Lionfish Food Web Lesson Plan

Age Range: 4th – 9th grade

Time: 15 – 20 minutes

Goal: Provide students background on food webs and the delicate balance between interacting communities. Demonstrate how dynamic food webs can withstand lots of pressure and changes to the ecosystem. Demonstrate how lionfish disrupt even healthy food webs and have the potential to cause a food web to collapse.

Materials: Yarn of a bright color, cards/labels with multiple types of reef species (cut out the rows to make cards of each species), and multiple beach balls/kickballs

Lesson Outline:

- Provide background information on food webs. Describe the difference between ***food chains*** and ***food webs***. Food chains are linear systems of organisms from consumers to producers (i.e. plant -> grasshopper -> bird -> fox). Food webs are complex combinations of food chains where organisms consume or are consumed by multiple other organisms in the food web.
- Describe Trophic levels and how energy and nutrients pass between trophic levels
    - ***Primary Producers*** – plants, algae (seagrass, corals)
    - ***Primary Consumers*** – herbivores (shrimp, wrasses, parrotfish)
    - ***Secondary and Tertiary Consumers*** – omnivores and carnivores (reef fishes)
    - ***Apex Consumers*** – predators (sharks)

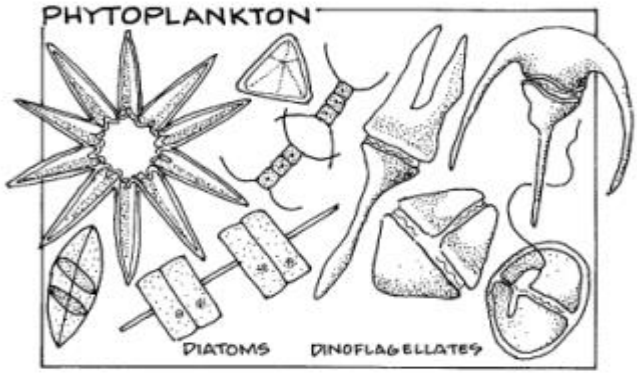
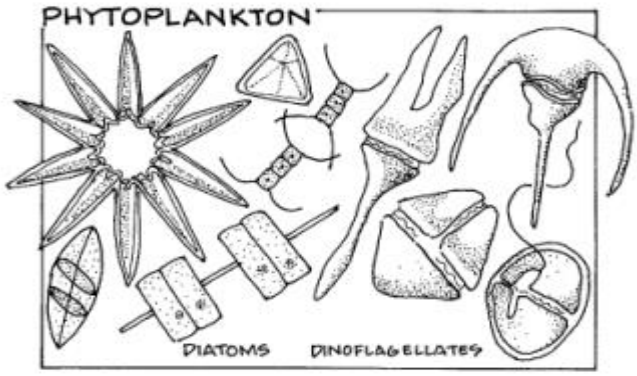
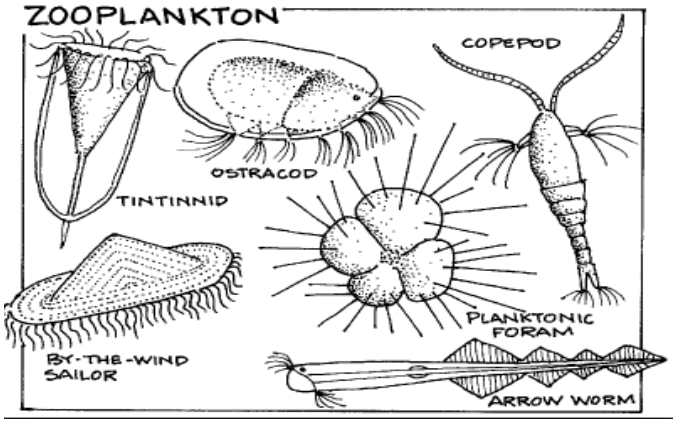
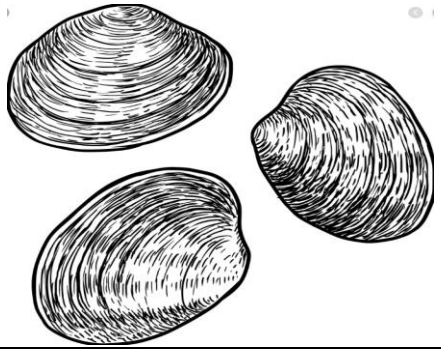
Activity:

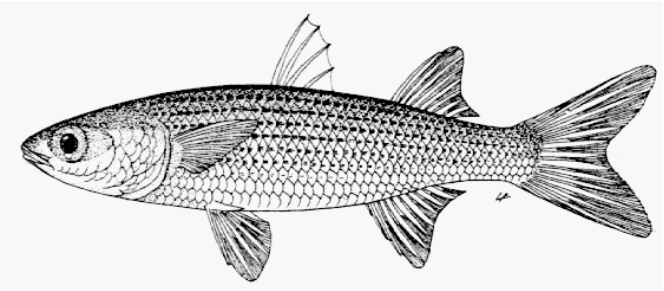
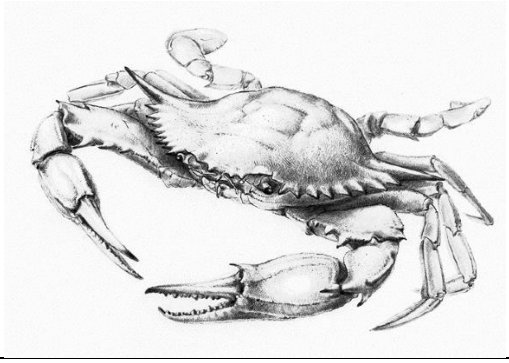
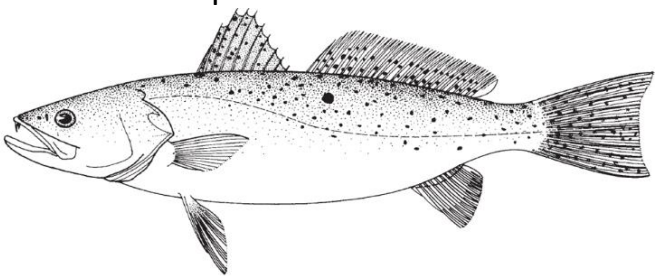
- Use species cards to ask what **trophic level** it is and explain that there are more of the bottom levels to support the higher levels (think of a pyramid).
- Show multiple cards and ask what does each eat to show how some organisms can interact with multiple other species, following chart below:

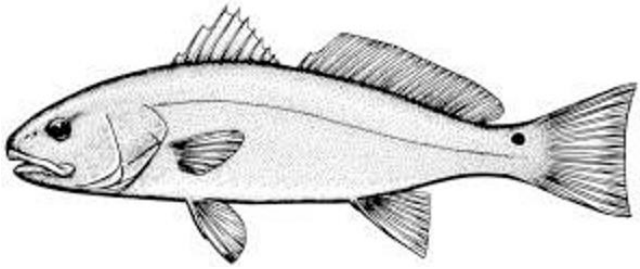
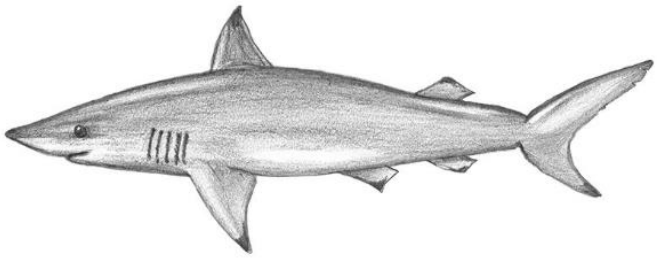
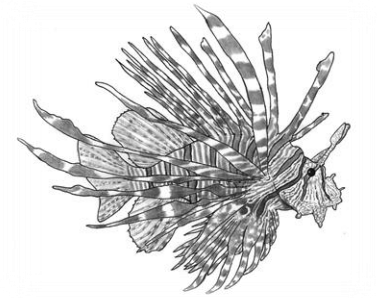
Species	Trophic Level	Eats	Eaten by
Phytoplankton	**Primary Producer**	**Nothing (photosynthesis)**	**Zooplankton, Clams**
Zooplankton	**Primary Consumer**	**Phytoplankton**	**Clams, Mullet, Crab**
Clams	**Primary Consumer**	**Phytoplankton, Zooplankton**	**Crab**
Mullet	**Secondary Consumer**	**Zooplankton**	**Spotted Seatrout, Red Drum**
Crab	**Secondary Consumer**	**Clams, Zooplankton**	**Spotted Seatrout, Red Drum**
Spotted Seatrout	**Tertiary Consumer**	**Crab, Mullet**	**Spinner Shark**
Red Drum	**Tertiary Consumer**	**Crab, Mullet**	**Spinner Shark**
Spinner Shark	**Apex Predator**	**Spotted Seatrout, Red Drum**	**Other sharks**
Lionfish	**Invasive Species**	**Crab, Mullet, Juvenile: Spotted Seatrout, Red Drum**	**No known predators in invaded range**

- Pass out cards to students making sure there is a diversity of species. Have students stand in a circle and show their cards. Run yarn from each species that is preyed on by another species. This should make a pretty thick web around the circle, depending on the number of students. Place beach ball on the web and explain that a healthy food web can support a lot of energy movement (weight/movement of beach ball)
- Now introduce lionfish (picture card). Describe how lionfish are invasive and eat over 160 different species. Since they have no predators, they are unbalanced and only disrupt interactions between other species. Walk around the web and have students drop the yarn between species that are affected by lionfish. As more yarn is dropped, eventually the web falls apart. Explain how this invasive can be destructive to all organisms in the ecosystem, even if lionfish don't eat them.
- Talk about how lionfish came from Indo-Pacific and are an ***invasive***, ***non-native*** species. Encourage students not to release pets but find another home for them.

If there is remaining time, answer questions about lionfish and pass around pictures/models.

	Primary Producer
	Primary Producer
	Primary Consumer
Clams 	Primary Consumer

Mullet 	Secondary Consumer
Crab 	Secondary Consumer
Spotted Seatrout 	Tertiary Consumer

Red Drum 	Tertiary Consumer
Spinner Shark 	Apex Predator
Lionfish 	Invasive Species