Keystone Species: Amur Tiger

Grade Level

Grade 5

Objectives

This activity is designed to start your at-home student(s) in recognizing themselves as scientists and in thinking critically about problem-solving. The goal is to teach concepts through discovery and to encourage using scientific thought processes. Feel free to adapt the lesson provided to better suit your students' abilities. Take these ideas, make them your own, and your students will have a greater chance of success.

Materials

Paper, plate, 3-4 straws (can use chopsticks or spoons as an alternative), 30-40 colorful candies like M&Ms or Skittles – mix of 4 colors. For the sake of this activity, we will use red, orange, yellow, and green (can use beads, dried beans, dried pasta, or pennies as an alternative, but will need to be able to color them). This activity is designed for three or four players.

Background Information

Amur Tigers are important for the survival of the ecosystems where they live. As an apex predator, the Amur Tiger keeps populations of prey species in balance which maintains the balance between herbivores and the vegetation that they feed upon. Amur Tigers help the whole ecosystem flourish. Being an apex predator means they are not preyed upon by any other animal. The only other threat that Amur Tigers may face is from humans due to poaching and habitat loss.

Key vocabulary:

- Keystone species – a species on which other species in an ecosystem largely depend, such that if it were removed, the ecosystem would change drastically.
- Predator – an animal that naturally preys on other animals.
- Prey – an animal that is food for another animal.

- Ecosystem – a community of interacting organisms and their physical environment.
- Food web – all of the food chains found within an ecosystem.
    - Producers – make their own food (plants and other vegetation).
    - Primary consumers – mostly herbivores (some omnivores) that consume the producers
    - Secondary consumers – eat primary consumers
    - Tertiary consumers – eat primary and secondary consumers
    - Apex predator – a predator at the top of the food chain that is not preyed upon by any other animal

Procedure

1. Begin this activity by discussing ecosystems, food webs, and keystone species. Ensure your at-home student understands these concepts. Then discuss Amur Tiger ecology – range, habitat, diet, behavior, etc. Explain that they will be playing a game to help identify how important Amur Tigers are to their ecosystem as a keystone species.
2. Place 20 candies (five red, five orange, five yellow, and five green) on a plate and give each player a straw or other utensil.
3. Each color candy represents a different organism in the ecosystem:
    - Red – wolves
    - Orange – deer
    - Yellow – boar
    - Green – vegetation
4. Assign each player a role to play – Amur tiger, wolf, red deer, and wild boar. Each player will be allowed to remove certain colors based on what they eat. Amur Tigers eat red deer (orange), wild boar (yellow) and sometimes wolves (red). Wolves eat red deer (orange), and wild boar (yellow). Red deer eat vegetation (green), and wild boars eat vegetation (green).
    - Note: If there are only two players, each player can play two animal roles. For example – Player 1 is the Tiger and Wolf, and Player 2 is the red deer and wild boar.
5. Begin Game #1 - Explain that the candies represent a healthy, balanced ecosystem full of producers and consumers. Because everything must eat to survive, they will compete with each other for food resources. Players will have 10 seconds to remove as many of their identified food items from the plate using only their straws, or other utensil.
6. At the end of each round, use the sheet below to record how many of each were left in the ecosystem. Once that number is recorded, double the amount that were left to account for "reproduction." For example, if three red, two orange, three yellow, and two green were left after round one, round two would start with six red, four orange, six yellow, and four green. Play a total of five rounds or until all food resources have been removed.
7. After each round, take time to discuss the following:
    - What happened in this round?

- How many food resources are left and what are they?
- What does that mean for the health of the ecosystem?
- What patterns are emerging, if any?

8. Begin Game 2 – in this game, amur tiger (keystone species) will be removed. Assign each player a role, leaving out amur tigers. If an odd number of players, assign one more wolf. Follow the same rules as Game #1. After each round, take time to discuss the talking points listed above.
9. After Game #2 is complete, take time to discuss the following:
    - What was the difference between the first and second game?
    - How do amur tigers effect the ecosystem?
    - Why are keystone species, like amur tigers, important to ecosystems?
    - How can we, as humans, help ecosystems where amur tigers live?

Standards

Ohio Academic Content Standards
Grade 2 Life Science Topic: Interactions within habitats Living things cause changes on Earth

Game #1 – Amur tigers present in the ecosystem

	wolves (red)		red deer (orange)		wild boar (yellow)		vegetation (green)	
	Started with	Ended with	Started with	Ended with	Started with	Ended with	Started with	Ended with
Round #1	5		5		5		5	
Round #2								
Round #3								
Round #4								
Round #5								

Game #2 – Amur tigers absent from the ecosystem

	wolves (red)		red deer (orange)		wild boar (yellow)		vegetation (green)	
	Started with	Ended with	Started with	Ended with	Started with	Ended with	Started with	Ended with
Round #1	5		5		5		5	
Round #2								
Round #3								
Round #4								
Round #5								