

# Brine and Dine



## Teacher's Guide

**Topic:** Food Chains

**Grade level:** 6-8

### Aligned Standards

*Next Generation Science Standards (NGSS):*

MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

*NGSS Science and Engineering Practices:*  
Developing and Using Models

*NGSS Disciplinary Core Ideas:*  
LS2.B: Cycle of Matter and Energy Transfer in Ecosystems

*NGSS Crosscutting Concepts:*  
Energy and Matter

*Ocean Literacy Principles:*

Principle #5. The ocean supports a great diversity of life and ecosystems.

d. Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (symbiosis, predator-prey dynamics, and energy transfer) that do not occur on land.

### Program overview

Build a marine food chain that you get to actively participate in! Each group will create a unique food chain using our animals that we will then consolidate into a marine food web.



### Activity at a glance:

Students will learn about how organisms interact through feeding relationships in the ocean.

### Objectives

Students will be able to:

- Describe how life is interdependent, with producers and consumers interacting in food chains
- Explain the difference between a food chain and a food web
- Predict what would happen if one element of a food chain is removed

### Skills

Students will gain expertise in:

- Modeling the flow of energy in an ecosystem through food chains and a food web
- Collaborating with others in a small group to carry out tasks and make decisions

### Program features:

- Observe live magnified projection of zooplankton (brine shrimp) eating phytoplankton (algae)
- Each group receives beaker of zooplankton to feed a different secondary consumer (barnacle, anemone, mussel, or sponge)
- Each group then finds tertiary and quaternary consumers of their organism in the aquarium
- We build a marine food web using each group's food chain

### Extension activities

Use to facilitate further discovery before, during, or after your field trip to Oregon Coast Aquarium.

#### *In the Classroom*

- Have students learn about a real world food chain disruptions
  - Sea otters, sea urchins, and kelp forests
  - Cod, sprat, zooplankton, and phytoplankton; A decreasing cod population in the Baltic Sea has allowed their fish prey, the European sprat, to overprey on zooplankton causing a decrease in their population, which ultimately leads to an increase in phytoplankton. (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2587786/>)
  - Impacts of changes in populations of Antarctic krill and salps in the Southern Ocean
- Have students research the IUCN statuses of the organisms in their food chains. If any are threatened, have them research potential impacts to their food chains.
- Teach students about decomposers by having a classroom compost bin.
  - Compost bins and Red wiggler worms can be purchased here: <https://unclejimswormfarm.com/>
    - Can add mushrooms to the bin, too: <https://www.hobbyfarms.com/grow-mushrooms-on-compost/#:~:text=Layer%20compost%20materials%20with%20spawn,and%20keep%20it%20well%2Dhydrated.>

#### *At Oregon Coast Aquarium*

- If you come across any animal feedings happening, discuss how the involved organisms might fit together in a food chain.
- The word *plankton* means “drifter” and includes many different types of animals that drift along with the ocean currents. We tend to think of plankton as small but any animal that cannot swim against a current can be called plankton. If it’s large, we call it macroplankton. Challenge students to find an example of macroplankton in our exhibits. (**HINT:** Several types of large plankton can be seen in the “Coastal Waters” Gallery – they are slow, often transparent, and known for their stinging tentacles!)

### Background Information on food chains:

#### **Vocabulary:**

**Producer (autotroph)** - An organism that produces its own food using sunlight or chemical energy

**Consumer (heterotroph)** - An organism that eats another organism for food

- Primary consumer – feeds directly on producer
- Secondary consumer – feeds on primary consumer
- Tertiary consumer – feeds on secondary consumer
- Quaternary consumer – feeds on tertiary consumer

## Food Chains

**Food chain** - A series of feeding interactions in which energy is transferred from a producer through a series of consumers

**Food web**- A network of feeding interactions, usually consisting of multiple food chains

**Trophic level** - Each step in a food chain or food web

**Biomass** - The total amount of living tissue within a trophic level

**Decomposers** break down dead organic material and wastes.