

# The Game of Life



**Focus:** Threatened and endangered marine species

**Grade Level:** 3-8

**Connection to other Subjects:** English/Language Arts, Physical Education

**Correlation to National Standards:**

*National Science Education Standards (NSES):*

Content Standard: Life Science

K-4: Organisms and environments

5-8: Populations and Ecosystems

Content Standard: Science in Personal and Social Perspectives

K-4: Changes in Environments

5-8: Populations, resources and environments

*American Association for the Advancement of Science (AAAS):*

3-5: The Living Environment – Section D(1,4); Habits of Mind Section E(1)

6-8: The Living Environment Section D(1,2); Human Society Section G(5)

**Focus Question:** What does it mean to be threatened or endangered?

**Learning objectives:** The students should be able to describe what it means for a marine animal or fish to be threatened or endangered.

**Materials:**

Recess balls

Chart paper

Markers

Color-coded cards or stickers

**Teaching Time:** 1 class of 45 minutes

**Key words:**

Population

Interdependence

Threatened and endangered species

**Background:**

The number of threatened and endangered species is growing. The Endangered Species Act of 1973 protects all species, marine or terrestrial, by classifying them as either threatened or endangered. Under the Act, threatened means “any species which is likely to become an endangered species within the foreseeable future throughout all or a



significant portion of its range [habitat].” An endangered classification means “any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man.”

There are a variety of factors causing threatened or endangered marine species. They are primarily the result of human actions within their environment. Historically, this was not always the case, but it has been the trend since the mid-1800s. Several examples of overuse of marine resources since the mid 19<sup>th</sup> century are:

- the activities of the whaling industry
- collection turtle eggs and meat for food
- commercial or recreational ship strikes of animals
- loss of habitat both in and out of the water (e.g. turtle nesting beaches) due to variety of factors
- pollution
- commercial fishing (overfishing)

Commercial fishing includes the catch of species that are not the primary target of fishing operations (bycatch), as well as overfishing target species until the populations have declined to significantly low levels. For further information on this topic, you can visit [www.nmfs.noaa.gov/pr/](http://www.nmfs.noaa.gov/pr/).

### **Introduction:**

Your students have played many games inside and outside of school, whether they are organized sports or impromptu games. During the course of a game, many factors can work to influence the outcome of the game. Before playing the Game of Life with the class brainstorm what factors have affected the games they have played. The class is about to play a game where the goal is to have as many students standing at the end of the game as possible.

### **Lesson:**

**Game of Life:** The goal of this game is to show students what happens to a species when most of the population is gone and how easily the remaining animals can perish.

1. Give out color cards or stickers to students, as follows: 4 red, 6 green, 8 blue and 10 yellow. The proportion of colored cards will vary with class size.
2. Take the class to the gym or outside, if weather permits. The students need to spread out far enough to toss the recess balls to each other with some difficulty and all the colors need to be spread evenly around the space.



3. Have the kids toss around a ball labeled, “Life” for a minute or two. Discuss with the students how easy or hard this is. Explain that when a species has plenty of members their life is easy.

4. Over time, many species of marine animals and fish have been hunted on land or in the water or fished too much. That was the first threat to marine species and initially lowered the population numbers in many places. A big whaling ship from the turn of the century has entered your class waters to hunt. All of the yellow cardholders have to sit down. Next, ask the class how this affects the game of toss (longer distance to throw for some and not others; fewer people to choose from when you toss the ball).

5. Explain that commercial fishermen have nets and lines that are safer for various marine animals than they used to be. However, a fisherman has come through the class’ waters with an illegal, unsafe net and all the blue cardholders have to sit down. The rest of the kids can keep tossing. Now the class is a threatened species. There are still some members of the original team left, but the numbers have declined significantly.

6. Repeat step 4 with the green cardholders explaining that pollution (such as oil from a grounded tanker, plastic grocery bags floating in the water, and chemical runoff from lawns) has entered your waters and the blue cardholders have to sit down.

7. With only the red cardholders left standing and tossing the ball, the class is an endangered species. If anything else causes any students to sit down, few or no members will be left to toss the ball (carry on life). Discuss with the class what could happen to the remaining students? In addition, it is important to discuss the concept that the primary organism affecting the life of the marine species (students) in the game is man. The three events that caused the students sit down are also three of the primary causes for population decline in marine species. They are also the results of man’s activities. Other factors have caused species to become extinct in the past, but now man is exerting the primary influence over the animals and fish in the oceans.

**Closure:** After the game, hold a discussion with the students using the questions below as guidelines. You may want to record the answers in a format for the class to use in the evaluation activity.

- What problems could occur for the remaining marine animals (red cards) that are spread apart?
- What happens if a ship strikes one?
- What if an animal gets sick?
- What if one gets caught in a plastic ring used to group soda?
- What is one animal can’t get to another animal of the same species for a mate?



Each of these events can happen to a marine animal or fish. All of the events cause a decline in the population because the animals or fish will die. An additional problem occurs if a female is involved because, without the ability to produce young, the species will decline further over time and will never be able to recover.

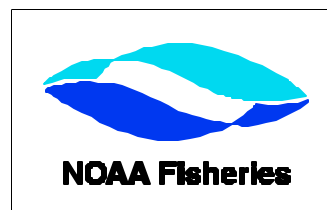
**Evaluation:**

Option 1. Using the class chart, each student composes a letter to an adult about what it means to be endangered.

Option 2. Have students write a short story about a fictional endangered marine species. They can describe the animal and then use the class generated ideas to explain what it means for the species to be endangered.

**Resources:**

For further reading the class can visit the website for the Office of Protected Resources at [www.nmfs.noaa.gov/pr/](http://www.nmfs.noaa.gov/pr/).



Office of Protected Resources  
[www.nmfs.noaa.gov/pr/](http://www.nmfs.noaa.gov/pr/)  
Molly Harrison 2004