Northern York County School District

Curriculum Overview

Course: 6th Grade Earth and Space Science	
Grade Level: 6	
Development/Revision Date: January 2025	**Length of Time:** 180 Days

Course Description:

In this course, students will explore the dynamic systems that shape our planet and its place in the universe. Using models, data analysis, and scientific explanations, students will investigate the Earth-sun-moon system to understand lunar phases, eclipses, and the seasons. They will also study gravity's influence on solar system motion and galaxies, analyze the scale of celestial objects, and construct explanations about Earth's 4.6-billion-year history using rock strata. The course delves into geoscience processes such as plate tectonics, erosion, and the cycling of Earth's materials and water. Students will also explore Earth's climate systems, weather patterns, and natural hazards while examining human impacts on the environment, resource distribution, and global temperatures.

By engaging with these topics, students will develop skills to interpret data on past and present geologic and atmospheric changes, forecast natural hazards, and design solutions for minimizing human environmental impact. This course emphasizes critical thinking and scientific reasoning, preparing students to understand the complex interactions that shape Earth's systems and the broader universe.

Course Objectives:

- Develop and use models of the Earth-sun-moon system to explain the patterns of lunar phases, eclipses, and seasonal changes.
- Describe the role of gravity in the movement of objects within the solar system and galaxies through model development.
- Analyze and interpret data to determine the scale and properties of objects in the solar system, such as planets and moons.
- Construct scientific explanations based on evidence from rock layers to understand Earth's 4.6-billion-year history.
- Explain how geologic processes, such as plate tectonics and erosion, have shaped Earth's surface over time.
- Develop models to describe the cycling of Earth's materials and the flow of energy driving these processes.
- Analyze evidence, such as fossil distribution and continental shapes, to provide insight into past plate motions.
- Model and explain the water cycle, driven by the sun's energy and gravity, across Earth's systems.
- Explore how uneven heating and Earth's rotation create atmospheric and oceanic circulation patterns that influence regional climates.
- Collect data to examine how the interactions of air masses lead to changing weather conditions.
- Investigate the factors contributing to global temperature rise over the past century.

- Explain how Earth's mineral, energy, and water resources are distributed due to past and ongoing geologic processes.
- Analyze data on natural hazards to predict future catastrophic events and inform strategies to mitigate their effects.
- Apply scientific principles to design methods for reducing human environmental impact and conserving natural resources.
- Construct arguments based on evidence about how population growth and resource consumption impact Earth's systems.
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Related Standards:

Pennsylvania STEELS State Standards

3.3.6-8.A Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
3.3.6-8.B Develop and use a model to describe the role of gravity in the motion within galaxies and the solar system.
3.3.6-8.C Analyze and interpret data to determine scale properties of objects in the solar system.
3.3.6-8.D Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
3.3.6-8.E Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
3.3.6-8.F Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
3.3.6-8.G Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions.
3.3.6-8.H Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
3.3.6-8.I Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
3.3.6-8.J Collect data to provide evidence for how the motion and complex interactions of air masses result in changes in weather conditions.
3.3.6-8.O Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
3.3.6-8.K Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
3.3.6-8.L Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
3.3.6-8.M Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.
3.3.6-8.N Construct an argument supported by evidence for how increases in human population and per capita consumption of natural resources impact Earth's systems.

Units:

- The History of Planet Earth
- Earth's Materials and Systems
- Large-Scale System Interactions
- Roles of Water in Earth's Surface Processes
- Weather, Climate, and Global Climate Change
- Human Impact on Earth
- Space Systems

Competencies:

- Identify patterns that indicate cause-and-effect relationships within various contexts.
- Understand that natural systems exhibit consistent patterns, which can be comprehended through measurement and observation.
- Create and use models to represent systems and their interactions, including the flows of energy, matter, and information.
- Analyze time, space, and energy phenomena at various scales using models to study systems that are either too large or too small.
- Explore how engineering advancements contribute to discoveries across scientific fields and how scientific discoveries foster the development of industries and engineered systems.
- Construct explanations for stability and change in natural or designed systems by examining processes and changes over time, including at the atomic scale.
- Interpret patterns in rates of change and numerical relationships to gain insights into natural systems.
- Analyze how energy transfer within natural or designed systems drives the motion and cycling of matter.
- Use cause-and-effect relationships to predict phenomena in both natural and designed systems.
- Evaluate the impact of human activities on natural resources, considering both short- and long-term consequences for health and the environment.
- Utilize graphs, charts, and images to identify and interpret patterns in data.
- Assess how societal needs, scientific findings, and various factors (such as climate and economic conditions) influence technology use and its limitations.
- Classify relationships as causal or correlational, recognizing that correlation does not imply causation.
- Track the transfer of energy as it flows through both designed and natural systems.
- Describe the consequences of actions based on scientific knowledge, acknowledging that such knowledge does not dictate societal decisions.
- Understand how stability in systems can be disturbed by sudden events or gradual changes over time.

Concepts:

- **SPACE SYSTEMS** - The sun, moon, and stars move in patterns that can be explained by models, with Earth's tilt causing seasons and eclipses, all parts of our solar system formed from dust and gas in the Milky Way galaxy.
- **HISTORY OF EARTH** - The geologic time scale organizes Earth's history using rock strata and fossils, while various planetary systems interact over different timescales to shape the planet's surface and determine its future.
- **EARTH'S SYSTEMS** – Earth's processes are driven by energy from the sun and Earth's heat, affecting the environment and living things, while humans depend on limited and unevenly distributed resources from the planet.
- **WEATHER AND CLIMATE** - Ocean currents, driven by temperature and

Learning Activities:

- Ask questions and define problems
- Plan and carry out investigations
- Engage in argument from evidence
- Develop and use models
- Analyze and interpret data
- Construct explanations and design solutions
- Obtain, evaluate, and communicate information
- Use math and computational thinking

salinity, influence weather and climate, and human activities like greenhouse gas emissions contribute to global warming, highlighting the need to understand climate science for better decision-making. • **HUMAN IMPACTS** - Mapping natural hazards help predict future events, and human activities can harm the environment, increasing negative impacts as populations and resource use grow unless addressed by better technologies.	

Performance Tasks:

- Formative lesson assessments such as student discussion, questioning, peer collaborative activities, reflections
- Summative unit assessments and projects

Other Assessment Measures:

Textbook/Primary Resource:
Amplify Education, Inc. (2022). *Amplify Science: Earth and Space Science*. Amplify Education, Inc.

Supplemental Resource Materials: iXL, EdPuzzle, Nearpod, EduCreations, reading material, Boom Cards