



A Drop in the Bucket: Alignment with Next Generation Science Standards

Earth's Systems

Grade 5

Disciplinary Core Ideas:

ESS2.C: The Roles of Water in Earth's Surface Processes

§ 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. (5-ESS2-2)

Students who demonstrate understanding can: Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. (5-ESS2-2)

Grade 6

Disciplinary Core Ideas:

ESS2.C: The Roles of Water in Earth's Surface Processes

§ Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4)

§ Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4)

Crosscutting concepts:

Cause and Effect

§ Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5)

Systems and System Models

§ Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (MS-ESS2-6)

Students who demonstrate understanding can: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (MS-ESS2-4)



Earth and Human Activity

Grade 5

Disciplinary Core Ideas:

ESS3.C: Human Impacts on Earth Systems

§ 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. (5-ESS3-1)

Students who demonstrate understanding can: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. (5-ESS3-1)

Grade 6

Disciplinary Core Ideas:

ESS3.C: Human Impacts on Earth Systems

§ Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3)

Students who demonstrate understanding can: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (MS-ESS3-3)

Engineering Design

Grades 3-5

Disciplinary Core Ideas:

ETS1.B: Developing Possible Solutions

§ Tests are often designed to identify failure points or difficulties

§ 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. (3-5-ETS1-2)

ETS1.C: Optimizing the Design Solution

§ Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

Students who demonstrate understanding will be able to:

§ Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

§ Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (3-5-ETS1-2)

§ Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. (3-5-ETS1-3)



Grade 6:

Disciplinary Core Ideas:

ETS1.B: Developing Possible Solutions

§ A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4)

Crosscutting Concepts:

Influence of Science, Engineering, and Technology on Society and the Natural World

§ All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1)

§ The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)

Students who demonstrate understanding will be able to:

Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS-ETS1-1)

Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)

Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)

Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (MS-ETS1-4)