liberty science center

Move It or Lose It
Fish Migration Game

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Topic: Introduce different species that depend on specific water conditions for survival. Participants take on the role of a species forced to migrate to stay in its favored water conditions over the course of one year.

Audience: Age 9 and older

Length: 30 minutes

NJ State Standards: 5.3.4.C - Interdependence

Objectives:

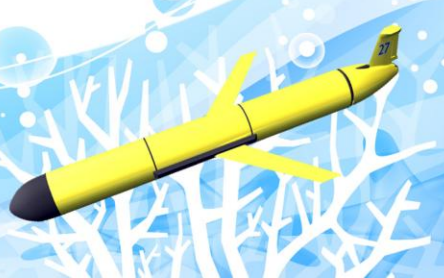
- Compare and contrast how marine and terrestrial animals generally inhabit their environment
- Describe possible reactions to changes in an animals' environment

Introduction:
This activity is intended to help students understand how marine organisms can react to changes in their environment through role-play. While this is by no-means entirely scientifically accurate, it is meant to model the behavior of animals in response to habitat changes.

Background:
Within the open ocean, habitat is often defined by the physical water conditions present, such as temperature and salinity. Species inhabiting the open ocean might have several different responses to changing temperatures. They could go dormant, have a wide range of conditions they live in, or they move with the favorable conditions. Many migrations in the ocean are triggered by changing conditions.

Materials:

- Playing tarp (See ConstructionGuide_Fish_Migration.pdf for instructions to make this.)
- Color print out of fish cards (Fish_Cards.pdf)
- Paper cutter – fish cards are printed 2 per page
- Laminator (optional – to protect fish cards)
- Container of small tokens to use as Energy Points (paper clips, or beads for example)
- Small cups, one per student to hold their supply of Energy Points
- Powerpoint presentation (Fish_Migration_Game.ppt)
- Computer Projector
- Projection Screen
- Small binder clips (have 2 per student available)



Procedure:

I. Preparation

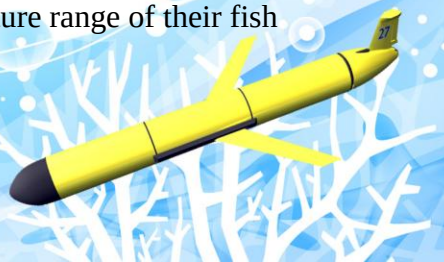
1. Print fish cards, and cut pages in half, so each card is only displaying information about one fish. (If desired, laminate the cards to protect and improve durability).
2. Lay out playing tarp
3. Set-up projector with PowerPoint Presentation in a way that students won't block the projection while on the tarp.
4. Pass out the one Fish Card to each of the players in the game
5. Pass out 6 energy points to each player to start the game

II. Activity

This activity relies on the honesty of players. Students may decide to cheat to "win" by not paying enough for movement, or moving to "safe" squares while unobserved. This needs to be strongly discouraged, "dying" is not a failure, just a lesson learned.

Explain the rules:

1. There will be 12 rounds to this game- one for each month of the year.
2. The students (who are now playing the role of an animal, using information they get from the Fish Cards) will have to make decisions based on the information on their card.
3. The object is for each student to try to 'survive' the year by keeping their animal in the habitat that it likes to live in (information found on the Fish Cards) and to have enough food to keep moving on their migration/movement path.
4. The students have to move around the playing tarp trying to stay within their particular animals' range of habitat requirements.
5. The colored areas on the slides represent different temperatures of ocean water, which will change each turn because they change each month; the salinity of the open ocean is relatively constant, and students will not have to worry about this during game play.
6. The yellow stars are food sources (energy points).
7. Each turn:
    - The facilitator will announce the month that is that turn.
    - A map will appear with the SST for that month (via PowerPoint)
    - The facilitator will then hand out energy points to any animal standing on a food source at the beginning of the turn. (4 points) Note: No food is given at the being of the first month as students have just received 6 energy tokens to start the game.
    - The students must decide if they are going to use energy to move towards their (end) goal location or if they should wait (end location information on Fish Cards).
        - If they decide to move, the students must pay the energy amount to move (1 point per square moved, students may move in any direction, including diagonally).
        - If at any time, the student does not have enough energy to move, they cannot move; they are stuck! Their fish survives as long as whatever changes in water temperature that occurs to that area is within their comfort range.
    - Students can obtain more energy points by standing on a food-rich area at the beginning of the month. (4 points)
    - Those animals that did not survive the month are out of the game and should sit on the side. This means that any student who is outside the temperature range of their fish



species at the end of the month once they've had a chance to move, dies. (Alternate: students who are out of the game could choose an active player's species to track for the rest of the game).
    - Students will receive a binder clip when they reach their mid-point, and another when they reach their finish point.
    - Students do not have to be on their Start/Finish Location at the end of turn 12 if they have both binder clips.
8. If an animal completes their migration without going outside of their comfort range of temperature, they win!

Evaluation:

1. Once the students have finished- either reached their migration goal or didn't succeed, talk about the factors that effected their travels:
    1. What was the hardest part:
        a. Not knowing what the water temperatures would be?
        b. Trying to stay in the range of temperature?
        c. Having enough food to survive?
    2. How do you think real marine organisms decide where and when they are going to migrate?

Safety Precautions:

1. Students must walk at all times during this game.

Extension:

Have students select a species on the tagging of Pacific predators website and observe it's movements within the Pacific basin. Try comparing the movements of those species to ocean conditions at the same time, (view live data). Can students determine what factors influence the migration patterns of these predators?

Resources:

Tagging of Pacific Predators (TOPP): http://www.topp.org/
Near Real Time Data with TOPP: http://las.pfeg.noaa.gov/TOPP_recent/index.html