

## Part 2: Overfishing Game (adapted from National Agriculture in the Classroom)

1. You will now play a game to simulate an ocean food web (a system of interlocking and interdependent food chains) using the different colored fish tokens you created. The yellow fish eat seaweed of which there is always plenty, the green fish and red fish eat the yellow fish, and the blue fish eat both green fish and red fish.
2. In addition to its place in the food web, each fish also has a dollar value, and the purpose is to earn money. If the fish are caught, each yellow fish will make a profit of \$2, red fish will make a profit of \$5 each, green fish will make a profit of \$5 each, and dark orange fish will make a profit of \$10 each.

TYPE OF FISH	WHAT THEY EAT	DOLLAR VALUE (\$)
Yellow Fish	Seaweed	\$2
Green Fish	Yellow Fish	\$5
Red Fish	Yellow Fish	\$5
Blue Fish	Green and Red Fish	\$10

3. At the start of the activity, put 5 of each color of fish facedown into your ocean—it's best to use a plate for this. (You will have 5 fish of each color that don't go in the ocean right now—we will use these later.) Before you begin playing, record the number of each fish currently in the ocean in the "Start" column of Data Table A. As you play each round of the game, you will record how many fish are in your ocean, as well as how many fish you caught. You can print out this page to record your data or simply create your own data tables on a separate piece of paper. You will play 4 rounds total.

### A. FISH IN THE OCEAN:

FISH	START	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Yellow	5				
Green	5				
Red	5				
Blue	5				

4. Once your ocean is stocked, randomly remove half of the fish from the ocean. If you started with 5 fish of each color, or 20 fish total, that would mean you remove 10 fish. Set these tokens aside. You should not be able to see the colors of each fish as you remove them. If you can, close your eyes while you remove fish from the ocean.
5. Flip over the fish tokens that you removed from your ocean. Count how many fish of each color you caught. Fill in Data Table B for "Year 1" with the number of fish that you caught. For example, if I caught 3 yellow fish, 1 green fish, 4 red fish, and 2 blue fish, my chart would look like:

**B. FISH THAT WERE CAUGHT:**

FISH	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Yellow	3			
Green	1			
Red	4			
Blue	2			

6. Flip over the fish tokens that remain in your ocean. Count how many fish of each color remain. Fill in Data Table A for "Year 1" with the number of fish that remain. For example, if I have 2 yellow fish, 4 green fish, 1 red fish, and 3 blue fish left, my chart will look like:

**FISH IN THE OCEAN:**

FISH	START	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Yellow	5	2			
Green	5	4			
Red	5	1			
Blue	5	3			

7. Add all the fish that survived Year 1 back into your ocean facedown. However, before starting the next round, adjust the number of fish in your ocean to account for reproduction by adding one new fish of each species for each two that remain. Keep in mind that there must be a food source for each species to allow for survival. If no food source remains, remove that species from the ocean entirely. So, based on my last round, I would add 1 yellow fish, 2 green fish, no extra red fish (only 1 remains, so it can't reproduce), and 1 blue fish. When you restock your ocean, make sure to put the fish facedown so you can't see the color.
8. Repeat steps 4 - 7 three more times until there have been four years of fishing. Remember to only remove half of the fish from the ocean each round. How many fish you remove each round will change as fish reproduce or become extinct. Make sure to keep track of your data for each round and save your data in a save spot. Next week, you will use your data to make your own graphs and calculate how much money you made in each year!