



Eutrophication Game

Ecosystem Interactions and Energy

Name: _____

Per: _____

■ Materials

- One six-sided die
- 10 fish cards
- 20 algae cards
- 20 nutrients cards

■ Instructions

1. Align the algae into a circle to form a pond
2. Attach 10 nutrients to your algae circle (one per algae card.) This represents the algae that are healthy and growing within the pond.
3. Place all of you fish inside the circle
4. Roll you die and follow the below commands until one of the two **stop conditions** occur:
 - a. Roll 1 or 2: attach one nutrient to an algae card...represents natural nutrient addition
 - b. Roll 3 or 4: remove one nutrient to represent natural digestion of nutrients
 - c. Roll 5 or 6: attach 2 nutrients and remove a fish...represents unnatural addition of nutrients as well as fish death due to algae entanglement
5. **Stop Conditions:**
 - a. All fish are gone from the pond (dead.) Leads to dysregulation of algae and proliferation of algae growth.
 - b. A complete ring is formed around the fish where each alga has an attached nutrient. Such conditions cause congestion within the pond and more fish deaths due to algae entanglement.

■ **Post Game**

1. Based on the results of the game, what are the effects of nutrients on algae? _____

2. Create a mathematical model to represent the relationship between nutrients, algae and fish in the game.

3. Describe where the excess nutrients may result from. _____

4. Discuss some impacts of eutrophication on ecosystems, and on humans. _____

5. The law of conservation of matter states that matter cannot be created or destroyed, but it can be transformed from one form to another. Thus, matter cycles through the environment and living things. In the space provided below, create a simple model of eutrophication that illustrates the conservation of matter, and as part of a cycle.