WHALE FOOD CHAIN GAME

This lesson plan developed by:

Overview:

In this fun, modified version of Jenga, kids will learn about a baleen whale's food chain and the potential impact humans have on that food chain. Even though the ocean seems so vast, small changes in the marine food web can have dramatic consequences.

Materials:

For instructor (needed for demonstration and discussion purposes):

- Set of Jenga blocks (54 total blocks)
- Paint or permanent (green, blue, red and purple),
- Paint brush
- Playing cards
- Informational whale chart
- Black permanent marker

Set-up Prior to Activity:

1. Paint or color the ends of the Jenga blocks and write the name of the organisms on the top or sides as specified below:
    - 21 green blocks (phytoplankton)
    - 18 blue blocks (zooplankton)
    - 12 red blocks (krill and small fish)
    - 3 purple blocks (baleen whales)
2. Print and if possible, laminate the playing cards and the informational whale chart.

Duration:

20-30 minutes

Whale Food Chain Game (cont.)

Physical Activity:
Moderate

Background:
In this activity, students will learn about the relationship between trophic levels of a baleen whale's food chain and the impact humans can have on that food chain. The base of almost all marine food webs is phytoplankton, which are microscopic plants that use sunlight to grow. They are eaten by zooplankton, or animal plankton, which are then eaten by small fish and crustaceans. Baleen whales are filter feeders that feed on small fish and crustaceans, like krill.

The stack of blocks will represent the food chain for baleen whales in the ocean, like humpback whales. The phytoplankton are on the bottom followed by the zooplankton, then small fish and krill with the whales on top. Students will remove or replace blocks depending on what the card reveals. The more negative things that happen in the ocean, the more unstable the food chain becomes. If the balance in the food chain is disturbed too much, the baleen whale's food web could potentially collapse.

Activity:
Part 1: Setting up Whale Food Chain Jenga

1. The blocks will be set up similarly to Jenga, with three blocks placed at the bottom, and then the next three on top of the first layer crossways creating a tower of blocks.
2. The blocks will be placed in the following order: all of the green (phytoplankton) blocks on the bottom, followed by all of the blue (zooplankton) blocks, followed by all of the red (fish and krill) blocks. The three purple (baleen whale) blocks will be placed on top. The tower represents the baleen whales' food chain.
3. Shuffle the playing cards and stack them upside-down.
4. Ask the following engaging questions:
    - If the ocean is so large, why do small changes make a difference?
    - How can something as large as a whale be impacted by changes in the ocean?
5. Explain to the students that this game is a representation of how changes can impact the stability of a whole system.

Part 1: Playing Whale Food Chain Jenga

1. The first player picks a card, reads it aloud and follows the instructions written on the card. Or the educator can be in charge of reading all of the cards to the class. Only the block being removed or returned may be touched. (You are not allowed to hold the rest of the stack together while removing the blocks.)
2. Put the used cards into a discard pile.

Whale Food Chain Game (cont.)

3. Place removed wood blocks into a pile off to the side.
4. Continue to take turns until the tower falls and the food chain collapses or all cards are used up.
5. Reset to play again using the directions above.
6. Extensions of the game: create more cards with different impacts or a different food chain (ex. great white shark).

Discussion:

1. What surprised you in playing this game?
2. What did you discover about human impact on the environment?
3. What questions would you like to investigate further?

Additional Resources:

To learn more about the activity, check out our Whale Food Chain Game "how to" video.

Ocean Literacy Principles:

Ocean literacy is an understanding of the ocean's influence on us, and our impact on the ocean. There are seven Ocean Literacy Essential Principles that all people of our blue planet should have an opportunity to learn and understand. This activity touches upon the following Essential Principles:

5. The ocean supports a great diversity of life and ecosystems
6. The ocean and humans are inextricably interconnected
7. The ocean is largely unexplored

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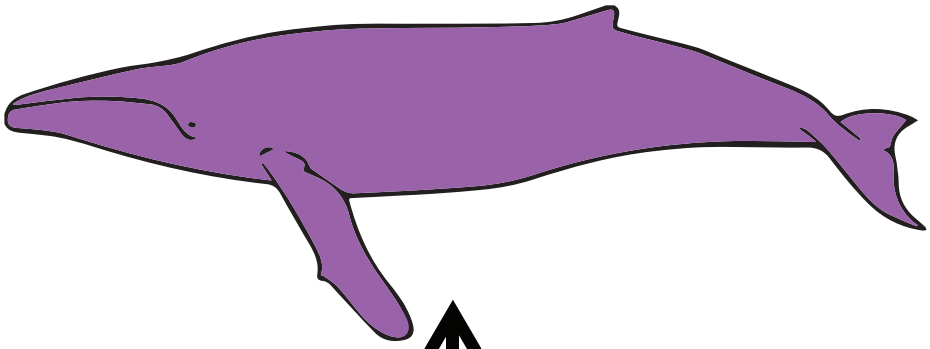
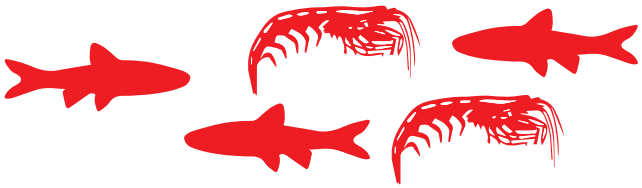
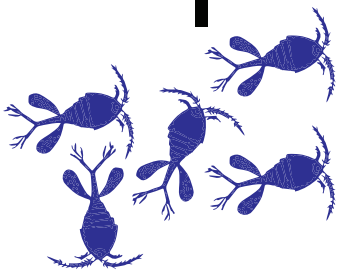
Whale Food Chain Game (cont.)



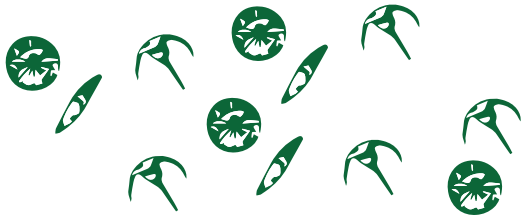
Baleen whale



Krill and small fish



Zooplankton - (mostly) tiny floating animals



Phytoplankton - tiny floating plants

Plastic microbeads enter the water and zooplankton eat them.

Remove 1 blue block.

Harmful phytoplankton blooms creates toxin.

Remove 1 blue and 1 red block.

Overfishing - humans catch too many small fish.

Remove 1 red block.

Changes in ocean currents, disperses phytoplankton.

Remove 2 green blocks.

Increase in atmospheric carbon dioxide (CO_2) leads to increased ocean acidification.

Remove 2 red blocks.

Successful beach clean-up reduces harmful phytoplankton blooms.

Put back 1 blue and 1 red block.

Sunlight reaching ocean increases and phytoplankton grow.

Put back 1 green block.

Pollution through storm drains increased with storms.

Remove 1 green and 1 blue block.

Chemical spill on the island gets washed into the water.

Remove 1 green, 1 blue and 1 red block.

Layer of smog reduces sun reaching ocean.

Remove 1 green block.

Oil spill in harbor.

Remove 1 green, 1 blue and 1 red block.

Increase in ocean temperature leads to smaller phytoplankton, unsuitable as food for zooplankton.

Remove 1 blue and 1 red block.

Humpback whales leave the area.

Put back 1 red block.

Humpback whales remain in area longer than usual.

Remove 1 red block.

Changes in ocean currents decrease upwelling.

Remove 1 blue block.

Ocean temperature becomes too warm.

Remove 1 green, 1 blue and 1 red block.