

LEARNING WORKSHEETS SEVENTH GRADE



NAME: _____

Our Mission: To foster understanding, wonder, and respect for Hawaii's marine life.
E paipai i ka 'i'ini e ulu ai ka 'ike ku'una Hawai'i e ola mau ka nohona moana.

Interdependent Relationships

A food web (or chain) shows how each living thing gets its food. Some animals eat plants and some animals eat other animals. For example, a simple food chain links plants, cows (that eat plants), and humans (that eat cows). Each link in this chain is food for the next link. A food chain always starts with plant life and ends with an animal.

Plants are called producers (they are also autotrophs) because they are able to use light energy from the sun to produce food (sugar) from carbon dioxide and water. Animals cannot make their own food so they must eat plants and/or other animals. They are called consumers (they are also heterotrophs). There are three groups of consumers.

- Animals that eat only plants are called herbivores.
- Animals that eat other animals are called carnivores.
- Animals and people who eat both animals and plants are called omnivores.

Decomposers (bacteria and fungi) feed on decaying matter. These decomposers speed up the decaying process that releases minerals back into the food chain for absorption by plants as nutrients.

Do you know why there are more herbivores than carnivores?

In a food chain, energy is passed from one link to another. When a herbivore eats, only a fraction of the energy (that it gets from the plant food) becomes new body mass; the rest of the energy is lost as waste or used up (by the herbivore as it moves). Likewise, when a carnivore eats another animal, only a portion of the energy from the animal food is stored in its tissues. In other words, organisms along a food chain pass on much less energy (in the form of body mass) than they receive.



Food Webs

Draw a food web using the following organisms:

- Sea Lettuce (limu) - green alga
- Sea Hare (kualakai) - feeds on algae
- Cauliflower coral (ko'a) - a hard coral with zooxanthellae
- Orange cup coral - hard coral without zooxanthellae
- Tiger sharks - feeds on fish and other animals
- Yellowfin tuna (ahi) - eats fish, squid and crustaceans
- Achilles tang (paku'iku'i) - eats green algae
- Spiny lobster - crustacean, scavenger, eats anything!
- Humans - eats a varied diet of fish, meat and vegetables
- Phytoplankton - microscopic green algae
- Zooplankton - feeds on phytoplankton



Create A Food Web

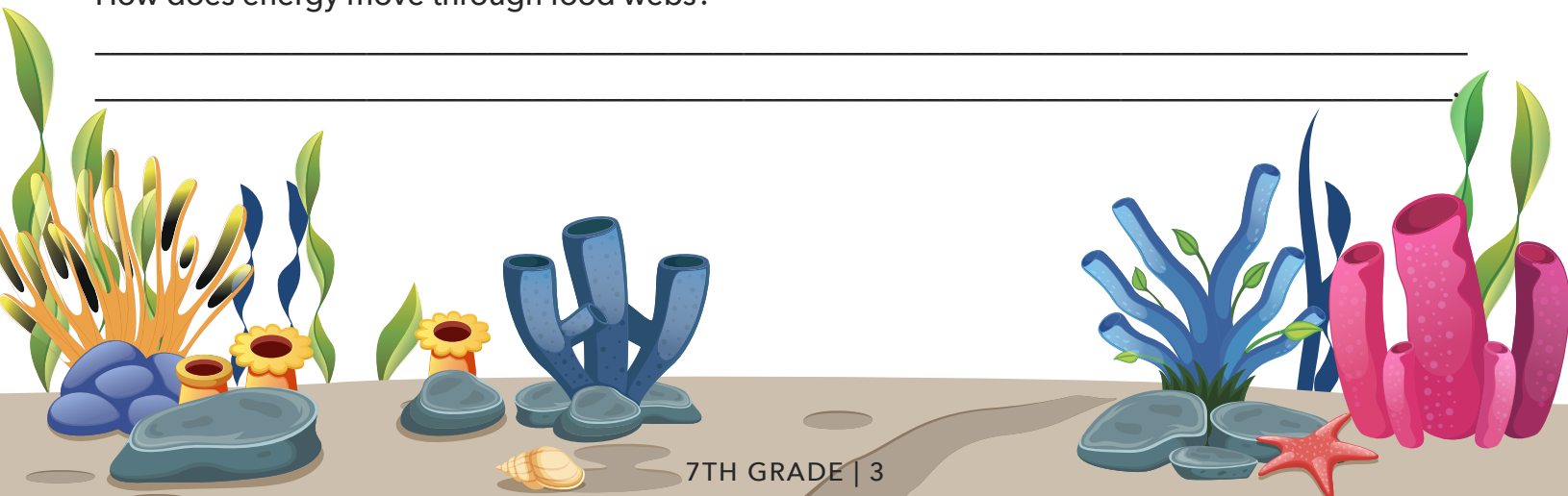
Create a marine food web. Be sure to begin each food web with a Producer (plant) and end each food web with a Decomposer (such as shrimp, crabs, or marine bacteria). Each food web should have at least four levels.

Label the Producers (P), Consumers (C), and Decomposers (D) in your food chain.
Why do all food webs begin with a plant?

What is the role of Consumers in a food web?

Why are Decomposers so important in a food web?

How does energy move through food webs?



Interdependence

We just examined food chains and how animals depend on each other to gain nutrients and energy. Keep in mind how animals interact with and depend on other organisms for their own survival.

Visit our Open Ocean Exhibit and observe some of the apex predators, like the sharks. Explain the importance of a predator in a biological community.

Give an example of two animals you observed at the Maui Ocean Center that have benefited from each other? What were they doing to help each other survive?

Why does a parasite depend on other animals?



Symbiotic Relationships & Energy Transfer

Coral reefs play an important role in Hawaii's marine ecosystem. A diverse number of organisms rely on coral reefs for food as well as shelter. Symbiotic relationships are observed in many marine organisms. Figure 2. illustrates the relationship between coral organisms and zooxanthellae algae. Explore our Living Reef building and answer the following questions about energy transfer between these two organisms.

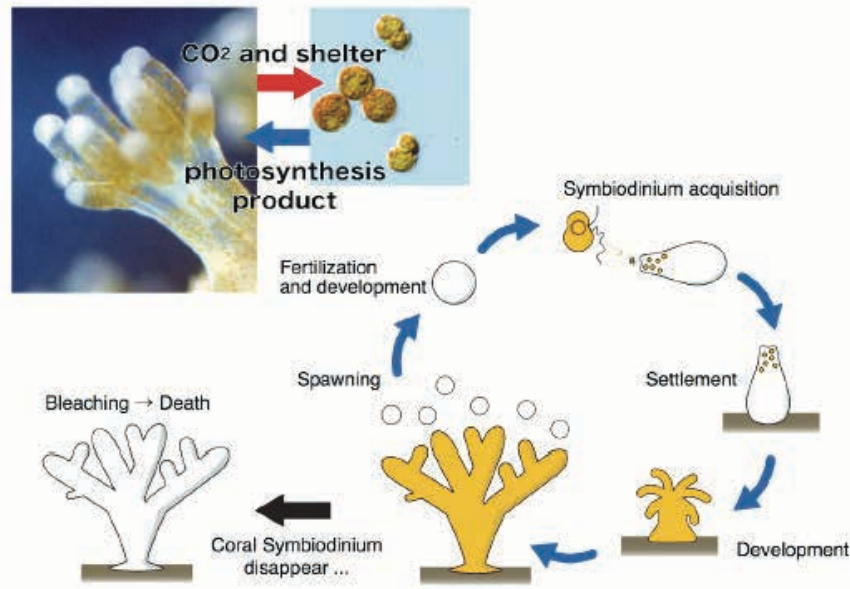


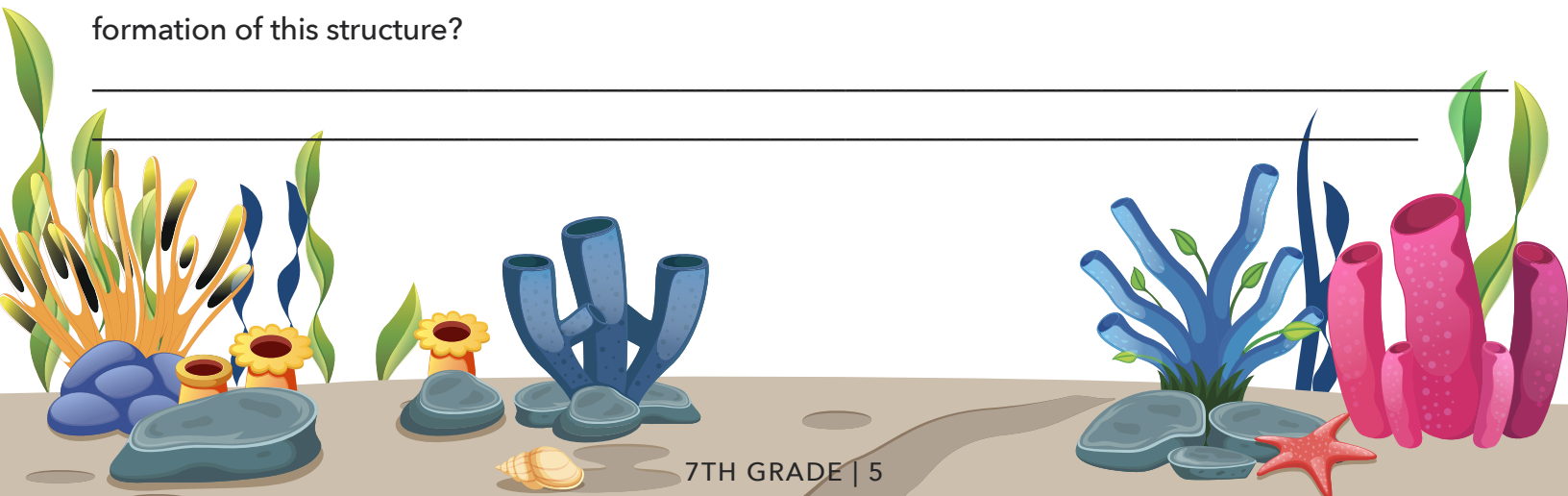
Figure 2. A symbiotic relationship between corals and Symbiodinium

1. Describe how each organism benefits from this symbiotic relationship between coral and the algae?

2. What source of energy does the symbiotic algae use to produce the food and oxygen for the polyp?

3. Roughly what % of food does the zooxanthellae provide to coral? _____

4. Coral secretes a hard skeleton made out of limestone or calcium carbonate. What contributes to the formation of this structure?



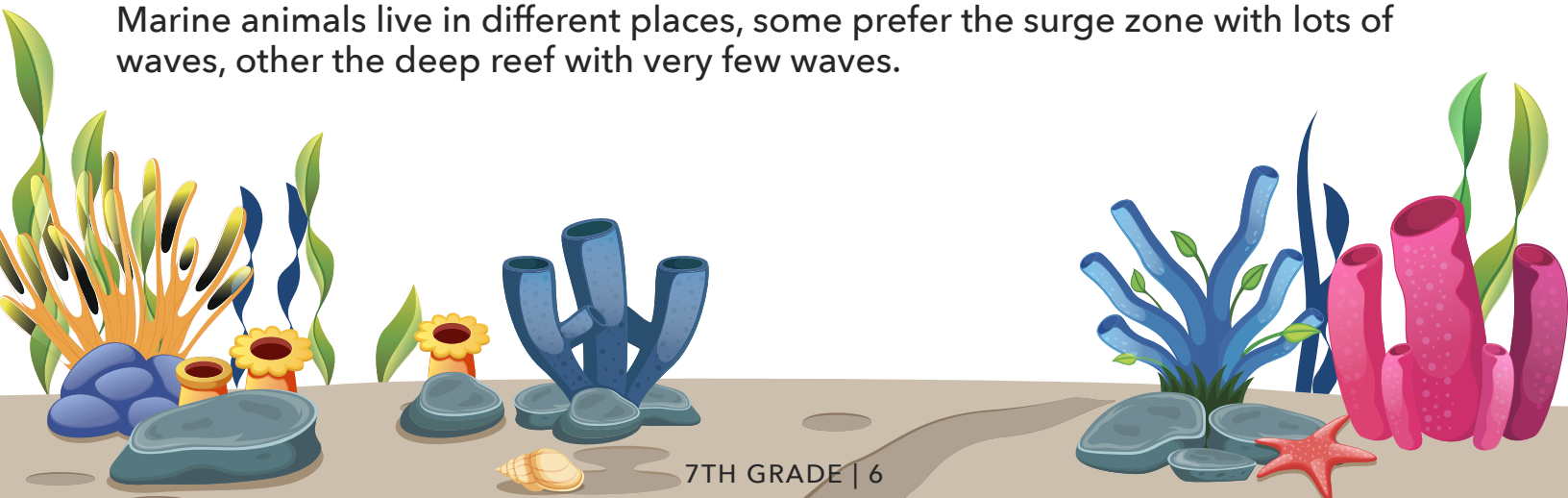
Coral Reef Dwellers

Find two animals living in different sections of The Living Reef, Surge Zone and Deep Reef.
Draw these animals and write where you're likely to see them and why.

Animal #1:

Animal #2:

Marine animals live in different places, some prefer the surge zone with lots of waves, other the deep reef with very few waves.



Fish Adaptations

BACKGROUND

The tropical oceans of the world are home to fish, mammals, and birds as well as a myriad of invertebrates. Many beautiful and fragile animals have adapted to the warm waters of coral reefs. Because the reefs offer natural protection to many of the fish, many interesting adaptations have taken place. The result is some of the most bizarre and beautiful creatures found in the sea.

ADAPTATIONS

Why do you think the Frogfish looks the way it does? Adaptations appear over time because certain shapes and colors create camouflage which protect an organism from its predators. Looking like a piece of sponge or coral can help the Frogfish avoid being another animal's lunch!

ACTIVITY

Each student will choose one fish from any exhibit. They will write down its name, observe the animal in its environment for at least 15 minutes and record their observations on the worksheet. They will take their information and compile it in a short report.

ASSESSMENT

Completed reports will give specific details about the behavior and characteristics of the individual fish and how it survives in its environment.

RESOURCES

On the next two pages you will find some common adaptations in fish and how they use these adaptations to survive in their environment.

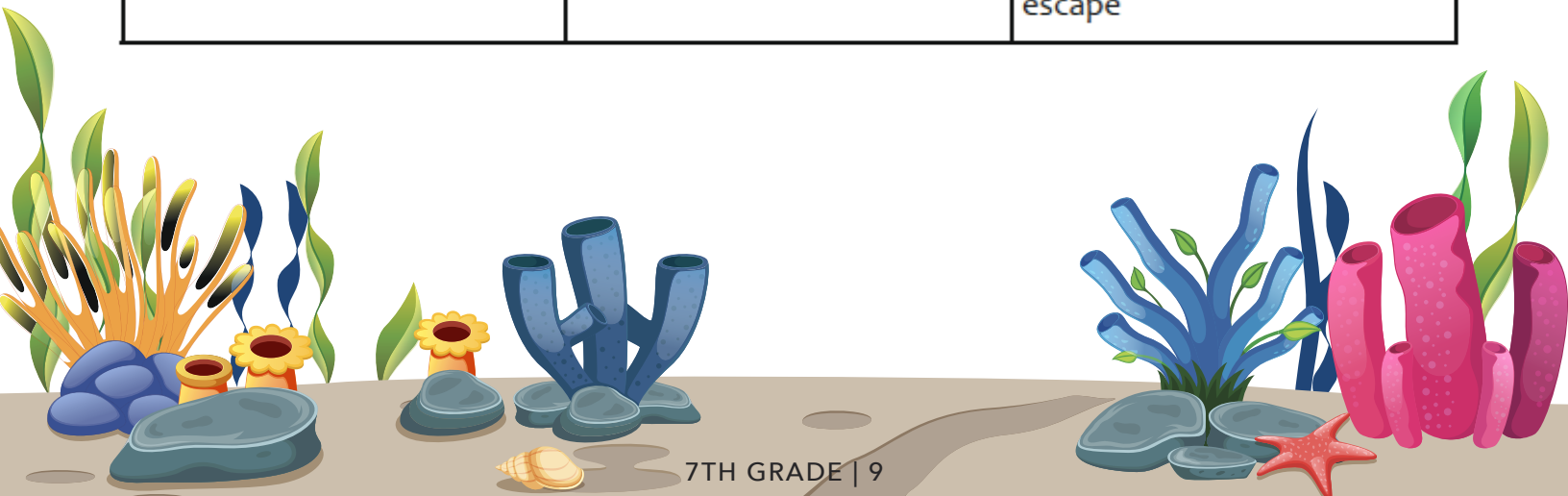


Adaptations in Fish

Body Parts	Adaptation	Purpose
Mouth	At the end of the snout, symmetrical	Open water feeder
	Angled downward/longer upper jaw	Feeds on prey below it, bottom feeder
	Angled upward/longer lower jaw	Feeds on prey about it, surface feeder
	Strong jaws– teeth	Preys on other fish
	Sucker– shaped	Eats small plants and animals
	Barbells	Feeds off bottom, senses food in murky water
	Duckbill jaws	Grasps its prey
	No teeth	Eats plankton
	Very large mouth	Surrounds prey
Fins	Large, forked caudal fin	Strong, fast swimmer
	Spines on fins	Protection, more difficult to swallow, can be poisonous
	Large pelvic fins	Bottom dweller
	Small pelvic fins	Open water swimmer
Body Shape	Round	Difficult to swallow, slow swimmer
	Flat bottomed	Feeds on the bottom
	Long, eel-like	Hides in rocks and weeds
	Torpedo shaped	High speed swimmer
	Flat from side to side	Almost invisible from the front of rear, feeds above and below
	Flat from top to bottom	Hides on the bottom
	Hump backed	Stable in fast moving water

Adaptations in Fish

Body Parts	Adaptation	Purpose
Eyes	Both on the same side of the head	Lies flat on the bottom of the ocean
	Small	Shallow water fish
	Large	Usually deep water fish
Scales	Large	Uses its scales for protection
	Small	Fast swimmer
Coloration	No markings	Swims in the open water
	Stripes	Hides in seaweeds and grasses
	Mottled	Hides in rocks or on the bottom
	Countershading- dark on top, light on bottom	Less visible to predators above and below
	Stripe through eye	Helps to camouflage fish by hiding
	False eye spot	Predator will attack tail giving fish a greater chance to escape



Adaptations in Fish



Follow A Fish

Sketch your animal. Be sure to include unusual markings.

Common Name: _____

Hawaiian Name: _____

APPEARANCE:

What does it look like?

Color: _____

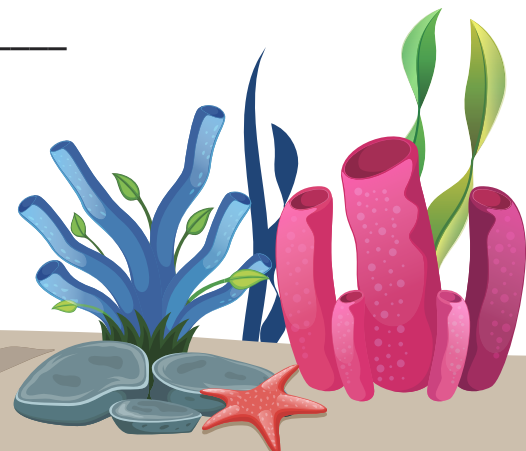
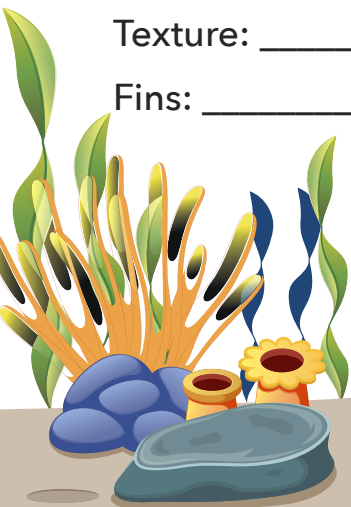
Body Shape: _____

Markings: _____

Size: _____

Texture: _____

Fins: _____



Adaptations in Fish

Follow A Fish

Behavior- How does your fish behave?

Swimming pattern:

Does your fish have any defense mechanisms? _____

Does it travel alone or with others? _____

Where in the tank does it go? _____

Notes: _____

Conclusion: _____

How do this fish's characteristics enable it to live in its environment?

