



Everblue Education

Tropical Reef Communities

Our communities are made up of our homes, neighbors, friends, and favorite places. Communities in the Caribbean sea are made up of fishes, corals, and seaweed! In this lesson, students will cut out and color their own at-home reef community and then learn about different species interactions by creating their own story. This lesson builds students' foundational skills of reading, math, and investigations while also teaching students about ecosystem science.

Everblue is a 501(c)(3) nonprofit dedicated to encouraging ocean-conscious living by increasing scientific literacy. Our online education resources connect current science to daily life, allowing you to learn about the ocean at your fingertips! Stay in touch by following @oceaneverblue on your preferred social media platform or by visiting our website at www.oceaneverblue.org.

To help us keep the ocean ever blue, please share this program with the teachers and parents you know so we can spread ocean science far and wide. Partnering with marine scientists from around the world who study all parts of the ocean, we've created simple and engaging activities based on recently published papers! These activities connect you and your students to current research while fulfilling education standards for reading, math, science, and writing. Even though the activities are created for grade school, they're fun and informative for parents and siblings, as well! More activities will be available to download for FREE off of our website, with a new activity added every Friday until the end of quarantine.

Research Paper:

Fish assemblages on fringing reefs in the southern Caribbean: Biodiversity, biomass and feeding types. *Jahson B. Alemu I., 2014.*

Grade Level:

Elementary School, Grades 1-3

Timing:

40 -70 minutes

Materials:

Scissors, coloring implements, and playful curiosity

Common Core State Standards

<p style="text-align: center; color: #4F81BD;">English Language Arts:</p> <p style="text-align: center;">Craft and structure Integration of knowledge and ideas Key ideas and details</p>	<p style="text-align: center; color: #4F81BD;">Math:</p> <p style="text-align: center;">Operations & algebraic thinking Analyzing and interpreting data</p>
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Next Generation Science Standards

<p style="text-align: center; color: #4F81BD;">Science & Engineering Practices:</p> <p style="text-align: center;">Develop and use a model Planning and carrying out investigations</p>	<p style="text-align: center; color: #4F81BD;">Crosscutting Concepts:</p> <p style="text-align: center;">Cause and effect Patterns</p>	<p style="text-align: center; color: #4F81BD;">Disciplinary Core Ideas:</p> <p style="text-align: center;">Biodiversity and humans Interdependent relationships in ecosystems</p>
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Activity Overview

Title of Activity	Learning Cycle Stage	Time
Creating a Reef Community	Invitation, Exploration	10 - 15 minutes
Meeting the Reef Community	Exploration, Concept Invention	5-10 minutes
Exploring the Reef Community	Concept Invention, Application	10 - 20 minutes
Humans in the Reef Community	Application	10 - 20 minutes
Reflection	Reflection	5 minutes

Appendix Contents

<p>Appendix I Instructor Support</p>	<p>Appendix II Attached Lesson Materials</p>
<p>Content Knowledge and Vocabulary Common Relevant Misconceptions</p>	<p>Fishes, Corals, & Seaweed Pictures Sorting boxes</p>



Tropical Reef Communities Activity

Creating a Reef Community

1. **Cut out the reef fishes, seaweed, and corals.** As students are cutting out the illustrations, read to them the provided information about each species.
2. **Color the fishes, seaweed, and corals.** Begin to ask questions pertaining to the species information, having students recall information they learned while cutting out the illustrations and assigning information to each different species.
3. **Create a reef community.** Have students arrange the species on a table, the floor, or other flat surface to create their own reef! Help the students to arrange the species so that the corals and seaweed are on the “seafloor” (the side of the table closest to the students) and the fishes are in the “ocean” (anywhere above the corals and seaweed.)

Meeting the Reef Community

1. **Learn the difference between plants and animals.** In this activity, instructors will read the following information to their students while they play with their colored at-home reef community.
 - a. Plants make their own food, while animals have to get their food to eat from other sources.
 - b. In this storytelling lesson, our seaweeds are classified as plant-like, and our corals and our fishes are classified as animals.
 - c. The fishes in this lesson eat seaweeds, munch on corals, and eat other fish, so they are classified as animals. Have the students sort all of their colored fishes onto the paper box labeled “animals.”
 - d. The corals in this lesson eat very small plants and animals, called plankton, that float in the water around the corals, so they are classified as animals. Have the students sort all of their colored corals onto the paper box labeled “animals.”
 - e. The seaweeds in this lesson use sunlight to make their own food like plants. Have the students sort all of their colored seaweeds onto the paper box labeled “plants.”

2. Learn the difference between vertebrate and invertebrate animals.

- a. In this storytelling lesson, our fishes are classified as vertebrates and our corals are classified as invertebrates.
- b. Vertebrates are animals that have a spinal cord or backbone. Invertebrates are animals that do not have a spinal cord or backbone.
- c. The fishes in this lesson have a backbone, and are vertebrates just like humans. You can demonstrate this to students by having them point out their own backbone. Then, have the students sort all of their fishes onto the paper box labeled “vertebrates.”
- d. The corals in this lesson do not have a backbone. Have the students sort their corals onto the paper box labeled “invertebrates.” Another type of animal that is related to our corals is the sea anemone. This comparison may help your students visualize the many tiny animals that live together to form each coral structure. Try asking your student how many tiny coral animals live on each coral picture as they are coloring.

3. Learn the difference between swimmers and settlers.

- a. Some plants and animals in our reef are able to move around, and some stay in the same spot for their entire lives once they land on a hard surface.
 - i. Settled organisms live on the seafloor, and often are permanently attached once they grow, much like plants. Swimming animals live in the open ocean, and can swim or float.
- b. In this storytelling lesson, our seaweeds and corals will stay in the same spot once your student decides where they will live, and our fishes will be able to swim around.
- c. The seaweeds in this lesson attach to the seafloor using a holdfast, much like the roots of a plant. Since they will stay where they are placed, have the students sort all of their seaweeds onto the paper box labeled “settlers.”
- d. The fishes in this lesson can swim freely in the water, and can travel to, from, and around the reef community, so they are classified as swimmers. Have the students sort all of their fishes onto the paper box labeled “swimmers.”
- e. The corals in this lesson settle onto the seafloor as babies and grow, unable to move as they get older, so they are classified as settlers. Have the students sort all of their corals onto the paper box labeled “settlers.”

Exploring the Reef Community

This portion of the lesson is a choose-your-own adventure! Have your student sort their corals into a pile and their seaweed into a pile. Sort the three different reef fish into separate piles. Read the prompts by each number to the students and have them choose either option a or option b. Based on their choice, lead them to the next numbered prompt. This way, students will learn how each member of the reef supports and affects the health of the ecosystem.

1. Welcome to the reef! Right now it doesn't look like very much, just an empty ocean floor. Let's change that. Place your corals along the ocean floor (the side of the table closest to the student). Remember that corals stay in one place their entire adult life, so your corals will stay where you put them for the rest of this story. Who do you want to add to your reef community next?
 - a. I want to add some seaweed. Go to #2.
 - b. I want to add some fish. Go to #3.
2. Place some seaweed patches on and around your corals. Who do you want to add to your reef community next?
 - a. I want to add some fish. Go to #3.
 - b. Wait! I want to add more corals first. After you do so, go to #3.
3. There are many types of fishes that live in reef communities, and our story will include three of them. Damselfish are the smallest in this lesson. They have tails that look like the symbol < and eat seaweed. Parrotfish are the medium sized fish. They have tails that look like the letter C and eat by cleaning the corals. Groupers are our largest fish. They have flat tails and eat the other fishes. Since we don't have any fish to feed the groupers yet, let's add one of the other two fishes. Who do you want to add to your reef community next?
 - a. I want to add a parrotfish. Go to #4.
 - b. I want to add a damselfish. Go to #5.
4. Place a parrotfish in the water above your corals and seaweed. Who do you want to add to your reef community next?
 - a. I want to add a damselfish. Go to #5.
 - b. I want to add a grouper. Go to #6.
5. Place a damselfish in the water above your corals and seaweed. Who do you want to add to your reef community next?
 - a. I want to add a parrotfish. Go to #4.
 - b. I want to add a grouper. Go to #6.

6. Place a grouper in the water above your corals and seaweed. Now, you have a thriving reef community... but your grouper gets hungry, and eats a damselfish! Take away a damselfish from your reef. Who do you want to add to your reef community next?
 - a. I want to add a damselfish. Go to #7.
 - b. I want to add a parrotfish. Go to #8.
7. Place a damselfish in the water above your corals and seaweed. Since damselfish eat seaweed, take away a seaweed patch from your reef. Who do you want to add to your reef community next?
 - a. I want to add a parrotfish. Go to #8.
 - b. I want to add a grouper. Go to #9.
8. Place a parrotfish in the water above your corals and seaweed. Since parrotfish clean the corals, take away one seaweed patch from your reef if you have more seaweed patches than corals. Who do you want to add to your reef community next?
 - a. I want to add a grouper. Go to #9.
 - b. I want to add some seaweed. Go to #10.
9. Place a grouper in the water above your corals and seaweed. A grouper ate a parrotfish! Take away a parrotfish from your reef, and add a patch of seaweed. Who do you want to add to your reef community next?
 - a. I want to add a parrotfish. Go to #11.
 - b. I want to add a damselfish. Go to #12
10. Place a seaweed patch on or around your corals. Now, let's give your reef a check-up. Count how many seaweed patches and how many corals you have in your reef community. Are there more seaweed patches than corals?
 - a. Yes, there is more seaweed than coral. Go to #15.
 - b. No. Go to #13.
11. Place a parrotfish in the water above your corals and seaweed. Since parrotfish clean the corals, take away one seaweed patch from your reef if you have more seaweed patches than corals. Who do you want to add to your reef community next? (After you make this decision 3 times, you can go to #19 if you want to.)
 - a. I want to add a damselfish. Go to #12.
 - b. I want to add some seaweed. Go to #10.
12. Place a damselfish in the water above your corals and seaweed. Since damselfish eat seaweed, take away a seaweed patch from your reef. Now, let's give your reef a check-up. Count how many seaweed patches and how many damselfish you have in your reef community. Are there more damselfish than seaweed patches?
 - a. Yes, there are more damselfish than seaweed patches. Go to #16.
 - b. No. Go to #14.

13. Let's give your reef a check-up. Count how many seaweed patches, how many corals, and how many parrotfish you have in your reef community. Is the sum of seaweed patches and corals bigger or smaller than the number of parrotfish in your reef community?
 - a. This number is bigger than the number of parrotfish. Go to #11.
 - b. This number is smaller than the number of parrotfish. Go to #17.
14. Snack time for the grouper! Take away either one damselfish or one parrotfish from your reef, and add a patch of seaweed. Now, let's give your reef a check-up. Add together the number of damselfish and parrotfish and count how many groupers you have in your reef community. Are there more groupers than the sum of damselfish and parrotfish?
 - a. Yes, there are more groupers than the other two fish combined. Go to #18.
 - b. No. Go to #12.
15. Oh no! There is too much seaweed and the corals are unhealthy. How do you want to help the corals?
 - a. I want to add a damselfish to eat some seaweed. Go to #12
 - b. I want the grouper to eat a fish. Go to #14.
16. Oh no! There is not enough seaweed to feed your damselfish. What do you want to happen to your reef?
 - a. I want the grouper to eat a fish. Go to #14.
 - b. I want to add some seaweed to feed the damselfish. Go to #10.
17. Oh no! There are too many parrotfish and they eat some of the coral. Take away a coral from your reef community. What do you want to happen to your reef?
 - a. I want the grouper to eat a fish. Go to #14
 - b. I want to add some seaweed to feed the parrotfish. Go to #10.
18. Oh no! There is not enough food for the groupers. How do you want to help these fish?
 - a. I want to add a damselfish to feed the grouper. Go to #12
 - b. I want to add a parrotfish to feed the grouper. Go to #11
19. Congratulations! Your reef is healthy and is made up of many different valuable community members. Do you want to go swimming and explore it yourself, or keep observing how the reef community works together?
 - a. I want to go explore it myself! Leave your reef community as it is and move on to our next activity, "Humans in the Reef Community".
 - b. I want to keep observing how the reef community works together. Go to #7.

Humans in the Reef Community

This portion of the lesson is a choose-your-own adventure! Read the prompts by each number to the students and have them choose either option a or option b. Based on their choice, lead them to the next numbered prompt. This way, students will learn how human choices might affect a reef community!

1. Welcome to the reef! You live on an island in the Caribbean that is surrounded by coral reefs just like the at-home reef in front of you. In this reef, the seaweed grows quickly and the coral grows slowly, but the fishes eat the seaweed so it doesn't take over the reef! As someone living on the island, you have the option to swim out to the reef and explore. The water looks calm today, but the weather is hot! Do you want to swim out?
 - a. Yes! Go to #3.
 - b. No thank you, I'll wait for a day that isn't so hot. Go to #2.
2. You spend a day relaxing on the sandy beaches, then get a good night's sleep. The next morning, you wake up to calm seas and a warm day. Would you like to explore the reef?
 - a. Yes, I'll go today! Go to #3.
 - b. No, I'd rather go fishing. Go to #4.
3. Time to explore! You grab your snorkel, mask, and fins and wade into the crystal clear water. After putting on your mask and snorkel, you stick your head under the water and see so many colorful fishes swimming around you! Which fish is your favorite?
 - a. I like the colorful damselfish! Go to #5.
 - b. I like the bright parrotfish! Go to #6.
 - c. I like the striped grouper! Go to #7.
4. You grab your fishing rod, your bait, and your tiny boat, and row out over the reef. You throw a line into the water and wait! But this is a lot of waiting... what would you like to do?
 - a. I'm patient, so I'll wait for the fish! Go to #8.
 - b. It's too hot, and I don't want to wait, so I think I'll go back to the beach. Go to #1.
5. You love the colorful damselfish, and wonder how fun it would be to keep one as a pet. Do you want to try to take one home?
 - a. Yes! Take one damselfish out of your reef, and go to #10.
 - b. No, I just want to follow them around the reef. Go to #17.
6. You love the bright parrotfish, and wonder how fun it would be to keep one as a pet. Do you want to try to take one home?
 - a. Yes! Take one parrotfish out of your reef, and go to #11.
 - b. No, I just want to follow them around the reef. Go to #18.

7. You love the striped grouper, and wonder how fun it would be to keep one as a pet. Do you want to try to take one home?
 - a. Yes! Take one grouper out of your reef, and go to #12.
 - b. No, I just want to follow them around the reef. Go to #19.
8. A while later, you feel a tug on your fishing line. You've got something! You reel it in, and see that it's a parrotfish! What do you want to do?
 - a. I want to bring it home to feed my family! Take one parrotfish out of your reef community, and go to #13.
 - b. I want to catch and release, and put it back in the reef. Go to #9.
9. You take the parrotfish off of your fishing line, and put it back into the water. What do you want to do now?
 - a. I want to keep fishing. Go to #8.
 - b. I want to put my fishing gear away and get into the water. Go to #3.
10. You make a safe home for your damselfish in a large tank of saltwater with lots of seaweed to feed it. But the next time you go back to the reef, you realize that without the damselfish to eat the seaweed, the corals have all been overgrown by seaweed! Take one coral away from your reef, and add two seaweeds. What do you do now?
 - a. I want to try to pick all of the seaweed to give the corals a place to grow. Take one seaweed away, and go to #14.
 - b. I want to return my damselfish back to its reef home. Place a damselfish back in your coral reef, and go to #16.
11. You make a safe home for your parrotfish in a large tank of saltwater with some coral rubble and seaweed to feed it. But the next time you go back to the reef, you realize that without the parrotfish, the groupers have gone hungry, and moved to another reef where there are more fishes for them to eat! Remove all the groupers from your reef. What do you do now?
 - a. I want to try and find the groupers! Go to #15.
 - b. I want to return my parrotfish back to its reef home. Place a parrotfish back in your coral reef, and go to #24.
12. You make a safe home for your grouper in a large tank of saltwater with some of small fish to feed it. But the next time you go back to the reef, you realize that without the grouper, the parrotfish have gone wild and eaten all of the coral! Remove all the coral from your reef. What do you do now?
 - a. I want to try and fish some of the parrotfish off of the reef! Go to #8.
 - b. I want to return my grouper back to its reef home. Place a grouper back in your coral reef, and go to #25.

13. Your parrotfish dinner keeps your brothers and sisters happy and healthy. But, the next time you go back to the reef, you realize that without the parrotfish, the groupers have gone hungry, and moved to another reef where there are more fishes for them to eat! Remove all the groupers from your reef. What do you do now?
 - a. I want to try and find the groupers! Go to #15.
 - b. I want to return my parrotfish back to its reef home. Place a parrotfish back in your coral reef, and go to #24.
14. After long hard hours of seaweed picking, you realize that you just aren't going to be able to remove enough of it to make room for the corals. Would you like to try returning your damselfish to its reef home?
 - a. Yes! Go to #16.
 - b. No, I want to keep my new pet. Go to #27.
15. You hop in your boat and cruise around the other reefs in the area, but you can't seem to find your reef's groupers. The sun is beginning to set, and you need to get home before dark. But, you still need food for groupers on your reef! Would you like to try returning your parrotfish to its reef home?
 - a. Yes! Go to #24.
 - b. No, I want to keep my new pet. Go to #27.
16. You swim out to the reef to bring your damselfish back to its home. Weeks later, you return to the reef and see that all the corals are happy - the damselfish is eating the seaweed, so they don't get overgrown! What would you like to do now?
 - a. I'd like to explore more. Go to #3.
 - b. I'm happy swimming around the reef! Go to #26.
17. You easily follow the colorful damselfish, happily floating along in the water. You start noticing more and more colors, and small animals that you don't have names for moving around in the sand. You see a flash of color behind some coral, and find that there are even more of this fish! A moment later, a bright parrotfish comes around the corner, cleaning the coral structures beneath you. Which fish do you want to follow?
 - a. I want to follow the parrotfish. Go to #25.
 - b. I want to swim around the coral to watch the school of damselfish. Go to #20.
18. You float and watch the bright parrotfish munch on the corals and seaweed beneath you. You find yourself smiling at the way that the bright fish nibbles seaweed and corals as it slowly swims around in the reef, snacking as it swims. A striped grouper swims into view. Do you want to continue watching the parrotfish snack and clean the reef, or observe this large grouper?
 - a. I want to watch the grouper. Go to #19.
 - b. I want to stay with the parrotfish. Go to #21.

19. You follow the striped grouper, swimming together slowly around the corals in your reef and watch as it opens and closes its large mouth. As you watch this movement, you also notice that some corals sway with the movement of the ocean, and some do not. A small, colorful damselfish peaks around one of the corals. What do you want to do now?
 - a. I want to follow the damselfish. Go to #17.
 - b. I want to stay with the grouper. Go to #22.
20. You try to count how many damselfish are behind the coral, and lose track after fifteen, knowing there are more. The way that all of the fish swim together at the same time, swimming left, swimming right, and curving around a rounded piece of coral slows your breathing and you feel very relaxed. A big, striped grouper near you looks like it is breathing slowly as well because of it slowly opening and closing its mouth. Where do you want to go next?
 - a. I want to follow the grouper. Go to #19.
 - b. I want to take a snack break and drink some water. Go to #23.
21. You continue watching the parrotfish nibble the corals and seaweed beneath you. Looking closer, you see that the parrotfish mouth looks like a beak, flat and hard. Perfect for scraping corals! As you think about how the name parrotfish now makes more sense, a damselfish swims by. What do you want to do?
 - a. I want to follow the damselfish. Go to #17.
 - b. I want to take a snack break and drink some water. Go to #23.
22. You continue swimming with the striped grouper, noticing the stripes and dots on its back, and how it can move its entire tail or make small movements. You bring your hand in front of you and mimic this by moving your whole hand with your wrist and moving individual fingers at a time. You look up from your hand and the grouper is gone! You look for the big fish, but cannot see it. You do see a parrotfish, though. What do you want to do?
 - a. I want to follow the parrotfish. Go to #18.
 - b. I want to take a snack break and drink some water. Go to #23.
23. You take a final look around the reef in front of you, taking in the beautiful colors and feel happy and grateful for your time in the water. You get out of the water, go eat a snack, and drink some water. Now that you are rested, what do you want to do?
 - a. I'd like to explore more. Go to #3.
 - b. I think I'm done exploring today, but I have learned so much! Go to #26.
24. You swim out to the reef to bring your parrotfish back to its home. Weeks later, you return to the reef and see that the groupers have returned - with the parrotfish back, they have their food source! What would you like to do now?
 - a. I'd like to explore more. Go to #3.
 - b. I'm happy swimming around the reef! Go to #26.

25. You swim out to the reef to bring your grouper back to its home. Weeks later, you return to the reef and see that all the corals are happy - now that the parrotfish are kept in check by the groupers, the corals won't be overeaten! What would you like to do now?
 - a. I'd like to explore more. Go to #3.
 - b. I'm happy swimming around the reef! Go to #26.
26. With all three fishes present in the reef community, the corals, the seaweed, and the fishes are happy! Everyone has enough food and has its fellow reef friends to keep the reef balanced. But, you realize that there are lots of other people on your island. How do you want to keep the reef balanced?
 - a. I want to protect a small piece of the reef! Go to #28.
 - b. I want to share what I've learned with everyone else on the island! Go to #29.
27. Oh no! Your reef is not healthy because the three fishes of your reef community are not balanced. This is not the end, though! You can work with your island community to help your reef become healthy again. How do you want to help the reef become balanced again?
 - a. I want to protect a small piece of the reef! Go to #28.
 - b. I want to share what I've learned with everyone else on the island! Go to #29.
28. Working with your family and your neighbors, you decide to protect a small piece of the reef. This means that the reef is open for swimming and exploring, but closed to fishing. Closing a small piece of the reef to fishing also means that the fishing will be better in other parts of the ocean, because the parrotfish, damselfish, and groupers have a safe place to live on your reef.
 - a. Congratulations! You've protected a small piece of your reef to keep it healthy and happy. Say "sea you soon" to your reef, and move on to a reflection for the next activity!
29. You spend the next week going around your neighborhood and telling everyone what you learned about the reef and its special community of fishes, corals, and seaweed! Sharing what you've learned helps your friends and family to join you in taking good care of your reef.
 - a. Congratulations! You've helped your community learn how to take care of your reef to keep it healthy and happy. Say "sea you soon" to your reef, and move on to a reflection for the next activity!

Reflection

As you and your student are cleaning up, talk to your student about what you just did together. Here are some guiding questions to help shape your conversation.

- What was your favorite part of our activity today?
- What is something that you learned about reef communities?
- Did you notice any patterns during our activity today?
- What is something you wonder about reef communities?
- What surprised you the most during our activity today?



Appendix I - Instructor Support

Content Knowledge

Interested in ocean vocabulary?

- Algae - Simple organisms that make their own food and do not have roots, stems, or leaves. Algae are protists (see below).
- Ecosystem - A community of living organisms interacting with the each other and their non-living environment
- Holdfast - Root-like structures that anchor seaweeds to the seafloor
- Invertebrate - Any animal that does not have a backbone, including corals, crabs, jellyfish, and insects
- Plankton - A general term that describes any organism that floats with the current
- Plant - An organism that uses sunlight and oxygen to make food through photosynthesis.
- Polyp - The small, soft, living portion of coral. Each polyp has a ring of tentacles to capture food from the water. Each of the coral structures in this lesson would be made up of hundreds of thousands of coral polyps.
- Protist - A single-celled organism. This is the most accurate classification for our seaweeds in this lesson. Seaweeds make their own food but are more simple than plants.
- Sessile - This word describes plants or animals that stay in one place, like the corals and seaweeds in this lesson.
- Vertebrate - Any animal that has a backbone, including fish, birds, and mammals (and you!)

How do corals eat?

Corals eat small plants and animals, called plankton, that float by in the water where they live, but that's not their only source of food. Corals allow special protists, called zooxanthellae, to safely live in their tissue and in return, these protists give the coral some of the food that they make from the sun. (This is known as a "symbiotic" relationship, where both species benefit.) So, corals gain energy through the zooxanthellae's photosynthesis, but they also eat with their polyps.

Why are seaweeds "plant-like"?

Plants are photosynthetic organisms in the kingdom Plantae (other kingdoms include Animalia and Fungi). Seaweeds are photosynthetic but have a different ancestry (they are not classified in the plant kingdom). However, seaweeds function in the ocean as plants do on land.

How does protecting a reef help local fishermen?

Scientists who study Marine Protected Areas often refer to "spillover," a phenomenon where marine protected areas allow populations of overfished species to recover. The healthy population can then "spill over" outside the boundaries of protection, boosting fish stocks. This phenomenon is being studied all over the world to assess how we can better manage our fisheries, so we can continue to support fishermen and a healthy ocean. Follow @oceaneverblue for all our summaries on up-to-date research!

Common Relevant Misconceptions

Grammatical difference between "fishes" and "fish"

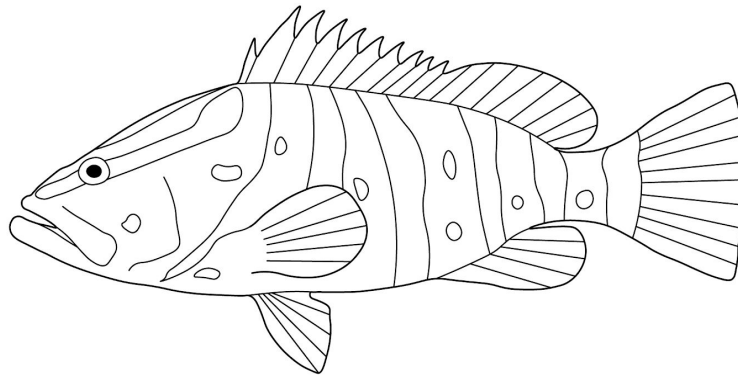
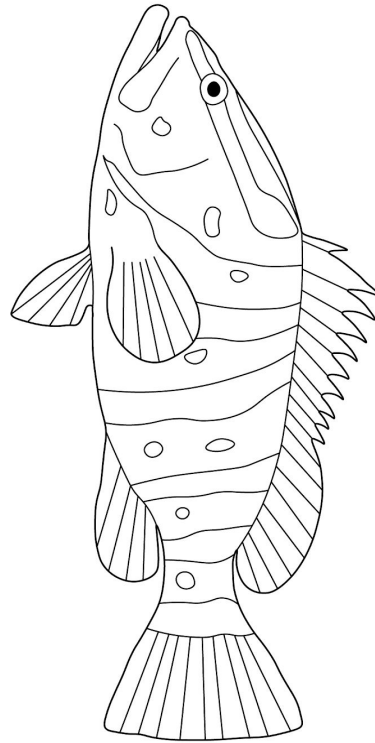
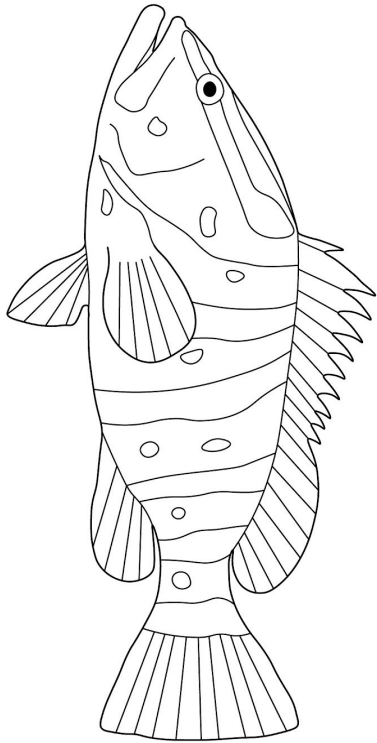
- *Fishes*: Used to describe multiple different species of fish.
 - For example, when referring to the groupers, parrotfish, and damselfish in our lesson, we say "the reef fishes."
- *Fish*: Used to describe one species of fish.
 - For example, when referring to a large group of damselfish, we say "the colorful fish."

Appendix II - Attached Lesson Materials

Fishes

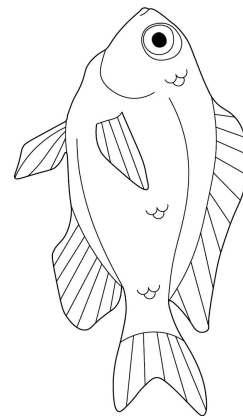
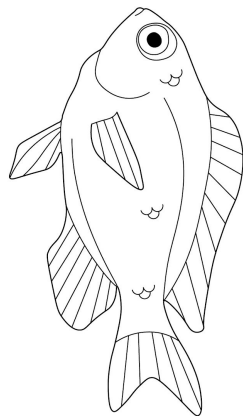
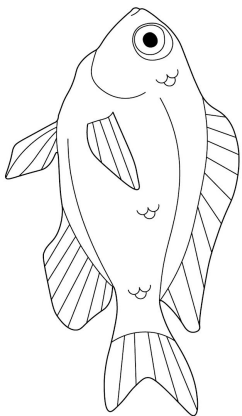
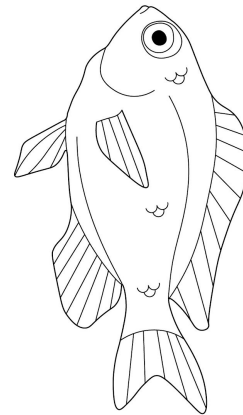
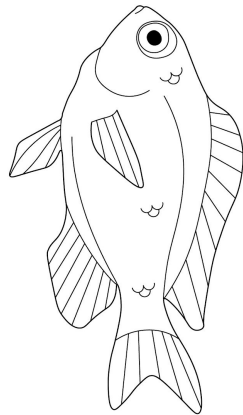
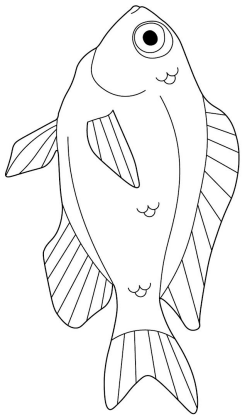
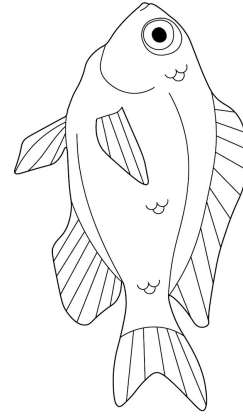
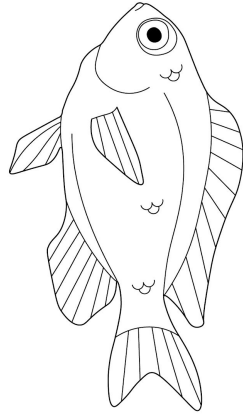
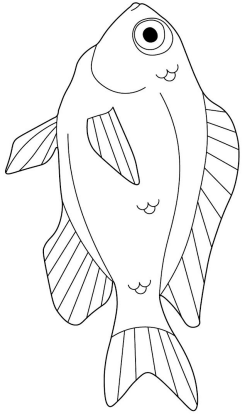
Groupers - *Epinephelus striatus*

- These groupers are usually one to two feet long, but can grow as long as four feet!
- Groupers eat other fish by opening their large mouths and swallowing their food whole.
- Groupers can change color based on their mood.



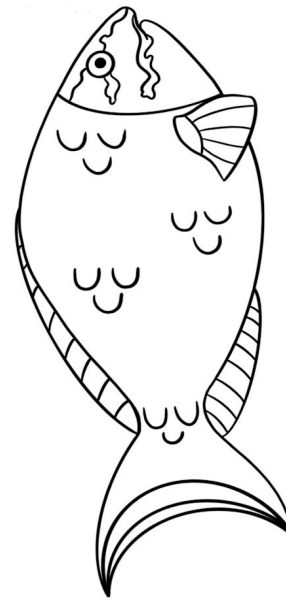
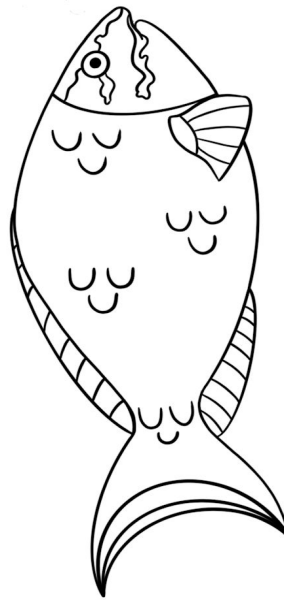
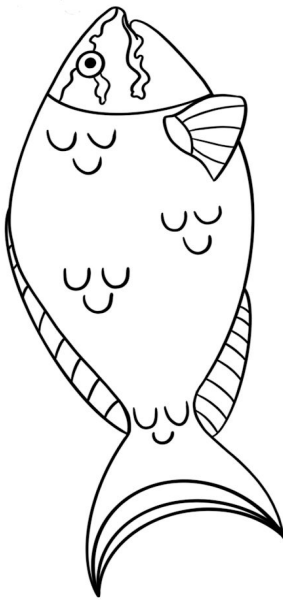
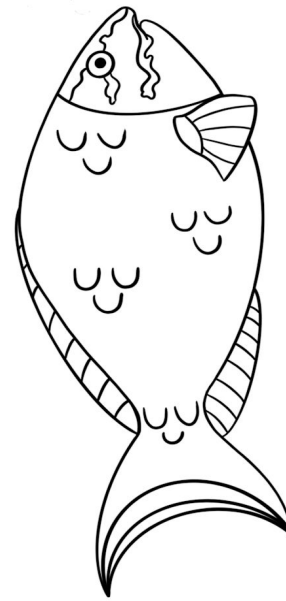
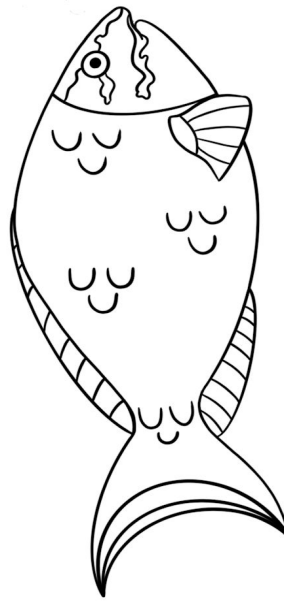
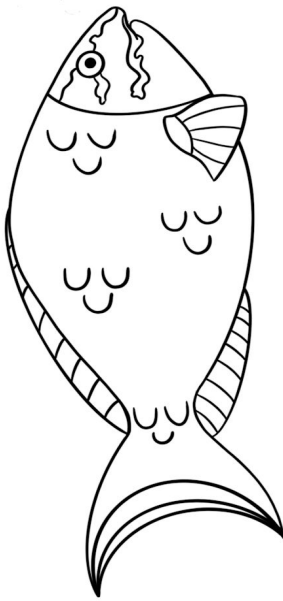
Damselfish - *Stegastes partitus*

- The damselfish in our lesson are typically about four inches long.
- This type of reef fish eats the seaweed that grows on and around the corals.
- Damselfish often live in groups, called schools of twenty fish!

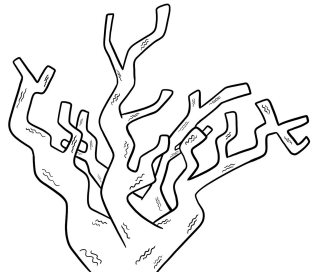


Parrotfish - *Sparisoma viride*

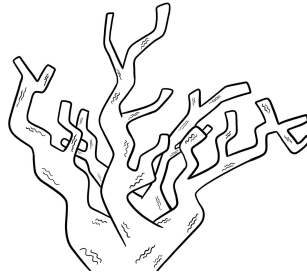
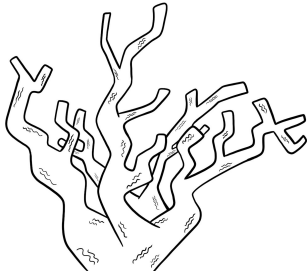
- The parrotfish in our lesson can grow up to two feet long.
- Parrotfish have hard teeth that are all connected, or fused, to eat corals and seaweeds. This big tooth looks like a parrot's hard beak, which is where the fish get their name!
- These reef fish help keep the corals clean and healthy!



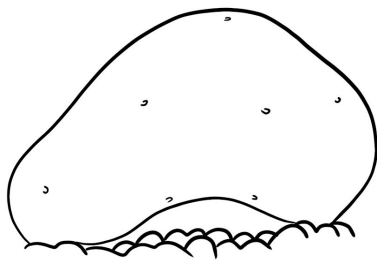
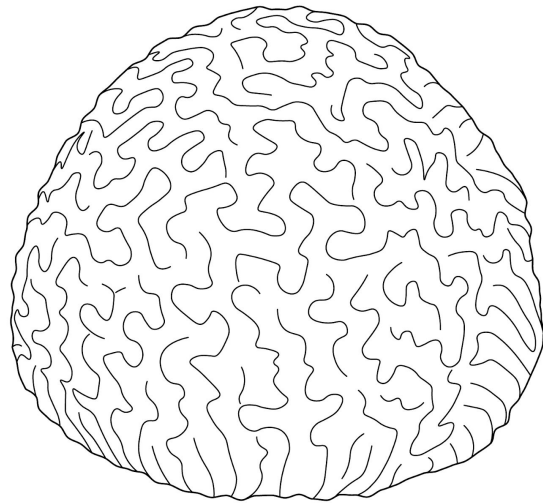
Corals



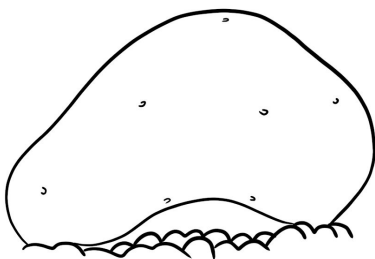
Elkhorn Coral
Acropora palmata



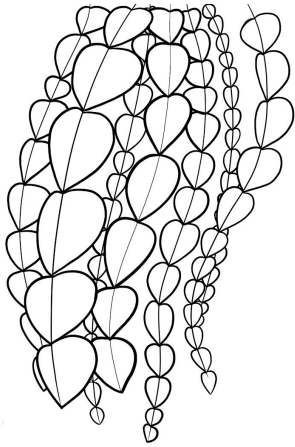
Brain Coral
Pseudodiploria strigosa



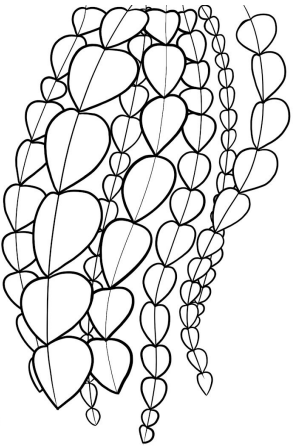
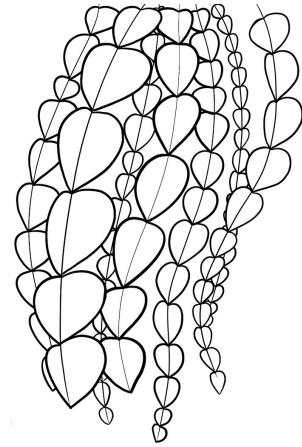
Massive Starlet Coral
Siderastrea siderea



Seaweed



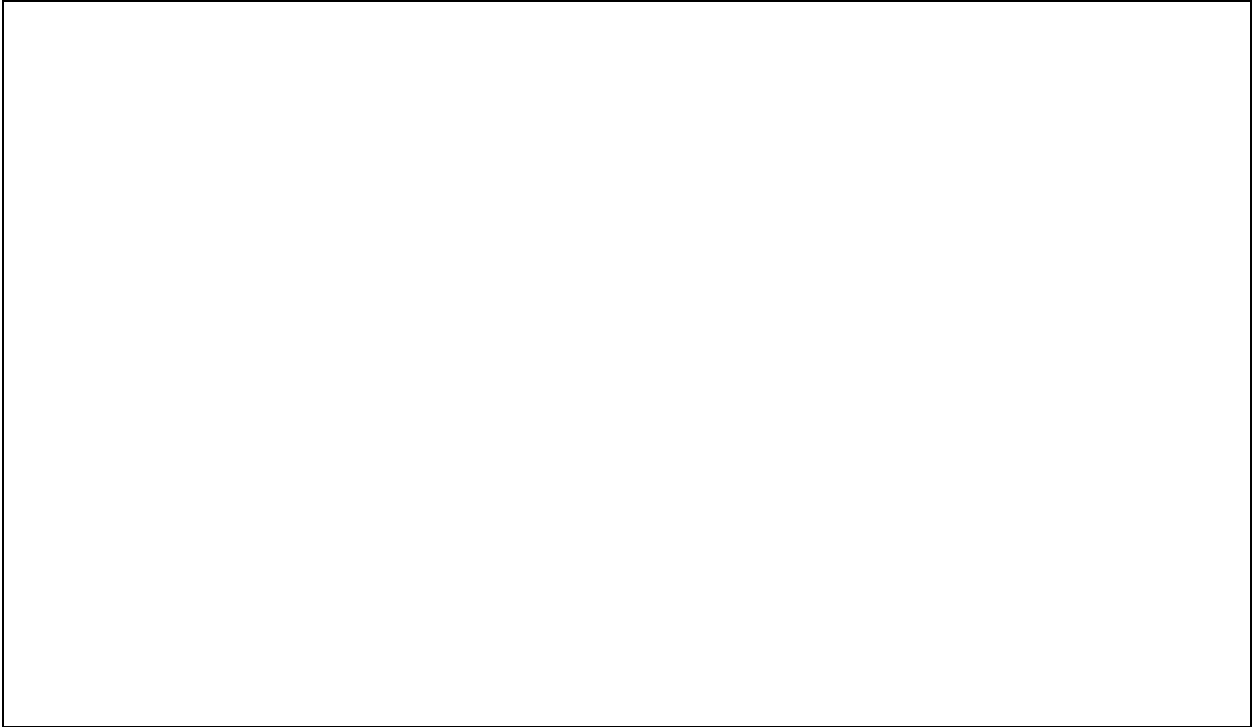
Large-leaf
hanging vine
seaweed



Green turf
seaweed



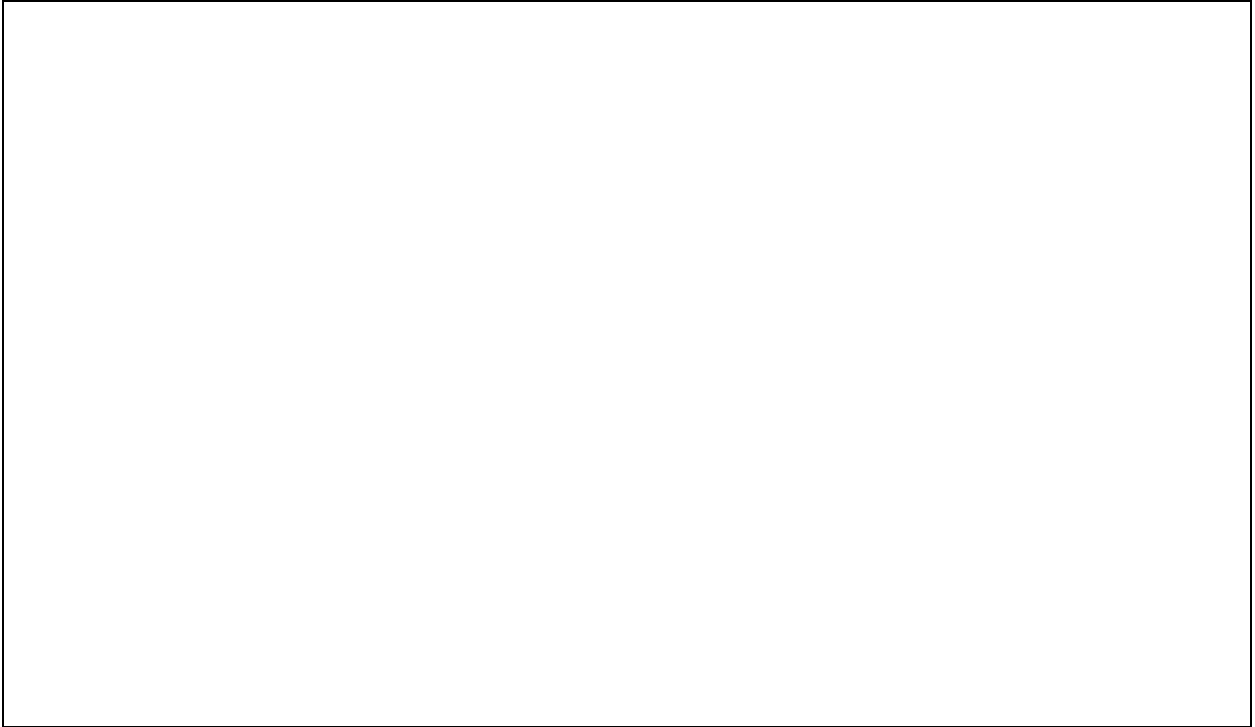
Plants



Animals



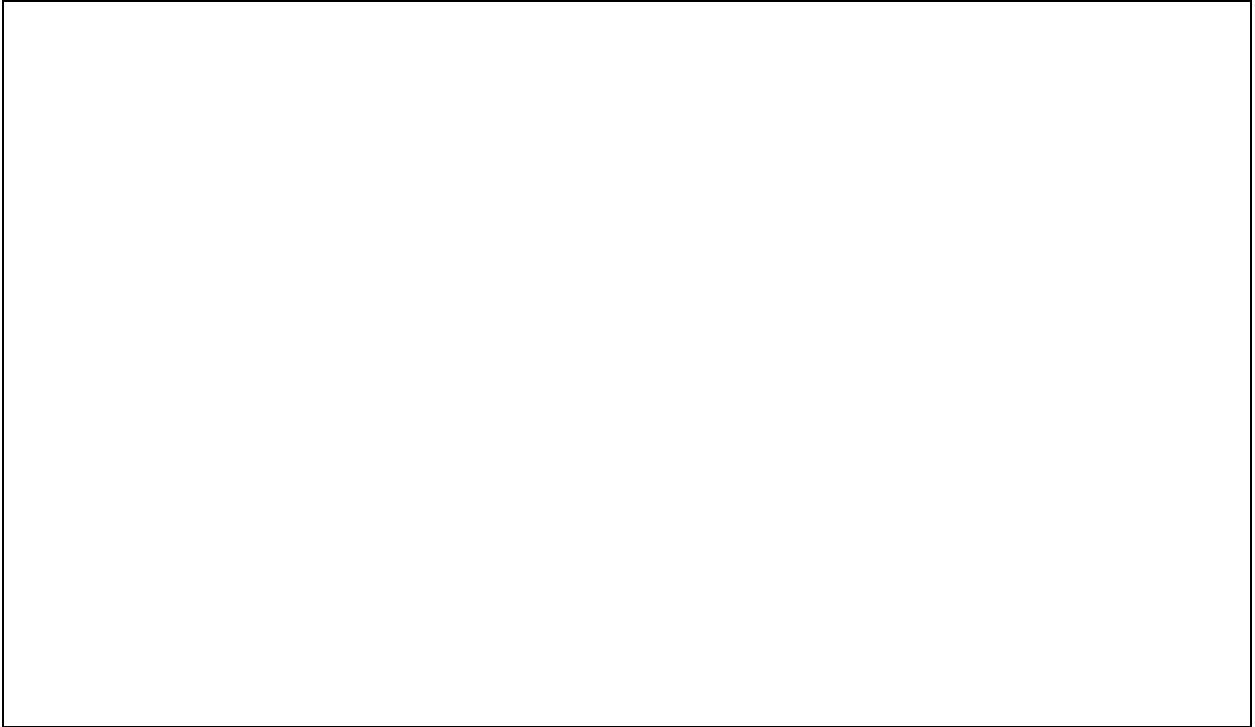
Vertebrate Animals



Invertebrate Animals



Settlers



Swimmers

