DCC Progression Frameworks - Early, First and Second Levels

Rationale

Dundee City Council's Progression Frameworks, from early to third/fourth level provide a council-wide aid to practitioners in curriculum planning and assessment design.

They offer guidance on developing Broad General Education learning pathways within the primary curriculum, creating natural progression from nursery to secondary, and they support teachers to plan a learner journey/pathway.

The frameworks are designed to encourage pace and challenge across early, first and second levels, while accounting for breadth and depth within each curricular area, with a central focus on application of skills and knowledge in order to achieve the benchmarks.

Purpose

The frameworks are a tool to provide guidance for learning progression across the BGE through early, first and second levels. They should be used in conjunction with school planning, tracking and assessment approaches.

The frameworks have been designed with two purposes in mind:

- to inform teacher judgements about an individual learner's progression through each curricular area.
- to assist in the moderation of each curricular area for effective planning of learning, teaching and assessment.

User Guidance

General Layout: (see Appendix 1)

The frameworks assist practitioners in creating a learner journey starting at the experience and outcome and ending at the achievement of the accompanying benchmark for that outcome.

- The experiences and outcomes have been categorised into primary and secondary organisers according to practitioner input.
- In order to reflect an individual learner's journey through primary school, each experience and outcome is split to show the development of that skill from the beginning of the benchmark through to achievement of the benchmark.

Reading the Document: (see Appendix 2)

The frameworks include progression columns; two in the early level and three in first and second levels. These columns show standard progression for each stage of the primary school for the typical learner. It should be noted that not all learners in a class will be working in the same column.

The document is designed to be read:

- Horizontally: to chart a learner's journey through depth, challenge and application, whether that journey be linear or nonlinear, particularly in areas such as science, social subjects and expressive arts where not all experiences and outcomes will be taught each year.
- Vertically: To plan moderation of learning, teaching and assessment, taking account of the breadth of the curricular area, and to build on previous experiences. In addition, this supports the planning for coherent interdisciplinary learning experiences by ensuring that pupils have the necessary skills to access all areas of the curriculum. It also helps teachers to plan application of skills in new and unfamiliar settings.

Meta Skills: Meta-skills are innate, timeless, higher-order skills that create adaptive learners and promote success in whatever context the future brings. Each benchmark has a suggested linked meta-skill **(marked in blue text)** **however** these are only suggestions and others may be more appropriate for your planning. A link to the Meta Skills frameworks can be found **here.**

Appendix 1: General Layout

Primary Organiser:

This signposts the over-arching curricular topic.

Secondary Organiser:

This signposts the curricular sub-topics to reflect how DCC teaching staff have unpacked the experiences and outcomes.

Benchmarks:

The benchmarks define the end of a pathway. It is not necessary to achieve all benchmarks to achieve a level but there should be no major gaps. Pupils can progress to the next level and any unmet benchmarks should be revisited.

Learners progress along a pathway for each learning area or skills set. This journey can be linear or non-linear, depending on the individual.

SECOND LEVEL		LITERACY AND ENGLISH			
Experiences and outcomes		Progression			Benchmarks
Organiser – Listening and Talking	Tools for listening and talking	2.1	2.2	2.3	
	When I engage with others, I can [illegible]spond in ways [illegible] that [illegible] contributions and use these to build on thinking. LIT 2-02a	When eng… I can/am a… • Begin to…			…tributes a number …elevant ideas, …rmation and … …ws respect for the …vs of others and …rs own viewpoint. • *Builds on the contributions of others, for example, by asking or answering questions, clarifying points or supporting others' opinions or ideas.* • *Applies verbal and non-verbal techniques in oral presentations and interactions, for example, vocabulary, eye contact, body language, emphasis, pace and/or tone.* • Recognises some techniques used to engage or influence the listener, for example, vocabulary, emphasis, tone and/or rhetorical questions.
	I can recognise how the features of spoken language can help in communication and I can use what I learn. I can recognise different features of my own and others' spoken language. ENG 2-03a	• With sup… value th… by sharing my viewpoint respectfully. • With support, begin to develop my thinking by asking questions which clarify or build on what others are saying. e.g. using Voice21 Talking Roles • With support demonstrate my attention & willingness to take part in discussion using eye contact & body language. • Use eye contact & body language appropriately when talking to an audience. • Speak at an appropriate volume & pace to communicate things I have learned. • With support, choose & use different features of language to help me engage or influence my listeners or audience. when I speak or present for different purposes across my learning	viewpoint respectfully. • Develop my thinking by asking questions which clarify or build on what others are saying e.g. can re-tell what was said. • Demonstrate my attention & willingness to take part in discussion using appropriate eye contact & body language. e.g. using Voice21 Oracy Framework • Talk about & explore how eye contact & body language helps a speaker to interest & engage their audience. • Speak at an appropriate volume & pace, beginning to use tone & emphasis to communicate things I have learned. • Begin to independently choose & use different features of language to help me engage or influence my listeners or audience. when I speak or present for different purposes across my learning	others by sharing & justifying my viewpoint respectfully. • Develop my thinking by asking questions which clarify or build on what others are saying e.g. can re-tell & paraphrase • Demonstrate my attention & willingness to take part in discussion using my non-verbal skills & by re-telling or paraphrasing what others have said. • Recognise appropriate volume, pace, tone & emphasis when listening to others & use these tools when talking or presenting • Begin to give appropriate & constructive feedback to others about their non-verbal communication. • Choose & use different features of language to help me engage or influence my listeners or audience. when I speak or present for different purposes across my learning	

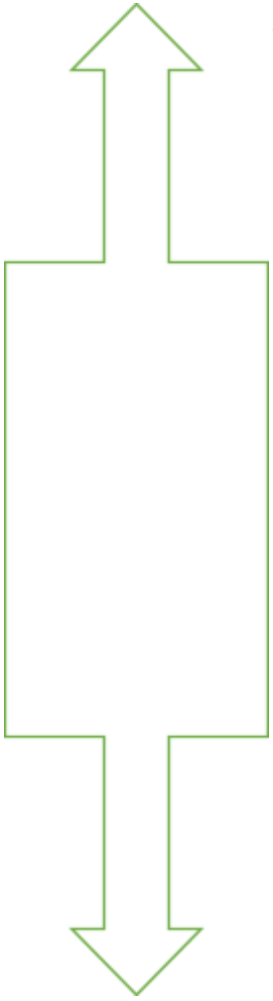
Experiences and Outcomes:

Experiences and outcomes should be bundled to ensure coverage across the year.

Progression Columns:

The central columns detail 'I can' statements that exemplify a learner's progress towards the level. These can be followed linear and non-linear, horizontally and vertically. Progression should be built on previous learning.

Appendix 2: Reading the Document



Organiser -Forces, Electricity and Waves

Forces

EXPERIENCES AND OUTCOMES	PROGRESSION 1.1	PROGRESSION 1.2	PROGRESSION 1.3	BENCHMARKS
By investigating forces on toys and other objects, I can predict the effect on the shape or motion of objects. **SCN 1-07a**	I can/am able to: • I can identify when I use pushing and pulling forces when playing with toys or other objects. • I can sort toys and objects accordingly to pushes and pulls. • I can describe how a force can make an object move faster or slower, change its direction, or change its shape.	I can/am able to: • I can explain that pushing harder or pulling harder increases the force. • I can explore how pushes and pulls can move objects. • I can recognise that a push or pull changes the speed of an object. • I can explain how twisting, turning, bending and stretching are forces which can cause change of shape e.g. elastic band. • I can describe how the movement of an object is affected by the size of the force or the size of the object.	I can/am able to: • I can predict how a force can change an object's shape e.g. play dough. • I can explain that different sizes of forces produce different changes in speed and/or direction e.g. hitting a ball • I can explain that different sizes of forces stop a moving object. • I can explain that if forces are equal (balanced) there is no movement • I can explain that the size of force required to move an object depends on the size, shape and mass of the object.	Predicts and then investigates how a force can make an object change speed, direction or shape, and uses vocabulary such as pushing, pulling, stretching, squashing and twisting to describe forces. Investigates balanced forces and explains that if a push and pull are equal in strength and opposite in direction then there is no change in movement.
	Key Words and Phrases magnet, magnetic, non-magnetic, push, pull, force, attract, repel, pole, strength.			
By exploring the forces exerted by magnets on other magnets and magnetic materials, I can contribute to the design of a game. **SCN 1-08a**	I can/am able to: • I can observe magnets attracting magnetic materials. • I can use a magnet to identify magnetic and non-magnetic materials. • I can identify that this attraction indicates a force.	I can/am able to: • I can demonstrate that magnets have north and south poles. • I can explain that not all metals are magnetic and can give examples.	I can/am able to: • I can describe how magnets exert a force that can attract or repel. • I can explain that this force does not require contact between the magnet and the metal.	Reports in writing, visually, orally how magnets exert a non-contact force on each other and attract certain materials. Demonstrates through practical activities that like

Key Vocabulary/Phrases

Some of the frameworks contain key vocabulary that should be taught with the experience and outcome.

Early Level
Has two columns, E.1 which exemplifies a typical learner at the beginning of P1 and E.2 at the end of P1.

First Level
Has three columns, 1.1 which exemplifies a typical learner in P2, 1.2 P3 and 1.3 P4.

Second Level
Has three columns, 2.1 which exemplifies a typical learner in P5, 2.2 P6 and 2.3 P7.

Second Level Skills	
Inquiry and Investigative Skills	Plans and designs scientific investigations and enquiries ● Formulates questions and predictions (hypotheses), with assistance, based on observations and information. ● Identifies the independent, dependent and controlled variables, with assistance. ● Anticipates some risks and hazards. Carries out practical activities in a variety of learning environments ● Applies appropriate safety measures. ● Contributes to carrying out all the procedures. ● Makes observations and collects information and measurements using appropriate devices and units. ● Manages identified controlled variables to ensure validity of results. Analyses, interprets and evaluates scientific findings ● Selects appropriate methods to record data/information. ● Identifies relationships between the independent and dependent variables. ● Makes links to original questions or predictions. ● Relates findings to the wider world. ● Draws basic conclusions consistent with findings. ● Identifies and discusses additional knowledge and understanding gained. ● Recognises anomalous results and suggests possible sources of error. ● Evaluates the investigation and suggests one way of improving it if it was to be repeated. Presents scientific findings ● Presents data/information by choosing from an extended range of tables, charts, diagrams, graphs, including bar graphs and line graphs. ● Reports collaboratively and individually using a range of methods. ● Collates, organises and summarises findings, with assistance, using headings or questions to provide structure for presentations. ▪ Uses appropriate scientific vocabulary and acknowledges sources, with assistance.
Scientific Analytical Thinking Skills	Applies scientific analytical thinking skills, with assistance, working with less familiar (or familiar but more complex) contexts. Applies understanding, and a combination of more than one science concept, to solve problems and provide solutions. Demonstrates further development of creative thinking including through the engineering processes of design, construction, testing and modification.
Skills and Attributes of Scientifically Literate Citizens	At Second Level, it is anticipated that learners will be able to demonstrate the skills below with assistance. ● Presents a reasoned argument based on evidence, demonstrating understanding of underlying scientific concepts, and engages with the views of others. ● Demonstrates understanding of the relevance of science to their future lives and the role of science in an increasing range of careers and occupations. Demonstrates increased awareness of creativity and inventiveness ● in science, the use of technologies in the development of sciences and the impact of science on society. ● Expresses informed views about scientific and environmental issues based on evidence.

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser-Planet Earth	Biodiversity and Interdependence	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction. **SCN 2-01a**	I can/am able to: ● I can identify that living things belong to 2 groups, plants and animals. ● I can identify plants as belonging to 2 groups, flowering and non-flowering ● I can identify animals as belonging to 2 groups, vertebrates and invertebrates. ● I can explain the difference between an extinct species and an endangered species.	I can/am able to: ● I can describe some of the features which help classify vertebrates into their 5 groups. ● I can describe some of the features which help classify invertebrates into their 7 groups ● I can use a key to identify plants and animals. ● I can name some examples of extinct species and endangered species. ● I can understand how species depend on the environment for survival.	I can/am able to: ● I can construct a key which can be used to identify particular plants or animals. ● I can explain why animals need to adapt to changes in their environment. ● I can explain why certain animals have become extinct through not adapting. ● I can suggest reasons why plants and animals are becoming endangered as a result of human behaviour.	Classifies living things into plants (flowering and non-flowering), animals (vertebrates and invertebrates) and other groups through knowledge of their characteristics. *Self-Management - Focusing* Begins to construct and use simple branched keys which can be used to identify particular plants or animals. *Innovation- Sense Making* Identifies characteristics of living things and their environment which have contributed to the survival or extinction of a species. *Innovation - curiosity* Describes how some plants and animals have adapted to their environment, for example, for drought or by using flight. *Social Intelligence - Communicating*
			Key Words and Phrases vertebrates, invertebrates, mammals, fish, reptiles, amphibians, birds, molluscs, arthropods, echinoderms, protozoa, annelids, flowering plants, annual, biennials, perennials, non-flowering plants, mosses, conifers, ferns, extinct, endangered, threatened, habitat, environment, adaptation, survival, predator, prey, destruction, ecotourism, climate change, rainforests.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser-Planet Earth	Biodiversity and Interdependence	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area. **SCN 2-02a**	I can/am able to: ● I can use a food chain to identify living things which depend on each other for food. ● I can identify the Sun as the primary source of energy in the food chain ● I can identify animals that predators eat, and I know that they are called prey.	I can/am able to: ● I can describe the environment for living things as their habitat. ● I can combine simple food chains to construct a food web. ● I can give examples of predators and explain that a predator is an animal that eats other animals.	I can/am able to: ● I can explain how energy from the sun moves through a food chain. ● I can explain that most organisms use more than one kind of food and are therefore part of more than one food chain. ● I can explain how the position in a food web can indicate the relative numbers and size of the organisms. ● I can explain how a change in one part of a food web might affect other parts. ● I can use my knowledge to contribute to the design or conservation of a wildlife area.	Describes how energy flows between plants and animals in more complex food chains and webs and ecosystems, using vocabulary such as 'producers', 'consumers' and 'herbivore'. *Innovation – Critical Thinking*
			Key Words and Phrases herbivore, carnivore, omnivore, producer, consumer, predators, prey, decomposers, food chain, food web, photosynthesis.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser-Planet Earth	Biodiversity and Interdependence	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		Through carrying out practical activities and investigations, I can show how plants have benefited society. **SCN 2-02b**	I can/am able to: ● I can identify that living things belong to 2 groups, plants and animals. ● I can identify plants as belonging to 2 groups, flowering and non-flowering ● I can identify the main parts of a plant: root, stem, leaves, and flower.	I can/am able to: ● I can describe examples where plants are used to benefit society; eg. habitat creation, wood for construction and paper, medicines, dyes, fuels, rubber and life support.	I can/am able to: ● I can investigate a variety of beneficial aspects of plants and explain how they make a difference. ● I can explain the climatic and social impact of plants on society e.g. oxygen production, green spaces etc.	Relates findings from practical investigations to describe how plants have benefited society, for example, in medicine, dyes, fuels, construction, prevention of soil erosion and by influencing the balance of gases in the air. *Innovation – Curiosity*
			Key Words and Phrases food chains, producers, photosynthesis, seed dispersal, wind dispersal, animal dispersal, water dispersal, carnivores, interdependent, climatic benefit, air pollution, Greenhouse Effect.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser - Planet Earth	Biodiversity and Interdepe	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I have collaborated in the design of an investigation into the effects of fertilisers on the growth of plants. I can express an informed view of the risks and benefits of their use. **SCN 2-03a**	I can/am able to: ● I can identify that plants need water, heat, sunlight and soil in order to grow healthily. ● I can identify a fertilizer as a substance which is used to help plants grow.	I can/am able to: ● I can describe how the soil supplies the nutrients which a plant needs. ● I can describe how a fertilizer adds these nutrients to the soil and can increase plant growth. ● I can describe that fertilisers come in two categories (organic and inorganic) and understand the benefits of using fertilisers on crops and the implications to the farmer/grower. ● I can research environmental issues	I can/am able to: ● I can plan and carry out an investigation into the effect on plant growth of using different fertilizers in different amounts, deciding on appropriate measuring activities and collecting evidence. ● I can evaluate my results and report on my findings. ● I can explain some of the risks associated with different fertilizers.	Collaborates with others to present a reasoned argument, based on evidence, of the risks and benefits of using fertilisers, demonstrating understanding of the underlying scientific concepts. *Social Intelligence - Collaboration*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

	n d e n c e			involving inorganic fertilisers.		
			Key Words and Phrases oxygen, light, warmth, soil, fertilisers, inorganic, organic, chemical, plant growth, crop production, flowering, experiment, fair test, living conditions, discuss, observe, analyse, record, phosphorous, nitrogen, nutrients, potassium, crop rotation, plant growth.		

		EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
O r g a n i s e r - P l a n e t E a r t h	E n e r g y S o u r c e s a n d S u s t a	By considering examples where energy is conserved, I can identify the energy source, how it is transferred and ways of reducing wasted energy. SCN 2-04a	I can/am able to: ● I can identify the Sun as a major energy source ● I can identify the form of energy supplied and the forms of energy produced by different appliances and devices. ● I can discuss different household items and how these can potentially waste energy.	I can/am able to: ● I can describe simple energy transfers which occur in appliances and devices (including the human body). Eg electrical energy in a heater transferring to heat energy. ● I can describe how energy cannot be created or destroyed only transferred. ● I can describe various ways in which energy can be stored; eg. plants, food, batteries.	I can/am able to: ● I can explain how energy is transferred through some simple systems and highlight where energy is wasted in the system. ● I can explain ways of reducing energy waste and increasing the efficiency of the system. ● I can explain the issues associated with finite energy resources and pollution.	Demonstrates understanding of the law of conservation of energy (energy can be converted from one form to another but cannot be created or destroyed). *Innovation – Sense Making* Identifies the common types of energy (kinetic, potential, electrical, chemical, light, sound and heat) used in energy transfers and transformations that occur in everyday appliances. *Innovation- Sense Making*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

	i n a b i l i t y			**Error! Reference source not found.**		Explains that when energy transfers and transformations take place, energy is converted into 'useful' and 'wasted' energy, for example a mechanical braking system transforms kinetic energy into heat energy which is dissipated to the atmosphere as 'waste' heat. *Innovation – Critical Thinking*
			Key Words and Phrases renewable energy, non-renewable energy, kinetic energy, gravitational energy, hydro-electric power, conservation, conversion, tidal power, wave power, solar power, electrical energy, fossil fuels, coals, power station, energy efficiency, kinetic energy, chemical energy, heat and light energy, natural energy, energy conversion.			

O r g a n i s e r - P l a n e t E a r t h	E n e r g y S o u r c e s a n d S u s t a	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		Through exploring non-renewable energy sources, I can describe how they are used in Scotland today and express an informed view on the implications for their future use. SCN 2-04b	I can/am able to: ● I can identify the Sun as our major energy source ● I can identify that energy is stored in fossil fuels, coal, oil and gas. ● I can describe the difference between 'non-renewable' energy and 'renewable' energy sources. ● I can research where non-renewable energy sources come from	I can/am able to: ● I can describe how fossil fuels are formed including the time constraint. ● I can describe the energy chain in fossil fuel formation. ● I can describe how fossil fuels and nuclear fuel are used to produce electrical energy in Scotland's power stations and how this is transferred to out homes through the National Grid.	I can/am able to: ● I can explain the advantages and disadvantages of using fossil fuels and nuclear fuel and the possible implications for the future. ● I can investigate and identify ways in which Scotland can use renewable energy sources.	Research non-renewable sources of energy, such as fossil fuels and nuclear, and discusses how these are used in Scotland. *Innovation - Curiosity* Draws on increasing knowledge and understanding to suggest ways in which they can reduce their own energy use and live more sustainably. *Self-Management - Adapting*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

	inability		and how we use them in our everyday life.			
			Key Words and Phrases non-renewable energy source, renewable energy source, coal, oil, natural gas, fossil fuels, electricity.			

Organiser - Planet	Processes of the P	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I can apply my knowledge of how water changes state to help me understand the processes involved in the water cycle in nature over time. **SCN 2-05a**	I can/am able to: ● I can identify the different forms of water - ice, water and steam, and associate these with the states, solid, liquid and gas. ● I can identify the temperatures at which these changes of state occur.	**Error! Reference source not found.**I can/am able to: ● I can describe how water changes state as it is heated or cooled using terms such as melting, freezing, boiling, evaporating and condensing. ● I can describe how a hot gas rises when heated and sinks when cooled.	I can/am able to: ● I can explain the process of the water cycle using terms such evaporation, condensation, precipitation and run-off. ● I can explain the importance of the water cycle in nature in terms of water provision, crop growth, drinking water and land formation.	Discusses the necessity of water for life, for example, for the growth of crops, for drinking and in river formation/flow. *Social Intelligence - Communicating* Demonstrates understanding of the processes involved in the water cycle.

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

t E a r t h	l a n e t					*Innovation – Critical Thinking*
			Key Words and Phrases evaporation, change, measure, condition, volume, condensation, water vapour, higher, cooler, water droplets, clouds, river, rainfall, water cycle, drought, melting, boiling, freezing, solidifying, gas, liquid, solid.			

O r g a n i s e r - P l a n e	S p a c e	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		By observing and researching features of our solar system, I can use simple models to communicate my understanding of size, scale, time and relative motion within it. **SCN 2-06a**	I can/am able to: ● I can describe how the earth moves round the sun once a year. ● I can describe how the earth's spin relative to the sun gives us day and night and explain why the sun appears to move across the sky during the day.	I can/am able to: ● I can identify the earth as a planet and can name some other planets which orbit in a similar way. ● I can describe how a planet moves across the sky at night while stars are fixed relative to each other.	I can/am able to: ● I can describe the solar system as a number of planets which orbit the sun (a star). ● I can compare the size of some of the planets relative to the earth and the sun. ● I can compare the distance of the planets	Reports collaboratively on the key features of the planets including size, distance from the sun, length of day, length of year, temperature, materials from which they are predominantly made and the number of moons. *Social Intelligence - Collaborating*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

t E a r t h				• I can describe the different sizes of some planets and how they're much smaller than the sun. • I can describe the relative distances of the planets.	from the sun relative to the sun's size. • I can explain why some planets are hotter than others. • I can explain how the solar system was formed and why moons, asteroids and comets exist.	Uses simple models to communicate understanding of size, scale, time and relative motion within our Solar System, including how solar & lunar eclipses occur. *Innovation - Creativity*
			Key Words and Phrases planets, dwarf planets, Earth, Moon, Sun, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, Eris, asteroid Ceres, orbit, gravity, revolves, rotates, lunar, Solar System, attraction, distance, diameters, axis, characteristics, features.			

O r g a n i s e r - F o	F o r c e s	EXPERIENCES AND OUTCOMES	PROGRESSION			B E N C H M A R K S
			2.1	2.2	2.3	
		By investigating how friction,	I can/am able to:	I c	I can/am able to:	D e

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

rces, Electricity and Waves		including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects. **SCN 2-07a**	• I can identify friction as a force which opposes motion when surfaces rub together. • I can identify air resistance as a friction force which opposes motion through the air. • I can explain how the shape of an object affects its rate of fall through air.	an/amable to: •	• I can investigate different ways of reducing friction and air resistance. • Using my findings, I can explain how to improve the efficiency of moving objects by smoothing surfaces, lubrication, rollers & wheels and streamlining. • I can explain, using examples, why increasing friction and air resistance can sometimes be a good thing.	scribes friction as a force which opposes them

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

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DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

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DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

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DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

				•		*Intelligence - Communicating* Finds ass oc

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

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DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

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DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

						r f a c e a r e a e x p o s e d t o t h e a i r , m a k i n g l i n k s t o o

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

						r i g i n a l p r e d i c t i o n s . *I n n o v a t i o n - C r e a t i v i*
			Key Words and Phrases spring, force, stretch, push, pull, measure, amount, distance, travel, weight, heavier, mass, pushing, pulling, floating, sinking, surface area, direction, speed, friction, rate of descent, time of descent, air resistance, streamlining.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

				t *y* D e m o n s t r a t e s u n d e r s t a n d i n g o f h o w f r i c t i

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

				on and air resistance can both be useful, for ex

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

				ample, inbraking systems, and also a problem,

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

				for example, causing moving parts to wear. *Inn*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

				ovation - SenseMaking Describes efficient m

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				ovementasthatwhichrequirestheleastpossi

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

				b l e e n e r g y a n d s u g g e s t s w a y s t o i m p r o v e e f f i c i

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

				energy in moving objects, for example, by stream

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

					I i n i n g . *I n n o v a t i o n - C r e a t i v i t y*	
O r g a n i s e r -	F o r c e s	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I have collaborated in investigations to compare magnetic, electrostatic and gravitational forces and have explored their practical applications.	I can/am able to: ● I can identify a magnet and demonstrate that it has 2 poles (north seeking and south seeking) and attracts	I can/am able to: ● I can describe the attraction and repulsion in magnetic and electrostatic situations as 'non-contact forces' or 'forces at a distance'.	I can/am able to: ● I can work with others to investigate the 3 types of non-contact forces and make a comparison using our findings.	Measures gravitational force with a force meter or newton meter and records results using appropriate units (newtons). *Innovation - Curiosity*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Forces, Electricity and Waves		**SCN 2-08a**	and repels in different situations. ● I can create a static electrically charged object and demonstrate that this attracts and repels in different situations ● I can identify the gravitational force and demonstrate that it acts downwards as there is an attraction to the Earth.	● I can describe the attraction force in gravitational situations as 'non-contact forces' or 'forces at a distance'.	● I can describe some of the uses of magnet, electrostatic and gravitational forces.	Explains how some objects may become electrically charged by rubbing two surfaces together and how the charges produce an electrostatic force. *Social Intelligence - Communicating* Investigates and demonstrates understanding that magnetic and electrostatic forces can both repel and attract. *Innovation - Curiosity* Describes practical applications of magnetic, electrostatic and gravitational forces, for example, magnetised needle in a compass. # *Innovation – Critical Thinking*
			Key Words and Phrases attraction, effects, magnet, pole, repulsion, acceleration, force, gravity, matter, pull, charge, static electricity, positive, negative, electrons, electric force, positive, negative, charge, attract, repel, static electricity, electrostatic charge.			

Organis	Forces	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		By investigating floating and sinking of objects in water, I can apply my understanding of	I can/am able to: ● I can identify some common objects which float and some which	I can/am able to: ● I can describe floatation as a balanced situation where gravitational	I can/am able to: ● I can solve a practical challenge; eg. buoy design, ship design	Explores the factors which affect floating, for example, the object's shape and the

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

e r - F o r c e s , E l e c t r i c i t y a n d W a v e s		buoyancy to solve a practical challenge. **SCN 2-08b**	sink and use the term buoyancy appropriately. ● I can identify that this buoyancy may depend on the size and weight of the object.	force (weight) is balanced by the upward force of the water. ● I can investigate the effect of weight on the buoyancy of an object. (plimsoll line) ● I can investigate the effect of surface area on the buoyancy of an object.	using my knowledge of the factors which affect buoyancy. ● I can demonstrate the term buoyancy based on practical investigations.	density of the material that the object is made of, and collates, organises and summarises findings with assistance. *Self-Management – Focusing*
			<u>Key Words and Phrases</u> floating, sinking, buoyancy, water displacement, mass, density, weight, surface area, float, sink, density, liquid, size, volume, mass, viscosity, Plimsoll line, buoyancy.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser - Forces, Electricity	Electricity	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I have used a range of electrical components to help to make a variety of circuits for differing purposes. I can represent my circuit using symbols and describe the transfer of energy around the circuit. **SCN 2-09a**	I can/am able to: ● I can identify a simple series circuit and name the components in the circuit, eg. battery, lamp, motor, switch, buzzer, light emitting diode (led). ● I can recognise that a circuit is working or not working and relate this to a break in the circuit. ● I can match components to their circuit diagram symbol. ● I can describe circuits using appropriate languages, (volts, amps). ● I can use/read simple meters in circuits.	I can/am able to: ● I can describe how a switch is used to turn a circuit on or off. ● I can connect components together from a circuit diagram to make series and parallel circuits. ● I can describe the energy change in the components in circuits.	I can/am able to: ● I can explain why components will work in a closed circuit but not in an open circuit. ● I can build circuits with a variety of components and explain the effect of making changes. ● I can design and build a circuit, which meets a given purpose, making use of circuit diagrams. ● I can identify potential risks when working with electrical circuits and relate this to real life situations.	Designs and builds a variety of electrical circuits for differing purposes, using an increasing range of components. *Self-Management – Initiative* Draws circuit diagrams using appropriate symbols to denote a bulb, switch, motor, bell, buzzer, wires, cell and a battery. *Innovation - Creativity* Describes how components in a circuit transfer energy into different forms. *Social Intelligence - Communicating*
			<u>Key Words and Phrases</u>			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

and Waves			electricity, electrons, circuit, power source, electric current, safety, dangerous, components, bulbs, buzzers, motors, wires, switches, battery, cells, conventional symbols, volts, amps.	

Organiser - Forces, Ele	Electricity	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		To begin to understand how batteries work, I can help to build simple chemical cells using readily-available materials which can be used to make an appliance work. **SCN 2-10a**	I can/am able to: ● I can identify a battery or the mains socket as being sources of electricity which are used to make electrical devices work. ● I can identify batteries and electrical sockets as being sources of electrical energy.	I can/am able to: ● I can describe how a battery changes chemical energy into electrical energy which is transferred round a circuit. ● I can set up an experiment to show that readily available materials e.g. orange, lemons etc. can be used to make a simple battery/cell.	I can/am able to: ● I can work with others to build simple chemical cells and compare them. ● I can explain why the electricity from a mains socket is more dangerous than that from a simple cell.	Applies knowledge and understanding to build simple batteries (chemical cells) and demonstrates understanding that a battery (cell) is a portable energy source which has a store of chemical energy. *Innovation – Critical Thinking* Explains the process of energy transformation from battery (cell) to electrical components. *Innovation- Sense Making*

c t r i c i t y a n d W a v e s			**Key Words and Phrases** battery, portable, power source, chemical energy, transfer of energy, powerful, weak, chemical reaction, generate electricity, electrical inventions, acid, metals	

O r g	V i b	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

<table>
<tr>
<td rowspan="3">anis er- Forces, Electricity and Waves</td>
<td rowspan="3">rationsandWaves</td>
<td rowspan="3">Through research on how animals communicate, I can explain how sound vibrations are carried by waves through air, water and other media.
SCN 2-11a</td>
<td>I can/am able to:
● I can describe how a sound is produced by a vibration.
● I can describe how the pitch (high or low) is changed in a variety of different sources of sounds.</td>
<td>I can/am able to:
● I can describe how sound travels as a wave through different instruments and through air.
● I can describe experiments which show that sound waves travel through solids, liquids and gases.
● I can describe how the voice box (larynx) and the ear work.</td>
<td>I can/am able to:
● I can explain why sound waves travel better through solids than liquids then gases.
● I can research and explain how some animals use sound waves to communicate.</td>
<td rowspan="3">Discusses and demonstrates through experiments how sound travels differently through air, water and solids.
Social Intelligence-Leading

Explains how hearing is limited by a range of factors, for example, age, position, and flexibility (direction) of ears.
Social Intelligence - Communicating</td>
</tr>
<tr>
<td colspan="3"><u>Key Words and Phrases</u>
vibrations, echoes, ear canal, ear drum, hammer, anvil, stirrup, cochlea, pitch, amplitude, communicate, frequency, sound waves, ultrasound, oscilloscope.</td>
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</table>

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser - Forces, Electric	Vibrations and Waves	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		By exploring reflections, the formation of shadows and the mixing of coloured lights, I can use my knowledge of the properties of light to show how it can be used in a creative way. **SCN 2-11b**	I can/am able to: ● I can describe how humans see light with their eyes. ● I can describe how light travels in straight lines using suitable examples.	I can/am able to: ● I can describe how light reflects off some surfaces and not others. ● I can describe how shadows are formed. ● I can describe how white light can be split up to give the different colours of light. ● I can explore how lenses affect the direction of light.	I can/am able to: ● I can explain how an image is formed in a mirror by reflection. ● I can investigate and explain the factors which affect shadow formation. ● I can describe and demonstrate the mixing of coloured lights to produce different effects. ● I can apply my knowledge of the properties of light to demonstrate how it can be used creatively e.g. light show, lasers, shadow puppets.	Demonstrates and records, through practical investigations, that light travels in straight lines, can be reflected by highly-polished surfaces and that curved faces can distort the image. *Innovation - Creativity* Predicts and investigates how the position, shape and size of a shadow depend on the position of the object in relation to the light source. *Innovation - Curiosity* Demonstrates that white light/sunlight can be dispersed to show the colours of the visible spectrum and identifies the colours and order of the rainbow. *Innovation -Sense Making* Explains that we see objects because they give out or reflect light rays that enter our eyes. *Social Intelligence - Communicating*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

ityandWaves			**Key Words and Phrases** sun, light, source, daytime, shadows, blocked, direction, length, shape, reflected, mirror, prism, lenses, convex, concave opaque, eye, focus, lens, cast, reflection, sight, seeing, concave, convex, source of light, light beam/ray, shiny objects, bounces off, straight lines, invert, mirrors, angles, transparent, opaque, translucent, cyan, magenta.	Draws on findings from practical investigations to describe the effect that coloured filters have on white light and how they can be used to make other colours. *Innovation-Critical Thinking* Explains how we can recognise the colour of an object due the reflection and absorption of particular parts of the visible spectrum. *Innovation- Sense Making*

		EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
Organiser–Biologicaly	BodySystemsandCells	By investigating some body systems and potential problems which they may develop, I can make informed decisions to help me to maintain my health and wellbeing. **SCN 2-12a**	I can/am able to: ● I can identify the skeleton and name some of the major parts such as the skull, spine, ribcage, pelvis. ● I can identify the position of some of the major organs.	I can/am able to: ● I can describe the broad function of the respiratory system in terms of the major organs involved and the gas exchange which occurs. ● I can describe the broad function of the circulatory system in terms of the major organs involved and the role played by the blood. ● I can describe the broad function of the digestive system I terms of the major organs involved	I can/am able to: ● I can explain, using my knowledge of body systems, how to maintain my health and well-being using examples such as smoking, poor diet and lack of exercise.	**The expectation is that at least two of the following body systems will be studied at Second Level.** *Innovation – Sense Making & Curiosity* ***Respiratory system*** Describes the function of the respiratory system (lungs, windpipe and bronchi), for example, in gas exchange. Discusses the main preventable causes of bronchitis, lung cancer and asthma, for example, smoking. ***Circulatory system*** Describes the function of the circulatory system (heart and blood vessels), for example, transport of food, oxygen and waste materials.

s t e m s				and the nutrient exchange which occurs.		Discusses the main preventable causes of heart disease or stroke, for example, obesity, lack of exercise, smoking and high (saturated) fat diet. ***Digestive system*** Describes the function of the digestive system (mouth, oesophagus, stomach, liver, small intestine, large intestine, rectum and anus), for example, breakdown of food and absorption of nutrients, minerals and water. Discusses the main preventable causes of liver disease, for example, alcohol and drug misuse. ***Reproductive system*** Describes the function of the reproductive system (penis, testes, sperm tube/duct, ovaries, egg tube/duct, uterus and vagina), for example, to make a baby. Discusses some preventable causes of fertility problems, for example, alcohol misuse, anorexia and obesity. ***Skeletal system*** Describes the function of the **skeleton** (skull, spine, ribcage some bones of the arm and leg), for example, to provide support, protection and enable movement. Discusses some common problems of bones (for example, arthritis, osteoporosis and breaks) and
			<u>Key Words and Phrases</u> heart, lungs, stomach, digestive system, nervous system, kidneys, liver, brain, cell membrane, nucleus.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

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<tr><td></td><td></td><td></td><td colspan="3"></td><td>how their incidence can be reduced (for example, through calcium in the diet and weight-bearing exercise).</td></tr>
<tr><td rowspan="3">Organiser – Biological Systems</td><td rowspan="3">Body Systems and Cells</td><td>EXPERIENCES AND OUTCOMES</td><td colspan="3">PROGRESSION</td><td>BENCHMARKS</td></tr>
<tr><td></td><td>2.1</td><td>2.2</td><td>2.3</td><td></td></tr>
<tr><td>I have explored the structure and function of sensory organs to develop my understanding of body actions in response to outside conditions.
SCN 2-12b</td><td>I can/am able to:
● I can identify the 5 senses and the parts of my body which detect each one.
● I can describe the limitations of my senses and how they can vary from person to person</td><td>I can/am able to:
● I can outline the structure of the eye naming the main components and describing how it works.
● I can outline the structure of the ear, naming the main parts and describing how it works.
● I can describe how all the sensory organs contain nerve endings which are directly linked to the brain.</td><td>I can/am able to:
● I can explain how 2 eyes and 2 ears allow humans to judge distance and sound direction more effectively.
● I can explain, with examples, how the body uses all the senses to keep itself safe.
● I can identify ways in which our senses can be damaged by our actions e.g. listening to loud music, over exposure to screens.</td><td>Demonstrates understanding of how microorganisms, including bacteria, viruses and fungi, can multiply rapidly.
Innovation - Curiosity

Investigates and explains the action of some microorganisms used in food production, for example, yeast in bread and bacteria in yoghurt.
Innovation – Critical Thinking

Describes how some micro-organisms break down food causing it to be inedible or harmful if digested, and how others exist in the gut to break down food to aid digestion.
Innovation- Sense Making</td></tr>
<tr><td colspan="3"><u>Key Words and Phrases</u>
sense, hearing, touch, smell, sight, taste, sweet, sour, salty, bitter, , retina, iris, cornea, optic nerve, illusions, perception, Braille, lenses, hearing aids, eardrum, vibrates, communicate, hammer, anvil, stirrup, ear canal, balance, olfactory cells, frontal lobe, limbic system, memories, reflexes, Goosebumps, sensory receptors, pressure, pain, temperature.</td></tr>
</table>

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser – Biological Systems	Body Systems and Cells	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I have contributed to investigations into the role of microorganisms in producing and breaking down some materials. **SCN 2-13a**	I can/am able to: ● I can identify bacteria and fungi as being micro-organisms. ● I can explain that microorganisms are living things found all around us that cannot be seen by the naked eye.	I can/am able to: ● I can describe how micro-organisms are used in food production. Eg. bread (yeast), cheese, yoghurt. ● I can describe how micro-organism are used to break down food in compost heaps, recycling plants and in stomachs. ● I can give examples of harmful micro-organisms and give reasons why they can cause problems.	I can/am able to: ● I can make bread and explain the role which micro-organisms play in its production. ● I can work with others to set up a compost heap and explain how the micro-organisms are responsible for the breakdown of the waste materials.	Investigates, observes and records how microscopic organisms are necessary for the process of decomposition (the breaking down of dead material – decay). *Innovation – Curiosity*
			Key Words and Phrases biodegradable, non-biodegradable, landfill site, rot, break down, recycle, micro-organisms, microbes, germs, viruses, bacteria, fungi, microscope, vaccine, vaccination, antibody, immunisation, pus, decay, hygiene, mould.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser – Biological Systems	Inheritance	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		By investigating the lifecycles of plants and animals, I can recognise the different steps of their development. **SCN 2-14a**	I can/am able to: ● I can identify the different parts of a plant. ● I can identify the reproductive organs of humans. ● I can demonstrate that I understand that all animals and plants have a life cycle.	I can/am able to: ● I can describe how flowering plants reproduce via pollination, fertilization, fruit and seed development. ● I can describe how humans reproduce to produce a baby. ● I can describe how plants ensure the continued existence of the species by the nature of seed dispersal and provision of the right conditions for growth. ● I can describe how animals ensure the continued existence of the species by the number of young they produce and the nurturing environment provided.	I can/am able to: ● I can explain the life cycles of plants and animals using examples from nature.	**Plants** Describes how pollination occurs when the male cell (pollen) lands on the stigma. *Social Intelligence - Communication* Describes how fertilisation (sexual reproduction) occurs when the genetic information in the male cell fuses (joins) with the genetic information in the female cell. *Innovation- Sense Making* Describes how the fertilised ovule develops into a seed and how the ovary ripens to form a fruit. *Social Intelligence – Communication* Investigates and explains how a seed germinates into a plant using water, oxygen, a food store and warmth. *Innovation - Curiosity* **Animals** Identifies and compares the two distinct groups of animals – vertebrates and invertebrates.

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

			Key Words and Phrases sepal, stamen, petals, dispersal, seeds, germination, pollination, flowers, fruit, seeds, reproduction, cycle of birth, life cycle, extinction, conservation, pollen, stigma, baby, toddler, adolescence, adulthood, old age, ovum, fertilise.	*Self-Management – Focusing* Researches the lifecycles of the five main types of vertebrates including fish (spawn), birds (eggs which are rigid but fragile), amphibians (spawn and metamorphosis), reptiles (leathery shelled eggs) and mammal (live young), and communicates findings using a range of media. *Innovation – Curiosity* Compares the lifecycles of some invertebrates, for example, ladybird and spider. *Self-Management - Focusing*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser – Biological Systems	Inheritance	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		By exploring the characteristics offspring inherit when living things reproduce, I can distinguish between inherited and non-inherited characteristics. **SCN 2-14b**	I can/am able to: ● I can identify some characteristics of humans that might be inherited and some that might be due to the environment. ● I can state that we possess similarities and differences which make us all unique and give some examples.	I can/am able to: ● I can investigate, research and describe some characteristics which are inherited and some which are not. ● I can explain that variation between different members of the same species of living things can be caused by either inheritance or environmental factors.	I can/am able to: ● I can explain using suitable models (Reebop) how different inherited characteristics can be carried on through different generations. ● I can explain that human characteristics are determined by genes and that these genes are passed down from each parent; half from the mother and half from the father.	Knows that genetics is the study of inherited characteristics and that inherited characteristics are carried on genes and can sometime skip a generation. *Innovation – Critical Thinking* Explores and categorises characteristics into inherited (eye and hair colour, height and right/left handedness) and non-inherited (native language spoken and favourite colour). *Innovation – Curiosity* Describes how every living thing has its own DNA fingerprint. *Social Intelligence - Communicating*
			Key Words and Phrases evolution, species, adaptation, variation, inherited, environmental, generations, genetics, DNA, genes, chromosomes, dominant, recessive, continuous variation, discontinuous variation.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser - Materials	Properties and Uses of Substances	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed. **SCN 2-15a**	I can/am able to: ● I can classify some common materials as being natural (wood, stone, soil) or synthetic/man-made (glass, ceramic, plastic). ● I can classify materials into metals and non-metals.	I can/am able to: ● I can identify that a material/substance has changed through decay, cooking, burning, rusting, melting and dissolving. ● I can investigate what causes this change.	I can/am able to: ● I can describe the conditions or processes which will cause a material/substance to change over time. ● I can describe some of the characteristics which indicate this change. ● I can identify that some changes are reversible (physical) and some are irreversible (chemical).	Investigates and explains physical changes to the properties of materials which are fully and partially reversible, for example, salt dissolving in water, chocolate melting and water freezing. *Innovation - Curiosity* Uses scientific vocabulary such as 'melting', 'freezing', 'evaporating' and 'condensing' to describe changes of state. *Social Intelligence - Communicating* Investigates and records chemical changes to the properties of materials which are irreversible, for example, cooking, rusting and striking a match. *Innovation – Creativity* Observes and identifies some of the signs of a chemical reaction, for example, production of bubbles, colour/texture change and heat given out/taken in. *Innovation - Curiosity* Explores and describes the characteristics of solids,
			Key Words and Phrases reversible, irreversible, heating, cooling, burning, freezing, boiling, melting, dissolving, bicarbonate of soda, vinegar, water vapour, condensing, Solids, liquids, gas, materials, substances, chemical reactions, properties, evaporated, melted, heated, solidifying, reversible, irreversible, carbon dioxide, oxygen.			

				liquids and gases, for example, solids retain the same volume and shape, liquids keep the same volume but the shape changes to fit the container and that gases change shape and volume to fill the container. *Self-Management - Adapting*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser-Materials	Properties and Uses of Substances	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I have participated in practical activities to separate simple mixtures of substances and can relate my findings to my everyday experience. **SCN 2-16a**	I can/am able to: ● I can recognise that some substances are a mixture of other substances and some present as a single substance. ● I can identify solutions as being a mixture where the dissolved solid appears to have disappeared but is still present.	I can/am able to: ● I can describe the properties of substances in a mixture eg heavy, light, soluble, insoluble, magnetic, and investigate ways that the mixture can be separated. ● I can set up an experiment to show that solids which dissolve in water can be separated from the water by evaporation.	I can/am able to: ● I can select a suitable method and separate mixtures into their constituent parts on the basis of observable properties such as particle size, shape, weight and magnetic attraction.	Draws on findings from practical investigations to explain how a mixture of solids of different sizes can be separated using a sieve or magnet, for example, sand and peas or salt and iron filings. *Self-Management – Adapting* Selects the most appropriate practical technique for separating insoluble solids, for example, filtering or sieving. *Self-Management- Initiative* Explains why a dissolved solid cannot be separated from the solvent by filtering but can be separated by evaporation. *Social Intelligence – Leading* Uses scientific vocabulary such as 'soluble', 'insoluble', 'dissolve' and 'solution' in context. *Social Intelligence – Communicating* Relates findings of practical investigations about dissolving to everyday experiences, for example, recycling, salt production and water purification.
			Key Words and Phrases dissolving, soluble, insoluble, solutions, solvent, solute, mixtures, filtering, evaporation, filtrate, residue, magnets, chromatography, reversible, irreversible., suspension, saturation.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

						Innovation- Sense-Making
Organiser-Materials	Properties and Uses of Substances	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		By investigating common conditions that increase the amount of substance that will dissolve or the speed of dissolving, I can relate my findings to the world around me. SCN 2-16b	I can/am able to: ● I can classify materials into ones which will dissolve in water and ones which will not using the terms soluble and insoluble.	I can/am able to: ● I can describe some factors which speed up the rate of dissolving and predict the difference this makes. ● I can describe situations where this happens in everyday life. (eg. sugar in tea, salt in water)	I can/am able to: ● I can investigate and describe how, temperature, grain size, stirring and volume of water affects the rate of dissolving. ● I can include 'fair test' considerations in this investigation.	Finds an association between the quantity of substance that dissolves and a range of conditions – temperature, time, particle size, stirring and quantity of solvent. *Innovation - Creativity* Investigates how a range of factors such as particle size and heat can affect the rate of dissolving. *Innovation – Curiosity* Relates learning about the quantity and rate of dissolving to everyday examples such as dissolving sugar in tea or salt in water (granules or big crystals, hot or cold liquid, stirred or not stirred). *Innovation- Sense Making*
			Key Words and Phrases Soluble, insoluble, dissolve, solution, factors, temperature.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organisers-Materials	Earth's Materials	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses. **SCN 2-17a**	I can/am able to: ● I can state that the 'ground' is the surface of the Earth and identify different constituents such as rock, soil, water and air. ● I can identify the difference between rocks and soil in terms of some simple characteristics.	I can/am able to: ● I can identify the different parts of the earth on a picture or model. ● I can describe the atmosphere round the Earth in terms of the main gases. ● I can recognise that there are different types of rock with different characteristics. ● I can classify soil samples into different types.	I can/am able to: ● I can describe the model of the earth's structure in terms of the core, mantle and crust. ● I can describe a volcano as a vent in the crust through which magma (lava) from the core is ejected ● I can describe how the different types of rock, igneous, sedimentary and metamorphic are formed. ● I can describe the characteristics of the 3 different types of soil, clay, sand and loam.	Analyses and compares samples of rocks, soil and minerals and reports their characteristics and uses, using a range of media. *Self-Management - Focusing*
			Key Words and Phrases crust, core, mantle, molten, volcano, sedimentary, igneous, metamorphic, metaphoric, lava, magma, rock cycle, slate, granite, sandstone, marble, limestone, erosion, weathering, compacting, permeability natural materials, rock, sand, soil, minerals, periodic table, elements, crude oil, gas, petrol.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser-Materials	Chemical Changes	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I have investigated different water samples from the environment and explored methods that can be used to clean and conserve water and I am aware of the properties and uses of water. **SCN 2-18a**	I can/am able to: ● I can describe how water changes state as it is heated or cooled using terms such as melting, freezing, boiling, evaporating and condensing. ● I can explain the process of the water cycle using terms such evaporation, condensation, precipitation and run-off. ● I can classify materials into ones which will dissolve in water and ones which will not using the terms soluble and insoluble.	I can/am able to: ● I can investigate water samples and describe how water becomes polluted with soluble, insoluble and living material through the water cycle. ● I can describe how different pollutants can be removed or rendered harmless through filtration, evaporation and chemical treatment.	I can/am able to: ● I can explain how important water is to life and why it is important to conserve it. ● I can demonstrate and explain how water is cleaned to make it safe to drink. ● I can describe how water is collected, cleaned and transferred to our homes.	Uses knowledge of the water cycle to explain how the quantity of water on the Earth has remained approximately the same. *Social Intelligence-Leading* Investigates and discusses the methods used to purify water, for example, sedimentation, filtration, evaporation, desalination and the addition of chemicals such as chlorine. *Innovation – Curiosity* Researches methods used to conserve water within the home, school and globally and communicates findings to others. *Social Intelligence-Feeling* Discusses the many uses of water, for example, to support all living things, in preservation (ice) and to generate electricity. *Social Intelligence-Feeling*
			Key Words and Phrases conservation, sample, distilled, minerals, mineral water, solution, evaporates, crystals, dissolved, filtered, residue, undissolved, separated, purify, filter paper, pH value, acid, alkali, corrosive, universal indicator paper (litmus paper).			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser-Materials	Chemical Changes	EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		I have collaborated in activities which safely demonstrate simple chemical reactions using everyday chemicals. I can show an appreciation of a chemical reaction as being a change in which different materials are made. **SCN 2-19a**	I can/am able to: ● I can identify that a material/substance has changed through decay, cooking, burning, rusting, melting and dissolving. ● I can identify that some changes are reversible (physical) and some are irreversible (chemical).	I can/am able to: ● I can work with a group to carry out a number of mixing experiments with different substances.	I can/am able to: ● I can explain where a chemical reaction has occurred using evidence about a new substance being formed, the difficulty of changing back, a gas being given off and/or a change of colour. ● I can distinguish between reversible and irreversible change and identify examples of each.	Collaborates with others to safely demonstrate simple chemical reactions, for example, effervescence. *Social Intelligence - Collaborating* Investigates examples of everyday chemical reactions, such as burning and corrosion, and names some of the new substances which are produced. *Innovation – Critical Thinking* Uses prior knowledge to identify when a chemical reaction has occurred to produce a new substance. *Self-Management - Initiative*
			Key Words and Phrases chemical reaction, gas, water vapour, carbon dioxide, reversible, irreversible, evaporation, filtering, burning, condensing, dissolving, freezing, hazard, mass, material, melting, solidifying.			

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

Organiser – Topical Science		EXPERIENCES AND OUTCOMES	PROGRESSION			BENCHMARKS
			2.1	2.2	2.3	
		Through research and discussion I have an appreciation of the contribution that individuals are making to scientific discovery and invention and the impact this has made on society. **SCN 2-20a**	I can/am able to: ● I can discuss individuals who are making scientific discoveries/inventions that impact on society.	I can/am able to: ● I can research and discuss individuals who are making scientific discoveries/inventions that are impacting on society.	I can/am able to: ● I can prepare a presentation on the impact of individuals who are making scientific discoveries/inventions and their impact on society.	Researches historic and contemporary scientists (ensuring gender balance) and their scientific discoveries and reports collaboratively to others using a range of methods. *Social Intelligence – Collaborating* Describes the impact of scientific discovery, creativity and invention on society past and present, for example, in design, medicine and agriculture. *Innovation – Sense Making* Demonstrates understanding of how science impacts on every aspect of our lives. Relates the development of scientific skills in the classroom to an increasingly wide variety of science, technology, engineering and mathematics (STEM) careers. *Social Intelligence - Feeling*

DUNDEE SCIENCE PROGRESSION FRAMEWORK – SECOND LEVEL

		I can report and comment on current scientific news items to develop my knowledge and understanding of topical science. **SCN 2-20b**	I can/am able to: ● I can report and comment on current scientific news items. ● I can reflect upon and critically ● evaluate media portrayal of scientific findings. ● I can demonstrate knowledge and understanding of topical science issues.	I can/am able to: ● I can report and comment on current scientific news items. ● I can reflect upon and critically evaluate media portrayal of scientific findings. ● I can demonstrate knowledge and understanding of topical science issues.	I can/am able to: ● I can report and comment on current scientific news items. ● I can reflect upon and critically evaluate media portrayal of scientific findings. ● I can demonstrate knowledge and understanding of topical science issues.	Explores items of current scientific interest within the school, local community, nationally or in the global media and collates, organises and summarises findings, with assistance. *Social Intelligence – Collaborating* - Shares opinions about a variety of topical scientific issues considering, for example, moral, ethical, societal, cultural, economic and environmental aspects. *Self-Management - Integrity*