

Welsh - Progression 3 Stage - Science and Technology of a Curriculum For Sustainability Complementing the Welsh Framework



This outline, grounded in the Welsh curriculum, provides a foundation for planning teaching, learning, and experiences that promote sustainability. It is designed to be flexible, allowing teachers to adapt the learning to meet the needs of their specific cohort. Co-creating learning experiences is encouraged, fostering collaboration between educators and learners. This progression pathway aims to support teachers in their planning and implementation of sustainability-focused education.

Overarching Objectives for Progression Step 3:

- Promote the development of independent and collaborative learning.
- Encourage critical thinking and the ability to make connections between subjects.
- Develop a sense of responsibility for personal well-being and the environment.
- Continue fostering creativity, curiosity, and a lifelong love of learning.
- Equip learners with the skills to engage with real-world issues, including global challenges such as climate change and social justice.

The Curriculum of Wales

Expressive Arts	Health and Wellbeing	Humanities (including History, Geography, Religion, Values, and Ethics)	Languages, Literacy, and Communication (including Welsh and International Languages)	Mathematics and Numeracy	Science and Technology
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Expressive Arts Subject Areas: Music, Drama, Art, Dance, Film and Digital Media. Objectives: Develop skills in using a wider variety of materials, techniques, and technologies in creative work. Explore a deeper understanding of how emotions, ideas, and narratives can be expressed through art forms. Collaborate in group performances and artistic projects. Begin to reflect more critically on their own work and that of others.	Health and Well-being Subject Areas: Physical Health, Mental and Emotional Well-being, Relationships, Healthy Eating, Personal Safety, and Self-care. Objectives: Develop an understanding of physical, mental, and emotional well-being and how to maintain balance. Take increasing responsibility for making healthy lifestyle choices. Build self-confidence and resilience to	Humanities Subject Areas: History, Geography, Religious Education, Business Studies, Citizenship, and Social Studies. Objectives: Explore significant historical events, people, and places, locally, nationally, and globally. Understand geographical processes and their impact on people and the environment. Examine different belief systems, values, and cultural practices. Begin to develop an understanding of	Languages, Literacy and Communication Subject Areas: English, Welsh, Modern Foreign Languages, Literature, Oracy, and Digital Communication. Objectives: Refine skills in both Welsh and English, in speaking, listening, reading, and writing. Develop confidence in using language for a range of purposes, including debate, persuasion, and creative expression. Explore and analyse a wider variety of texts, both written and spoken, including contemporary and classical works. Begin to learn a	Mathematics and Numeracy Subject Areas: Number, Geometry, Algebra, Measurement, Data Handling, and Problem Solving. Objectives: Continue to develop fluency in number and calculation, including mental arithmetic. Understand more complex mathematical relationships, such as ratios, proportions, and percentages. Use geometry to explore properties of shapes, patterns, and space. Solve increasingly complex mathematical	Science and Technology Subject Areas: Biology, Chemistry, Physics, Computer Science, Design and Technology, Engineering. Objectives: Explore scientific phenomena and develop an understanding of the scientific method (observation, experimentation, analysis). Understand the role of science and technology in solving real-world problems, including sustainability and health.
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Make connections between their own experiences and those portrayed in different artistic forms.	cope with challenges and change. Learn how to manage relationships, both in person and online, with a focus on positive communication and respect. Understand the importance of personal safety, including digital well-being. Reflect on and respond to the emotions of themselves and others.	ethics, rights, and responsibilities in different societies. Understand economic activities and basic business concepts. Investigate the impact of human actions on the environment and learn about sustainability and global citizenship.	modern foreign language and understand its cultural context. Use digital platforms to communicate effectively and safely. Engage in critical discussions about the media and its influence.	problems in a variety of contexts. Begin to understand algebraic concepts and simple equations. Analyse data to draw conclusions and make predictions. Apply mathematical reasoning in real-world scenarios, such as financial literacy or environmental issues.	Develop computational thinking, coding, and digital literacy skills. Investigate the properties and uses of materials and energy. Design, create, and evaluate solutions to technical challenges, such as building structures or simple machines. Study living organisms, ecosystems, and the environment, and understand the importance of biodiversity. Begin to understand the role of engineering and technological innovation in society.
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The Sustainability Curriculum Headings

Understanding Sustainability (SUS1)	Environmental Awareness (SUS2)	Environmental Stewardship (SUS3)	Waste Management (SUS4)	Energy Conservation (SUS5)	Biodiversity and Ecosystems (SUS6)
Climate Change and Adaptation (SUS7)	Food and Agriculture (SUS8)	Water Conservation (SUS9)	Sustainable Transport and Urban Planning (SUS10)	Citizenship / Global Responsibility and Sustainable Development (SUS11)	Outdoor Learning and Connection to Nature (SUS12)

The Sustainability Curriculum Model linked to the Curriculum of Wales - For Science and Technology Progression Step 3

Understanding
Sustainability

(SUS1)

Science and Technology

Biology

- Objective: Study living organisms, ecosystems, and the environment to understand their role in sustainability and the importance of biodiversity for a balanced ecosystem.
 - SDG Link: SDG 15 – Life on Land / SDG 14 – Life Below Water
 - Learning Link: Investigate how biodiversity contributes to ecosystem resilience and supports sustainable food systems. Explore the effects of human activity, such as deforestation, pollution, and climate change, on biodiversity and ecosystems.
 - Scientific Inquiry: Conduct studies to observe how ecosystems adapt to changes in the environment. Research and analyse how sustainable practices, such as conservation efforts and habitat restoration, support biodiversity and ecosystem health.

Chemistry

- Objective: Investigate the chemical properties of materials and processes, focusing on their environmental impact and sustainability, such as sustainable materials, recycling, and waste management.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 6 – Clean Water and Sanitation
 - Learning Link: Study how the chemical properties of materials influence their recyclability and environmental impact. Investigate sustainable alternatives to harmful chemicals and materials in manufacturing and waste management.
 - Scientific Inquiry: Conduct experiments to test the properties of biodegradable materials and explore how different materials break down over time. Analyse the impact of chemical waste on ecosystems and explore sustainable solutions, such as green chemistry and eco-friendly products.

Physics

- Objective: Understand the principles of energy, motion, and forces in the context of sustainability, focusing on energy conservation, renewable energy, and efficient use of resources.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Investigate how renewable energy sources, such as solar, wind, and hydropower, contribute to sustainability by reducing reliance on fossil fuels. Study the physics of energy efficiency and how it can be applied in everyday life to reduce energy consumption.
 - Scientific Inquiry: Conduct experiments to measure the efficiency of renewable energy technologies. Investigate how physics principles can be applied to design more efficient systems in buildings, transport, and industry to conserve energy and reduce environmental impacts.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to solve sustainability challenges, model energy systems, and track resource use.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 13 – Climate Action
 - Learning Link: Use coding and digital tools to track and model energy consumption, water usage, or carbon emissions. Develop applications that help monitor and improve sustainability efforts in various sectors, including agriculture, transportation, and waste management.
 - Scientific Inquiry: Design algorithms to optimise energy use in buildings or transportation systems.

Create digital simulations to model the impact of sustainability strategies or predict the long-term effects of climate change on resources.

Design and Technology

- Objective: Design, create, and evaluate solutions to technical challenges in sustainability, such as developing energy-efficient systems, waste-reducing technologies, or sustainable products.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 12 – Responsible Consumption and Production
 - Learning Link: Investigate how design and technology can contribute to sustainability by reducing waste, increasing energy efficiency, and promoting the use of renewable resources. Focus on designing products and systems that are eco-friendly and contribute to sustainability goals.
 - Scientific Inquiry: Design and prototype sustainable solutions, such as low-energy devices, water-saving technologies, or recyclable products. Evaluate their effectiveness in reducing environmental impact and promoting sustainability in daily life.

Engineering

- Objective: Understand the role of engineering in creating sustainable solutions, focusing on renewable energy systems, waste management technologies, and sustainable infrastructure.
 - SDG Link: SDG 13 – Climate Action / SDG 9 – Industry, Innovation, and Infrastructure
 - Learning Link: Study how engineering innovations contribute to sustainability through technologies such as wind turbines, solar panels, water filtration systems, and green buildings. Explore how engineers design solutions that reduce environmental impacts and enhance resource efficiency.
 - Scientific Inquiry: Investigate engineering solutions for waste management, water conservation, and energy efficiency. Design and test models of sustainable infrastructure or renewable energy systems to assess their impact on reducing environmental footprints.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to sustainability using the scientific method (observation, experimentation, analysis) to study environmental issues and propose solutions for sustainable practices.
 - SDG Link: SDG 13 – Climate Action / SDG 12 – Responsible Consumption and Production

- Learning Link: Use the scientific method to investigate sustainability challenges, such as waste management, water use, or energy consumption. Study how different practices or technologies affect environmental outcomes, and propose solutions to reduce environmental impacts.
- Scientific Inquiry: Plan and conduct experiments to measure the effectiveness of sustainability practices, such as testing the carbon footprint of various activities or the impact of recycling efforts. Analyse data to propose improvements for environmental management and resource conservation.

Environmental Awareness
(SUS2)

Science and Technology

Biology

- Objective: Study living organisms, ecosystems, and the environment, developing an understanding of the impact of human activities on biodiversity and the environment.
 - SDG Link: SDG 15 – Life on Land / SDG 14 – Life Below Water
 - Learning Link: Investigate the role of biodiversity in ecosystems and how human activities, such as pollution and deforestation, impact environmental health. Study the importance of preserving ecosystems and species for long-term ecological balance.
 - Scientific Inquiry: Conduct observations of local ecosystems and species to assess the impact of

environmental changes. Explore how conservation practices can protect biodiversity and ecosystems.

Chemistry

- Objective: Investigate the properties and uses of materials and their environmental impact, focusing on sustainable materials, recycling, and pollution reduction.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 6 – Clean Water and Sanitation
 - Learning Link: Study materials used in everyday life, focusing on their environmental impact. Investigate sustainable alternatives and the chemistry behind recycling and waste management processes to reduce pollution.
 - Scientific Inquiry: Experiment with materials to understand their environmental impact, such as testing biodegradable substances or recycling methods. Evaluate the role of chemicals in both polluting and protecting the environment.

Physics

- Objective: Understand the principles of energy, motion, and forces in the context of environmental issues, focusing on renewable energy sources and energy efficiency.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Explore how renewable energy sources like solar, wind, and hydropower work to provide clean energy, and understand how these technologies reduce reliance on fossil fuels and lower carbon emissions.
 - Scientific Inquiry: Conduct experiments to measure energy efficiency, such as comparing solar panel outputs or wind turbine efficiency. Investigate how physical principles can be used to solve environmental challenges, like improving energy use in homes.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to track environmental data, model climate change scenarios, and create solutions to environmental problems.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 13 – Climate Action
 - Learning Link: Use coding and data analysis tools to monitor environmental changes such as air quality, water use, and carbon emissions. Develop models to simulate the impact of environmental

policies or track sustainability efforts.

- Scientific Inquiry: Design algorithms or apps to help users track their energy consumption, waste production, or carbon footprint. Use data to suggest environmentally friendly actions and predict the outcomes of sustainability efforts.

Design and Technology

- Objective: Design, create, and evaluate solutions to environmental challenges, such as building sustainable structures or machines that reduce resource use and promote sustainability.
 - SDG Link: SDG 11 – Sustainable Cities and Communities / SDG 12 – Responsible Consumption and Production
 - Learning Link: Investigate how design and technology can help reduce waste, increase energy efficiency, and support the use of renewable resources. Focus on creating products or systems that are eco-friendly and contribute to environmental awareness.
 - Scientific Inquiry: Design and prototype sustainable solutions, such as energy-efficient buildings or waste-reducing technologies. Evaluate how these designs can reduce the environmental footprint and improve sustainability.

Engineering

- Objective: Begin to understand the role of engineering in addressing environmental challenges, such as designing systems that reduce pollution, conserve resources, and promote sustainability.
 - SDG Link: SDG 13 – Climate Action / SDG 9 – Industry, Innovation, and Infrastructure
 - Learning Link: Study how engineers create technologies and systems that address global environmental issues, such as water treatment plants, waste management systems, or renewable energy systems.
 - Scientific Inquiry: Investigate how engineering can reduce environmental impacts by designing eco-friendly infrastructure, like efficient water systems or carbon capture devices. Build models to test the effectiveness of these systems in real-world scenarios.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to environmental issues using the scientific method

(observation, experimentation, analysis) to understand the impact of human activities on the environment and propose solutions for sustainability.

- SDG Link: SDG 13 – Climate Action / SDG 6 – Clean Water and Sanitation
- Learning Link: Use the scientific method to study environmental issues such as climate change, pollution, and resource depletion. Investigate how human actions contribute to environmental degradation and explore solutions for mitigating these impacts.
- Scientific Inquiry: Conduct experiments to measure the impact of various environmental factors (e.g., pollution, deforestation) on ecosystems or resources. Analyse data to propose actionable solutions to environmental problems and contribute to global sustainability efforts.

Environmental Stewardship

(SUS3)

Science and Technology

Biology

- Objective: Study living organisms, ecosystems, and the environment, understanding their role in environmental stewardship and the importance of biodiversity in maintaining healthy ecosystems.
 - SDG Link: SDG 15 – Life on Land / SDG 14 – Life Below Water
 - Learning Link: Investigate the interdependence of species within ecosystems and understand the role of humans in preserving biodiversity. Explore how environmental stewardship, such as conservation efforts and sustainable resource management, can mitigate the effects of habitat destruction and climate change.
 - Scientific Inquiry: Conduct fieldwork to observe biodiversity in local ecosystems. Use the scientific method to investigate how different environmental management practices, such as conservation

areas, affect biodiversity and ecosystem health.

Chemistry

- Objective: Investigate the chemical properties and environmental impact of materials, focusing on sustainability and reducing pollution through chemical processes.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 6 – Clean Water and Sanitation
 - Learning Link: Study the chemical processes involved in recycling, waste treatment, and the creation of environmentally friendly materials. Understand how chemical innovations can help reduce pollution and support sustainable living.
 - Scientific Inquiry: Conduct experiments to examine how biodegradable materials break down and compare them to traditional plastics. Investigate the chemical processes in water purification or air cleaning technologies to understand their role in environmental stewardship.

Physics

- Objective: Understand the principles of energy, motion, and forces in the context of environmental stewardship, focusing on renewable energy systems and energy efficiency.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Explore renewable energy sources such as solar, wind, and hydro power, and their role in reducing environmental harm. Understand the physics behind energy efficiency measures in buildings, transportation, and industrial processes.
 - Scientific Inquiry: Conduct experiments to measure the efficiency of renewable energy systems or study the effectiveness of energy-saving technologies. Investigate how energy conservation can reduce carbon footprints and contribute to sustainability.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to create solutions for environmental challenges, such as monitoring pollution or modelling sustainable systems.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 13 – Climate Action
 - Learning Link: Use coding and data analysis to develop tools for environmental monitoring, such as tracking air quality, water usage, or carbon emissions. Model the effects of different sustainability

practices using computational tools.

- Scientific Inquiry: Design a program that simulates the environmental impact of different waste management systems or renewable energy sources. Use data from environmental sensors to predict changes in ecosystems or environmental quality.

Design and Technology

- Objective: Design, create, and evaluate sustainable solutions to technical challenges, focusing on environmentally friendly products, energy-efficient systems, and waste reduction.
 - SDG Link: SDG 11 – Sustainable Cities and Communities / SDG 12 – Responsible Consumption and Production
 - Learning Link: Explore how design and technology can contribute to environmental stewardship by reducing waste, increasing energy efficiency, and supporting sustainable resource use. Focus on creating eco-friendly products and systems.
 - Scientific Inquiry: Design and prototype a product or system that reduces environmental impact, such as a water-saving irrigation system, a solar-powered device, or a waste-recycling product. Evaluate the sustainability, functionality, and environmental impact of the design.

Engineering

- Objective: Understand the role of engineering and technological innovation in developing sustainable systems, such as clean energy infrastructure, sustainable transport solutions, and green building designs.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 13 – Climate Action
 - Learning Link: Investigate how engineers design and implement solutions that promote environmental stewardship, such as renewable energy systems, sustainable transportation, and green buildings. Understand the engineering behind technologies that reduce human impact on the environment.
 - Scientific Inquiry: Study engineering solutions that address environmental challenges, such as the development of energy-efficient machines or low-carbon transportation systems. Design models or prototypes of these technologies to evaluate their effectiveness in reducing environmental damage.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to environmental stewardship, using the scientific method

(observation, experimentation, analysis) to assess the impact of human activity on ecosystems and propose solutions for sustainability.

- SDG Link: SDG 13 – Climate Action / SDG 6 – Clean Water and Sanitation
- Learning Link: Use the scientific method to investigate the environmental impact of human activities, such as pollution, deforestation, or overfishing. Study how environmental stewardship practices can mitigate these impacts and promote sustainability.
- Scientific Inquiry: Plan and conduct experiments to measure the environmental effects of specific activities, such as the carbon footprint of different transportation modes or the effectiveness of conservation strategies in protecting ecosystems. Analyse data to propose improvements for environmental stewardship.

Waste Management

(SUS4)

Science and Technology

Biology

- Objective: Study living organisms, ecosystems, and the environment, focusing on how waste management affects biodiversity and ecosystem health.
 - SDG Link: SDG 15 – Life on Land / SDG 14 – Life Below Water
 - Learning Link: Investigate the impact of waste (e.g., plastic, organic waste) on ecosystems, plants, and animals. Explore how improper waste disposal can harm wildlife and biodiversity, particularly through pollution in landfills and waterways.
 - Scientific Inquiry: Conduct studies to observe how different types of waste affect soil health, water

quality, and plant growth. Explore the role of waste management in reducing pollution and protecting biodiversity.

Chemistry

- Objective: Investigate the chemical properties of materials and waste products, focusing on the recycling process and the decomposition of organic and inorganic materials.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 6 – Clean Water and Sanitation
 - Learning Link: Study the chemical processes involved in recycling and waste treatment, such as the decomposition of organic waste and the recycling of plastics and metals. Understand the role of chemical reactions in breaking down waste and converting it into reusable resources.
 - Scientific Inquiry: Conduct experiments to understand the breakdown of organic materials in composting, and test how different materials degrade over time. Explore the environmental benefits of recycling and waste reduction through chemical processes.

Physics

- Objective: Explore the principles of energy, motion, and forces involved in waste management systems, such as waste-to-energy technologies and the efficiency of recycling processes.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Investigate the physics behind waste-to-energy technologies and the energy efficiency of recycling processes. Understand the energy required to transport, process, and dispose of waste and how renewable energy can be generated from waste materials.
 - Scientific Inquiry: Conduct experiments to calculate the energy saved by recycling different materials (e.g., paper, plastic, metals). Investigate the physical principles of waste-to-energy plants and explore how they convert waste into electricity or heat.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to create solutions for waste management challenges, such as optimising recycling systems or modelling waste generation.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 12 – Responsible Consumption and Production

- Learning Link: Use coding and data analysis to develop solutions for waste management systems, such as simulating recycling flows, tracking waste production, or optimising collection routes for waste disposal.
- Scientific Inquiry: Create algorithms or applications that monitor waste generation or recycling rates, and use data analysis to optimise waste management processes. Build models to predict the impact of waste reduction strategies in communities or cities.

Design and Technology

- Objective: Design, create, and evaluate solutions to technical challenges in waste management, focusing on sustainable materials, waste reduction, and the development of recycling technologies.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 9 – Industry, Innovation, and Infrastructure
 - Learning Link: Explore how design and technology can reduce waste through sustainable product design, packaging, and manufacturing processes. Investigate recycling systems, composting solutions, and zero-waste technologies.
 - Scientific Inquiry: Design and prototype waste-reducing technologies, such as recycling bins with built-in sorting systems or composting devices. Evaluate the effectiveness and environmental impact of these innovations.

Engineering

- Objective: Understand the role of engineering and technological innovation in waste management systems, including the development of efficient recycling processes, waste-to-energy systems, and sustainable waste treatment technologies.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 11 – Sustainable Cities and Communities
 - Learning Link: Study engineering solutions that address waste management challenges, such as designing automated sorting systems, energy-efficient recycling plants, or sustainable landfill alternatives. Investigate how engineers develop technologies to convert waste into valuable resources.
 - Scientific Inquiry: Explore engineering solutions for waste management, such as building prototypes of recycling machines, developing energy-efficient waste treatment plants, or creating systems that reduce the amount of waste sent to landfills. Evaluate the technical and environmental performance of

these systems.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to waste management, using the scientific method (observation, experimentation, analysis) to study the environmental impact of waste and propose solutions for reducing waste generation.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 13 – Climate Action
 - Learning Link: Use the scientific method to study the impact of waste on the environment, including how waste affects air, soil, and water quality. Investigate methods for reducing waste, such as recycling, reusing materials, and composting.
 - Scientific Inquiry: Plan and conduct experiments to measure the effects of waste on different environments, such as observing the decomposition of organic waste or testing the effectiveness of different recycling methods. Analyse data to suggest strategies for improving waste management in local communities.

Energy Conservation (SUS5)

Science and Technology

Biology

- Objective: Study the impact of energy use on ecosystems and living organisms, and explore how energy conservation can benefit biodiversity and the environment.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Investigate how energy consumption affects ecosystems, plant growth, and animal life. Explore the role of energy conservation in protecting habitats and reducing environmental degradation.
 - Scientific Inquiry: Conduct experiments to observe the effects of reduced energy use on ecosystems (e.g., effects on plant growth or animal migration patterns). Explore how conserving energy can help mitigate climate change and protect biodiversity.

Chemistry

- Objective: Investigate the properties and chemical processes involved in energy conservation, including the use of sustainable materials and energy-efficient technologies.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 7 – Affordable and Clean Energy
 - Learning Link: Study the chemical properties of materials used in energy-efficient technologies, such as insulation materials or solar panels. Explore the chemical processes in renewable energy sources like biofuels, wind, or solar energy.
 - Scientific Inquiry: Conduct experiments to test the effectiveness of energy-saving materials, such as comparing the heat retention of different insulation types. Investigate how chemicals in batteries or other energy storage devices impact energy efficiency.

Physics

- Objective: Understand the principles of energy, motion, and forces in the context of energy conservation, such as energy transfer, thermodynamics, and renewable energy technologies.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Explore how energy is transferred and conserved in different systems, such as heating, cooling, and electricity use. Study renewable energy systems (solar, wind, hydroelectric) and understand the physics behind their efficiency.
 - Scientific Inquiry: Conduct experiments to measure the efficiency of different energy transfer systems (e.g., insulating materials or energy-efficient light bulbs). Investigate how renewable energy sources

work, such as measuring the efficiency of solar panels or wind turbines.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to model energy systems, track energy usage, and develop solutions for energy conservation.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 7 – Affordable and Clean Energy
 - Learning Link: Use coding and data analysis tools to track and optimise energy usage in homes, schools, or industries. Develop simulations to predict the impact of energy-saving actions or to model renewable energy systems.
 - Scientific Inquiry: Create algorithms to track energy consumption, optimise resource use, or predict energy savings from adopting energy-efficient technologies. Design digital tools to help monitor and manage energy usage in different settings.

Design and Technology

- Objective: Design, create, and evaluate solutions to technical challenges in energy conservation, focusing on creating energy-efficient products and systems.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 7 – Affordable and Clean Energy
 - Learning Link: Investigate how design and technology can contribute to energy conservation through products like low-energy appliances, smart thermostats, or renewable energy-powered systems.
 - Scientific Inquiry: Design and prototype a system or device that reduces energy consumption (e.g., a solar-powered light or a water-efficient irrigation system). Evaluate the energy efficiency, cost, and sustainability of these designs.

Engineering

- Objective: Understand the role of engineering and technological innovation in creating solutions for energy conservation, such as designing energy-efficient buildings or renewable energy systems.
 - SDG Link: SDG 13 – Climate Action / SDG 7 – Affordable and Clean Energy
 - Learning Link: Explore how engineers design systems that reduce energy consumption and increase energy efficiency, such as green buildings, smart grids, or low-carbon transportation systems.
 - Scientific Inquiry: Study engineering solutions for improving energy efficiency, such as energy-efficient

heating systems or designing sustainable urban environments. Investigate the role of engineers in reducing global energy demand through technological innovations.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to energy conservation using the scientific method (observation, experimentation, analysis) to understand the environmental impact of energy use.
 - SDG Link: SDG 13 – Climate Action / SDG 7 – Affordable and Clean Energy
 - Learning Link: Use the scientific method to assess the impact of energy use on the environment, including carbon emissions, air quality, and resource depletion. Investigate how energy conservation practices can reduce environmental harm.
 - Scientific Inquiry: Plan and conduct experiments to measure the environmental impact of different energy sources, such as comparing the carbon footprint of renewable vs. non-renewable energy sources. Analyse data to propose practical energy-saving solutions for homes, schools, and communities.

Biodiversity and Ecosystems (SUS6)

Science and Technology

Biology

- Objective: Study living organisms, ecosystems, and the environment, understanding the interdependence of species and the importance of biodiversity in maintaining ecosystem balance.
 - SDG Link: SDG 15 – Life on Land / SDG 14 – Life Below Water
 - Learning Link: Investigate the relationships between living organisms in ecosystems, focusing on food webs, energy flow, and the role of biodiversity in ecosystem stability. Explore the effects of human

activity, such as deforestation and pollution, on biodiversity.

- Scientific Inquiry: Conduct investigations to observe and identify species in local ecosystems. Analyse the effects of habitat destruction or conservation efforts on biodiversity and propose strategies to protect endangered species and ecosystems.

Chemistry

- Objective: Investigate the properties and chemical interactions within ecosystems, understanding the role of chemicals and materials in maintaining ecological balance.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 6 – Clean Water and Sanitation
 - Learning Link: Study how different chemicals, such as pollutants, fertilizers, or plastics, impact ecosystems and biodiversity. Examine the role of natural chemicals in nutrient cycles and their importance in maintaining healthy ecosystems.
 - Scientific Inquiry: Conduct experiments to measure the effects of pollutants on soil and water quality, and investigate how different materials, such as biodegradable substances, can help reduce the impact of pollution on ecosystems.

Physics

- Objective: Understand the principles of energy, forces, and motion in ecosystems, and how energy flows through ecological systems, including the impact of environmental changes on ecosystems.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Investigate how energy from the sun drives photosynthesis and supports the flow of energy through ecosystems. Understand the physical processes involved in water and nutrient cycles and how changes in climate or energy consumption affect biodiversity.
 - Scientific Inquiry: Conduct experiments to measure the effect of light intensity on plant growth or the impact of environmental variables like temperature on species distribution. Study how energy conservation methods in human activity can support ecosystem health.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to model ecosystems and biodiversity, and track environmental changes in ecosystems.

- SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 15 – Life on Land
- Learning Link: Use coding and data analysis tools to model ecosystems, track biodiversity, or simulate the effects of environmental changes such as pollution or deforestation. Develop programs to monitor biodiversity and predict changes in ecosystems based on human activities.
- Scientific Inquiry: Design and implement algorithms to analyse environmental data, such as species counts, habitat sizes, or pollution levels, and use coding to create models predicting the effects of different conservation strategies on biodiversity.

Design and Technology

- Objective: Design, create, and evaluate solutions to technical challenges in conserving biodiversity and maintaining ecosystem health, such as creating wildlife corridors or sustainable urban environments.
 - SDG Link: SDG 11 – Sustainable Cities and Communities / SDG 15 – Life on Land
 - Learning Link: Investigate how design and technology can be applied to protect biodiversity and enhance ecosystems. Focus on designing green infrastructure, wildlife corridors, and sustainable farming practices that reduce human impact on ecosystems.
 - Scientific Inquiry: Design prototypes for ecological solutions, such as wildlife bridges, water-efficient farming systems, or eco-friendly building materials. Evaluate their effectiveness and environmental impact on biodiversity and ecosystems.

Engineering

- Objective: Understand the role of engineering and technological innovation in creating solutions for ecosystem conservation, such as habitat restoration and climate change mitigation.
 - SDG Link: SDG 13 – Climate Action / SDG 15 – Life on Land
 - Learning Link: Explore engineering solutions for mitigating human impact on ecosystems, such as developing sustainable energy sources, restoring habitats, and reducing pollution. Study how engineers can use technology to support biodiversity and ecosystem restoration projects.
 - Scientific Inquiry: Investigate engineering solutions for controlling pollution, improving waste management, or restoring damaged ecosystems, such as through reforestation or wetland restoration. Design models for improving biodiversity conservation efforts using technology.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to ecosystems and biodiversity, developing an understanding of the scientific method (observation, experimentation, analysis) to assess and mitigate environmental threats.
 - SDG Link: SDG 15 – Life on Land / SDG 14 – Life Below Water
 - Learning Link: Use the scientific method to investigate the impact of environmental factors such as pollution, climate change, or invasive species on local ecosystems. Collect data on biodiversity levels and propose solutions based on findings.
 - Scientific Inquiry: Plan and conduct experiments to measure the impact of human activities or natural changes on ecosystem health. Analyse data to assess the effects of different environmental strategies on biodiversity and ecosystem resilience.

Climate Change and Adaptation

(SUS7)

Science and Technology

Biology

- Objective: Study living organisms, ecosystems, and the environment, focusing on how climate change affects biodiversity, habitats, and species survival.
 - SDG Link: SDG 13 – Climate Action / SDG 15 – Life on Land / SDG 14 – Life Below Water
 - Learning Link: Investigate the effects of climate change on ecosystems, such as shifts in species distribution, habitat loss, and the impact of rising temperatures on aquatic and terrestrial organisms. Understand the role of biodiversity in maintaining ecosystem resilience to climate change.

- Scientific Inquiry: Conduct field studies to observe how different species respond to changing environmental conditions due to climate change. Explore adaptation strategies in both animals and plants to survive in changing climates.

Chemistry

- Objective: Investigate the chemical properties of greenhouse gases and pollutants, their effects on the environment, and explore chemical solutions for mitigating climate change.
 - SDG Link: SDG 13 – Climate Action / SDG 12 – Responsible Consumption and Production
 - Learning Link: Study the chemical processes involved in the greenhouse effect, carbon capture, and alternative energy production. Examine the impact of pollutants on air quality, water systems, and soil, and explore chemical solutions for reducing emissions.
 - Scientific Inquiry: Conduct experiments to measure CO₂ levels, explore the chemistry of greenhouse gases, and investigate methods for reducing carbon footprints, such as through alternative fuels or recycling processes.

Physics

- Objective: Understand the principles of energy, motion, and forces in the context of climate change, including renewable energy technologies and the physics of climate systems.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Explore the physics behind renewable energy systems (solar, wind, hydroelectric) and how they can be used to combat climate change. Understand the impact of energy consumption on global warming and how energy efficiency can contribute to climate change mitigation.
 - Scientific Inquiry: Conduct experiments to measure the efficiency of different energy sources and explore how energy conservation techniques can help reduce carbon emissions. Study the physical principles of climate systems and how they are affected by human activity.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to model climate systems, track climate change, and develop technological solutions for adaptation and mitigation.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 13 – Climate Action

- Learning Link: Use coding and data analysis tools to model climate change scenarios, track global temperature rise, and predict the impacts of different climate action strategies. Understand how technology can support climate change adaptation and mitigation.
- Scientific Inquiry: Create simulations to predict climate patterns, analyse data from climate sensors, or build simple applications that help monitor environmental changes. Use coding to develop solutions for tracking resource use or climate mitigation actions.

Design and Technology

- Objective: Design, create, and evaluate solutions to technical challenges posed by climate change, such as building energy-efficient structures or developing sustainable transport systems.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 13 – Climate Action
 - Learning Link: Investigate how design and technology can help mitigate climate change through the creation of sustainable infrastructure, energy-efficient homes, or eco-friendly transportation systems. Focus on technologies that reduce carbon footprints and improve environmental sustainability.
 - Scientific Inquiry: Design prototypes for energy-efficient buildings, renewable energy-powered machines, or transportation solutions that reduce emissions. Evaluate the sustainability, cost, and effectiveness of these designs in mitigating climate change.

Engineering

- Objective: Understand the role of engineering and technological innovation in developing solutions for climate adaptation and mitigation, such as building resilient infrastructure or renewable energy technologies.
 - SDG Link: SDG 13 – Climate Action / SDG 9 – Industry, Innovation, and Infrastructure
 - Learning Link: Explore how engineers are tackling climate change by designing solutions for climate adaptation, such as flood barriers, storm-resistant buildings, and water conservation technologies. Study the role of engineering in creating sustainable systems for renewable energy, waste management, and green infrastructure.
 - Scientific Inquiry: Investigate engineering solutions for climate adaptation, such as sustainable urban planning or carbon capture technology. Build prototypes or models to demonstrate how engineering innovations can reduce climate risks or increase resilience to extreme weather.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to climate change and adaptation using the scientific method (observation, experimentation, analysis) to understand the environmental impact of human activities and potential solutions.
 - SDG Link: SDG 13 – Climate Action / SDG 12 – Responsible Consumption and Production
 - Learning Link: Use the scientific method to investigate how human activities, such as deforestation or fossil fuel use, contribute to climate change. Explore the effectiveness of different climate adaptation strategies, such as reforestation or sustainable farming practices.
 - Scientific Inquiry: Conduct experiments to measure the carbon footprint of different activities, such as transport or energy use, and analyse the data to suggest methods for reducing emissions and promoting sustainable practices.

Food and Agriculture

(SUS8)

Science and Technology

.Biology

- Objective: Study living organisms, ecosystems, and the environment, focusing on the impact of food production systems, agriculture, aquaculture, and agroforestry on biodiversity and sustainability.
 - SDG Link: SDG 2 – Zero Hunger / SDG 15 – Life on Land / SDG 14 – Life Below Water
 - Learning Link: Investigate how agricultural practices (e.g., monoculture vs. agroforestry), aquaculture, and food production systems impact biodiversity, soil health, and aquatic ecosystems. Study the

benefits of sustainable farming practices on ecosystem balance and food security.

- Scientific Inquiry: Conduct fieldwork to study the effects of different farming systems on soil health, water quality, and biodiversity. Compare the environmental impact of conventional agriculture versus sustainable agriculture and agroforestry.

Chemistry

- Objective: Investigate the properties and uses of materials in food and agriculture, focusing on the chemical processes involved in food production, preservation, and sustainable farming practices.
 - SDG Link: SDG 12 – Responsible Consumption and Production
 - Learning Link: Explore the role of chemical fertilizers, pesticides, and soil amendments in food production, as well as the impact of these chemicals on soil and water. Study the chemical processes involved in food preservation, fermentation, and sustainable farming practices.
 - Scientific Inquiry: Conduct experiments to test the effects of organic vs. chemical fertilizers on plant growth, investigate how different preservation methods affect food quality, and explore alternative chemicals that can reduce the environmental impact of food production.

Physics

- Objective: Understand the principles of energy, motion, and forces in the context of sustainable food production systems, including aquaculture, agriculture, and renewable energy in farming.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 2 – Zero Hunger
 - Learning Link: Study the energy requirements of farming systems, including aquaculture, and explore how renewable energy sources (e.g., solar, wind) can be integrated into farming and food production processes. Investigate the physics of irrigation systems, water management, and the role of energy in food production.
 - Scientific Inquiry: Conduct experiments to measure the energy efficiency of different farming systems (e.g., traditional vs. modern, or aquaculture systems powered by renewable energy). Analyse how energy and water usage can be optimised to improve sustainability in food production.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to model and improve food

production systems, aquaculture, and agroforestry practices.

- SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 2 – Zero Hunger
- Learning Link: Use coding and digital tools to model farming systems, track food production, or analyse data related to water usage, crop yields, or fish stock in aquaculture. Develop applications that support sustainable farming practices or monitor environmental factors affecting agriculture.
- Scientific Inquiry: Create algorithms to optimise irrigation systems or track agricultural yields. Develop a simple app or digital tool that helps farmers monitor environmental variables (e.g., soil moisture, weather) and implement sustainable practices.

Design and Technology

- Objective: Design, create, and evaluate solutions to technical challenges in food and agriculture systems, such as creating sustainable irrigation systems, building eco-friendly farm structures, or improving aquaculture practices.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 9 – Industry, Innovation, and Infrastructure
 - Learning Link: Explore the design of innovative and sustainable solutions to food production challenges, such as vertical farming, precision agriculture, or sustainable aquaculture systems. Focus on creating systems that reduce resource use and environmental impact.
 - Scientific Inquiry: Design and prototype a sustainable farming solution (e.g., an automated irrigation system) or a renewable energy-powered aquaculture system. Evaluate the performance, feasibility, and environmental benefits of the solution in real-world settings.

Engineering

- Objective: Understand the role of engineering and technological innovation in creating sustainable food production systems, such as developing water-efficient irrigation systems, eco-friendly farm machinery, or fish farming technologies.
 - SDG Link: SDG 2 – Zero Hunger / SDG 12 – Responsible Consumption and Production
 - Learning Link: Investigate how engineering innovations improve food production efficiency, reduce environmental impact, and increase food security. Study how technologies such as drones, sensors, or renewable energy can be applied to sustainable farming and aquaculture.
 - Scientific Inquiry: Study engineering solutions for sustainable food production, such as the

development of automated farming machines, smart irrigation systems, or aquaponics. Test and evaluate how these technologies improve resource efficiency and reduce the carbon footprint of farming practices.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to sustainable food systems and develop an understanding of the scientific method (observation, experimentation, analysis) to investigate how different practices in agriculture, aquaculture, and agroforestry impact the environment.
 - SDG Link: SDG 15 – Life on Land / SDG 14 – Life Below Water / SDG 2 – Zero Hunger
 - Learning Link: Use the scientific method to investigate how different farming methods, such as agroforestry or organic farming, affect soil health, water resources, and biodiversity. Study the impacts of these practices on local and global ecosystems.
 - Scientific Inquiry: Conduct experiments to test the impact of various agricultural or aquaculture practices on soil, water quality, and biodiversity. Collect data and analyse the environmental impacts to make recommendations for sustainable farming practices.

Water Conservation

(SUS9)

Science and Technology

Biology

- Objective: Study ecosystems and the role of water in supporting life, understanding the impact of water conservation on biodiversity and environmental health.

- SDG Link: SDG 6 – Clean Water and Sanitation / SDG 14 – Life Below Water
- Learning Link: Investigate the relationship between water availability and biodiversity, studying how water conservation affects ecosystems, plant growth, and animal populations. Understand how reducing water wastage can preserve habitats and support biodiversity.
- Scientific Inquiry: Explore how different ecosystems depend on water, conduct experiments to observe the effects of water scarcity on plant and animal life, and propose solutions to conserve water while supporting biodiversity.

Chemistry

- Objective: Investigate the properties and uses of materials in water conservation, focusing on water treatment processes and the chemical properties of water-saving technologies.
 - SDG Link: SDG 12 – Responsible Consumption and Production / SDG 6 – Clean Water and Sanitation
 - Learning Link: Study the chemical properties of water and explore water purification methods, such as filtration, distillation, and chemical treatments. Investigate how different materials, like water-efficient appliances and biodegradable products, contribute to water conservation.
 - Scientific Inquiry: Conduct experiments to examine how materials interact with water, such as the effectiveness of different filtration materials, and explore the chemistry behind water-saving technologies in daily life.

Physics

- Objective: Understand the principles of energy, motion, and forces involved in water conservation technologies, such as water-efficient appliances, irrigation systems, and hydropower.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 6 – Clean Water and Sanitation
 - Learning Link: Explore the physical principles behind water-efficient technologies, such as low-flow taps, irrigation systems that conserve water, and hydropower systems that generate renewable energy. Understand how energy and water are interconnected and how technologies can optimise both.
 - Scientific Inquiry: Conduct experiments to understand the efficiency of water-saving technologies, such as measuring water flow rates through different systems or calculating energy consumption in water treatment plants.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to create solutions for water conservation challenges, such as tracking water usage or modelling water-saving behaviours.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 6 – Clean Water and Sanitation
 - Learning Link: Use digital tools to monitor and analyse water usage, model water conservation scenarios, or create coding projects that help manage water resources more efficiently.
 - Scientific Inquiry: Develop algorithms or applications that track water consumption patterns, simulate the effects of water-saving actions, or predict water scarcity in different regions. Use data to inform decisions about water management.

Design and Technology

- Objective: Design, create, and evaluate solutions to technical challenges in water conservation, such as water-efficient infrastructure, water storage systems, or recycling systems.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 6 – Clean Water and Sanitation
 - Learning Link: Investigate how design and technology can help reduce water waste, such as developing rainwater harvesting systems, low-flow showerheads, or irrigation systems that use less water. Focus on designing solutions that are both effective and sustainable.
 - Scientific Inquiry: Design and prototype water conservation solutions, evaluate their performance, and assess their environmental impact. Study how different materials and designs contribute to reducing water usage in buildings, agriculture, and urban areas.

Engineering

- Objective: Begin to understand the role of engineering and technological innovation in water conservation, such as the development of sustainable water systems or renewable energy-powered water treatment plants.
 - SDG Link: SDG 6 – Clean Water and Sanitation / SDG 13 – Climate Action
 - Learning Link: Explore the engineering behind water conservation systems, such as efficient irrigation technologies, water recycling plants, or desalination processes. Understand how engineering innovations can help conserve water and improve access to clean water.
 - Scientific Inquiry: Study engineering solutions for water conservation, such as designing water-efficient appliances, testing materials for water filtration, or creating systems that capture and store rainwater. Investigate how engineering advances can support sustainable water use in both urban and rural

settings.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena related to water conservation, using the scientific method (observation, experimentation, analysis) to understand the impact of water use and conservation practices on the environment.
 - SDG Link: SDG 6 – Clean Water and Sanitation / SDG 13 – Climate Action
 - Learning Link: Use the scientific method to investigate the environmental impact of water conservation practices, such as reducing water usage in households, agriculture, and industry. Collect data on water quality and availability, and use analysis to propose solutions that conserve water and reduce environmental harm.
 - Scientific Inquiry: Plan and conduct experiments to measure water quality or the effectiveness of different water conservation methods. Analyse data to determine how different water-saving actions affect the local environment, and propose practical solutions to improve water management.

Sustainable Transport and Urban Planning

(SUS10)

Science and Technology

Biology

- Objective: Study living organisms, ecosystems, and the environment, with a focus on the impact of sustainable transport and urban planning on biodiversity.
 - SDG Link: SDG 11 – Sustainable Cities and Communities / SDG 15 – Life on Land
 - Learning Link: Investigate the role of urban green spaces, biodiversity corridors, and sustainable

transport networks (e.g., cycling lanes, public transport systems) in promoting biodiversity in urban and rural areas.

- Scientific Inquiry: Explore how urban planning and sustainable transport contribute to reducing habitat fragmentation and supporting local wildlife. Conduct experiments or surveys to assess the impact of transport infrastructure on local ecosystems.

Chemistry

- Objective: Investigate the properties and uses of materials in sustainable transport and urban infrastructure, focusing on their environmental impact.
 - SDG Link: SDG 12 – Responsible Consumption and Production
 - Learning Link: Examine the environmental impact of materials used in construction, such as concrete, metals, and eco-friendly alternatives (e.g., recycled materials, biodegradable materials).
 - Scientific Inquiry: Investigate the chemical properties of materials used in the construction of sustainable transport systems (e.g., buses, bicycles, electric vehicles) and buildings. Analyse the impact of these materials on sustainability and waste reduction.

Physics

- Objective: Understand the principles of energy, motion, and forces in relation to sustainable transport and urban planning.
 - SDG Link: SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - Learning Link: Investigate how physics principles apply to energy-efficient transport, such as the physics of electric vehicles, bicycles, and public transport systems. Study how energy use can be reduced in urban planning through efficient design and renewable energy integration.
 - Scientific Inquiry: Conduct experiments to measure energy consumption of different transport modes and evaluate their efficiency. Explore the principles behind renewable energy sources in urban infrastructure, such as solar-powered traffic lights or energy-efficient public transport systems.

Computer Science

- Objective: Develop computational thinking, coding, and digital literacy skills to create solutions for sustainable transport and urban planning challenges.

- SDG Link: SDG 9 – Industry, Innovation, and Infrastructure
- Learning Link: Use computational tools and coding to model and simulate sustainable transport systems, such as traffic flow, bus routes, or public transport timetables. Analyse data related to urban planning, such as population density, air quality, or energy consumption.
- Scientific Inquiry: Design algorithms to optimise transportation routes, reduce traffic congestion, or improve energy efficiency. Use data analysis to make predictions about the effectiveness of sustainable urban planning policies.

Design and Technology

- Objective: Design, create, and evaluate solutions to technical challenges in sustainable transport and urban planning, with an emphasis on environmental sustainability.
 - SDG Link: SDG 11 – Sustainable Cities and Communities / SDG 13 – Climate Action
 - Learning Link: Create designs for sustainable transport solutions, such as bicycle-sharing schemes, electric vehicle charging stations, or solar-powered public transport. Understand the design principles behind eco-friendly urban infrastructure and their impact on reducing carbon emissions.
 - Scientific Inquiry: Design and prototype transportation systems or buildings that reduce environmental impact (e.g., energy-efficient homes, sustainable roads). Evaluate the feasibility, cost, and environmental benefits of these solutions.

Engineering

- Objective: Begin to understand the role of engineering and technological innovation in creating sustainable cities and transport systems.
 - SDG Link: SDG 9 – Industry, Innovation, and Infrastructure / SDG 11 – Sustainable Cities and Communities
 - Learning Link: Explore how engineers design and implement sustainable transport solutions, such as electric buses, renewable energy-powered infrastructure, and green urban planning. Understand how engineering innovations reduce the environmental footprint of transportation networks.
 - Scientific Inquiry: Investigate engineering solutions for reducing emissions in urban transport systems, such as electric vehicles or hydrogen-powered trains. Study the role of engineers in designing buildings and infrastructure that support sustainable living.

Environmental Awareness and Scientific Method

- Objective: Explore scientific phenomena and develop an understanding of the scientific method (observation, experimentation, analysis) in the context of sustainable transport and urban planning.
 - SDG Link: SDG 13 – Climate Action / SDG 6 – Clean Water and Sanitation
 - Learning Link: Use the scientific method to investigate environmental impacts related to transport and urban planning, such as pollution levels, carbon emissions, and resource use in urban environments.
 - Scientific Inquiry: Plan and conduct experiments to measure the environmental impact of different transport systems or urban planning strategies. Analyse the data to draw conclusions and propose strategies for improving sustainability in cities and transport systems.
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Citizenship / Global Responsibility and Sustainable Development (SUS11)

Science and Technology

Biology

- Objective: Study living organisms, ecosystems, and the environment, and understand the importance of biodiversity in global development.
 - SDG Link: SDG 15 – Life on Land / SDG 14 – Life Below Water

- **Learning Link:** Investigate how biodiversity contributes to ecosystem services and global sustainability. Understand the importance of conserving species and habitats to support food security, clean water, and climate resilience.
- **Scientific Inquiry:** Conduct fieldwork to study biodiversity in local ecosystems, observe the relationships between different organisms, and understand the role of biodiversity in maintaining environmental balance. Propose solutions for protecting endangered species and ecosystems.

Chemistry

- **Objective:** Investigate the properties and uses of materials and energy in the context of sustainable development.
 - **SDG Link:** SDG 12 – Responsible Consumption and Production
 - **Learning Link:** Explore sustainable materials and chemicals used in everyday life, such as biodegradable plastics, renewable energy materials, or eco-friendly construction materials.
 - **Scientific Inquiry:** Experiment with materials to assess their environmental impact, such as testing biodegradability or energy efficiency. Evaluate the role of chemical engineering in creating sustainable products and reducing waste in manufacturing.

Physics

- **Objective:** Understand how energy, motion, and forces impact environmental systems and technological innovation.
 - **SDG Link:** SDG 7 – Affordable and Clean Energy / SDG 13 – Climate Action
 - **Learning Link:** Explore renewable energy sources (solar, wind, and hydro) and how physical principles are applied in energy generation. Understand how physics principles are used to design energy-efficient systems for urban and rural environments.
 - **Scientific Inquiry:** Conduct experiments to measure and analyse the efficiency of renewable energy systems or study the principles behind energy-saving technologies (e.g., solar panels, wind turbines). Investigate how these technologies can help reduce carbon emissions.

Computer Science

- **Objective:** Develop computational thinking, coding, and digital literacy skills to support global development

and sustainability.

- **SDG Link:** SDG 9 – Industry, Innovation, and Infrastructure
- **Learning Link:** Understand how digital tools and technologies are used to address global challenges, such as climate change, poverty, and access to healthcare. Develop skills to create solutions for real-world problems through coding and data analysis.
- **Scientific Inquiry:** Use coding to develop simple algorithms for tracking global sustainability indicators (e.g., energy consumption, carbon emissions). Analyse data to make predictions about the impact of specific actions on the environment or society.

Design and Technology

- **Objective:** Design, create, and evaluate solutions to technical challenges with a focus on sustainability and global development.
 - **SDG Link:** SDG 11 – Sustainable Cities and Communities / SDG 9 – Industry, Innovation, and Infrastructure
 - **Learning Link:** Develop designs for sustainable infrastructure, such as energy-efficient buildings, waste management systems, or clean water solutions. Understand how design and technology can address global development challenges by improving access to resources and reducing environmental impact.
 - **Scientific Inquiry:** Design, prototype, and test solutions for technical challenges such as clean energy generation, water purification, or sustainable housing. Evaluate their feasibility, efficiency, and environmental impact.

Engineering

- **Objective:** Begin to understand the role of engineering and technological innovation in society, particularly in addressing global challenges such as climate change, poverty, and access to essential services.
 - **SDG Link:** SDG 6 – Clean Water and Sanitation / SDG 13 – Climate Action
 - **Learning Link:** Explore how engineering solutions are used to provide clean water, renewable energy, and efficient transportation systems. Understand the role of engineering in creating sustainable technologies that address global issues.
 - **Scientific Inquiry:** Study engineering innovations like water filtration systems, solar-powered devices, or energy-efficient technologies. Develop prototypes for sustainable engineering solutions that support

global development goals.

Environmental Awareness and Scientific Method

- **Objective:** Explore scientific phenomena and develop an understanding of the scientific method (observation, experimentation, analysis) in the context of global development and sustainability.
 - **SDG Link:** SDG 13 – Climate Action / SDG 3 – Good Health and Well-being
 - **Learning Link:** Use the scientific method to investigate environmental issues, such as pollution, waste management, or climate change, and explore the scientific principles behind sustainable practices.
 - **Scientific Inquiry:** Plan and conduct experiments to collect data on environmental issues, such as carbon emissions or water usage, and analyse the results to draw conclusions. Use this data to propose actionable solutions for mitigating environmental damage and promoting sustainable living.

Outdoor Learning and Connection to Nature (SUS12)

Science and Technology

Biology

- **Objective:** Study living organisms, ecosystems, and the environment, and understand the importance of biodiversity.
 - **SDG Link:** SDG 15 – Life on Land
 - **Learning Link:** Investigate the diversity of plant and animal species in both urban and rural environments, comparing ecosystems and the role of biodiversity in maintaining environmental health. Understand how changes in biodiversity affect ecosystems and the overall health of the planet.
 - **Scientific Inquiry:** Collect data on species diversity, study the interdependence of organisms within ecosystems, and explore the impact of human activities (such as urbanisation) on local biodiversity.

Use this data to propose solutions for enhancing biodiversity in local environments.

Chemistry

- **Objective:** Investigate the properties and uses of materials and energy in outdoor settings, linking them to sustainability and environmental impact.
 - **SDG Link:** SDG 12 – Responsible Consumption and Production
 - **Learning Link:** Examine natural and man-made materials found in urban and rural environments, including their chemical properties and environmental impacts. Explore the role of sustainable materials in construction and agriculture.
 - **Scientific Inquiry:** Conduct experiments to investigate the effects of different materials on the environment, such as biodegradable plastics, water purification methods, or energy-efficient materials. Analyse the impact of these materials on sustainability.

Physics

- **Objective:** Explore the properties of energy, motion, and forces in outdoor environments, with a focus on renewable energy sources and energy efficiency.
 - **SDG Link:** SDG 7 – Affordable and Clean Energy
 - **Learning Link:** Understand how renewable energy sources, such as solar, wind, and hydro power, work in real-world outdoor environments. Investigate how the principles of physics apply to the generation of clean energy in urban and rural settings.
 - **Scientific Inquiry:** Conduct experiments to measure wind speed, sunlight exposure, or water flow to determine potential for renewable energy generation. Explore the relationship between energy consumption and sustainability in both urban and rural settings.

Computer Science

- **Objective:** Develop computational thinking, coding, and digital literacy skills, with an emphasis on technology's role in sustainability and environmental conservation.
 - **SDG Link:** SDG 9 – Industry, Innovation, and Infrastructure
 - **Learning Link:** Apply coding and computational thinking to solve problems related to environmental monitoring, such as creating simple algorithms to track local weather patterns, plant growth, or air

quality in urban and rural environments.

- **Scientific Inquiry:** Use digital tools to collect and analyse environmental data (e.g., temperature, humidity, pollution levels). Develop software solutions to help monitor and improve sustainability efforts, such as tracking water usage or waste reduction.

Design and Technology

- **Objective:** Design, create, and evaluate solutions to technical challenges, such as building structures or simple machines, with an emphasis on sustainability.
 - **SDG Link:** SDG 11 – Sustainable Cities and Communities
 - **Learning Link:** Investigate how design and technology can contribute to creating more sustainable urban and rural environments. Focus on designing solutions to improve energy efficiency, reduce waste, or create sustainable transport systems.
 - **Scientific Inquiry:** Design, create, and test prototypes for sustainable buildings, efficient transportation systems, or waste management technologies. Evaluate the environmental impact and feasibility of these designs in both urban and rural settings.

Engineering

- **Objective:** Begin to understand the role of engineering and technological innovation in society, particularly in relation to environmental sustainability and outdoor learning.
 - **SDG Link:** SDG 13 – Climate Action
 - **Learning Link:** Understand the engineering principles behind sustainable infrastructure, such as flood control systems, energy-efficient buildings, and waste management systems. Investigate how engineers use technology to address climate change and enhance environmental conservation.
 - **Scientific Inquiry:** Study engineering solutions to local environmental challenges, such as designing energy-efficient homes or developing irrigation systems that conserve water. Explore the impact of these innovations on reducing carbon footprints and mitigating climate change.

Environmental Awareness and Scientific Method

- **Objective:** Explore scientific phenomena and develop an understanding of the scientific method (observation, experimentation, analysis) through outdoor learning.

- **SDG Link:** SDG 6 – Clean Water and Sanitation
- **Learning Link:** Conduct fieldwork in both urban and rural settings to observe and analyse environmental issues such as water quality, soil health, or pollution. Use the scientific method to design experiments that test hypotheses related to these environmental factors.
- **Scientific Inquiry:** Plan and conduct investigations into water quality or the effects of pollution in different environments. Analyse the data to draw conclusions and suggest solutions for improving local water quality or reducing environmental damage.