

# **The Monarch Butterfly: A Race for Life!**

(This is an adaptation of the Project Wild Game of "Oh Deer!")

## **Objectives**

Students will be able to:

1. identify and describe food, and a safe habitat
2. describe the importance of good habitat for animals;
3. define "limiting factors" and give examples;
4. recognize that some fluctuations in wildlife populations are natural, as ecological systems undergo a constant change; and
5. recognize the impact humans can have on the Monarch's survival

## **Method**

Students become "Monarchs" and components of habitat in a highly involving physical activity.

## **Background**

A variety of factors affects the ability of wildlife to successfully reproduce and to maintain their populations over time. Disease, predator/prey relationships, varying impacts of accidents, environmental pollution, and habitat destruction and degradation are among these factors.

Some naturally caused, as well as culturally induced, limiting factors serve to prevent wildlife populations from reproducing in numbers greater than their habitat can support. An excess of such limiting factors, however, leads to threatening, endangering, and eliminating whole species of animals.

This activity is designed for students to learn that:

- a. good habitat is the key to wildlife survival;
- b. a population will continue to increase in size until some limiting factors are imposed;
- c. limiting factors contribute to fluctuations in wildlife populations;
- d. recognize the human impact on survival of the Monarch; and
- e. nature is never in "balance" but is constantly changing. Wildlife populations are not static. They continuously fluctuate in response to a variety of stimulating and limiting factors. We tend to speak of limiting factors as applying to a single species, although one factor may affect many species. Natural limiting factors, or those modeled after factors in natural systems, tend to maintain populations of species at levels within predictable ranges. This kind of "balance in nature" is not static but is more like a teeter-totter than a balance. Some species fluctuate or cycle annually. Sea gulls, for example, may start with a population of 100 pairs in early spring, grow to a population of 1200 birds by late spring, and decline slowly to a winter population of 100 pairs again. This cycle appears to be almost totally controlled by the habitat components of food, clean water and being safe, which are also limiting factors. Habitat components are the most fundamental and therefore the most critical of limiting factors in most natural settings.

This activity is intended to be a simple but powerful way for students to grasp some basic concepts: that everything in natural systems is interrelated; that populations of organisms are continuously affected by elements of their environment; and that populations of animals do not stay at the same static number year after year in their environment, but rather are continually changing in the process of maintaining dynamic equilibria in natural systems.

The major purpose of this activity is for students to understand the importance of suitable habitat as well as factors that may affect wildlife populations in constantly changing ecosystems.

## **Materials**

area - either indoors or outdoors -  
chalkboard or flip chart; writing materials

## Procedure

1. Begin by telling students that they are about to participate in an activity that emphasizes the most essential things that animals need in order to survive. Review the essential components of a marine habitat with the students: **food, clean water, safe habitat, and space in a suitable arrangement.** This activity emphasizes three of those habitat components - **food, clean water, and a safe living arrangement** - but the students should not forget the importance of the animals having sufficient space in which to live and that all the components have to be in a suitable arrangement or the animals will die.
2. Ask your students to count off in fours. Have all the ones go to one area; all twos, threes and fours go together to another area. Mark two parallel lines on the ground or floor nine to 18 meters apart. Have the ones line up behind one line; the rest of the students line up behind the other line.
3. The ones become "Monarchs". All Monarchs need good habitat in order to survive. Ask the students what the essential components of habitat are again: food, clean water, and being safe, and space in a suitable arrangement. For the purposes of this activity, we will assume that the Monarch have enough space in which to live. We are emphasizing food, clean water, and a safe habitat. The Monarch (the ones) need to find food, clean water, and a safe habitat in order to survive. **SIGNS- When a Monarch is looking for food, it should clamp its hands over its stomach. When it is looking for clean water, it puts its hands over its mouth. When it is looking for a safe habitat, it holds its hands together over its head.** A Monarch can choose to look for any one of its needs during each round or segment of the activity; the Monarch cannot, however, change what it is looking for, e.g., when it sees what is available, during that round. It can change again what it is looking for in the next round, if it survives.
4. The twos, threes, and fours are food, clean water, and a safe habitat. Each student gets to choose at the beginning of each round which component he or she will be during that round. They depict their component by placing their hands in the proper position, i.e. on their stomach for food etc. At the same time the Monarch show what they are searching for; that is, hands on head for a safe habitat, etc.
5. The game starts with all players lined up on their respective lines (Monarchs on one side; habitat components on the other side) - and with their backs to the students on the other line.
6. The teacher begins the first round by asking all of the students to make their signs - each Monarch deciding what it is looking for, each habitat component deciding what it is. Give the students a few moments to get their hands in place - over stomachs, mouths, or over their heads. (As you look at the two lines of students, you will normally see a lot of variety - with some students clean water, some food, some a safe habitat. As the game proceeds, sometimes the students confer with each other and all make the same sign. That's okay, although don't encourage it. For example, all the students in habitat might decide to be water. That could represent a drought year with no available food or clean water).
7. When you can see that the students are ready, count: "One... two... three". At the count of three, each Monarch and each habitat component turn to face the opposite group, continuing to hold their signs clearly.
8. When the Monarchs see the habitat component they need, they are to **WALK** to it. Each Monarch must hold the sign of what it is looking for until getting to the habitat component person with the same sign. Each Monarch that reaches its necessary habitat component takes the "food", "clean water", or "safe habitat" back to the Monarch side of the line. This is to represent the Monarch successfully meeting its needs and reproducing. The student who represented the food, water or shelter then becomes a Monarch, thus increasing the population. Any Monarch that fails to find its food, clean water, or safe habitat dies and becomes part of the habitat. That is, in the next round, the Monarch that died is a habitat component and so is available as food, clean water, or a safe habitat to the Monarchs that are still alive.  
**NOTE:** When more than one Monarch reaches a habitat component, the student who gets there first survives. Habitat components stay in place on their line until a Monarch needs them. If no Monarch needs a particular habitat component during a round, the habitat component just stays where it is in the habitat. The habitat person can, however, change which component it is from round to round.
9. You, as the teacher, keep track of how many Monarchs there are at the beginning of the game. At the end of each round you record the new Monarch population numbers. Continue the game for approximately 10 rounds. Keep the pace brisk, and the students will thoroughly enjoy it.
10. When you want to game to end, identify two students as humans. Have them go around and tag the other players. If they tag the fresh water, they have polluted it. If they tag the safe habitat, they have built on it. If they tag the food, they have destroyed it (could be a particular area that grows milkweed).
11. At the end of the 10 rounds or the end of the game, whichever comes first, gather the students together to discuss the activity. Encourage them to talk about what they experienced and saw. For example, they saw a small number of Monarchs (seven students in a class size of 28) begin by finding more than enough of its habitat needs. The

population of Monarchs expanded over two to three rounds of the game, until the habitat was depleted and there was not sufficient food, clean water, and a safe habitat for all the Monarch. At that point, Monarch which are starved or die from a lack of a safe habitat, return to be part of the habitat. Such things happen in nature also.

- Using a flip chart pad or an available whiteboard, post the data recorded during the game. The number of Monarch at the beginning of the game and at the end of each round represent the number of Monarch in a series of years. That is, the beginning of the game is year one; each round is an additional year.

**Create a line graph to show the fluctuation in the population.** The students will see this visual reminder of what they experienced during the game: The Monarch population fluctuated over a period of years. This is a natural process, as long as the factors that limit the population do not become excessive to the point where the animals cannot successfully reproduce. The wildlife populations will tend to peak and rebuild, peak and rebuild, as long as there is good habitat and sufficient numbers of animals to successfully reproduce. Now discuss the impact that humans have had on the safe habitat and the Monarch population. How did their presence immediately affect the environment and the Monarch population?

### Discussion:

In discussion, ask the students to summarize some of the things they have learned from this activity.

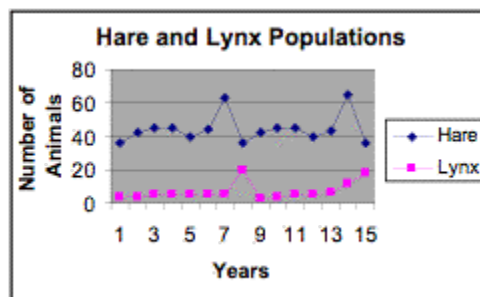
- What do animals need to survive?
- What are some of the "limiting factors" that affected their survival?
- Are wildlife populations static, or do they tend to fluctuate, as part of an overall "balance of nature"?
- Is nature ever really in "balance", or are ecological systems involved in a process of constant change?
- How did the impact of humans rapidly change the game?

### Extensions

- When you have finished tabulating the graph data and discussing it, ask the students if they have ever heard of the west coast fishing issues.
- Relate the following example of a predator-prey relationship on land.

Researchers have found that hare populations seem to peak about every seven to nine years and then crash, repeating the process over each comparable time period.

- It has also been discovered that lynx populations do the same thing - except that their populations peak one year behind the hare populations. The combined graph would look like this. For your class, first graph the hare then the lynx populations. Ask the students:



- Which animal is the predator? Which prey?
- Are predators controlling the prey, or are prey controlling the predators? (We have been brought up to "know" that predators control the prey - and are now discovering that this is not so. The number of prey animals available tells us how many predators can live in the area.)

- How is this like the Monarch habitat game we just played? What controls populations? What happens when the Monarch population is too large? What happens when the habitat is too small or there is not enough food?
- What happens when humans enter the environment?
- Discuss the "balance of nature". Is it ever in "balance"?

### **Evaluation**

1. Name three essential components of habitat. **Fresh water, food, a safe habitat**
2. Define "limiting factors". Give three examples.
3. Examine the graph. What factors may have caused the following population changes:
  - a. between years 1 and 2?
  - b. between years 3 and 4?
  - c. between years 5 and 6?