

Science Australian Upper Level Primary - Years 3-6 Curriculum For Sustainability Complementing the Australian Framework



© The Sustainables Academy - Published May 2025 .

General Capabilities (Integrated across all areas):

- **Literacy:** Reading, writing, speaking, and listening skills across subjects.
- **Numeracy:** Application of mathematical concepts and problem-solving.
- **ICT Capability:** Use of technology in learning and problem-solving.
- **Critical and Creative Thinking:** Ability to analyze, reason, and create solutions.
- **Personal and Social Capability:** Self-management, social awareness, and interpersonal skills.
- **Ethical Understanding:** Ability to make decisions based on ethics and social responsibility.
- **Intercultural Understanding:** Awareness of and respect for cultural differences.

Cross-Curriculum Priorities:

- **Aboriginal and Torres Strait Islander Histories and Cultures:** Recognizing the cultural significance and history of Australia's Indigenous peoples.
- **Asia and Australia's Engagement with Asia:** Exploring Asia's history, cultures, and connections with Australia.
- **Sustainability:** Encouraging responsible stewardship of resources and environmental awareness.

English and Languages	Mathematics	Science	Humanities and Social Sciences (HASS)	Health and Physical Education (HPE)	The Arts	Technologies
-----------------------	-------------	---------	---------------------------------------	-------------------------------------	----------	--------------

English Content Areas: Language: Focus on the structure of language, including grammar, spelling, punctuation, and vocabulary. Literature: Students explore a range of texts, including stories, poems, and plays. They analyze characters, themes, and context. Literacy: Focus on reading and writing skills, listening, speaking, and viewing. Students are encouraged	Mathematics Content Areas: Number and Algebra: Students work with whole numbers, fractions, decimals, percentages, and introduce simple algebraic concepts. Measurement and Geometry: Understanding units of measurement, time, volume, angles, and basic geometry. Statistics and Probability: Collecting data, understanding chance and	Science Content Areas: Biological Sciences: Study of living things, including plants, animals, ecosystems, and human biology. Chemical Sciences: Understanding the properties of materials and the reactions that occur between different substances. Physical Sciences: Introduction to concepts of energy, force, motion, and simple machines. Earth and Space Sciences:	Humanities and Social Sciences (HASS) Content Areas: History: Focus on historical events, time periods, and the development of societies. Geography: Study of places and spaces, understanding human-environment interactions, and geographical features.	Health and Physical Education (HPE) Content Areas: Personal, Social, and Community Health: Topics include healthy lifestyle choices, mental health, safety, and personal well-being. Movement and Physical Activity: Physical exercise, sports,	The Arts Content Areas: Dance: Creating and performing dances, exploring movement, rhythm, and expression. Drama: Acting, storytelling, and performing to express ideas, feelings, and stories. Music: Understanding musical concepts, playing instruments,	Technologies Content Areas: Design and Technologies: Introduction to designing and making products using digital and non-digital materials. This includes developing solutions for problems and understanding processes of designing, planning, and production. Digital Technologies: Focus on computational thinking, understanding
---	---	--	---	---	---	--

to communicate effectively in various situations. Key Goals: Develop comprehension skills (listening, reading, viewing). Increase fluency in writing. Build vocabulary and grammar proficiency. Understand and analyze literary and non-literary texts. Languages Content Areas: Focus on the study of languages other than	probability, interpreting and analyzing statistical information. Key Goals: Improve numeracy and problem-solving skills. Apply mathematical understanding in practical and real-world contexts. Develop logical thinking and reasoning in mathematical contexts.	Understanding the Earth's systems, weather, climate, and the solar system. Key Goals: Develop scientific inquiry skills. Understand natural systems and the environment. Encourage curiosity and exploration through experiments and observations.	Civics and Citizenship: Understanding the rights and responsibilities of citizens in society, the function of governments, and the democratic process. Economics and Business: Introduction to economic concepts such as needs, wants, resources, and the economy. Key Goals: Develop critical thinking about	fitness, and developing motor skills. Key Goals: Promote physical fitness and health. Teach teamwork, collaboration, and social skills through physical activity. Encourage well-being and the development of healthy habits.	singing, and composing. Visual Arts: Exploring various forms of art such as drawing, painting, sculpture, and digital media. Key Goals: Foster creativity and self-expression. Develop appreciation and skills in different forms of art. Enhance cultural understanding through	algorithms, coding, and digital systems. Key Goals: Foster problem-solving skills and innovation. Encourage students to use technology creatively. Develop practical skills in digital and non-digital fields.
---	--	--	--	---	--	--

English (e.g., French, Japanese, Mandarin, etc.). Learn about language structure, vocabulary, and grammar, as well as cultural understanding related to the language studied. Key Goals: Develop communication skills in a second language. Enhance cultural awareness and understanding.			the past and present. Build an understanding of geography, social studies, and citizenship. Encourage decision-making based on historical knowledge and current events.		artistic exploration.	
---	--	--	--	--	------------------------------	--

Build confidence in speaking, listening, reading, and writing in a new language.						
--	--	--	--	--	--	--

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)

Understanding Sustainability (SUS1)
--

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will understand the interdependence of organisms within an ecosystem and how changes in one part of an ecosystem (e.g., deforestation, pollution) can affect biodiversity, supporting SDG 15 (Life on Land) and SDG 13 (Climate Action).
Example: Investigate how the removal of a specific plant species from a local ecosystem affects the animals that depend on it. Through observation and discussion, identify how the food chain is impacted.
 - **Objective 1.2:** Students will explore sustainable farming practices and how they can benefit both biodiversity and human populations, supporting SDG 2 (Zero Hunger) and SDG 15.
Example: Research different farming practices, such as organic farming, and investigate how these practices contribute to soil health, plant diversity, and animal populations.
 - **Objective 1.3:** Students will investigate the role of plants and trees in reducing carbon dioxide levels and contributing to carbon sequestration, supporting SDG 13 and SDG 15.
Example: Conduct a simple experiment where students measure the amount of carbon dioxide absorbed by different types of plants or trees over a week. Discuss how planting more trees can help mitigate climate change.
-

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will investigate how different materials are recycled and how the recycling process helps reduce waste and conserve resources, supporting SDG 12 (Responsible Consumption and Production).
Example: Perform an experiment where students sort various materials (plastic, paper, glass, metal) and observe how different substances can be recycled, reused, or composted. Discuss the environmental benefits of recycling.
- **Objective 2.2:** Students will explore how the properties of materials (e.g., biodegradable, non-biodegradable) affect their impact on ecosystems and the environment, contributing to SDG 12 and SDG 14 (Life Below Water).
Example: Compare biodegradable materials (e.g., food scraps, paper) with non-biodegradable materials (e.g., plastic, glass).

in terms of their decomposition and impact on soil and marine environments.

- **Objective 2.3:** Students will understand how the chemical processes of energy generation, such as burning fossil fuels or using renewable resources, impact the environment, supporting SDG 7 (Affordable and Clean Energy) and SDG 13.
Example: Investigate how burning different materials produces carbon dioxide and discuss the implications of this process for global warming and air quality.
-

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will explore how energy-efficient devices work and how they contribute to sustainability, helping to reduce energy consumption and environmental impact, supporting SDG 7 (Affordable and Clean Energy).
Example: Build a simple solar-powered car or fan and investigate how renewable energy sources like solar power can be used to reduce reliance on non-renewable energy sources, such as fossil fuels.
 - **Objective 3.2:** Students will examine the impact of different energy sources (e.g., fossil fuels, solar, wind) on the environment, considering their role in climate change, and understand how switching to renewable energy contributes to SDG 13 (Climate Action).
Example: Compare the energy output of a wind turbine and a coal-fired power plant. Calculate how much energy is generated and discuss the environmental advantages of using wind energy.
 - **Objective 3.3:** Students will investigate the role of sustainable transportation methods (e.g., bicycles, electric cars, public transportation) in reducing carbon emissions and promoting environmental sustainability, supporting SDG 11 (Sustainable Cities and Communities) and SDG 13.
Example: Conduct an experiment to measure the energy consumed by a bicycle compared to a car over a given distance. Discuss the benefits of biking as a sustainable transportation choice.
-

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will investigate how human activities, such as deforestation and burning fossil fuels, contribute to climate change and how this impacts global weather patterns and ecosystems, supporting SDG 13 (Climate Action).
Example: Track daily weather patterns and discuss how they are influenced by changes in the atmosphere, such as the increase in global temperatures. Discuss how human activity can accelerate climate change.

- **Objective 4.2:** Students will explore how sustainable land management, such as agroforestry and sustainable forestry, helps preserve biodiversity and ecosystems, supporting SDG 15 (Life on Land).
Example: Research and discuss the benefits of agroforestry practices, such as planting trees alongside crops, and how they contribute to soil conservation, water retention, and biodiversity.
- **Objective 4.3:** Students will examine the impact of waste on the Earth's ecosystems, such as plastic pollution in oceans, and explore solutions to reduce waste and protect wildlife, supporting SDG 14 (Life Below Water) and SDG 12 (Responsible Consumption and Production).
Example: Conduct a study of the types of waste found in local waterways and marine environments. Create a report on how reducing plastic use can help protect aquatic life and improve the health of oceans.
- **Objective 4.4:** Students will learn about renewable energy sources, such as solar, wind, and hydropower, and their potential to meet the world's energy needs while reducing the environmental impact, contributing to SDG 7 (Affordable and Clean Energy) and SDG 13.
Example: Model a simple wind turbine or solar panel and calculate how much energy it generates compared to non-renewable energy sources. Discuss how widespread use of renewable energy can help reduce carbon footprints.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in hands-on investigations and experiments to understand sustainability concepts, formulate hypotheses, and draw conclusions about the impact of human activities on the environment.
- **Understand Natural Systems and the Environment:** Students will deepen their understanding of ecosystems, climate systems, and the importance of biodiversity, learning how these systems interact and the role sustainability plays in preserving them.
- **Encourage Curiosity and Exploration:** Through experiments, observations, and research, students will be encouraged to explore how they can positively impact the environment and contribute to a sustainable future, fostering a sense of environmental stewardship.

Environmental Awareness

(SUS2)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will explore the interrelationships between plants, animals, and their ecosystems, understanding the role of biodiversity in maintaining ecosystem health and sustainability, contributing to SDG 15 (Life on Land).
Example: Investigate how different species of plants and animals depend on each other in a local ecosystem. Describe the impact on biodiversity if one species is removed or endangered.
 - **Objective 1.2:** Students will learn about the importance of pollinators (e.g., bees, butterflies) in ecosystems and the effects of their decline on food systems, supporting SDG 2 (Zero Hunger) and SDG 15 (Life on Land).
Example: Research the role of bees in pollination and how their decline could affect food production. Create a poster illustrating the life cycle of a bee and its importance in agriculture.
 - **Objective 1.3:** Students will investigate human impacts on ecosystems, such as deforestation, pollution, and habitat destruction, and discuss ways to mitigate these impacts, aligned with SDG 13 (Climate Action) and SDG 15 (Life on Land).
Example: Study the effects of plastic pollution on marine life and how it impacts biodiversity. Discuss solutions, such as reducing plastic use or participating in clean-up activities.
-

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will explore how chemicals found in everyday materials (e.g., plastic, metals, and synthetic materials) impact the environment, and investigate alternatives to reduce environmental damage, supporting SDG 12 (Responsible Consumption and Production).
Example: Investigate how plastic waste breaks down in the environment and how long it takes to decompose. Compare biodegradable alternatives and discuss their environmental benefits.
- **Objective 2.2:** Students will investigate chemical processes in nature, such as photosynthesis and the carbon cycle, and explore how they contribute to ecosystem balance, supporting SDG 13 (Climate Action) and SDG 15 (Life on Land).
Example: Conduct an experiment on plant photosynthesis to understand how plants absorb carbon dioxide from the air.

and help reduce global warming. Discuss the role of plants in mitigating climate change.

- **Objective 2.3:** Students will explore the chemical properties of water, its role in supporting life, and how pollution affects water quality, contributing to SDG 6 (Clean Water and Sanitation).

Example: Conduct an experiment on the effects of oil or soap on water. Discuss how pollutants can affect aquatic ecosystems and suggest ways to reduce water pollution.

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will investigate renewable energy sources, such as solar, wind, and hydroelectric power, and compare their environmental impact to fossil fuels, supporting SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action).
Example: Build a simple solar oven to demonstrate the use of solar energy. Compare the efficiency of a solar oven with traditional cooking methods in terms of energy use and environmental impact.
 - **Objective 3.2:** Students will explore the concept of energy conservation, learning how to measure and reduce energy usage at home and school, contributing to SDG 13 (Climate Action) and SDG 12 (Responsible Consumption and Production).
Example: Measure the electricity usage of different household appliances (e.g., light bulbs, fans) and discuss strategies to reduce energy consumption, such as switching to energy-efficient devices or turning off lights when not in use.
 - **Objective 3.3:** Students will investigate the role of simple machines in reducing energy consumption, such as levers, pulleys, and wheels, and apply these concepts to sustainability, supporting SDG 12 (Responsible Consumption and Production).
Example: Design a simple machine, such as a pulley system, to lift a load with minimal energy. Discuss how simple machines can help reduce the effort needed in everyday tasks and improve energy efficiency.
-

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will explore the Earth's systems, including the atmosphere, hydrosphere, and biosphere, and understand how human activity impacts climate and weather patterns, supporting SDG 13 (Climate Action) and SDG 6 (Clean Water and Sanitation).
Example: Track and record daily weather data over a month and discuss the role of human activity (e.g., greenhouse gas emissions) in influencing weather patterns and climate change.
- **Objective 4.2:** Students will learn about the greenhouse effect and how it contributes to global warming, and explore ways

to reduce the carbon footprint through sustainable practices, contributing to SDG 13 (Climate Action).

Example: Create a simple model to demonstrate the greenhouse effect using a transparent box, a thermometer, and a light source. Discuss how reducing greenhouse gas emissions can help combat global warming.

- **Objective 4.3:** Students will investigate the impact of deforestation and land-use changes on the Earth's systems and biodiversity, exploring solutions for forest conservation and reforestation, supporting SDG 15 (Life on Land).

Example: Study the effects of deforestation on local wildlife populations and habitats. Create a model of a forest ecosystem and demonstrate how deforestation reduces biodiversity and impacts the environment.

- **Objective 4.4:** Students will learn about the role of water in the Earth's climate system, such as the water cycle, and understand how human actions, like water pollution, affect water quality and availability, supporting SDG 6 (Clean Water and Sanitation).

Example: Use an experiment to demonstrate the water cycle, showing how water evaporates, condenses, and precipitates. Discuss how pollution can disrupt this cycle and affect water availability.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will conduct investigations and experiments related to environmental awareness, developing skills to make observations, form hypotheses, and analyze data in the context of sustainability.
- **Understand Natural Systems and the Environment:** Students will learn about the Earth's systems, ecosystems, and the impact of human activity on the environment, and develop an understanding of how to live sustainably and protect natural resources.
- **Encourage Curiosity and Exploration:** Through hands-on activities and scientific inquiry, students will be encouraged to explore sustainability challenges and solutions, fostering a sense of responsibility for the environment.

Environmental Stewardship

(SUS3)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will explore the roles of different organisms within ecosystems and how these interactions contribute to ecosystem health and sustainability, supporting SDG 15 (Life on Land) and SDG 13 (Climate Action).
Example: Investigate how the introduction of non-native species can disrupt local ecosystems. Discuss how humans can act as stewards by protecting natural biodiversity. Create a poster showing local species and their roles in maintaining a balanced ecosystem.
 - **Objective 1.2:** Students will examine how plants and trees contribute to carbon sequestration and environmental health, and understand the importance of reforestation and afforestation as environmental stewardship practices, contributing to SDG 13 (Climate Action) and SDG 15.
Example: Study how trees absorb carbon dioxide during photosynthesis. Plant a tree in the school garden and monitor its growth over time. Discuss the importance of trees in reducing global warming.
 - **Objective 1.3:** Students will investigate the impacts of human activities, such as deforestation and pollution, on local wildlife and ecosystems, and explore solutions for environmental restoration, contributing to SDG 15 (Life on Land) and SDG 13.
Example: Research how plastic waste affects marine animals and propose ways to reduce plastic pollution, such as beach clean-up activities or using less plastic in daily life.
-

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will investigate the environmental impact of various materials, such as plastics and metals, and explore alternatives that are biodegradable or recyclable, supporting SDG 12 (Responsible Consumption and Production).
Example: Compare the decomposition rates of biodegradable materials (e.g., paper, food scraps) with non-biodegradable materials (e.g., plastic). Discuss which materials should be used to reduce waste and improve sustainability.
- **Objective 2.2:** Students will study the properties of water and its importance to all living organisms. They will investigate the effects of pollutants like oil or chemicals on water systems, supporting SDG 6 (Clean Water and Sanitation).
Example: Conduct an experiment to observe how oil affects water in a controlled setup. Discuss how pollutants from industries and households impact rivers, lakes, and oceans and how environmental stewardship can reduce water contamination.
- **Objective 2.3:** Students will explore chemical processes in recycling, such as the breakdown of materials in waste management, and how recycling reduces the environmental impact of production, supporting SDG 12 (Responsible

Consumption and Production).

Example: Investigate the process of recycling paper or plastic and create a model or poster to show how these materials are processed and reused, helping to reduce landfill waste.

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will investigate renewable and non-renewable energy sources, exploring how the use of renewable energy reduces environmental impacts and promotes sustainable energy use, supporting SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action).
Example: Build a simple solar-powered car or wind turbine. Discuss how renewable energy sources like wind and solar help reduce carbon emissions compared to fossil fuels.
 - **Objective 3.2:** Students will examine how energy conservation practices, such as reducing energy use in the home or school, can contribute to environmental stewardship and help reduce carbon footprints, supporting SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action).
Example: Conduct an energy audit in the classroom or at home. Calculate how much energy is used for different activities (e.g., lighting, heating) and suggest ways to reduce energy consumption.
 - **Objective 3.3:** Students will investigate how simple machines, such as levers, pulleys, and wheels, help in reducing energy consumption and improving efficiency, contributing to sustainability practices, aligned with SDG 12 (Responsible Consumption and Production).
Example: Build a simple pulley system to lift objects. Discuss how simple machines can make tasks easier and more efficient, reducing the effort required and conserving energy.
-

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will investigate the Earth's climate system and the effects of human activities, such as deforestation and carbon emissions, on global warming and weather patterns, supporting SDG 13 (Climate Action).
Example: Use weather data to analyze local temperature changes over time. Discuss how human activities like burning fossil fuels and deforestation contribute to climate change and propose solutions to reduce emissions.
- **Objective 4.2:** Students will study the water cycle and its importance to sustaining life on Earth, and explore the impact of

pollution on the water cycle and ecosystems, contributing to SDG 6 (Clean Water and Sanitation) and SDG 15 (Life on Land).
Example: Conduct a simple experiment to demonstrate the water cycle. Discuss how human activities, such as overuse of water or pollution, can disrupt the natural water cycle and suggest ways to protect water resources.

- **Objective 4.3:** Students will examine how human activities impact the Earth's ecosystems and how environmental stewardship practices, such as sustainable farming, conservation, and renewable energy, help protect natural resources, supporting SDG 12 (Responsible Consumption and Production) and SDG 15 (Life on Land).

Example: Research how different farming methods (e.g., conventional vs. sustainable farming) impact the environment. Compare the benefits of sustainable practices like crop rotation or organic farming on soil health and biodiversity.

- **Objective 4.4:** Students will explore how Earth's natural resources, such as minerals, water, and forests, are finite and need to be managed sustainably to ensure the well-being of all living organisms, contributing to SDG 12 (Responsible Consumption and Production) and SDG 15 (Life on Land).

Example: Study the effect of overharvesting natural resources (e.g., overfishing or logging) on ecosystems. Discuss how sustainable resource management practices, like sustainable fisheries or forest conservation, can protect biodiversity and ensure resources are available for future generations.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in scientific investigations and experiments related to environmental stewardship, fostering skills in observation, data collection, hypothesis testing, and drawing conclusions based on evidence.
- **Understand Natural Systems and the Environment:** Students will develop an understanding of natural systems, including ecosystems, climate systems, and the role of human activities in impacting the environment. They will explore how to contribute to a more sustainable world.
- **Encourage Curiosity and Exploration:** Through hands-on activities and real-world applications, students will be encouraged to ask questions, explore environmental challenges, and propose solutions that contribute to environmental stewardship and sustainability.

Waste Management

(SUS4)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will investigate how waste affects ecosystems, particularly how waste accumulation (such as plastics) impacts animals, plants, and food chains, supporting SDG 15 (Life on Land) and SDG 14 (Life Below Water).
Example: Study the effects of plastic pollution on marine life. Research how animals ingest plastic and discuss the impact on their health and food sources. Suggest ways to reduce plastic waste to protect marine biodiversity.
 - **Objective 1.2:** Students will explore how decomposers, such as fungi and bacteria, break down organic waste in ecosystems and the importance of composting for environmental sustainability, supporting SDG 12 (Responsible Consumption and Production) and SDG 15 (Life on Land).
Example: Create a compost bin in the classroom and monitor the decomposition of organic materials (e.g., food scraps, leaves) over time. Discuss how composting reduces landfill waste and returns nutrients to the soil.
 - **Objective 1.3:** Students will investigate the role of humans in managing waste responsibly, including reducing, reusing, and recycling, and how these actions help maintain biodiversity and ecosystem balance, contributing to SDG 12 (Responsible Consumption and Production).
Example: Research different waste management systems used by communities around the world. Compare their effectiveness in reducing waste and protecting local ecosystems, then present ideas for improving waste management in their own community.
-

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will investigate the chemical properties of materials used in packaging and how their decomposition affects the environment, with a focus on plastics, metals, and biodegradable substances, contributing to SDG 12 (Responsible Consumption and Production).
Example: Compare the decomposition rates of plastic, metal, and paper in different environmental conditions. Discuss how each material affects the environment and why some materials are easier to recycle than others.

- **Objective 2.2:** Students will explore the chemical reactions involved in recycling materials such as paper, plastic, and metals, and how recycling reduces the need for new raw materials, supporting SDG 12 (Responsible Consumption and Production).
Example: Conduct an experiment to demonstrate the process of recycling paper. Show how paper fibers are broken down and reformed into new paper products. Discuss how this process conserves natural resources and reduces waste.
 - **Objective 2.3:** Students will learn about the environmental impact of landfill gases, particularly methane, produced by organic waste, and explore solutions to mitigate these effects, supporting SDG 13 (Climate Action).
Example: Study how organic waste in landfills produces methane and discuss how capturing this gas for energy production could reduce greenhouse gas emissions. Calculate how much methane could be saved by composting food scraps instead of sending them to landfills.
-

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will investigate how energy is required to manage waste, such as the energy used in recycling or transporting waste, and consider how energy conservation contributes to sustainability, aligned with SDG 7 (Affordable and Clean Energy) and SDG 12 (Responsible Consumption and Production).
Example: Calculate the energy used by a garbage truck to transport waste to a landfill. Discuss how recycling or composting reduces the need for waste transportation, thus saving energy.
 - **Objective 3.2:** Students will explore how simple machines, like levers and pulleys, can be used to improve waste management processes, such as sorting recyclables or lifting heavy waste materials, contributing to SDG 12 (Responsible Consumption and Production).
Example: Design a simple machine, such as a lever, to help lift heavy items into a recycling bin. Discuss how this machine helps reduce energy consumption and makes waste management more efficient.
 - **Objective 3.3:** Students will investigate the role of force and motion in the process of sorting waste, such as how conveyor belts and sorting machines help in recycling plants, and how this contributes to resource conservation, supporting SDG 12 (Responsible Consumption and Production).
Example: Observe the motion of a conveyor belt at a local recycling facility or watch a video of one in action. Calculate the speed at which recyclable materials are moved and discuss how this process contributes to waste reduction.
-

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will study how human waste affects the Earth's natural systems, such as soil, water, and air, and explore the environmental benefits of reducing waste, supporting SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).
Example: Investigate how waste products, such as plastics or chemicals, enter local water systems and affect the quality of water for human and animal use. Discuss how reducing waste at home can help protect local ecosystems and water supplies.
- **Objective 4.2:** Students will examine the impact of waste on the Earth's climate system, focusing on how greenhouse gases from decomposing waste in landfills contribute to climate change, supporting SDG 13 (Climate Action).
Example: Study the role of landfills in producing methane gas and its impact on global warming. Discuss alternative waste management practices, such as reducing landfill use and increasing recycling, to help mitigate climate change.
- **Objective 4.3:** Students will explore how reducing waste and conserving natural resources, like water and energy, can help maintain a healthy planet and support sustainable development, aligned with SDG 12 (Responsible Consumption and Production) and SDG 6 (Clean Water and Sanitation).
Example: Calculate how much water is used to produce common goods (e.g., clothes, food, electronics). Discuss how reducing consumption and recycling these products can help conserve water and other resources.
- **Objective 4.4:** Students will explore how sustainable waste management practices, such as composting and waste-to-energy technology, contribute to reducing environmental harm and supporting Earth's ecosystems, contributing to SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action).
Example: Research how composting food waste can reduce methane emissions from landfills and contribute to healthy soils. Discuss how waste-to-energy plants convert waste into usable energy and explore their environmental benefits.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in hands-on activities and experiments to better understand the science behind waste management and sustainability, formulating hypotheses, conducting experiments, and analyzing data.
- **Understand Natural Systems and the Environment:** Students will learn about the Earth's ecosystems and how waste management plays a crucial role in protecting natural systems, fostering an understanding of sustainability and environmental stewardship.
- **Encourage Curiosity and Exploration:** Students will explore real-world waste management issues through inquiry-based learning, developing curiosity about how scientific principles can be applied to improve sustainability and protect the

environment.

Energy Conservation (SUS5)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will investigate how energy consumption in human activities impacts ecosystems and biodiversity, exploring the role of energy conservation in sustaining natural systems, supporting SDG 15 (Life on Land) and SDG 13 (Climate Action).
Example: Explore how human activities, such as deforestation and industrial energy consumption, disrupt local ecosystems. Discuss how reducing energy use can help protect wildlife and natural habitats.
- **Objective 1.2:** Students will understand the role of plants in energy conservation, focusing on how they contribute to carbon sequestration through photosynthesis, contributing to SDG 13 (Climate Action) and SDG 15 (Life on Land).
Example: Conduct an experiment to measure how much carbon dioxide plants absorb through photosynthesis. Discuss how planting trees or conserving forests can help reduce carbon emissions.
- **Objective 1.3:** Students will explore the relationship between energy use in agricultural practices and the health of ecosystems, investigating the role of sustainable farming techniques in reducing energy consumption, supporting SDG 2 (Zero Hunger) and SDG 13.
Example: Research sustainable farming methods, such as organic farming or permaculture, and investigate how these methods reduce energy consumption while promoting biodiversity.

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will examine how different materials and their properties affect energy efficiency, such as how insulating materials can reduce energy loss, contributing to SDG 7 (Affordable and Clean Energy).
Example: Compare the effectiveness of different materials (e.g., cotton, wool, plastic) as insulators by conducting an experiment to test how well they retain heat. Discuss how insulating homes can reduce energy consumption for heating and cooling.
 - **Objective 2.2:** Students will explore the chemical reactions involved in energy production, such as the combustion of fossil fuels, and understand how alternative energy sources, like solar or wind power, contribute to energy conservation and sustainability, supporting SDG 7 and SDG 13.
Example: Investigate the chemical process of burning coal or natural gas for energy and compare it to the process of generating electricity using renewable energy sources, such as wind turbines or solar panels.
 - **Objective 2.3:** Students will learn about the energy transfer in ecosystems, such as how plants capture solar energy through photosynthesis and how this energy moves through the food chain, supporting SDG 13 (Climate Action).
Example: Create a model of an ecosystem to demonstrate how energy flows from the sun to plants, herbivores, and carnivores. Discuss how energy conservation in agriculture can help maintain healthy ecosystems.
-

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will explore how energy is transferred and conserved in simple machines and everyday devices, and how using energy-efficient machines can reduce energy consumption, supporting SDG 7 (Affordable and Clean Energy) and SDG 12 (Responsible Consumption and Production).
Example: Investigate how a pulley system or lever reduces the amount of force needed to lift an object. Discuss how simple machines can be used to reduce energy consumption in everyday tasks, such as lifting or moving materials.
 - **Objective 3.2:** Students will investigate the concept of energy conservation in the context of force and motion, such as how friction affects the energy required for movement, contributing to SDG 7 and SDG 12.
Example: Conduct experiments to measure the amount of energy used to move an object over different surfaces (e.g., smooth vs. rough). Discuss how reducing friction can help conserve energy in vehicles and machinery.
 - **Objective 3.3:** Students will explore renewable energy sources, such as solar, wind, and hydropower, and understand how these sources conserve energy by harnessing natural processes, supporting SDG 7 (Affordable and Clean Energy).
Example: Build a simple solar-powered car or wind turbine and discuss how renewable energy reduces reliance on non-renewable energy sources, such as fossil fuels.
-

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will investigate how energy conservation practices, such as using energy-efficient appliances and reducing electricity usage, help mitigate climate change, supporting SDG 13 (Climate Action).
Example: Study the effects of using energy-efficient appliances (e.g., LED lights, Energy Star refrigerators) on reducing energy consumption. Calculate how much energy could be saved in a school over a month by switching to energy-efficient devices.
- **Objective 4.2:** Students will explore how the Earth's climate system is affected by human energy consumption, particularly the burning of fossil fuels, and how reducing energy use can help address global warming, supporting SDG 13 (Climate Action).
Example: Investigate how burning fossil fuels increases carbon dioxide levels in the atmosphere and contributes to climate change. Discuss how switching to renewable energy can reduce greenhouse gas emissions and slow global warming.
- **Objective 4.3:** Students will study the impact of human energy use on Earth's resources, such as water and minerals, and explore sustainable energy practices that help preserve natural resources, contributing to SDG 12 (Responsible Consumption and Production) and SDG 7 (Affordable and Clean Energy).
Example: Research the water usage involved in generating electricity through different energy sources, such as hydroelectric power versus coal power plants. Discuss how reducing energy consumption can help conserve water and other natural resources.
- **Objective 4.4:** Students will investigate how sustainable energy practices, like using solar panels and wind turbines, contribute to environmental protection by reducing energy demand and minimizing ecological footprints, supporting SDG 7 (Affordable and Clean Energy) and SDG 12.
Example: Study how the installation of solar panels in a community can reduce dependence on non-renewable energy sources. Calculate the energy savings for a school or home using solar energy instead of conventional electricity.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in experiments, observations, and research to investigate energy conservation practices, fostering critical thinking and problem-solving skills in real-world contexts.
- **Understand Natural Systems and the Environment:** Students will gain a deeper understanding of energy systems, Earth's climate, and the importance of conserving natural resources, helping them connect scientific principles to global sustainability challenges.

- **Encourage Curiosity and Exploration:** Through hands-on activities and experiments, students will explore innovative energy conservation technologies and sustainable practices, stimulating their curiosity about how science can help solve environmental problems.

Biodiversity and Ecosystems (SUS6)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will explore the interdependence of organisms in ecosystems and how changes in one part of an ecosystem (e.g., the loss of a species or habitat) can affect biodiversity, supporting SDG 15 (Life on Land).
Example: Study the role of bees in pollination and their impact on plant and animal species. Discuss the consequences for the ecosystem if the bee population declines and explore ways to protect pollinators.
- **Objective 1.2:** Students will investigate the importance of biodiversity in maintaining the health of ecosystems, and how the loss of biodiversity can lead to ecosystem collapse, contributing to SDG 15 (Life on Land) and SDG 14 (Life Below Water).
Example: Research the concept of keystone species in an ecosystem (e.g., sea otters in kelp forests) and investigate what happens to the ecosystem if these species are removed. Discuss how human activities like deforestation and overfishing affect biodiversity.
- **Objective 1.3:** Students will investigate local ecosystems, such as forests, wetlands, or coral reefs, and identify the various plant and animal species that contribute to ecosystem stability, supporting SDG 14 (Life Below Water) and SDG 15.
Example: Take a field trip to a local park, wetland, or forest to observe and catalog plant and animal species. Create a report or poster on how these species work together to maintain ecosystem health.
- **Objective 1.4:** Students will explore the concept of endangered species and learn about the importance of conservation efforts in maintaining biodiversity, aligning with SDG 15 and the UNCRC's recognition of the right of all children to live in a healthy environment.
Example: Research an endangered species and create a presentation about the causes of its decline and the actions being taken to protect it, such as habitat restoration or legal protections.

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will study how human-made chemicals, such as pesticides and plastics, affect biodiversity and ecosystems, and investigate eco-friendly alternatives, supporting SDG 12 (Responsible Consumption and Production) and SDG 14 (Life Below Water).
Example: Investigate the effects of plastic pollution on marine life, such as how it disrupts the feeding and reproduction of marine animals. Discuss biodegradable alternatives to plastic and how they help reduce pollution.
 - **Objective 2.2:** Students will examine how changes in water quality (e.g., through pollution) affect plant and animal species, especially aquatic ecosystems, contributing to SDG 6 (Clean Water and Sanitation) and SDG 14.
Example: Conduct a simple experiment testing water quality in a nearby stream or pond by measuring pH, turbidity, and temperature. Discuss how poor water quality impacts aquatic life and biodiversity.
 - **Objective 2.3:** Students will explore how chemicals in the environment (e.g., carbon dioxide, methane) contribute to climate change, and how this affects biodiversity and ecosystems, supporting SDG 13 (Climate Action) and SDG 15 (Life on Land).
Example: Study how carbon dioxide levels in the atmosphere influence global warming and discuss how rising temperatures affect the habitats of species such as polar bears or coral reefs.
-

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will explore how energy flows through ecosystems, from producers (plants) to consumers (animals), and how human activities, such as deforestation or fossil fuel consumption, affect the energy balance in ecosystems, contributing to SDG 15 (Life on Land) and SDG 13 (Climate Action).
Example: Create a food chain or food web for a local ecosystem, illustrating how energy moves from plants to herbivores to carnivores. Discuss how disruptions in this balance (e.g., habitat destruction) affect the ecosystem.
- **Objective 3.2:** Students will investigate the effects of physical forces (e.g., wind, water) on the environment, such as how wind and water erosion affect soil and plant growth, contributing to SDG 15 (Life on Land) and SDG 13.
Example: Conduct a simple experiment to observe how wind and water erosion affect soil quality. Discuss how deforestation or agriculture practices can exacerbate erosion and threaten biodiversity.
- **Objective 3.3:** Students will study how human-made structures (e.g., dams, roads) affect the natural movement of species and resources, and how conservation efforts, such as wildlife corridors, can help maintain biodiversity, supporting SDG 11

(Sustainable Cities and Communities) and SDG 15 (Life on Land).

Example: Investigate the construction of a wildlife corridor and how it allows animals to safely migrate across human-made barriers, ensuring gene flow and population survival.

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will explore the Earth's climate systems and how climate change, driven by human activities, affects biodiversity and ecosystems, supporting SDG 13 (Climate Action) and SDG 15 (Life on Land).
Example: Investigate how global warming is changing weather patterns and how this affects species migration, reproduction, and food availability. Discuss climate adaptation strategies for endangered species.
 - **Objective 4.2:** Students will learn about the importance of conservation and sustainable management of ecosystems, such as forests, wetlands, and oceans, in mitigating the effects of climate change and preserving biodiversity, contributing to SDG 15 (Life on Land) and SDG 14 (Life Below Water).
Example: Research the role of wetlands in carbon sequestration and discuss how protecting wetlands can help mitigate climate change and preserve biodiversity.
 - **Objective 4.3:** Students will investigate the effects of pollution, such as plastic and chemical waste, on ecosystems and species, and discuss sustainable waste management practices that help reduce environmental impact, supporting SDG 12 (Responsible Consumption and Production) and SDG 14.
Example: Conduct an experiment on how pollution (e.g., plastic or oil) affects plant growth or water quality. Discuss how reducing waste and recycling can protect ecosystems and biodiversity.
 - **Objective 4.4:** Students will explore how sustainable practices, such as using renewable energy sources, reducing waste, and conserving natural habitats, contribute to the health of ecosystems and biodiversity, supporting SDG 7 (Affordable and Clean Energy) and SDG 15.
Example: Research how solar and wind energy reduce the environmental impact of energy production compared to fossil fuels. Discuss how these sustainable practices can help protect biodiversity by reducing pollution and habitat destruction.
-

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in hands-on experiments, investigations, and observations related to biodiversity, ecosystems, and sustainability, fostering skills in hypothesis testing, data analysis, and drawing conclusions

based on evidence.

- **Understand Natural Systems and the Environment:** Students will learn about Earth's systems, including ecosystems, the water cycle, climate systems, and how human activities affect biodiversity. They will explore how conservation and sustainability efforts can mitigate these effects.
- **Encourage Curiosity and Exploration:** Through field trips, experiments, and research, students will explore the diversity of life on Earth, the relationships between organisms, and the importance of protecting ecosystems. They will be encouraged to think critically about how their actions affect the environment and how they can contribute to biodiversity conservation.

Climate Change and Adaptation

(SUS7)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will investigate how climate change affects biodiversity and ecosystems, exploring the impact of changing temperatures and weather patterns on plant and animal species, supporting SDG 13 (Climate Action) and SDG 15 (Life on Land).
Example: Research how changing weather patterns affect the migration, hibernation, and feeding patterns of animals. Discuss how species such as polar bears or migratory birds are impacted by climate change and what can be done to protect them.
- **Objective 1.2:** Students will explore the concept of adaptation in plants and animals and investigate how species are evolving to cope with climate change, contributing to SDG 13 (Climate Action) and SDG 15.

Example: Study how certain plant species are adapting to longer periods of drought, such as cacti or succulents. Compare these adaptations with the effects of climate change on other plants in different environments.

- **Objective 1.3:** Students will examine the role of ecosystems in mitigating climate change, such as how forests and wetlands act as carbon sinks, contributing to SDG 13 (Climate Action) and SDG 15.

Example: Conduct a study on how forests absorb carbon dioxide and discuss how deforestation contributes to climate change. Investigate how planting trees and conserving forests can help reduce the impact of climate change.

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will explore how the burning of fossil fuels increases the amount of greenhouse gases in the atmosphere and contribute to global warming, supporting SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy).

Example: Investigate the chemical reactions involved in burning fossil fuels, such as coal, oil, and gas. Discuss how these reactions release carbon dioxide and how this contributes to the greenhouse effect and climate change.

- **Objective 2.2:** Students will examine how alternative, sustainable energy sources (e.g., wind, solar, and hydroelectric power) help reduce greenhouse gas emissions and support climate change adaptation, contributing to SDG 7 (Affordable and Clean Energy) and SDG 13.

Example: Build a small solar oven and calculate how much energy it can save compared to using a traditional oven. Discuss the environmental benefits of solar energy and its role in reducing the effects of climate change.

- **Objective 2.3:** Students will explore the chemical properties of materials used in sustainable practices, such as biodegradable plastics and eco-friendly detergents, and how these materials can reduce pollution, supporting SDG 12 (Responsible Consumption and Production).

Example: Study the chemical composition of plastic and discuss how it decomposes in the environment. Investigate the potential for biodegradable alternatives and how they contribute to reducing waste and pollution.

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will explore the concept of energy conservation and how using energy-efficient devices reduces energy consumption and mitigates climate change, supporting SDG 7 (Affordable and Clean Energy) and SDG 13.

Example: Conduct an energy audit in the classroom to measure electricity usage by different devices. Discuss the importance of energy-saving technologies, such as LED light bulbs, and how they can reduce carbon footprints.

- **Objective 3.2:** Students will investigate how simple machines, such as levers and pulleys, can be used to improve energy efficiency in various systems, such as recycling or waste management, contributing to SDG 12 (Responsible Consumption and Production).

Example: Create a simple lever to lift a load and calculate the amount of force needed. Discuss how machines that reduce the effort required can improve energy efficiency in various activities, like lifting or moving goods.

- **Objective 3.3:** Students will learn about renewable energy sources like wind, solar, and geothermal, and investigate how these sources provide sustainable alternatives to fossil fuels, helping to mitigate climate change, supporting SDG 7 (Affordable and Clean Energy) and SDG 13.

Example: Build a model wind turbine or solar panel and measure how much electricity it generates compared to traditional energy sources. Discuss how renewable energy can help reduce carbon emissions and combat climate change.

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will explore the Earth's climate system and investigate how human activities contribute to global warming, leading to changes in weather patterns and the increased frequency of extreme weather events, supporting SDG 13 (Climate Action).

Example: Track local weather data over a period of time and analyze how changes in temperature and rainfall patterns are related to climate change. Discuss how these changes affect local ecosystems and communities.

- **Objective 4.2:** Students will examine the water cycle and understand how climate change affects water availability, including droughts and flooding, contributing to SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).

Example: Study the water cycle and how it is impacted by climate change. Discuss how rising temperatures may lead to changes in precipitation patterns, causing droughts in some areas and flooding in others.

- **Objective 4.3:** Students will investigate how climate change affects the Earth's ecosystems, such as how rising temperatures impact coral reefs, forests, and glaciers, supporting SDG 15 (Life on Land) and SDG 14 (Life Below Water).

Example: Research how coral bleaching occurs due to rising ocean temperatures. Discuss the impact of this phenomenon on marine biodiversity and the steps that can be taken to reduce global warming and protect marine ecosystems.

- **Objective 4.4:** Students will explore the role of climate change adaptation strategies, such as the development of drought-resistant crops and building resilient infrastructure, and how these strategies help communities adapt to changing climate conditions, contributing to SDG 13 (Climate Action) and SDG 2 (Zero Hunger).

Example: Research different climate adaptation strategies, such as planting drought-resistant crops or building flood

defenses, and discuss how these strategies help communities cope with the effects of climate change.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in hands-on investigations, observations, and experiments related to climate change and adaptation, developing skills in scientific inquiry and critical thinking.
- **Understand Natural Systems and the Environment:** Students will learn about Earth's climate system, ecosystems, and the science behind climate change, exploring how these systems interact and how humans can help mitigate the effects of climate change.
- **Encourage Curiosity and Exploration:** Through fieldwork, experiments, and discussions, students will be encouraged to explore the scientific principles behind climate change, adaptation strategies, and sustainable practices, fostering a sense of responsibility and curiosity about environmental issues.

Food and Agriculture

(SUS8)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will investigate the relationships between plants, animals, and humans in agricultural ecosystems, and explore how farming practices impact biodiversity and food production, supporting SDG 2 (Zero Hunger) and SDG 15 (Life on Land).
Example: Research how monoculture farming affects biodiversity by growing only one crop over a large area. Compare this with agroforestry practices, where multiple plant species are grown together, to discuss the benefits of biodiversity in

agriculture.

- **Objective 1.2:** Students will explore how aquaculture (fish farming) impacts marine ecosystems, and how sustainable practices can reduce its environmental footprint, contributing to SDG 14 (Life Below Water) and SDG 15.
Example: Study the effects of fish farming on marine ecosystems, particularly water quality and fish species diversity. Discuss how sustainable aquaculture techniques, such as integrated multi-trophic aquaculture (IMTA), help reduce environmental impacts.
 - **Objective 1.3:** Students will explore how agroforestry practices, such as the integration of trees in farming systems, can improve soil health, water retention, and biodiversity, supporting SDG 15 (Life on Land) and SDG 13 (Climate Action).
Example: Investigate the benefits of planting trees in agricultural fields to prevent soil erosion, improve water retention, and provide habitats for wildlife. Discuss how these practices can help farmers adapt to climate change.
-

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will explore the role of fertilizers, pesticides, and herbicides in modern farming and investigate their chemical properties, including potential impacts on the environment and biodiversity, supporting SDG 12 (Responsible Consumption and Production) and SDG 15 (Life on Land).
Example: Research the chemical properties of commonly used fertilizers and pesticides, and discuss how they can affect the soil, water, and local wildlife. Explore alternatives, such as organic farming practices, that reduce chemical inputs.
 - **Objective 2.2:** Students will investigate the chemical processes involved in soil health and nutrient cycles, understanding the role of soil microbes and organic matter in sustainable farming, contributing to SDG 2 (Zero Hunger) and SDG 15 (Life on Land).
Example: Conduct an experiment to observe the effects of compost (organic matter) on soil fertility and plant growth. Discuss the chemical processes involved in nutrient cycling and how these processes support sustainable agriculture.
 - **Objective 2.3:** Students will explore the chemical properties of water and its role in agriculture, particularly in irrigation and aquaculture, and investigate the environmental impact of water usage, contributing to SDG 6 (Clean Water and Sanitation) and SDG 14 (Life Below Water).
Example: Study how water is used in different agricultural systems (e.g., irrigation in crops vs. water for fish farming). Investigate how excess water use can lead to problems like salinization and how efficient water management can support sustainability.
-

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will investigate the role of energy in farming practices, such as using solar power or biofuels in agriculture and aquaculture, to reduce reliance on fossil fuels and mitigate climate change, supporting SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action).
Example: Research the use of solar panels to power irrigation systems or fish farms. Discuss how renewable energy sources can reduce greenhouse gas emissions in agriculture and support sustainable farming practices.
 - **Objective 3.2:** Students will explore the role of simple machines in farming and aquaculture systems, such as pulleys for irrigation or levers for lifting heavy fish tanks, and how these machines contribute to energy efficiency, supporting SDG 12 (Responsible Consumption and Production).
Example: Design a simple pulley system for lifting buckets of water or fish feed. Discuss how using simple machines in farming or aquaculture can save energy and reduce the environmental impact of farming practices.
 - **Objective 3.3:** Students will study how mechanical systems in farming, such as plows and tractors, use energy to increase efficiency in food production, and investigate how energy-efficient technologies can reduce environmental impacts, contributing to SDG 12 (Responsible Consumption and Production).
Example: Research the energy consumption of different farming equipment (e.g., tractors vs. manual labor). Discuss how energy-efficient machinery can reduce fuel consumption and lower the carbon footprint of farming operations.
-

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will investigate how climate change affects farming and aquaculture, particularly in terms of changing weather patterns, temperature, and water availability, supporting SDG 13 (Climate Action) and SDG 2 (Zero Hunger).
Example: Study how increased temperatures and unpredictable rainfall patterns are affecting crop yields. Discuss the potential impacts of climate change on aquaculture, such as how rising water temperatures can affect fish health and reproduction.
- **Objective 4.2:** Students will explore how soil quality is affected by agricultural practices and how sustainable farming methods, such as crop rotation and agroforestry, can help improve soil health, supporting SDG 15 (Life on Land) and SDG 2 (Zero Hunger).
Example: Investigate how different farming practices (e.g., monoculture vs. agroforestry) affect soil health and biodiversity.

Conduct an experiment comparing soil health in different farming systems and discuss the importance of soil conservation for sustainable food production.

- **Objective 4.3:** Students will study how water management is essential for agriculture and aquaculture, and explore how climate change impacts water availability for farming systems, contributing to SDG 6 (Clean Water and Sanitation) and SDG 2 (Zero Hunger).

Example: Research the impact of droughts on crop production and aquaculture systems, such as fish farms. Investigate water-saving irrigation systems and sustainable aquaculture techniques that help conserve water resources.

- **Objective 4.4:** Students will examine the benefits of sustainable farming and aquaculture practices for maintaining ecosystem balance, reducing environmental degradation, and promoting biodiversity, contributing to SDG 12 (Responsible Consumption and Production) and SDG 15.

Example: Study how integrated pest management (IPM) reduces the need for chemical pesticides and supports biodiversity. Discuss how sustainable farming and aquaculture practices help protect local wildlife and ecosystems.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in scientific investigations, experiments, and research projects to explore the interconnectedness of agriculture, aquaculture, and ecosystems, fostering skills in observation, data collection, and analysis.
- **Understand Natural Systems and the Environment:** Students will develop a deep understanding of how farming practices, aquaculture, and agroforestry interact with the environment, and how sustainable practices can help mitigate the negative impacts of human activity on ecosystems.
- **Encourage Curiosity and Exploration:** Through hands-on experiments, field trips, and inquiry-based projects, students will explore how innovative technologies and traditional practices in agriculture and aquaculture can contribute to sustainability and biodiversity conservation.

Water Conservation

(SUS9)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will investigate the role of water in ecosystems and how different plants and animals rely on water for survival, supporting SDG 6 (Clean Water and Sanitation) and SDG 15 (Life on Land).
Example: Study how different species of plants and animals adapt to environments with limited water. Discuss how desert animals and drought-resistant plants have developed special features to conserve water.
 - **Objective 1.2:** Students will explore the impact of water conservation on local ecosystems and biodiversity, investigating how human activities, such as overuse of water resources, affect local wildlife and plant species, contributing to SDG 6 (Clean Water and Sanitation) and SDG 15 (Life on Land).
Example: Research how water overuse in agricultural practices can lead to the destruction of wetlands and aquatic habitats. Discuss the importance of water conservation for preserving biodiversity in these ecosystems.
 - **Objective 1.3:** Students will examine how water conservation can improve soil health and promote sustainable agriculture practices, contributing to SDG 2 (Zero Hunger) and SDG 15 (Life on Land).
Example: Study the role of water in soil fertility and plant growth. Discuss how water-efficient farming techniques, such as drip irrigation, help conserve water while supporting crop production.
-

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will investigate the chemical properties of water and its role in chemical reactions in biological and environmental systems, supporting SDG 6 (Clean Water and Sanitation).
Example: Conduct an experiment to observe the effect of different water temperatures on the rate of dissolving substances (e.g., sugar or salt). Discuss how water is essential for many chemical reactions in both nature and human systems.
- **Objective 2.2:** Students will examine the impact of pollutants, such as chemicals and waste, on water quality and the effectiveness of water filtration methods, contributing to SDG 6 (Clean Water and Sanitation) and SDG 12 (Responsible

Consumption and Production).

Example: Investigate how oil or soap affects water quality in a controlled experiment. Discuss water filtration systems and how they are used to clean water for human consumption and protect aquatic ecosystems.

- **Objective 2.3:** Students will explore the role of water in the environmental processes of evaporation, condensation, and precipitation, and how these processes influence water availability, contributing to SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).

Example: Create a model of the water cycle to demonstrate how water moves through the environment. Discuss how climate change affects the water cycle and impacts water availability in different regions.

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will investigate how energy is used in water distribution systems, such as pumps and irrigation, and explore how energy-efficient technologies can reduce water usage, supporting SDG 7 (Affordable and Clean Energy) and SDG 6 (Clean Water and Sanitation).

Example: Study how different types of water pumps work (e.g., hand pumps vs. electric pumps) and calculate the energy efficiency of each. Discuss how using more efficient water distribution technologies can help conserve water.

- **Objective 3.2:** Students will explore how simple machines, such as levers and pulleys, can be used to help manage water, such as in irrigation systems or in water collection, contributing to SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).

Example: Design a simple water collection system using pulleys to lift water from a container. Discuss how such systems help conserve water by reducing the effort needed for manual labor and improve water accessibility.

- **Objective 3.3:** Students will study the relationship between water flow, pressure, and volume in different types of irrigation systems, such as drip irrigation versus traditional methods, supporting SDG 6 (Clean Water and Sanitation) and SDG 12 (Responsible Consumption and Production).

Example: Create a model of drip irrigation and traditional irrigation systems. Compare the water usage in each system and discuss how drip irrigation conserves water while maintaining crop yields.

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will examine how water cycles through the Earth's systems (water cycle) and how human activities influence water availability and quality, contributing to SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).
Example: Investigate how water evaporates from lakes and rivers, forms clouds, and falls as rain. Discuss how climate change affects precipitation patterns and water availability, leading to droughts or floods.
- **Objective 4.2:** Students will explore the effects of water scarcity on global ecosystems and how sustainable water management can help conserve resources and support agricultural production, supporting SDG 6 (Clean Water and Sanitation) and SDG 2 (Zero Hunger).
Example: Study the impact of drought on ecosystems, agriculture, and local communities. Research how sustainable water management practices, such as rainwater harvesting, can help address water scarcity.
- **Objective 4.3:** Students will explore how local weather and climate patterns affect water resources in different regions of Australia, and discuss how water conservation can mitigate the effects of drought and flooding, contributing to SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).
Example: Track and analyze rainfall data from different regions of Australia. Discuss how water availability in these regions affects agriculture and how water conservation can help prepare for extreme weather events, like droughts and floods.
- **Objective 4.4:** Students will investigate the relationship between climate change, sea level rise, and freshwater availability, and explore the impact of this on coastal communities, contributing to SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).
Example: Study how rising sea levels affect freshwater supplies in coastal regions. Discuss the importance of managing water resources in these areas to ensure a sustainable supply of drinking water for future generations.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will conduct experiments, observations, and research related to water conservation, developing their skills in data collection, hypothesis testing, and analysis.
- **Understand Natural Systems and the Environment:** Students will gain an understanding of Earth's water systems, the role of water in sustaining life, and the challenges of conserving water in the face of climate change and human activity.
- **Encourage Curiosity and Exploration:** Through hands-on activities, field trips, and inquiry-based learning, students will explore the science behind water conservation and gain a deeper understanding of how they can contribute to sustainable water management.

These learning objectives aim to help students understand the scientific principles behind water conservation, while promoting awareness of the importance of preserving water resources for the future. By applying scientific inquiry and exploring real-world challenges, students will develop a sense of responsibility toward conserving water in their communities and globally.

Sustainable Transport and Urban Planning

(SUS10)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will investigate the environmental impacts of different transport systems on biodiversity and ecosystems, particularly in urban areas, and discuss how sustainable transport options can reduce these impacts, contributing to SDG 11 (Sustainable Cities and Communities) and SDG 15 (Life on Land).
Example: Research the effects of car emissions on air quality and local wildlife in urban areas. Discuss how cycling or using public transport instead of private cars can help protect local ecosystems and improve biodiversity in cities.
- **Objective 1.2:** Students will explore how urban transport systems, such as buses, trains, and cycling infrastructure, can contribute to improving human health by reducing pollution and encouraging active travel, supporting SDG 3 (Good Health and Well-Being) and SDG 11 (Sustainable Cities and Communities).
Example: Study how regular cycling and walking improve physical health by reducing the risk of diseases like obesity or heart disease. Discuss how cities can promote healthier lifestyles through sustainable transport initiatives.
- **Objective 1.3:** Students will investigate the effects of urban sprawl on local ecosystems and discuss how sustainable transport solutions, like integrated public transport networks and green spaces, can help reduce urban sprawl and conserve biodiversity, supporting SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action).
Example: Research how urban sprawl contributes to habitat loss and increased pollution. Discuss how integrated public transport systems reduce the need for cars and promote more sustainable urban development.

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will study the chemical reactions that occur when burning fossil fuels for transport and their contribution to air pollution and climate change, and explore sustainable fuel alternatives, supporting SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy).
Example: Investigate the chemical reactions involved in burning petrol and diesel for cars. Discuss how alternative fuels like electricity or hydrogen power produce fewer emissions and reduce the environmental impact of transport.
 - **Objective 2.2:** Students will explore the properties of materials used in sustainable transport technologies, such as electric vehicles (EVs) and lightweight materials, and how these innovations help reduce energy consumption, contributing to SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action).
Example: Study the properties of electric vehicles (EVs) and the materials used to make their batteries, such as lithium. Discuss how lighter and more efficient materials in transport reduce energy consumption and the carbon footprint.
 - **Objective 2.3:** Students will explore the impact of transport-related pollutants (e.g., nitrogen oxides, carbon monoxide) on the environment and public health, and discuss how reducing these pollutants through sustainable transport practices can improve urban air quality, contributing to SDG 3 (Good Health and Well-Being) and SDG 11 (Sustainable Cities and Communities).
Example: Research how car exhaust emissions contribute to urban air pollution. Discuss the benefits of electric buses and cars in reducing pollutants like nitrogen oxides and carbon monoxide.
-

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will explore the energy efficiency of different modes of transport and investigate how sustainable transport systems, such as electric vehicles (EVs) or public transport, use less energy compared to traditional cars, supporting SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action).
Example: Compare the energy consumption of a car using petrol, an electric vehicle, and a bus. Discuss how public transport and electric vehicles reduce the overall energy demand and help lower carbon emissions in urban areas.
- **Objective 3.2:** Students will investigate how forces such as friction and air resistance affect the motion of vehicles and how design improvements in transport vehicles can improve energy efficiency, contributing to SDG 12 (Responsible Consumption and Production).
Example: Conduct an experiment to measure how the design of a vehicle (e.g., streamlined shape, tire material) affects its speed and energy consumption. Discuss how improvements in vehicle design contribute to energy conservation.
- **Objective 3.3:** Students will study how simple machines, such as pulleys and levers, are used in the design of public

transport infrastructure (e.g., buses, trains, and bike-sharing systems) to improve efficiency, supporting SDG 11 (Sustainable Cities and Communities).

Example: Investigate how train tracks and bus stops are designed using simple machines to help reduce friction and increase efficiency in public transport systems. Discuss how these improvements help make urban transport more sustainable.

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will explore the relationship between urban transport systems, climate change, and weather patterns, and investigate how transitioning to sustainable transport options can mitigate the effects of climate change, supporting SDG 13 (Climate Action).
Example: Study the relationship between increased car use and greenhouse gas emissions. Discuss how switching to public transport, cycling, and walking can help reduce the urban carbon footprint and mitigate climate change.
- **Objective 4.2:** Students will examine how transport-related carbon emissions contribute to the urban heat island effect and how sustainable transport systems, such as green roofs and electric vehicles, can help reduce local temperature increases, contributing to SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action).
Example: Investigate how the use of air conditioning in cars and buildings increases energy consumption and contributes to the urban heat island effect. Discuss how increasing green spaces and using electric vehicles can help cool down urban environments.
- **Objective 4.3:** Students will study how weather patterns and climate change affect urban transport systems, particularly the challenges posed by extreme weather events, such as floods and heatwaves, and explore how cities can adapt by investing in more resilient transport infrastructure, supporting SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action).
Example: Research how extreme weather events, like heavy rainfall or heatwaves, disrupt transportation systems. Discuss how cities can design more resilient transport systems to adapt to climate change, such as elevated train tracks or flood-resistant bike lanes.
- **Objective 4.4:** Students will explore the environmental impact of different modes of transport on air quality and how reducing emissions from transportation contributes to the health and well-being of urban populations, supporting SDG 3 (Good Health and Well-Being) and SDG 11 (Sustainable Cities and Communities).
Example: Study the effects of car exhaust on urban air quality, including the impact of fine particulate matter on respiratory health. Discuss how promoting walking, cycling, and the use of electric public transport can reduce air pollution and improve public health.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in hands-on investigations, experiments, and research projects related to sustainable transport systems, developing skills in observation, data collection, hypothesis testing, and drawing conclusions.
- **Understand Natural Systems and the Environment:** Students will learn about the Earth's ecosystems, the impact of transport on climate and biodiversity, and how sustainable transport systems can contribute to reducing pollution, conserving energy, and combating climate change.
- **Encourage Curiosity and Exploration:** Through scientific inquiry and exploration, students will be encouraged to explore how sustainable transport systems can help cities reduce their carbon footprints, improve public health, and protect the environment for future generations.

Citizenship / Global Responsibility and Sustainable Development (SUS11)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will explore the interdependence between humans, animals, and plants in ecosystems, understanding the role of individuals and communities in protecting biodiversity and promoting sustainability, supporting SDG 15 (Life on Land) and SDG 13 (Climate Action).
Example: Investigate how human activities, like deforestation or overfishing, affect local ecosystems and biodiversity. Discuss how small changes in behavior, such as reducing plastic use or conserving water, can contribute to the protection of biodiversity.
- **Objective 1.2:** Students will explore how sustainable agricultural and aquaculture practices contribute to food security and biodiversity, supporting SDG 2 (Zero Hunger) and SDG 14 (Life Below Water).
Example: Study the environmental impacts of traditional farming versus sustainable practices like agroforestry and

aquaculture. Discuss how these practices promote biodiversity and reduce environmental degradation while providing sustainable food sources for communities.

- **Objective 1.3:** Students will examine the global importance of water conservation for ecosystems, human health, and food production, exploring how citizens can reduce water usage and protect water quality, contributing to SDG 6 (Clean Water and Sanitation).

Example: Investigate how water is used in different ecosystems (e.g., wetlands, rivers, oceans) and by human populations. Discuss actions individuals and communities can take to conserve water, such as reducing water waste and supporting clean water initiatives.

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will investigate the environmental impact of different materials, such as plastic, and explore sustainable alternatives, discussing how reducing consumption and increasing recycling can contribute to environmental sustainability, supporting SDG 12 (Responsible Consumption and Production).

Example: Research the chemical properties of common materials (e.g., plastic, paper, metal) and how long they take to break down in nature. Discuss how reducing plastic use and increasing recycling can help reduce waste and pollution.

- **Objective 2.2:** Students will explore the role of chemical processes in pollution, such as how chemicals in wastewater or plastic products can affect ecosystems, and how responsible disposal and clean-up efforts can mitigate these impacts, supporting SDG 12 (Responsible Consumption and Production) and SDG 14 (Life Below Water).

Example: Study how different substances, like oil or chemicals from agricultural runoff, pollute water bodies. Discuss how individuals and communities can reduce chemical waste through sustainable practices and support initiatives that clean up polluted water sources.

- **Objective 2.3:** Students will explore the role of sustainable chemical innovations, such as biodegradable plastics or green energy technologies, in reducing human impact on ecosystems, contributing to SDG 7 (Affordable and Clean Energy) and SDG 12 (Responsible Consumption and Production).

Example: Investigate the chemical processes behind biodegradable plastics and how they differ from traditional plastics. Discuss the importance of these innovations in reducing waste and pollution in ecosystems.

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will explore how energy is used and conserved in different systems, such as household appliances or transport, and investigate how reducing energy consumption helps combat climate change, supporting SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy).
Example: Study how energy-efficient appliances work and the science behind energy conservation. Discuss how reducing energy consumption at home (e.g., using LED lights, turning off appliances) helps reduce carbon footprints and mitigate climate change.
 - **Objective 3.2:** Students will investigate the energy efficiency of transportation systems, such as electric vehicles and public transport, and discuss how these technologies help reduce environmental impact, contributing to SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action).
Example: Compare the energy consumption and environmental impact of electric vehicles versus traditional gasoline-powered cars. Discuss the benefits of using public transport or cycling in reducing individual carbon footprints.
 - **Objective 3.3:** Students will explore how simple machines, such as pulleys, levers, and gears, are used to improve efficiency in daily life and reduce energy consumption, supporting SDG 12 (Responsible Consumption and Production).
Example: Design a simple machine, like a pulley system, to lift objects more easily. Discuss how simple machines can make tasks more energy-efficient and how these systems are used in industries to conserve energy and resources.
-

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will explore the causes and effects of climate change, particularly how human actions, such as burning fossil fuels and deforestation, contribute to global warming and affect ecosystems, supporting SDG 13 (Climate Action).
Example: Study the greenhouse effect and how human activities increase carbon dioxide levels in the atmosphere. Discuss how reducing energy use, planting trees, and using renewable energy can mitigate the effects of climate change.
- **Objective 4.2:** Students will investigate how natural systems, such as the water cycle, influence weather patterns and how climate change is affecting these systems, contributing to SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).
Example: Investigate how changes in temperature and rainfall patterns are affecting the water cycle. Discuss how climate change is impacting the availability of fresh water in different parts of the world and what actions individuals can take to conserve water.
- **Objective 4.3:** Students will explore how natural disasters, such as floods, wildfires, and droughts, are increasingly influenced by climate change and how citizens can adapt to and prepare for these events, contributing to SDG 11

(Sustainable Cities and Communities) and SDG 13 (Climate Action).

Example: Research the causes of wildfires and how increased temperatures are contributing to their frequency. Discuss how communities can prepare for these events by creating firebreaks, promoting fire-resistant landscaping, and following fire safety protocols.

- **Objective 4.4:** Students will investigate how sustainable practices, such as recycling, renewable energy, and waste reduction, contribute to reducing human impact on the environment and promote global responsibility, supporting SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action).

Example: Study the benefits of recycling and composting. Discuss how individuals and communities can adopt sustainable waste management practices to reduce pollution and conserve resources for future generations.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will conduct experiments, gather data, and analyze the results to understand the scientific principles behind sustainability, conservation, and climate change, fostering skills in critical thinking and problem-solving.
- **Understand Natural Systems and the Environment:** Students will learn about Earth's systems, the impact of human activities on these systems, and how sustainable practices can reduce harm and promote ecological balance.
- **Encourage Curiosity and Exploration:** Through inquiry-based learning, field trips, and hands-on experiments, students will explore the interconnectedness of human actions and environmental stewardship, encouraging them to think critically about how they can contribute to sustainability and global responsibility.

Outdoor Learning and Connection to Nature (SUS12)

1. Biological Sciences

Content Area: Study of Living Things, Including Plants, Animals, Ecosystems, and Human Biology

- **Objective 1.1:** Students will explore the diversity of plant and animal life in local ecosystems and learn how these species interact within their environment, fostering a deeper understanding of biodiversity, supporting SDG 15 (Life on Land).
Example: Take a field trip to a local park, wetland, or forest to observe and catalogue different plant and animal species. Discuss the roles of these species in maintaining ecosystem health and the importance of protecting local biodiversity.
- **Objective 1.2:** Students will examine how ecosystems function and how they support life, focusing on the interdependence of plants, animals, and humans, supporting SDG 15 (Life on Land) and SDG 13 (Climate Action).
Example: Investigate a local ecosystem, such as a river, forest, or grassland, to understand how plants, animals, and microorganisms depend on each other. Create a diagram showing how energy flows through this ecosystem.
- **Objective 1.3:** Students will explore the effects of human activities on ecosystems, such as deforestation, pollution, and land development, and discuss how individuals and communities can contribute to environmental stewardship, supporting SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action).
Example: Discuss how local deforestation or urban expansion affects local wildlife and plant species. Brainstorm ways to help protect and restore these habitats through actions like tree planting, reducing pollution, or promoting sustainable land use.

2. Chemical Sciences

Content Area: Understanding the Properties of Materials and the Reactions That Occur Between Different Substances

- **Objective 2.1:** Students will investigate how natural materials, such as plant fibers, clay, and stone, are used in building materials and how they can be sustainably sourced, contributing to SDG 12 (Responsible Consumption and Production).
Example: Study the properties of natural materials like clay and wood. Discuss how these materials are used in the construction of homes and how they are more sustainable compared to synthetic materials.
- **Objective 2.2:** Students will explore the chemical processes that occur in nature, such as photosynthesis and decomposition, and investigate how these processes contribute to ecosystem health, supporting SDG 13 (Climate Action) and SDG 15 (Life on Land).
Example: Investigate the process of photosynthesis in plants and how it contributes to producing oxygen and reducing carbon dioxide in the atmosphere. Conduct an experiment to demonstrate how plants absorb water and nutrients from the soil.
- **Objective 2.3:** Students will examine the impact of pollution on the chemical properties of water, air, and soil in local ecosystems, and discuss how reducing pollution contributes to environmental health, supporting SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).
Example: Study the effects of pollutants like plastic or oil on the chemical composition of water and soil. Discuss how pollution negatively affects local wildlife and plant species and ways to reduce pollution, such as using biodegradable

materials or recycling.

3. Physical Sciences

Content Area: Introduction to Concepts of Energy, Force, Motion, and Simple Machines

- **Objective 3.1:** Students will investigate how natural forces, such as gravity, friction, and wind, affect the movement of objects and ecosystems, and explore how these forces can be harnessed in sustainable technologies, supporting SDG 7 (Affordable and Clean Energy).
Example: Study how wind energy can be harnessed to generate electricity using wind turbines. Conduct an experiment using small fans or windmills to demonstrate how wind energy works.
 - **Objective 3.2:** Students will explore how energy is transferred and conserved in natural systems, such as food webs and the water cycle, and how these processes can be applied to sustainable practices in agriculture and daily life, supporting SDG 13 (Climate Action) and SDG 12 (Responsible Consumption and Production).
Example: Investigate how energy moves through a food web, from producers (plants) to herbivores and carnivores. Discuss how energy-efficient farming practices, such as crop rotation and conservation tillage, can help conserve energy and resources.
 - **Objective 3.3:** Students will learn about simple machines, such as levers, pulleys, and wheels, and how they are used to make tasks more efficient in both human and natural systems, supporting SDG 12 (Responsible Consumption and Production).
Example: Build a simple lever to lift a small load and demonstrate how it reduces the force needed. Discuss how simple machines can be used in everyday tasks, such as lifting water or moving objects, to conserve energy.
-

4. Earth and Space Sciences

Content Area: Understanding the Earth's Systems, Weather, Climate, and the Solar System

- **Objective 4.1:** Students will explore the Earth's systems, such as the water cycle, and investigate how water is used and conserved in nature, contributing to SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action).
Example: Create a model of the water cycle to show how water evaporates, condenses, and precipitates. Discuss the importance of conserving water in our daily lives and the impact of droughts on local ecosystems.
- **Objective 4.2:** Students will study the effects of climate change on ecosystems and weather patterns, particularly how rising temperatures and changing precipitation patterns affect plant and animal life, contributing to SDG 13 (Climate

Action) and SDG 15 (Life on Land).

Example: Investigate how climate change is causing shifts in migration patterns of animals and plant blooming seasons. Discuss the importance of protecting ecosystems and habitats to help species adapt to climate change.

- **Objective 4.3:** Students will examine how human activities, such as urbanization, affect local weather and ecosystems, and explore how sustainable practices, such as green infrastructure and conservation, can mitigate these effects, contributing to SDG 11 (Sustainable Cities and Communities) and SDG 15 (Life on Land).

Example: Study the urban heat island effect and how cities with more green spaces and trees can reduce temperatures. Discuss how planting trees, creating green roofs, and promoting sustainable building materials can help mitigate the impact of urbanization on local climates.

- **Objective 4.4:** Students will investigate the importance of ecosystems in regulating the Earth's climate, including how forests, oceans, and wetlands absorb carbon dioxide and help mitigate climate change, supporting SDG 15 (Life on Land) and SDG 13 (Climate Action).

Example: Research how forests and wetlands act as carbon sinks by absorbing carbon dioxide from the atmosphere. Discuss how protecting and restoring these ecosystems is critical in combating climate change.

Key Goals for All Objectives:

- **Develop Scientific Inquiry Skills:** Students will engage in hands-on outdoor experiments, observations, and investigations to develop their skills in inquiry-based learning, fostering a deep understanding of natural systems and human impact on the environment.
 - **Understand Natural Systems and the Environment:** Students will gain a deeper understanding of ecosystems, biodiversity, and the environmental processes that support life on Earth. They will explore how interconnected natural systems work and how they can contribute to sustainability and conservation.
 - **Encourage Curiosity and Exploration:** By spending time in nature and using inquiry-based learning, students will be encouraged to observe and investigate the world around them. They will develop a sense of connectedness to nature and an understanding of their role in protecting the environment for future generations.
-