to suit their environment?	
VOCABULARY	**High Frequency** Filter Expel Substance Function Regulate Transform	**Subject Specific** Kidney Bladder Urine Excretion Toxin Nutrient	**High Frequency** Component Consequence Systematic Represent Source Generate	**Subject Specific** Proton Neutron Electron Terminal Series Voltage	**High Frequency** Characteristics Adaptation Acquire Theory Modify Generation	**Subject Specific** Evolve Survival Species Clone Inherit Fossil