5th Grade American Online School

SCIENCE CURRICULUM

Exploring Life, Earth, and the Universe with Curiosity and Purpose

Version May/2025

1. Introduction

The Role of Science Education in 5th Grade

The 5th Grade Science curriculum invites students to explore the living world, Earth's dynamic systems, and the vastness of space. Through observation, hands-on experiments, and real-world connections, students develop foundational scientific habits of mind—questioning, predicting, analyzing, and reflecting. A balance of structured instruction and open inquiry fosters deep understanding and readiness for middle school science.

By the end of this course, students will:

✓ **Understand the structure and function of ecosystems and cells.**

✓ **Investigate Earth's materials, systems, and their interactions.**

✓ **Explore the solar system, ocean, atmosphere, and rock cycle.**

✓ **Apply the scientific method to design and conduct experiments.**

✓ **Communicate scientific ideas through models, reports, and presentations.**

---

2. Core Competence Areas

SCI.1 General Science and Scientific Thinking

Learning Outcomes

By the end of this course, students will be able to:

✓ **Use scientific tools and inquiry processes to investigate questions.**

✓ **Record and interpret data using charts and graphs.**

✓ **Explain the importance of observation, hypothesis, and experimentation.**

Competencies

SCI.1.A.1 – Applying the scientific method.

- Form testable questions and plan simple investigations.
- Control variables and identify fair tests.

SCI.1.A.2 – Using tools and technologies.

- Use thermometers, magnifying lenses, graduated cylinders, and rulers accurately.
- Record data in tables and graph trends.

SCI.2 Earth and Space Science: Rocks and Minerals

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Identify different types of rocks and understand the rock cycle.**

✓ **Distinguish between igneous, sedimentary, and metamorphic processes.**

✓ **Recognize minerals and test their properties.**

Competencies

SCI.2.A.1 – Understanding the rock cycle.

- Model how rocks change through heating, cooling, pressure, and erosion.
- Compare properties such as hardness, color, and luster.

SCI.2.A.2 – Analyzing Earth's crustal materials.

- Classify rocks based on observation and testing.
- Research local or regional geological features.

SCI.3 Earth and Space Science: Oceans and Atmosphere

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Describe the layers of Earth's atmosphere and major weather patterns.**

✓ **Explain ocean currents, tides, and marine ecosystems.**

✓ **Model the water cycle and its role in weather and climate.**

Competencies

SCI.3.A.1 – Exploring air, water, and weather systems.

- Track local weather, cloud types, and atmospheric conditions.
- Build models of the water cycle and air circulation.

SCI.3.A.2 – Investigating the oceans.

- Understand saltwater composition, marine zones, and ocean floor mapping.
- Simulate waves, currents, and water pressure effects.

SCI.4 Earth and Space Science: Solar System and Beyond

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Identify planets, moons, and other celestial bodies.**

✓ **Compare planet features and orbital distances.**

✓ **Understand Earth's rotation, revolution, and seasonal patterns.**

Competencies

SCI.4.A.1 – Learning about our solar system.

- Label the planets and their order from the sun.
- Explain gravity's role in orbit and movement.

SCI.4.A.2 – Observing celestial motion.

- Track moon phases, sunrise/sunset patterns, and shadows.
- Use models to simulate eclipses and planetary motion.

SCI.5 Life Science: Ecosystems and Interdependence

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Identify producers, consumers, and decomposers in food chains.**

✓ **Explain the flow of energy through food webs.**

✓ **Understand ecosystems' balance and human impact.**

Competencies

SCI.5.A.1 – Investigating living systems.

- Draw and analyze food chains and webs in different biomes.
- Compare aquatic and terrestrial ecosystems.

SCI.5.A.2 – Understanding adaptation and change.

- Explore how organisms adapt to environments.
- Research endangered species and conservation efforts.

SCI.6 Life Science: Introduction to Cells

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Recognize cells as the building blocks of life.**

✓ **Differentiate plant and animal cells and their parts.**

✓ **Understand the function of basic organelles.**

Competencies

SCI.5.A.1 – Exploring cell structure and function.

- Use diagrams to identify the nucleus, membrane, cytoplasm, etc.
- Compare cells to a “city” or “factory” using analogies.

SCI.5.A.2 – Modeling microscopic life.

- Use microscopes or images to observe cells.
- Create 3D models of cells using clay, pasta, or digital tools.

---

3. Assessment and Evaluation

Formative Assessments – Inquiry and Exploration

✓ **Observation journals and science notebooks.**

✓ **Lab checklists and group reflections.**

✓ **Exit tickets, predictions, and pre/post-concepts maps.**

Summative Assessments – Mastery Demonstration

✓ **End-of-unit tests and mini research papers.**

✓ **Model-based presentations (e.g., water cycle, ecosystem).**

✓ **Cross-topic comparative projects (e.g., Earth vs. Mars).**

Authentic Assessment – Curiosity and Application

✓ **Student-created science podcasts or experiments.**

✓ **"Eco-Advocate" roleplay for conservation challenges.**

✓ **“Cell Museum” gallery walk with peer feedback.**

4. Instructional Strategies for Online Learning

Hands-On, Minds-On Exploration

✓ **Conduct experiments and use simulations regularly.**
✓ **Integrate real-world problems and local phenomena.**

Literacy Integration

✓ **Use science texts, articles, and vocabulary walls.**
✓ **Encourage science journaling and lab report writing.**

Technology and Modeling Tools

✓ **Apps: PhET Simulations, NASA Eyes, Mystery Science.**
✓ **Use of digital microscopes and virtual field trips.**

Learning Culture

✓ **Promote curiosity and the freedom to ask big questions.**
✓ **Build scientific identity and teamwork.**
✓ **Normalize mistakes as part of the inquiry process.**