04 _ Earth Science 1 – How Does Water Shape Our World?

Content Area: **Science**
Course(s):
Time Period: **Full Year**
Length: **10 Weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

Science and engineering—significant parts of human culture that represent some of the pinnacles of human achievement—are not only major intellectual enterprises but also can improve people's lives in fundamental ways. Although the intrinsic beauty of science and a fascination with how the world works have driven exploration and discovery for centuries, many of the challenges that face humanity now and in the future—related, for example, to the environment, energy, and health—require social, political, and economic solutions that must be informed deeply by knowledge of the underlying science and engineering.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Learning Set 1: How Is the Land Shaped Differently?

How and why is Earth constantly changing? How do Earth's major systems interact? Why do the continents move, and what causes earthquakes and volcanoes? How do the properties and movements of water shape Earth's surface and affect its systems?

Learning Set 2: How Is the Land Shaped Differently?

How and why is Earth constantly changing? How do Earth's major systems interact? Why do the continents move, and what causes earthquakes and volcanoes? How do the properties and movements of water shape Earth's surface and affect its systems? How can one explain the structure, properties, and interactions of matter? How do particles combine to form the variety of matter one observes? How is energy transferred and conserved? What is energy?

Learning Set 3: How Is the Land Shaped Differently?

How and why is Earth constantly changing? How do Earth's major systems interact? How do the properties and movements of water shape Earth's surface and affect its systems?

Learning Set 4: How Is the Land Shaped Differently?

How and why is Earth constantly changing? How do Earth's major systems interact? The Roles of Water in Earth's Surface Processes How do the properties and movements of water shape Earth's surface and affect its systems?

How does climate change impact our environment and the ecosystem?

CONTENT AREA STANDARDS

6-8.MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
6-8.MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
6-8.MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
6-8.MS-ESS2-5	Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
6-8.MS-ESS2-4	Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
6-8.MS-ESS2-6	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.
6-8.MS-PS1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

MA.K-12.2	Reason abstractly and quantitatively.
LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
MA.6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
LA.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
LA.WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
LA.WHST.6-8.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
TECH.9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
TECH.9.4.8.CT.2	Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).
TECH.9.4.8.CT.3	Compare past problem-solving solutions to local, national, or global issues and analyze the

factors that led to a positive or negative outcome.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand that:

1. On Earth, water is located in six reservoirs that vary in size.
2. Water moves in specific ways between reservoirs: flow, evaporation, condensation/ precipitation, and infiltration.
3. Water is continually changing phases and moving between reservoirs. There is no new water being created. This is called the water cycle.
4. Earth material is constantly changed and shaped by various processes: weathering, erosion, and deposition.
5. Small changes over a long period of time can have big effects (on Earth material).
6. Rock (sedimentary, igneous, and metamorphic) has different properties depending on how it was formed.
7. The rock cycle is the collection of processes that changes one kind of Earth material into another.

Procedural Knowledge

Students will be able to:

- Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
- Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.\
- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
- Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
- Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
- 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.
- Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

EVIDENCE OF LEARNING

Formative Assessments

MS-ESS2-1: Earth Science 1: Activity 11.1: Making New Rock from Old Rock, Activity 11.2: How Else Can You Make New Rock?, Reading 11.2: Cooling the Lava, Activity 11.3: Can You Make Rock Stronger Without Melting It?, Activity 12.1: Cycling Rock, Activity 12.2: What Types of Rock Are in My Park?

MS-ESS2-2: Earth Science 1: Activity 1.1: How Natural Compares to Man Made, Activity 1.2: Investigating Landforms, Activity 1.3: How Does Home Compare?, Activity 2.1: Making Sense of the Task, Reading 2.1: Landforms on Earth, Activity 2.2: Developing the Driving Question Board, Activity 7.1: How Does Flowing Water Affect Earth? Reading 7.1: How Long Does It Take a River to Form?, Homework 7.1: Could Water Have Shaped the Grand Canyon?, Activity 8.1: How Do Rocks Break Down?, Reading 8.1: What Causes Rock to Break into Pieces?, Activity 8.2: How Does Moving Water Carry Particles?, Activity 8.3: What Happens to the Pieces of Rock that Are Weathered and Eroded?, Reading 8.3: Flooding the Canyon, Activity 9.1: Investigating Stream Tables, Reading 9.1: Landslides and Erosion, Activity 10.1: How Does Water Shape the Landforms in the Case Study Parks?, Activity 10.2: How Does Water Shape the Landforms in Our Park?, Reading 10.2: What Is Sand?, Activity 13.1: Putting Together the Answer, Activity 13.2: Group Presentations

MS-ESS2-3:

MS-ESS2-4: Earth Science 1: Activity 3.1: Where Is Water on the Map?, Activity 3.4: How Do the Reservoirs Compare?, Activity 4.1: How Does Water Move over the Surface?, Activity 4.2: Can Maps Help Figure Out Flow?, Reading 4.2: Down the Drain!, Activity 4.3: How Does Water Move into the Ground?, Activity 5.1: Water Cycle Simulation: What Is It Like to Be a Water Molecule?, Activity 5.2: Can Maps Help Figure Out Flow?, Homework 5.2: My Life as a Water Molecule, Activity 6.1: Does Water Cycle Work in Case Parks?, Reading 6.1: I Think I Have Seen This Water Before, Activity 6.2: How Does the Water Cycle Work in Our Park?

MS-ESS2-5: Earth Science 1: Activity 3.2: Is There Water in the Air?, Reading 3.2: How Do I Know How Humid It Is?

MS-ESS2-6: Earth Science 1: Activity 4.4: How Does Water Move In and Out of the Atmosphere?

MS-PS1-4: Earth Science 1: Homework 4.4: Moving Water

Summative Assessments

- Benchmark Assessments
    - Multiple Choice Assessment administered at the end of each marking period.

Alternative Assessments

- Oral Presentations
- Questions for Comprehension
- Performance Tasks
- Scientific Journals/Notebooks
- Self-Assessment
- WebQuests

RESOURCES (Instructional, Supplemental, Intervention Materials)

IQWST Unit Materials for Earth Science 1 Learning Set 1-4

A Framework For K-12 Science Education

Online Resources provided by IQWST not included in the program (to be used as support/reinforcement/enrichment): https://docs.google.com/spreadsheets/d/1VpyFCL4_50_-1w2NhcGpdNNZ2jj6aJJegcIUNCy_uzQ/pubhtml

Climate Change Resources:

- In Grade 6, Module 6.4, Learning Set 1, Lesson 2, Activity 2.2: What are Greenhouse Gases?, students engage in a learning sequence to determine how we know the climate is changing. Students analyze a series of graphs in order to identify patterns in relationships between variables (SEP-DATA-M2, CCC-PAT-M4); they use this information as evidence to support a claim that addresses the question, "Is there a connection between humans and greenhouse gases?" (SEP-CEDS-M3). Student claims address how the increase in atmospheric greenhouse gases is a major factor in the current rise of earth's mean surface temperature (DCI-ESS3.D-M1).

https://www.nj.gov/education/climate/learning/gradeband/

Impact of Climate Change on the environment:

- The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns.
- Because these patterns are so complex, weather can only be predicted probabilistically.

INTERDISCIPLINARY CONNECTIONS

Collaboration with Math and Language Arts teachers is an essential part of the IQWST curriculum.

Information Writing

Current Events

Topography

Data collection/analysis

Computations

Statistics

Enginereering

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.

IQWST provides audio recording for all readings in student workbook-available through teacher portal online

Reading differentiation strategies are embedded in the IQWST program and all students prepare for reading through a 'Getting Reading' section which begins each reading.

The sections are desgined to engage students, generate interest, activate prior knowledge and provide a purpose for reading. Teachers use advance organizers for desired readings and to encourage students to plan and annote the passages.

A word wall is developed through vocabulary aquisition in the program. Students develop the word wall as words are learned in context and through experience in class. This helps to build meaning and understanding which support students when reading text.

Students are encouraged to ask questions and post them to the Driving Question Board. This DQB helps students develp a greater level of understanding and encourages students to work together to solve problems in and outside of class.

Supoort will be provided to students when writing in the student manual and use of teh computer, printing, and

pasting into the manual is acceptable if there is a present need.