

Changing Nature

(S2E3a,b)

Time

At least two 45-min classes (outside)

GES Standard (# and text) Character Count: 1000

S2E3. Obtain, evaluate, and communicate information about how weather, plants, animals, and humans cause changes to the environment. (Clarification statement: Changes should be easily observable and could be seen on school grounds or at home.)

- Ask questions to obtain information about major changes to the environment in your community.
- Construct an explanation of the causes and effects of a change to the environment in your community

Phenomenon



Photo credit: Time lapse - Google Earth [Deforestation](#)



Photo credit: Time lapse- Kanyangapilla [forest restoration](#) in So Australia
<https://youtu.be/LOAkF1SReo4>

Lesson Overview Character Count: 1000

Students will observe the phenomena of changes to the environment, as observed in the schoolyard. They will then explain causes and effects of various changes and propose solutions that will restore part of the land.

Engage Character Count: 900

Students will observe the phenomena of trees being deforested and reforested by watching time lapse videos linked above. Explain the concept of time lapse photography (a real life video that has been filmed over a long period of time and speeded up when it is shown), and point out to students that trees show up in the video as green; water as blue; and buildings, parking lots, roads, farms, and vacant lots or cleared areas show up as brown. Then show one more videos of a storm uprooting a tree.

Ask students to construct an initial explanation for how and why the earth has changed from its natural state to its current appearance, using the videos as examples.

Elicit Questions Character Count: 900

Invite students to ask questions about the phenomena and research things about which they are curious. Group student questions by topic and arrange students in research groups by similar interests.

Explore Character Count: 900

Take students into the schoolyard, organize them in pairs (discovery teams) and challenge them to make lists (or draw pictures) of everything that people have built or done that changed the forest and wildlife that originally occupied this land, before the school was built.

Consider other places in the community. Have students think of all the things that people have done or built in those places to change the original ecosystem in the same location. Possibilities include the grocery store, post office, park, sports fields and even grassy or landscaped areas.

Engineer Character Count: 900

N/A

Explain Character Count: 900

Students will use this [cause and effect graphic organizer](#) OR the [Earth Force root cause tree](#) to show actions that people take and how those actions can change the environment (for good or for better). The initial explanation should be constructed after students observe the phenomena and before they research, investigate and explore. A second (revised) explanation should incorporate all that students learned from this lesson in a more nuanced, refined, and detailed explanation.

Environmental Stewardship / PBL Character Count: 900

Students may propose a solution to the problem of decreased biodiversity in the schoolyard, caused by changes to the environment. This could include designing and installing a schoolyard habitat to attract wildlife by providing native plants, a source of water, shelter, and space to roam. The [National Wildlife Federation's Schoolyard Habitat How-To Guide](#) offers good information about how to plan and organize a project such as this.

Extend Character Count: 900

Consider having the class help prepare an application to have a portion of the [schoolyard certified as a wildlife habitat](#) by National Wildlife Federation. Improve the suitability of the school campus for attracting and supporting wildlife (as well as providing places for student investigations) by planting native trees and shrubs.

Evaluate Character Count: 900

Assess student growth in knowledge and understanding of human and natural impacts on the environment by comparing initial and final explanations of the phenomena. Be sure to clear up any persistent student misconceptions. At a minimum, students should be able to articulate that humans and natural processes (which may include weather, disasters, constructive or destructive forces) can change the environment in ways that cause benefits, harm, or a combination of both.

Re-Teach Character Count: 900

Reteach human impacts on the environment by showing some clips from these [videos presented by National Geographic](#). Be sure to include some videos that show positive or restorative impacts on the environment, and not solely negative effects.

How this Lesson incorporates "Gather / Reason / Explain / Act / Teach" or "Obtain / Evaluate / Communicate" framework

Check relevant sections and add a line that describes specific, related lesson activities on the right. Character Count: 144

Gather / Obtain includes any of the following:

- ☐ Obtaining Information
- ☐ Asking Questions/Defining Problems
- ☐ Planning & Carrying Out Investigations
- ☐ Using Models to Gather Data
- ☐ Using Mathematics / Computational Thinking

Students will gather or obtain data and information by . . .

Answer Here or N/A

Answer Here or N/A

Answer Here or N/A

Answer Here or N/A

Answer Here or N/A

Reason / Evaluate includes any of the following:

- ☐ Evaluating Information
- ☐ Analyzing Data
- ☐ Using Mathematics / Computational Thinking
- ☐ Developing Evidence
- ☐ Constructing Explanations / Solving Problems

Students will reason and evaluate data or other info by . . .

Answer Here or N/A

Answer Here or N/A

Answer Here or N/A

Answer Here or N/A

Answer Here or N/A

☐ Using Models to Predict & Develop Evidence

Answer Here or N/A

Explain / Communicate *includes any of the following:*

☐ Communicating Information

Students will explain and communicate by . . .

☐ Arguing from Evidence (written & oral)

Answer Here or N/A

☐ Using Models to Explain or Communicate

Answer Here or N/A

Act

Students will solve a real-world problem by . . .

☐ Student-Directed Stewardship Project or Civic Action

Answer Here or N/A

Teach

Students will share their findings and reflect by . . .

☐ Presentation of Project to Stakeholders / Reflection

Answer Here or N/A

How this Learning Experience Integrates 3-D Science *The checked elements are integrated in this lesson:*

Science and Engineering Practice

☐ Asking Questions and Defining Problems

Crosscutting Concepts

☐ Developing and Using Models

☐ Patterns

☐ Planning and Carrying Out Investigations

☐ Cause and Effect

☐ Analyzing and Interpreting Data

☐ Scale, Proportion and Quantity

☐ Mathematical and Computational Thinking

☐ Systems and System Models

☐ Constructing Explanations and Designing Solutions

☐ Energy and Matter

☐ Engaging in Argumentation from Evidence

☐ Structure and Function

☐ Obtaining, Evaluating and Communicating Information

☐ Stability and Change

Core Ideas

Physical Science

☐ Matter and Its Interactions

Earth and Space Science

☐ Motion and Stability / Forces and Interactions

☐ Earth's Place in the Universe

☐ Energy

☐ Earth's Systems

☐ Waves and their Applications in Info Transfer

☐ Earth and Human Activity

Life Science

Engineering

☐ Structure and Processes

☐ Engineering Design Process

☐ Ecosystem Interactions, Energy and Dynamics

☐ Links among Engineering, Technology, Science and Society

☐ Heredity, Inheritance and Variations

☐ Biological Evolution, Unity and Diversity

How this Learning Experience integrates STEM: *Character Count: 900*

Students may use tools like measuring wheels and tape measures to map parts of the schoolyard for an application to become certified as a Schoolyard Wildlife Habitat.

What parts of this lesson are suited for Outdoor Learning and why?: *Character Count: 900*

Observations of the schoolyard to identify human impacts on the environment will take place outside.

Is there a project or series of which this Lesson is a part?

Yes - CoOL Schoolyard lesson series

Is another version of this Lesson available?

Choose yes or no.

No

Lesson Name: Character Count: 144

Name:

Date:

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What I Noticed (My observations):

What I Wonder (My questions):

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My Initial Explanation for What Happened and How (or Draw and Label a Diagram on the Back)

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My Research Findings

Source(s)

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My Investigation Findings

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My Revised Explanation for What Happened and How

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