

Lesson Plan

Assessment	AFL, questions
Cross-curricular	

Big Ideas

- Ecosystems are in a constant state of change. The changes may be caused by nature or by human intervention.

Learning Goals

- Students learn how humans change ecosystems.
- Students gain an understanding of how human activities impact life forms in ecosystems.
- Students understand that the cumulative effect of human activities can make it impossible to survive for a life form, even if they can adapt to some changes.

Specific Expectations:

- 2.3** use scientific inquiry/research skills to investigate occurrences that affect the balance within the ecosystem (invasive species)
- 2.4** use appropriate science and technology vocabulary.
- 3.1** demonstrate an understanding of an ecosystem as a system of interactions between living organisms and their environment.
- 3.8** describe ways in which human activities and technologies alter balances and interactions in the environment

Description:

This is the **fourth** lesson in a five-lesson unit on ecosystems. The whole unit is based on the concept of playing a board game to learn about the interactions that occur in an ecosystem. Each day the rules of the game change as we focus on a different aspect. This fourth day will focus on the impact of human activities.

Materials/Resources:

Game rules summary (see link)
 Game Pieces, includes board and cards (see link)
 Scissors (one for each student)
 Dice (one per student group)
 Playing pieces (e.g. Lego figures, or any other token you can come up with)

Safety Notes

Introduction

On this fourth day students will focus on the impact of human activities. The game works in two rounds. In the first round, students will play humans who modify the environment. In the second round, students then observe if life forms can survive in this modified ecosystem.

Brief Review

- Yesterday students played a game to illustrate the impact of invasive species.
- Discussion question:
- Why do we have invasive species?
 - In fact, humans who travel and do commerce around the world mostly bring them in.
 - Invasive species hitch rides in ship ballast tanks, are released into the wild through gardens, from aquariums, or pet owners etc.
 - So really the problem of invasive species is connected to the human influence on our environment.

Pre-Game Discussion questions:

- How do humans impact ecosystems? (Endless possibilities... from pollution, construction, habitat reduction, to providing food to animals, managing growth (e.g. in forests), managing wildfires etc.)
- NOT all-human impact is necessarily bad.
- How are life forms affected by these impacts?
 - May decline in population. (e.g. various birds)
 - May become restricted in range. (e.g. larger wild animals, such as wolves)
 - May have INCREASED population. (e.g. deer, as humans eliminate their natural predators)
 - May become extinct.
- Some life forms can adapt to human impacts. Can you think of an example? (E.g. the raccoon, pigeons, bears etc.)

Action

Game Rules and Setup

Today the game will be played in two rounds. In round 1 everyone is a human. Students will travel around the ecosystem and each time they land on a field they can choose an action (a card) to place there that will have an impact on other life forms. In round 2, students will then play a life form trying to survive. If the student lands on a field where a card was previously placed indicating human activity they will have to follow the instructions on the card to see if they can adapt to that change. If they can't adapt they will lose some of their points.

- Students cut out the cards that will be used today. (See Game Pieces link)
- They set up their board. Each player should start in a different quadrant of the board (but otherwise choose their starting position freely).
- Students put 24 cards into the deck (and shuffle!), 10 of which are “no impact” cards. Students shuffle the deck. Time permitting they will play the game again with fewer “no impact” cards to see if this makes survival harder.

- **Round 1: players play humans.**
 - Each player draws 6 cards to play from the deck.
 - Take turn rolling dice and moving. When they land on a field:
 - Choose any card to place beside the field.
 - Students keep playing until they have used up all of their cards. If they land on a field where a card has already been placed, students roll again as two impact cards can't be placed beside the same field.
- **Round 2: Players play life forms.**
 - Life forms start with 10 points. If they can't adapt they lose one or several points.
 - All life forms start from the **same field** and move in the **same direction** (players can freely choose field and direction though)
 - Goal: To make it around the board without reaching zero.
 - Students take turns rolling dice and moving. When they land on a field:
 - Pick up the "human impact" card if one is present. Follow instructions on it.
 - The card stays by the field. So multiple life forms might have to try to adapt to the impact described on the card.
- **Repeat several times with more and more changes by humans.** To see that life forms can adapt to some changes but can't if it's just too much.
 - Number of "no impact" cards is reduced each time students play.
 - For example: Play once with 10 "no impact" cards. Then with 5 and finally with 0.

Consolidation/Extension

Discussion questions:

- Were life forms affected by human activities?
- What kind of activities did you encounter?
- Was it harder when there were fewer "no impact" cards?
 - Life forms can often adapt to a few changes to their ecosystem, but too many changes can lead to them being overwhelmed and dying out.
 - Often our goal therefore isn't to eliminate all human influence but maybe to reduce the number of things impacting the animals.
 - For example: Sea turtles are affected by a number of things, busy beaches where they lay eggs, garbage in the oceans, being hunted for food, etc.
 - By focusing on limiting beach access when the turtles lay their eggs and then protecting the eggs by putting markers up around them, sea turtles may have a much better chance of surviving, even if they still face other threats.
- Tomorrow we will look more at what humans can do to protect life forms.