Unit 2: Earth's Systems and Human Impact

Unit #:	APSDO-00034869	Duration:	10.0 Day(s)	Date(s):	

Team:
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Grades:
5
Subjects:
Science

Unit Focus

In this unit, students will learn about Earth's systems (geosphere, hydrosphere, atmosphere, biosphere) and understand that human activity impacts many of these systems. Students will learn that human sustainability is dependent upon the responsible management of natural resources. They will also explore ways to help protect Earth's resources and environment. Summative assessments include a performance task with a written component that assesses mastery of content and skills. Supporting instructional materials for this unit may include mentor text(s), print and online resources, related laboratory equipment and materials, and teacher generated inquiry tasks.

Stage 1: Desired Results - Key Understandings

Established Goals

Next Generation Science Standards (DCI)
Science: 5

- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. *ETS1.5.B2*
- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. *ETS1.5.C1*
- Earth's major systems are the geosphere (solid and molten rock, soil, and

Transfer

T1 (T1) Integrate knowledge from a variety of disciplines and apply it to new situations to make sense of information, formulate insightful questions, and/or solve problems.
T2 (T2) Design an investigation or model using appropriate scientific tools, resources, and methods.

Meaning

Understandings

U1 (U154) The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate.
U2 (U135) Water on Earth exists as a solid (ice), liquid (water), and gas (water vapor).

Essential Questions

Q1 (Q162) How do humans and Earth systems affect each other?
Q2 (Q139) How do the major systems (geosphere, hydrosphere, and biosphere) of the Earth interact?

sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. *ESS2.5.A1* • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. *ESS3.5.C1* • Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. *ESS2.5.C1* • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. *ETS1.5.A1* • Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. *ETS1.5.B1* • Tests are often designed to identify failure points or difficulties, which	**U3** (U139) Earth`s major systems are the geosphere, the hydrosphere, the atmosphere, and the biosphere. These systems are dynamic and interact in multiple ways to affect Earth`s surface materials and processes. **U4** (U161) Human activity impacts many of Earth`s systems. **U5** (U162) Human sustainability is dependent upon the responsible management of natural resources. **U6** (U923) Models provide an opportunity to test predictions and ideas through simulations. **U7** (U911) Scientists examine evidence to look for relationships (e.g., patterns, trends) to formulate insightful questions and solve problems. **U8** (U205) Engineers learn from failure. Failure helps engineers learn more about how things work and how they can improve upon their design. **U9** (U207) Engineers respond to a need by understanding the problem and developing solution(s) within given constraints and criteria. **U10** (U208) There is often more than one possible solution to a problem, but some are more effective than others given the criteria and constraints.	**Q3** (Q161) How do people`s actions affect the world around them? **Q4** (Q136) How does land change? What are some things that cause it to change? **Q5** (Q138) How does water shape and affect the Earth? **Q6** (Q146) Where do I see water in the environment? Where else can it be found? How does it support life on Earth? **Q7** (Q910) What questions do I wonder about? How can I use science to figure out the answer? **Q8** (Q912) What patterns or trends do I see in my data? **Q9** (Q920) How does this model help me to better understand a concept, answer a question, or solve a problem? **Q10** (Q201) What problem do I want to solve? How do I design a model/drawing to create a solution? How do I test it out and continue to make it better? **Q11** (Q202) What can I learn from my experience?
	Acquisition of Knowledge and Skill	
	Knowledge	**Skills**
		S1 Locate and identify sources of fresh and salt water **S2** Describe and graph the amounts and

suggest the elements of the design that need to be improved. *ETS1.5.B3*		percentages of water and fresh water in various reservoirs **S3** Define and explain Earth's systems: geosphere, hydrosphere, atmosphere, and biosphere **S4** Develop a model to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact (e.g., the influence of the ocean on ecosystems, landform shape, and climate) **S5** Identify different ways communities are using science to protect the Earth's resources and environment **S6** Give examples of how humans can affect the environment and change ecosystems **S7** Design a solution to a problem using the engineering design process **S8** Test a design solution to see how well the design solves the problem