STEM Glasgow Sciences Framework

The framework for Sciences has been organised by level and split by stage. Within each stage there are **suggested** bundles of Curriculum for Excellence Experiences and Outcomes. These E's & O's are then supported by:

SCN 1-06a Education Scotland Sciences Planning Tool

- Suggested bundles
- Benchmarks for Assessment
- Resources to support learning
- Exemplar IDL planners
- Key documents

This framework is a working document and will be updated regularly. Please be flexible in your approach and keep up to date with developments to ensure you can best plan for excellent learning and teaching.

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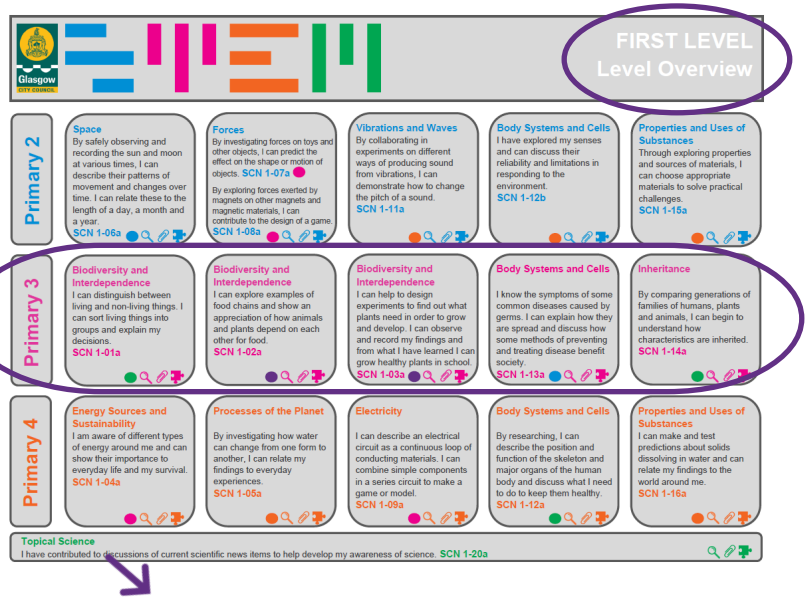
Our Vision

"That our young people, practitioners and partners work collaboratively to support the development of STEM based knowledge, skills and opportunities, increasing the skills for life, learning and work of our young people and supporting Glasgow's economic development."

SCIENCES FRAMEWORK
How to Use Guide

Early Level	Early Years	Primary 1	
First Level	Primary 2	Primary 3	Primary 4
Second Level	Primary 5	Primary 6	Primary 7
Third Level	1st Year	2nd Year	



Topical Science → Should be taught at every stage & level

Science Planning Tool → STEM Nation ← SCN 1-03a

SUGGESTED bundling of E's & O's for stage

Benchmarks for Assessment

Biodiversity and Interdependence
I can help to design experiments to find out what plants need in order to grow and develop. I can observe and record my findings and from what I have learned I can grow healthy plants in school.
SCN 1-03a

#STEMGlasgow → Linked resources

Exemplar IDL Planners (COMING SOON)

SCIENCES FRAMEWORK
Home

Early Level	Early Years	Primary 1	
First Level	Primary 2	Primary 3	Primary 4
Second Level	Primary 5	Primary 6	Primary 7
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EARLY LEVEL
Level Overview

Early Years

Biodiversity and Interdependence
I have observed living things in the environment over time and am becoming aware of how they depend on each other.
SCN 0-01a

Energy Sources and Sustainability
I have experienced, used and described a wide range of toys and common appliances. I can say 'what makes it go' and say what they do when they work.
SCN 0-04a

Space
I have experienced the wonder of looking at the vastness of the sky, and can recognise the sun, moon and stars and link them to daily patterns of life.
SCN 0-06a

Forces
Through everyday experiences and play with a variety of toys and other objects, I can recognise simple types of forces and describe their effects.
SCN 0-07a

Body Systems and Cells
I can identify my senses and use them to explore the world around me.
SCN 0-12a

Primary 1

Biodiversity and Interdependence
I have helped to grow plants and can name their basic parts. I can talk about how they grow and what I need to do to look after them.
SCN 0-03a

Processes of the Planet
By investigating how water can change from one form to another, I can relate my findings to everyday experiences.
SCN 0-05a

Electricity
I know how to stay safe when using electricity. I have helped to make a display to show the importance of electricity in our daily lives.
SCN 0-09a

Vibrations and Waves
Through play, I have explored a variety of ways of making sounds.
SCN 0-11a

Properties and Uses of Substances
Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes.
SCN 0-15a

Topical Science
I can talk about science stories to develop my understanding of science and the world around me. **SCN 0-20a**

FIRST LEVEL
Level Overview

Primary 2

Space
By safely observing and recording the sun and moon at various times, I can describe their patterns of movement and changes over time. I can relate these to the length of a day, a month and a year.
SCN 1-06a

Forces
By investigating forces on toys and other objects, I can predict the effect on the shape or motion of objects. **SCN 1-07a**

By exploring forces exerted by magnets on other magnets and magnetic materials, I can contribute to the design of a game.
SCN 1-08a

Vibrations and Waves
By collaborating in experiments on different ways of producing sound from vibrations, I can demonstrate how to change the pitch of a sound.
SCN 1-11a

Body Systems and Cells
I have explored my senses and can discuss their reliability and limitations in responding to the environment.
SCN 1-12b

Properties and Uses of Substances
Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges.
SCN 1-15a

Primary 3

Biodiversity and Interdependence
I can distinguish between living and non-living things. I can sort living things into groups and explain my decisions.
SCN 1-01a

Biodiversity and Interdependence
I can explore examples of food chains and show an appreciation of how animals and plants depend on each other for food.
SCN 1-02a

Biodiversity and Interdependence
I can help to design experiments to find out what plants need in order to grow and develop. I can observe and record my findings and from what I have learned I can grow healthy plants in school.
SCN 1-03a

Body Systems and Cells
I know the symptoms of some common diseases caused by germs. I can explain how they are spread and discuss how some methods of preventing and treating disease benefit society.
SCN 1-13a

Inheritance
By comparing generations of families of humans, plants and animals, I can begin to understand how characteristics are inherited.
SCN 1-14a

Primary 4

Energy Sources and Sustainability
I am aware of different types of energy around me and can show their importance to everyday life and my survival.
SCN 1-04a

Processes of the Planet
By investigating how water can change from one form to another, I can relate my findings to everyday experiences.
SCN 1-05a

Electricity
I can describe an electrical circuit as a continuous loop of conducting materials. I can combine simple components in a series circuit to make a game or model.
SCN 1-09a

Body Systems and Cells
By researching, I can describe the position and function of the skeleton and major organs of the human body and discuss what I need to do to keep them healthy.
SCN 1-12a

Properties and Uses of Substances
I can make and test predictions about solids dissolving in water and can relate my findings to the world around me.
SCN 1-16a

Topical Science
I have contributed to discussions of current scientific news items to help develop my awareness of science. **SCN 1-20a**

SECOND LEVEL
Level Overview

Primary 5

Biodiversity and Interdependence
SCN 2-01a
SCN 2-02a
SCN 2-02b

Energy Sources and Sustainability
SCN 2-04a
SCN 2-04b

Forces
SCN 2-07a
SCN 2-08b

Properties and Uses of Substances
SCN 2-15a
SCN 2-16a

Earth's Materials
SCN 2-17a

Topical Science
SCN 2-20a
SCN 2-20b

Primary 6

Space
SCN 2-06a

Vibrations and Soundwaves
SCN 2-11a
SCN 2-11b

Body Systems and Cells
SCN 2-12b

Properties and Uses of Substances
SCN 2-16b

Chemical Changes
SCN 2-18a
SCN 2-19a

Topical Science
SCN 2-20a
SCN 2-20b

Primary 7

Biodiversity and Interdependence
SCN 2-03a

Processes of the Planet
SCN 2-05a

Forces
SCN 2-08a

Electricity
SCN 2-09a
SCN 2-10a

Body Systems and Cells
SCN 2-12a
SCN 2-13a

Inheritance
SCN 2-14a
SCN 2-14b

Topical Science
SCN 2-20a
SCN 2-20b

SECOND LEVEL
P5 Overview

Primary 5

Biodiversity and Interdependence

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 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

Through carrying out practical activities and investigations, I can show how plants have benefitted society.
SCN 2-02b

Energy Sources and Sustainability

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

Through exploring non-renewable energy sources, I can describe how they are used in Scotland today and express an informed view on implications for their future use.
SCN 2-04b

Forces

By investigating how friction, including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects.
SCN 2-07a

By investigating floating and sinking objects in water, I can apply my understanding of buoyancy to solve a practical challenge.
SCN 2-08b

Properties and Uses of Substances

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 have participated in practical activities to separate simple mixtures of substances and can relate my findings to my everyday experience.
SCN 2-16a

Earth's Materials

Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses.
SCN 2-17a

Topical Science

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 report and comment on current scientific news items to develop my knowledge and understanding of topical science. **SCN 2-20b**

SECOND LEVEL
P6 Overview

Primary 6

Space

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

Vibrations and Soundwaves

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

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

Body Systems and Cells

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

Properties and Uses of Substances

By investigating common conditions that increase the amount of substance that will dissolve or speed of dissolving, I can relate my findings to the world around me.
SCN 2-16b

Chemical Changes

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 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

Topical Science

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 report and comment on current scientific news items to develop my knowledge and understanding of topical science. **SCN 2-20b**

SECOND LEVEL
P7 Overview

Primary 7

Biodiversity and Interdependence

I have collaborated in the design of an investigation into the effects of fertiliser on the growth of plants. I can express an informed view of the risks and benefits of their use.
SCN 2-03a

Processes of the Planet

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

Forces

I have collaborated in investigations to compare magnetic, electrostatic and gravitational forces and have explored their practical applications.
SCN 2-08a

Electricity

I have used a range of electrical components to help 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

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

Body Systems and Cells

By investigating some body systems and potential problems which they may develop, I can make informed decisions to help me maintain my health and wellbeing.
SCN 2-12a

I have contributed to investigations into the role of microorganisms in producing and breaking down some materials.
SCN 2-13a

Inheritance

By investigating the lifecycles of plants and animals, I can recognise the different stages of their development.
SCN 2-14a

By exploring the characteristics offspring inherit when living things reproduce, I can distinguish between inherited and non-inherited characteristics.
SCN 2-14b

Topical Science

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 report and comment on current scientific news items to develop my knowledge and understanding of topical science. **SCN 2-20b**

THIRD LEVEL
Level Overview

1st Year

Energy Sources and Sustainability
SCN 3-04a
SCN 3-04b

Processes of the Planet
SCN 3-05a
SCN 3-05b

Space
SCN 3-06a

Forces
SCN 3-08a

Vibrations and Waves
SCN 3-11a

Body Systems and Cells
SCN 3-12a
SCN 3-13a
SCN 3-13b
SCN 3-13c

Inheritance
SCN 3-14a
SCN 3-14b

Chemical Changes
SCN 3-18a
SCN 3-19a

2nd Year

Biodiversity and Interdependence
SCN 3-01a
SCN 3-02a
SCN 3-03a

Forces
SCN 3-07a

Electricity
SCN 3-09a
SCN 3-10a

Vibrations and Waves
SCN 3-11b

Body Systems and Cells
SCN 3-12b

Properties and Uses of Substances
SCN 3-15a
SCN 3-15b
SCN 3-16a
SCN 3-16b

Earth's Materials
SCN 3-17a
SCN 3-17b

Chemical Changes
SCN 3-19b

Topical Science

I have collaborated with others to find and present information on how scientists from Scotland and beyond have contributed to innovative research and developments. **SCN 3-20a**

Through research and discussion, I have contributed to evaluations of media items with regard to scientific content and ethical implications. **SCN 3-20b**

THIRD LEVEL
First Year Overview

First Year

Energy Sources and Sustainability

I can use my knowledge of the different ways in which heat is transferred between hot and cold objects and the thermal conductivity of materials to improve the energy efficiency in buildings and other systems. **SCN 3-04a**

By investigating renewable energy sources and taking part in practical activities to harness them, I can discuss their benefits and potential problems. **SCN 3-04b**

Processes of the Planet

By contributing to experiments and investigations, I can develop my understanding of models of matter and can apply this to changes of state and the energy involved as they occur in nature. **SCN 3-05a**

I can explain some of the processes which contribute to climate change and discuss the possible impact of Atmospheric change on the survival of living things. **SCN 3-05b**

Space

By using my knowledge of our solar system and the basic needs of livings things, I can produce a reasoned argument on the likelihood of life existing elsewhere in the universe. **SCN 3-06a**

Forces

I have collaborated in investigations into the effects of gravity on objects and I can predict what might happen to their weight in different situations on Earth and in Space. **SCN 3-08a**

Vibrations and Waves

By exploring the reflection of light when passed through different materials, lenses and prisms, I can explain how light can be used in a variety of applications. **SCN 3-11a**

Body Systems and Cells

I have explored the structure and function of organs and organ systems and can relate this to the basic biological processes required to sustain life. **SCN 3-12a**

Using a microscope, I have developed my understanding of the structure and variety of cells and of their functions. **SCN 3-13a**

I have contributed to investigations into the different types of microorganisms and can explain how their growth can be controlled. **SCN 3-13b**

I have explored how the body defends itself against disease and can prescribe how vaccines can provide protection. **SCN 3-13c**

Inheritance

I understand the processes of fertilisation and embryonic development and can discuss possible risks to the embryo. **SCN 3-14a**

I have extracted DNA and understand its function. I can express an informed view of the risks and benefits of DNA profiling. **SCN 3-14b**

Chemical Changes

Having taken part in practical activities to compare properties of acids and bases, I have demonstrated ways of measuring and adjusting pH and can describe the significance of pH in everyday life. **SCN 3-18a**

Through experimentation, I can identify indicators of chemical reactions having occurred. I can describe ways of controlling the rate of reactions and can relate my findings to the world around me. **SCN 3-19a**

Topical Science

I have collaborated with others to find and present information on how scientists from Scotland and beyond have contributed to innovative research and developments. **SCN 3-20a**
Through research and discussion, I have contributed to evaluations of media items with regard to scientific content and ethical implications. **SCN 3-20b**

THIRD LEVEL
Second Year Overview

Second Year

Biodiversity and Interdependence

I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution. **SCN 3-01a**

I have collaborated on investigations into the process of photosynthesis and I can demonstrate my understanding of why plants are vital to sustaining life on Earth. **SCN 3-02a**

Through investigations and based on experimental evidence, I can explain the use of different types of chemicals in agriculture and their alternatives and can evaluate their potential impact on the world's food production. **SCN 3-03a**

Forces

By contributing to investigations of energy loss due to friction, I can suggest ways of improving the efficiency of moving systems. **SCN 3-07a**

Electricity

Having measured the current voltage in series and parallel circuits, I can design a circuit to show the advantages of parallel circuits in an everyday application. **SCN 3-09a**

I can help to design simple chemical cells and use them to investigate the factors which affect the voltage produced. **SCN 3-10a**

Vibrations and Waves

By exploring radiations beyond the visible, I can describe a selected application, discussing the advantages and limitations. **SCN 3-11b**

Body Systems and Cells

I have explored the role of technology in monitoring health and improving the quality of life. **SCN 3-12b**

Properties and Uses of Substances

I have developed my knowledge of the Periodic Table by considering the properties and uses of a variety of elements relative to their positions. **SCN 3-15a**

Having contributed to a variety of practical activities to make and break down compounds, I can describe examples of how the properties of compounds are different from their constituent elements. **SCN 3-15b**

I can differentiate between pure substances and mixtures in common use and can select appropriate physical methods for separating mixtures into their compounds. **SCN 3-16a**

I have taken part in practical investigations into solubility using different solvents and can apply what I have learned to solve everyday practical problems. **SCN 3-16b**

Earth's Materials

Through evaluation of a range of data, I can describe the formation, characteristics and uses of soils, minerals and basic types of rocks. **SCN 3-17a**

I can participate in practical activities to extract useful substances from natural resources. **SCN 3-17b**

Chemical Changes

I have helped to design and carry out practical activities to develop my understanding of chemical reactions involving the Earth's materials. I can explain how we apply knowledge of these reactions in practical ways. **SCN 3-19b**

Topical Science

I have collaborated with others to find and present information on how scientists from Scotland and beyond have contributed to innovative research and developments. **SCN 3-20a**

Through research and discussion, I have contributed to evaluations of media items with regard to scientific content and ethical implications. **SCN 3-20b**

EARLY LEVEL
Benchmarks for Assessment

Early Level

Biodiversity and Interdependence I have observed living things in the environment over time and am becoming aware of how they depend on each other. **SCN 0-01a**	Explores living, non-living and once living objects.	Sorts objects as living, non-living or once living.	Describes characteristics of living things.	Explains how living things depend on each other for food.	Give examples of animals that eat plants.
Biodiversity and Interdependence I have helped to grow plants and can name their basic parts. I can talk about how they grow and what I need to do to look after them. **SCN 0-03a**	Discusses the basic needs of plants.	Explores what they need to grow including water, heat, sunlight and soil.	Observes plants growing.	Demonstrates an understanding that plants grow from seeds.	
Energy Sources and Sustainability I have experienced, used and described a wide range of toys and common appliances. I can say 'what makes it go' and say what they do when they work. **SCN 0-04a**	Asks questions about what 'makes things go'.	Describe and give examples of 'what make things go' e.g. batteries, wind-up toys and sunlight.	Identify toys and common appliances.	Discuss what toys/common appliances do when they work e.g. produce heat, light, movement or sounds.	
Processes of the Planet By investigating how water can change from one form to another, I can relate my findings to everyday experiences. **SCN 0-05a**	Investigates the different properties of water.	Shares their discoveries with others.	Gives examples of water in nature.	Discuss how water influences their everyday lives.	Identifies the 3 main states of water (ice, water & steam).	Use scientific vocabulary such as melting, freezing & boiling.	Describes the changes of state using scientific vocabulary.
Space I have experienced the wonder of looking at the vastness of the sky, and can recognise the sun, moon and stars and link them to daily patterns of life. **SCN 0-06a**	Describes that the Earth rotating around the sun gives us day and night.	Describes the pattern of night and day.	Explains how the pattern changes over the course of a year.		
Forces Through everyday experiences and play with a variety of toys and other objects, I can recognise simple types of forces and describe their effects. **SCN 0-07a**	Explores toys and objects that need to be pushed.	Explores toys and objects that need to be pulled.	Sorts toys into groups based on whether they need pushed or pulled.	Investigates how the size of the force affects movement of an object.	Investigates how the weight of an object affects the objects movement.	Measures, using simple equipment, the movement of an object in relation to the size of a force or weight of the object.	Demonstrates how a force can make an object stay still or move.	Demonstrates how force can make an object speed up or slow down.	Demonstrates how force can make an object change shape.

EARLY LEVEL
Benchmarks for Assessment

Early Level

Electricity I know how to stay safe when using electricity. I have helped to make a display to show the importance of electricity in our daily lives. **SCN 0-09a**	Identifies objects that use electricity from main electrical sockets.	Identifies objects that use electricity from alternative sources such as batteries and solar cells.	Groups objects based on their electricity source.	Gives examples of how electricity is used in everyday life.	Discusses the importance of electricity.	Identifies the risks that electricity can cause.	Recognises how to stay safe.
Vibrations and Waves Through play, I have explored a variety of ways of making sounds. **SCN 0-11a**	Predicts ways in which sounds can be made louder and quieter.	Investigates ways to make sounds louder and quieter.	Identifies different sources of sound.				
Body Systems and Cells I can identify my senses and use them to explore the world around me. **SCN 0-12a**	Identifies the different senses.	Match senses to specific parts of the body.	Uses their senses to describe the world around them.	Gives examples of what they see, hear, smell, taste and feel.			
Properties and Uses of Substances Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes. **SCN 0-15a**	Explores the different properties of materials.	Sorts materials by property; strong, smooth, rough and if they float or sink.	Selects appropriate materials for different uses.	Justifies selection based on their physical properties.			
Topical Science I can talk about science stories to develop my understanding of science and the world around me. **SCN 0-20a**	Discusses the science they encounter in everyday life.	Role-plays a variety of science related jobs.	Explores the science skills used in a variety of jobs.				

FIRST LEVEL
Benchmarks for Assessment

First Level

Biodiversity and Interdependence I can distinguish between living and non-living things. I can sort living things into groups and explain my decisions. **SCN 1-01a**	Explains difference between living and non-living things.	Justifies explanation referencing movement, reproduction, sensitivity, growth, excretion and feeding.	Creates and justifies criteria for sorting living things.	Sorts living things into groups using a variety of features.	
Biodiversity and Interdependence I can explore examples of food chains and show an appreciation of how animals and plants depend on each other for food. **SCN 1-02a**	Demonstrate awareness of how energy from the sun can be taken in by plants.	Explains how this is the major source of food for all living things.	Uses 'producer', consumer', 'predator' and prey appropriately.	Interprets and constructs food chains using appropriate vocabulary.	
Biodiversity and Interdependence I can help to design experiments to find out what plants need in order to grow and develop. I can observe and record my findings and from what I have learned I can grow healthy plants in school. **SCN 1-03a**	Understands that varying conditions such as; light, water, air, soil/nutrients and heat can all have an impact on growth.	Observes, collects and measures the outcomes from growing plants in different conditions.	Through a report/ presentation shares how plants grow.		
Energy Sources and Sustainability I am aware of different types of energy around me and can show their importance to everyday life and my survival. **SCN 1-04a**	Identifies different types of energy.	Gives examples of different energy sources, e.g. light, sound, heat, electrical.	Discusses how different types of energy are used in everyday life.	Discusses what the importance of energy and the types needed for survival.	
Processes of the Planet By investigating how water can change from one form to another, I can relate my findings to everyday experiences. **SCN 1-05a**	Uses more complex vocabulary relating to states of water including 'condensation' and 'evaporation'.	Understand and describes changes of states of water.	Contributes to design of experiment to identify temperature at which water boils, freezes and melts and uses appropriate units.	Knows that water boils at 100°, melts at 0° and freezes at 0°.	

FIRST LEVEL
Benchmarks for Assessment

First Level

Space By safely observing and recording the sun and moon at various times, I can describe their patterns of movement and changes over time. I can relate these to the length of a day, a month and a year. **SCN 1-06a**	Describes how the Earth spins around its axis in 24 hours.	Describes how this results in day and night.	Observes and records the different patterns and movements of the moon.	Explain the different shapes and positions of the moon and how these relate to the lunar month.	Demonstrates understanding of how the Earth takes one year to orbit the Sun.	Shows understanding that the Earth is tilted on its axis as it circles the Sun.	Understand that the tilt causes the pattern of the seasons and changes to the number of daylight hours over the course of a year.
Forces By investigating forces on toys and other objects, I can predict the effect on the shape or motion of objects. **SCN 1-07a**	Understands that the force on an object can make it change speed, direction or shape.	Predicts how a force will change using vocabulary such as pushing, pulling stretching, squashing and twisting.	Investigates how different forces can affect an object.	Investigates balanced forces.	Explains that if push and pull are equal in strength and opposite in direction then there is no change in movement.		
Forces By exploring forces exerted by magnets on other magnets and magnetic materials, I can contribute to the design of a game. **SCN 1-08a**	Explains how magnets exert a non-contact force on each other.	Explains why magnets attract certain materials.	Demonstrates through practical activities that like poles repel.	Demonstrates through practical activities that opposite poles attract.	Shares at least two examples of how magnets are used in everyday life.		
Electricity I can describe an electrical circuit as a continuous loop of conducting materials. I can combine simple components in a series circuit to make a game or model. **SCN 1-09a**	Builds simple circuits containing bulbs, switches, bells and batteries.						
Vibrations and Waves By collaborating in experiments on different ways of producing sound from vibrations, I can demonstrate how to change the pitch of a sound. **SCN 1-11a**	Understand how sounds can be made higher or lower in pitch by altering characteristics of sound source.	Demonstrates a change in pitch by altering tightness, length, width, thickness or other characteristics of source.	Explain that sound is caused by a vibration in material.				
Body Systems and Cells By researching, I can describe the position and function of the skeleton and major organs of the human body and discuss what I need to do to keep them healthy. **SCN 1-12a**	Identifies skull, spine, ribcage and some bones of the arms and legs.	Uses components to make simple models of a skeleton.	Explains how the skeleton gives support and protects organs.	Describes the position of the major organs including the brain, heart, lungs, stomach and bladder.	Describes the function of the major organs.	Describes how the skin, as an organ, provides a barrier to infection and help us to control our temperature.	Reports and explains how to have a healthy lifestyle e.g. balanced diet, regular exercise, sufficient sleep and by avoiding substance misuse.

FIRST LEVEL
Benchmarks for Assessment

First Level

Body Systems and Cells I have explored my senses and can discuss their reliability and limitations in responding to the environment. **SCN 1-12b**	Uses senses to detect information.	Explains how senses keep people safe.	Investigates the reliability and limitations of the senses e.g. using taste tests, limits of sounds, optical illusions and blind-fold games.
Body Systems and Cells I know the symptoms of some common diseases caused by germs. I can explain how they are spread and discuss how some methods of preventing and treating disease benefit society. **SCN 1-13a**	Describes the symptoms of some common diseases including colds, mumps, measles, chicken pox and flu.	Provides explanations of diseases are spread, supported by evidence.	Discusses ways in which some diseases can be prevented through good hygiene and vaccination.
Inheritance By comparing generations of families of humans, plants and animals, I can begin to understand how characteristics are inherited. **SCN 1-14a**	Identify inherited characteristics based on their own experiences.	Illustrate how inherited characteristics are passed from one generation to the next.	Knows that genetic information determines characteristics e.g. eye colour and shape of petals.	Demonstrates understanding of the variations within family groups.
Properties and Uses of Substances Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges. **SCN 1-15a**	Identifies and classifies natural materials.	Identifies and classifies human-made (synthetic) material.	Identifies properties of different materials e.g. rigidity, flexibility, rough, smooth and waterproof.	Describes how the properties of materials are linked to their uses.
Properties and Uses of Substances I can make and test predictions about solids dissolving in water and can relate my findings to the world around me. **SCN 1-16a**	Identifies examples of things that dissolve and don't dissolve.	Links knowledge of what dissolves to real-life examples of things.	Predicts how solubility is affected by heat and stirring.	Investigates how solubility is affected by heat and stirring.	Records outcomes of prediction and investigations.
Topical Science I have contributed to discussions of current scientific news items to help develop my awareness of science. **SCN 1-20a**	Discusses science topics in real-life contexts.	Expresses opinions about science topics in real-life contexts including those featured in the media.	Discusses how people use science in their everyday lives.	Gives examples of scientific knowledge and skills.	Describes a variety of jobs and careers which require scientific knowledge and skills.

SECOND LEVEL
Benchmarks for Assessment

Second Level

Biodiversity and Interdependence 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**	Classifies living things into plants, animals and other groups.	Groups through characteristics e.g. flowering and non-flowering, vertebrates and invertebrates.	Constructs and uses simple branched keys.	Uses keys to identify particular plants or animals.	Identifies characteristics that have contributed to the survival or extinction of a species.	Identifies contributing environmental factors to the survival or extinction of a species.	Describes plant adaptations linked to the environment e.g. drought.	Describes animal adaptations linked to the environment e.g. using flight.
Biodiversity and Interdependence 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**	Uses vocabulary such as 'producers', 'consumers' and 'herbivore' appropriately.	Describes energy flow between plants and animals.	Describes complex food chains, webs and ecosystems using appropriate vocabulary.					
Biodiversity and Interdependence Through carrying out practical activities and investigations, I can show how plants have benefitted society. **SCN 2-02b**	Conducts practical investigations into how plants have benefitted society.	Relates findings from investigations to real-life examples of how plants have benefited society.	Knows plants are used/have been used for medicine, dye, fuels and construction, prevention of soil erosion and influencing the balance of gases in the air.					
Biodiversity and Interdependence I have collaborated in the design of an investigation into the effects of fertiliser on the growth of plants. I can express an informed view of the risks and benefits of their use. **SCN 2-03a**	Understands the risks and benefits of using fertilisers.	Demonstrates understanding of the underlying scientific concepts relating to the risk and benefits	Collaborates with others to present a reasoned argument regarding fertilisers.					
Energy Sources and Sustainability 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**	Shows understanding of the law of conservation energy.	Demonstrates that energy can be converted from form to another and knows that it cannot be created or destroyed.	Identifies the common types of energy used in energy transfers and transformations; kinetic, potential, electrical, chemical, light, sound and heat.	Gives examples of energy transfers and transformations in every day appliances.	Explains that when energy transfers and transformations take place energy is converted into 'useful' and 'wasted' energy.			

SECOND LEVEL
Benchmarks for Assessment

Second Level

Energy Sources and Sustainability 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**	Researches non-renewable sources of energy.	Identifies fossil fuels and nuclear energy as examples of non-renewables.	Discusses use of non-renewables in Scotland.	Demonstrates understanding of ways to reduce own energy use.	Gives examples of how to live more sustainably.	
Processes of the Planet 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**	Understands the necessity of water for life.	Discusses the impact water has for life e.g. for growth of crops, for drinking and in river formation/flow.	Demonstrates understanding of the water cycle.	Discuss and explain the different process involved in the water cycle.		
Space 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**	Knows 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.	Reports collaboratively on the key features of the planets.	Shows understanding of the size and scale of the Solar System.	Constructs simple models to communicate size, scale, time and relative motion within our Solar System.	Describes how solar and lunar eclipses occur.	
Forces By investigating how friction, including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects. **SCN 2-07a**	Understands friction as a force which opposes the motion of moving objects.	Describes friction e.g. two solid surfaces rubbing against one another or a solid surface moving through air or water.	Understands air resistance (drag).	Predicts the association between air resistance, speed of an object and surface area.	Investigates link between air resistance, speed and surface area and compares findings to predictions.	Understands how friction and air resistance can be both useful and a problem.	Understands how friction is useful in braking systems and a problem e.g. causing moving parts to wear.	Understands that efficient movement requires the least possible energy.	Suggests ways to improve efficiency in moving objects e.g. by streamlining.
Forces I have collaborated in investigations to compare magnetic, electrostatic and gravitational forces and have explored their practical applications. **SCN 2-08a**	Measures gravitational force with a force or newton meter.	Records results using appropriate units (newtons).	Explains how some objects may become electrically charged by rubbing two surfaces together and how the charges produce an electrostatic force.	Investigates and demonstrates understanding that magnetic and electrostatic forces can both repel and attract.	Describes practical applications of magnetic, electrostatic and gravitational forces e.g. magnetised needle in a compass.	

SECOND LEVEL
Benchmarks for Assessment

Second Level

Forces By investigating floating and sinking of objects in water, I can apply my understanding of buoyancy to solve a practical challenge. **SCN 2-08b**	Explores how an objects shape affects floating.	Explores how the density of a material the object is made from affects floating.	Collates, organises and summaries findings of investigation with assistance.				
Electricity I have used a range of electrical components to help 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**	Identifies a range of electrical components.	Designs circuits for a variety of differing purposes.	Build electrical circuits using an increasing range of components.	Identifies symbols that denote a bulb, switch, motor, bell, buzzer, wires, cell and a battery.	Uses symbols to draw circuit diagrams.	Identifies common types of energy (kinetic, potential, electrical, chemical, light, sound and heat).	Describes how components in a circuit transfer energy into different forms.
Electricity 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**	Understands that a battery is a portable energy source.	Demonstrates understanding that a battery has a store of chemical energy.	Applies this knowledge to build simple batteries.	Explains the process of energy transformation from battery (cell) to electrical components.			
Vibrations and Waves Through research on how animals communicate, I can explain how sound vibrations care carries by waves through air water and other media. **SCN 2-11a**	Experiments and investigates how sound travels through different materials	Demonstrates through experiments how sound travels differently through air, water and solids.	Understands that hearing has limitations.	Explains the different limiting factions e.g. age, position, and flexibility (direction) of ears.			
Vibrations and Waves 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**	Knows that light travels in straight lines.	Demonstrates through practical investigations that light travels in straight lines, can be reflected by highly-polished surfaces and that curved faces can distort an image.	Understands that the position, shape and size of a shadow depend on the position in relation to the light source.	Predicts the position, shape and size of a shadow.	Understands that white light/sunlight contains a spectrum of different colours.	Demonstrates that light can be dispersed to make the colours visible.	Identifies the colours and order of the rainbow as red, orange, yellow, green, blue, indigo and violet.

SECOND LEVEL
Benchmarks for Assessment

Second Level

Cont…
Vibrations and Waves
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

Explains that we see objects because they give out or reflect light rays that enter our eyes.

Investigates the effect that coloured filters have on white light.

Draws on findings and describes how they can be used to make other colours.

Explains how we can recognise the colour of an object due to reflection and absorption of particular parts of the visible spectrum.

Body Systems and Cells
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

The expectation is that at least two of the following body systems will be studied at Second Level.

Respiratory

- Identifies parts of the respiratory system.
- Describes the function of the respiratory system (lungs, windpipe and bronchi) e.g. in gas exchange.
- Discusses the main preventable causes of bronchitis, lung cancer and asthma e.g. smoking.

Circulatory

- Identifies parts of the circulatory system.
- Describes the function of the circulatory system (heart and blood vessels) e.g. transport of food, oxygen and waste materials.
- Discusses the main preventable causes of heart disease or stroke e.g. obesity, lack of exercise, smoking and high (saturated) fat diet.

Digestive

- Identifies parts of the digestive system.
- Describes the function of the digestive system (mouth, oesophagus, stomach, liver, small intestine, large intestine, rectum and anus e.g. breakdown of food and absorption of nutrients, minerals and water.
- Discusses the main preventable causes of liver disease e.g. alcohol and drug misuse.

Reproductive

- Identifies parts of the reproductive system.
- Describes the function of the reproductive system (penis, testes, sperm tube/duct, ovaries, egg tube/duct, uterus and vagina) e.g. to make a baby.
- Discusses some preventable causes of fertility problems e.g. alcohol misuse, anorexia and obesity.

Skeletal

- Identifies parts of the skeletal system.
- Describes the function of the skeletal system (skull, spine, ribcage, some bones of the arm and leg) e.g. to provide support, protection and enable movement.
- Discusses some common problems of bones e.g. arthritis, osteoporosis and breaks and how their incidence can be reduced e.g. through calcium in the diet and weight-bearing exercise.

SECOND LEVEL
Benchmarks for Assessment

Second Level

Body Systems and Cells
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

- Describes how senses work individually or together.
- Describes how senses keep people safe from harm.
- Demonstrates understanding of how, if one sense is impaired, it can have an effect on the other senses, either positively or negatively.
- Describes how light enters the eye through the pupil.
- Understands how the pupil changes size in dark/light conditions.

Body Systems and Cells
I have contributed to investigations and the role of microorganisms in producing and breaking down some materials.
SCN 2-13a

- Identifies microorganisms including bacteria, viruses and fungi.
- Demonstrates understanding of how microorganisms can multiply rapidly.
- Investigates the use of some microorganisms used in food production e.g. yeast in bread.
- Explains the purpose of microorganisms used in food production.
- Describes how some microorganisms break down food causing it to be inedible or harmful if indigested.
- Describes how some microorganisms exist in the gut to break down food and aid digestion.
- Investigates, observes and records how microscopic organisms are necessary for the process of decomposition (the breaking down of dead material—decay).

Inheritance
By investigating the lifecycles of plants and animals, I can recognise the different stages of their development.
SCN 2-14a

Plants

- Describes how pollination occurs when the male cell (pollen) lands on the stigma.
- Describes how fertilisation (sexual reproduction) occurs when the genetic information in the male cell fuses (joins) with the genetic information in the female cell.
- Describes how the fertilised ovule develops into a seed and how the ovary ripens to form fruit.
- Investigates and explains how a seed germinates into a plant using water, oxygen, a food store and warmth.

Animals

- Identifies animals as vertebrates and invertebrates.
- Compares the two distinct groups –vertebrates and invertebrates.
- Identifies the five main types of vertebrates including fish (Spawn), birds (eggs which are rigid and fragile) amphibians (spawn and metamorphosis), reptiles (leathery shelled eggs) and mammal (live young).
- Researches the lifecycles of the five main types of vertebrates.
- Communicates findings using a range of media.
- Compares the lifecycles of some invertebrates e.g. ladybird and spider.

Inheritance
By exploring the characteristics offspring inherit when living things reproduce, I can distinguish between inherited and non-inherited characteristics.
SCN 2-14b

- Knows that genetics is the study of inherited characteristics.
- Understands that inherited characteristics are carried on genes and can sometimes skip a generation.
- Explores and categories characteristics as inherited (eye and hair colour, height and right/left handedness).
- Explores and categories characteristics as non-inherited (native language spoken and favourite colour).
- Describes how every living thing has is own DNA fingerprint.

SECOND LEVEL
Benchmarks for Assessment

Second Level

Properties and Uses of Substances By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed. **SCN 2-15a**	Investigates and explains physical changes to the properties of materials which are fully and partially reversible e.g. salt dissolving in water, chocolate melting and water freezing.	Uses scientific vocabulary such as 'melting', 'freezing, 'evaporating' and 'condensing' to describe changes of state.	Investigates and records chemical changes to the properties of materials which are irreversible e.g. cooking, rusting and striking a match.	Observes and identifies some of the signs of a chemical reaction e.g. production of bubbles, colour/texture change and heat given out/ taken in.	Explores and describes the characteristics of solids, liquids and gases e.g. 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.
Properties and Uses of Substances I I have participated in practical activities to separate simple mixtures of substances and can relate my findings to my everyday experience. **SCN 2-16a**	Investigates through practical activity how a mixture of solids of different sizes can be separated.	Explains using findings that a sieve or a magnet can be used to separate a mixture of solids e.g. sand and peas or salt and iron fillings.	Selects the most appropriate practical technique for separating insoluble solids e.g. filtering or sieving.	Understands that a dissolved solid cannot be separated from the solvent by filtering but can be separated by evaporation.	Uses scientific vocabulary such as 'soluble', 'insoluble', 'dissolve' and solution in context.	Relates findings of practical investigations about dissolving to everyday experiences e.g. recycling, salt production and water purification.
Properties and Uses of Substances 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**	Finds an association between the quantity of substance that dissolves and a range of conditions—temperature, time, particle size, stirring and quantity of solvent.	Investigates how a range of factors such as particle size and heat can affect the rate of dissolving.	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).			
Earth's Materials Having explored the substances that make up the Earth's surface, I can compare some of their characteristics and uses. **SCN 2-17a**	Analyses and compares samples of rocks, soil and materials.	Reports their characteristics and uses, using a range of media.				

SECOND LEVEL
Benchmarks for Assessment

Second Level

Chemical Changes 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**	Understands and explains the water cycle.	Knows that the quantity of water on the Earth has remained approximately the same.	Investigates methods to purify water.	Discusses examples of water purification e.g. sedimentation, filtration, evaporation, desalination and the addition of chemicals such as chlorine.	Researches methods used to conserve water within the home, school and globally and communicate findings to others.	Discusses the many uses of water, e.g. to supporting all living things in preservation (ice) and to generate electricity.
Chemical Changes 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**	Collaborates with others to safely demonstrate simple chemical reactions e.g. effervescence.	Investigates examples of everyday chemical reactions, such as burning and corrosion, and names some the new substances which are produced.	Uses prior knowledge to identify when a chemical reaction has occurred to produce a new substance.			
Topical Science 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**	Researches historic and contemporary scientists (ensuring gender balance).	Knows their scientific discoveries and reports collaboratively to others using a range of media.	Understands the impact of scientific discovery, creativity and invention on society past and present.	Describes the impact of discoveries in different industries e.g. in design, medicine and agriculture.	Demonstrates understanding of how science impacts on every aspect of our lives.	Identifies scientific skills.	Relates the development of scientific skills in the classroom to an increasingly wide variety of STEM careers.
Topical Science I can report and comment on current scientific news items to develop my knowledge and understanding of topical science. **SCN 2-20b**	Explores items of current scientific interest within the school, local community, nationally or in the global media.	Collates, organises and summarises findings, with assistance.	Considers a variety of topical scientific issues e.g. moral, ethical, societal, cultural, economic and environmental aspects.	Shares own opinion on topical scientific issues.		

Sciences Framework

Bibliography

Click on the icons below to access the documents that aided in the development of the STEM Glasgow Sciences Framework.

SCN 1-06a Sciences: Experiences and Outcomes

Sciences: Benchmarks for Assessment

DYW: Career Education Standard

Skills Development Scotland: Skills 4.0

Education Scotland: Sciences Planning Tool

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