

7. Grade 07: Human Impacts on Earth Systems and Global Climate Change

Content Area: **Science**
Course(s):
Time Period: **Generic Time Period**
Length: **12**
Status: **Published**

Stage 1: Desired Results

Unit Overview/ Rationale

In this unit of study, students analyze and interpret data and design solutions to build on their understanding of the ways that human activities affect Earth's systems. The emphasis of this unit is the significant and complex issues surrounding human uses of land, energy, mineral, and water resources and the resulting impacts of these uses. The crosscutting concepts of *cause and effect* and *the influence of science, engineering, and technology on society and the natural world* are called out as organizing concepts for these disciplinary core ideas.

This unit is based on MS-ESS3-3, MS-ETS1-1, MS-ETS1-2, and MS-ETS1-3.

Standards & Indicators

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. [Clarity of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of vegetation), and air quality (such as the release of pollutants into the air, water, or land).] ([MS-ESS3-3](#))

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

Big Ideas - Students will understand that...

Students will start by identifying a human impact on the environment that has resulted from human consumption of

natural resources. Using what they have identified, students will begin to define the criteria and constraints of the design problem whose solution will help to monitor and minimize the human impact on the environment. Using informational texts to support this process is important. Students will draw evidence from these texts in order to support their analysis, reflection, and research.

When students consider criteria, they should conduct short research projects to examine factors such as societal and individual needs, cost effectiveness, available materials and natural resources, current scientific knowledge, and current advancements in science and technology. They should also consider limitations due to natural factors such as regional climate and geology. While conducting their research, students will need to gather their information from multiple print and digital sources and assess the credibility of each source.

When students quote or paraphrase the data and conclusions found in these resources, they will need to avoid plagiarism and provide basic bibliographic information for each source. After comparing the information gained from their research, experiments, simulations, video, or other multimedia sources, they will be able to determine precise design criteria and constraints that lead to a successful solution.

Students will need to jointly develop and agree upon the design criteria that will be used to evaluate competing existing design solutions

Essential Questions - What provocative questions will foster inquiry and transfer of learning

How do we monitor the health of the environment?

How can people monitor resources used?

How can people conserve resources?

How can resources be reused and repurposed to reduce the amount of trash in a landfill?

Content - Students will know...

- Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species.
- Changes to Earth's environments can have different impacts (negative and positive) for different living things.
- Typically as human populations and per capita consumption of natural resources increase, so do the negative

impacts on Earth, unless the activities and technologies involved are engineered otherwise.

- Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.

Skills - Students will be able to...

1. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. Once students have evaluated competing solutions and analyzed and interpreted data showing the similarities and differences of these solutions, they may then begin designing their own solutions. It is important that students consider the benefits and risks of each existing design solution. The impact on the environment and human society must be considered in the design. The final goal for students is to identify the parts of each design solution that best fit their criteria and constraints and combine these parts into a design solution that is better than any of its predecessors.

Stage 2: Assessment Evidence

Assessment

Design and creation of clothing made using recycled materials

End of Unit assessments (multiple choice and constructed responses)

Mini Lab Performance based assessments (rubrics)

Essential Question Responses

Page Keeley Science Probes (formative assessments)

Performance-based Project: STEM ACTIVITY: Preventing erosion by choosing the correct ground cover

Stage 3: Learning Plan

Learning Activities

Academic vocabulary activities: journals, E-flash cards, puzzles, word parts, e-games

Mini-labs (student engagement)

Launch Labs (teacher/ and or student led)

Inquiry Labs (use of inquiry skills)

Interactive technology: classroom presentations, science videos, transparencies, visual literacy models, interactive whiteboard

Accommodations for students with IEPs and learning difficulties:

- Model how to perform specific roles when conducting experiments
- visual sentence frames using academic vocabulary for discussion
- use science "Reading Essentials" packets in place of textbook sections
- print lesson vocabulary in premade flashcard fashion to be used as a study guide
- allow verbal responses in place of written responses
- provide graphic organizers for comparing and contrasting science concepts
- modify graphic organizers/worksheets to reduce choices
- Use visuals to show important vocabulary for students to make connections
- Vocabulary word banks and strategies
- Think alouds and Think-Pair-Share

For ELL students:

- visuals for vocabulary

-word wall

-additional word work such as illustrating vocabulary and playing vocabulary games

-partner reading

-choral reading

-color-coded sticky notes for close reading to identify which sticky notes pertain to vocabulary

-questions about text, etc.

-When students make an error in speaking, answer or restate what they said using the correct form without drawing attention to the mistake.

For gifted students:

-additional self-selected science resources to explore the characteristics of life

-offer bonus points for "Reaching Higher" critical thinking questions

Language Arts Strategies: make tables, guiding questions, organize ideas, illustrate ideas, quick answers, make lists, make outlines, infer meaning, compare and contrast, make connections

Resources

Glencoe Earth and Space iScience, McGraw Hill, 2012

Paige Keeley Science Probes

Brain POP shorts

Various literature selections connected to science topics

Various video clips connected to science topics

Unit Reflections & Teacher Notes
