

Learning Objective: Increasing and Decreasing Human Impacts on Earth's Systems

NGSS Standard: (MS-ESS3.C-2) 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.

Objective:

Students will be able to:

1. Identify methods that can help reduce the negative impacts of humans on Earth.
2. Explain how human population has impacted Earth's systems.
3. Understand the significance of Earth's systems on human life.

Time Required: 75 minutes

Materials Needed:

- Teacher computer with internet access
- Projector/Smartboard
- 1 computer/laptop/iPad per student with internet access
- Changing Humans' Impacts on Earth's Systems handout (attached)

Teacher Preparation:

- 1 Create Playlist 1, a 5 minute [playlist](#) in [Legends of Learning](#) with the following game found in the Increasing and Decreasing Human Impacts on Earth's Systems Learning Objective:
 - The Big Picture Hosted by Zedd: Animal Agriculture
- 2 Create Playlist 2, a 20-minute [playlist](#) in [Legends of Learning](#) with the following games found in the Increasing and Decreasing Human Impacts on Earth's Systems Learning Objective (in order):
 - *Ecotown*
 - *Save Our Home*
- 3 Create Playlist 3, a 15-minute [playlist](#) in Legends of Learning with 5 [assessment questions](#) from the Increasing and Decreasing Human Impacts on Earth's Systems Learning Objective
- 4 Make copies of Changing Humans' Impacts on Earth's Systems Worksheet (1 per student)

Engage (10 minutes):

- 1 Have your students [sign in to Legends of Learning and enter your teacher code](#).
- 2 [Launch](#) Playlist 1 to your students.
- 3 After students have finished playing, the teacher will ask, "What thoughts do you have now that you have a brief introduction into our lesson?"
 - SUGGESTED ANSWERS: Humans need to be cognizant of our use of Earth's resources, because overuse and/or pollution has detrimental effects on Earth's systems. We (humans) depend on Earth's systems to survive. Without the Earth's systems functioning correctly, we would not be able to survive.

Explore (20 minutes):

- 1 Have your students [sign in to Legends of Learning and enter your teacher code](#).
- 2 [Launch](#) Playlist 2 to your students.
- 3 As students complete *Ecotown*, students should fill out the Changing Humans' Impacts on Earth's Systems handout.
- 4 Assist students as needed during game play, pause playlist if you need to address content or questions to entire class.

Explain (15 minutes):

- 1 Review answers to Changing Humans' Impacts on Earth's Systems handout.
- 2 Relate student knowledge to the game played at the beginning of class.
 - What actions did you need to click on in order to stop the citizens from continuing? (*Leaving the*

water running when not in use, leaving the lights on when not in use, automobiles with poor exhaust systems)

- What actions did you need to take in order for the town to begin to function more efficiently and produce less pollution? (*Upgrade the plumbing, install solar power panels*)
- What effects did these actions have on the town? (*The forest flourished, and the lake became clean again.*)

Elaborate (15 minutes):

- 1 Show this [short video](#) to students.
- 2 The teacher will ask students the following questions:
 - “Why will one tree make a big difference?” (*One tree can make a big difference because trees are nature’s air filters, and one tree has the potential to produce other trees.*)
 - “Why was an hourglass shown by a shower head with a cross out?” (*Taking showers that are an hour long wastes a large amount of water.*)
 - “In what way does public transportation impact Earth’s systems?” (*Public transportation reduces the amount of exhaust used because less vehicles are being used.*)
 - “What does the statement ‘Don’t gamble on Earth.’ mean?” (*This statement could mean that the care and protection of the Earth’s systems should not be left up to chance. We (humans) should act now in order to ensure Earth’s systems are functioning correctly.*)

Evaluate (15 minutes):

- 1 [Launch](#) Playlist 3 to your students. When they finish the assessment questions, any time left is freeplay.
- 2 [Analyze student results](#) to determine what concepts need to be a focus for reteaching.

Additional Lesson Strategies:

- To use Legends for additional instruction, create a [custom playlist](#) with an [instructional game](#) and pre and post [assessment](#).
- To use Legends for a quick formative assessment, create a 5-question [assessment](#) in a [playlist](#).
- To use Legends for a student-directed experience, create a [targeted freeplay](#) playlist.
- Encourage students to play on their own at home in [Legends of Learning: Awakening](#) for a student-driven experience including avatars, battling, and quests all centered around topics they are covering in class.

Changing Humans' Impacts on Earth's Systems

Name: _____

Directions: While playing the first game in Legends of Learning called *Ecotown*, use what you learn to answer the questions below.

- 1 What are some small changes that humans can make to make a change on Earth's systems?
 - A** Leaving the lights on in an empty room.
 - B** Tossing plastics and glassware into the garbage.
 - C** Turning off the water faucet when you are brushing your teeth.
 - D** None of the above.

- 2 Why are the Earth's resources being affected?
 - A** The higher the human population, the more resources that will be used.
 - B** The higher the human population, the less resources that will be used.
 - C** Both A and B
 - D** None of the above

- 3 Which of the following is the most significant agent of change in Earth's systems?
 - A** Wind
 - B** Fire
 - C** Water
 - D** Humans

- 4 According to the information in the game, why is it beneficial to upgrade old or outdated technology/infrastructure?
 - A** With technological advances, newer technology/infrastructure is more efficient.
 - B** With technological advances, newer technology/infrastructure is less efficient.
 - C** Both A and B
 - D** None of the above

- 5 Which of the following would make to make a positive change on Earth's systems?
 - A** Mining for minerals and releasing sulfuric acid into the groundwater and nearby lakes/streams.
 - B** Electric companies offering financial incentives to households that have solar panels.
 - C** Overfishing in order to adequately address the nation's food shortage.
 - D** Investigating other ways that coal and fossil fuel energies can be utilized.

