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Living Oceans  
Foundation

## KEYWORDS

- Abiotic Factor
- Algal Ridge
- Atoll
- Back Reef
- Barrier Reef
- Calcium Carbonate (CaCO<sub>3</sub>)
- Drop-off
- Fore Reef
- Fringing Reef
- Lagoon
- Patch Reef
- Reef Crest
- Reef Flat
- Reef Front
- Spur and Groove Reef

# REEF ZONATION

This unit explains the characteristics and location of the reef zones.

## STANDARDS

- **CCSS:** RST.9-10.1, 2, 3, 4, 5, 7, 8, 10; RST.11-12.1, 2, 3, 4, 8, 10; SL.9-10.1, 2, 3, 6; SL.11-12.1, 2, 3, 6
- **NGSS:** HS-ESS2-1, HS-LS2-6
- **OLP:** 5.B.7, 5.B.8, 5.C.33, 7.A.5, 7.C.2, 7.C.3

## MULTIMEDIA RESOURCE

- *Coral Reef Zones* YouTube video ([https://youtu.be/1wMrB37\\_GvI](https://youtu.be/1wMrB37_GvI))

## LEARNING OBJECTIVES

- Identify the three main types of coral reefs.
- List the abiotic factors that influence the distribution of organisms in each zone.
- Define reef flat and explain the conditions that corals have adapted to in this zone.
- Define lagoon and explain the conditions that corals have adapted to in this area.
- Define reef crest and explain the conditions that corals have adapted to in this zone.
- Define algal ridge
- Define spur and groove reef.
- Define reef front/fore reef and explain the conditions that corals have adapted to in this zone.
- Define drop-off.
- Define back reef and explain the conditions that corals have adapted to in this zone.
- Label the vertical zones for each of the main types of coral reefs.

## UNIT PROCEDURE

1. Show *Coral Reef Zones* YouTube video.
  - a. Complete **Watch It! Coral Reef Zones** student worksheet.
2. Teach *Unit 11: Reef Zonation - Background Information*.
  - a. Complete **Lesson 1: Modeling the Reef** student worksheet.
  - b. Complete **Lesson 2: GIS Mapping** student worksheet
3. Teach students how to read and critique blogs.
  - a. Complete **Read It! Let's Name the Zones** student worksheet.
4. Evaluate students using **Unit 11: Reef Zonation Quiz** (found online at [www.lof.org/education/portal/quiz/reef-zonation-assessment-1/](http://www.lof.org/education/portal/quiz/reef-zonation-assessment-1/)).  
NOTE: User must be logged in.



# LESSON 1

# MODELING THE REEF

## INSTRUCTIONS:

1. Answer the following questions:
  - a. Describe each of the three main types of coral reefs.

- b. What are the different vertical zones found in coral reefs?

- c. How do the abiotic factors differ between the zones? Add your answers to the table below.

Reef flat	Lagoon	Reef crest	Reef front	Back reef

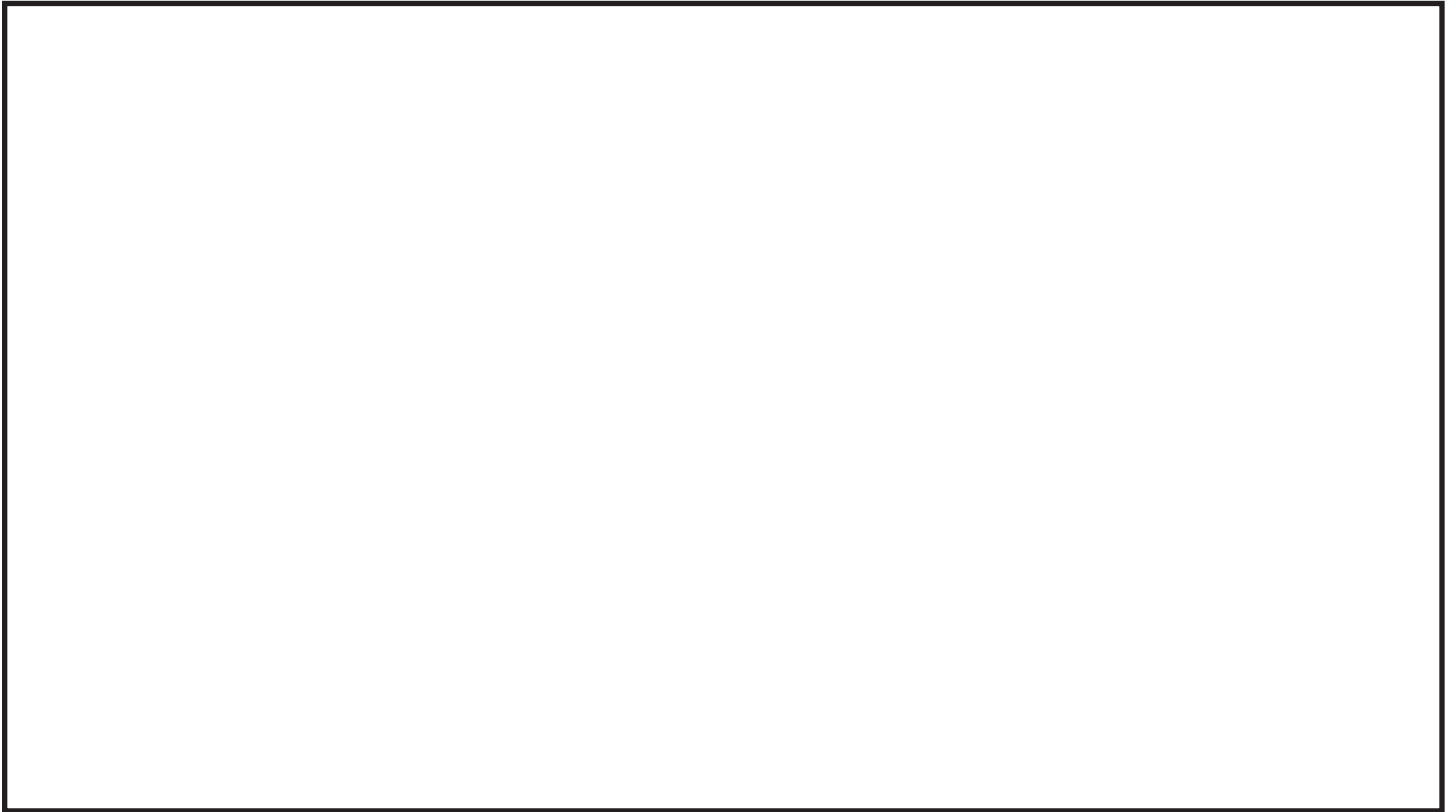
- d. How do the biotic factors differ between the zones? Add your answers to the table below.

Reef flat	Lagoon	Reef crest	Reef front	Back reef

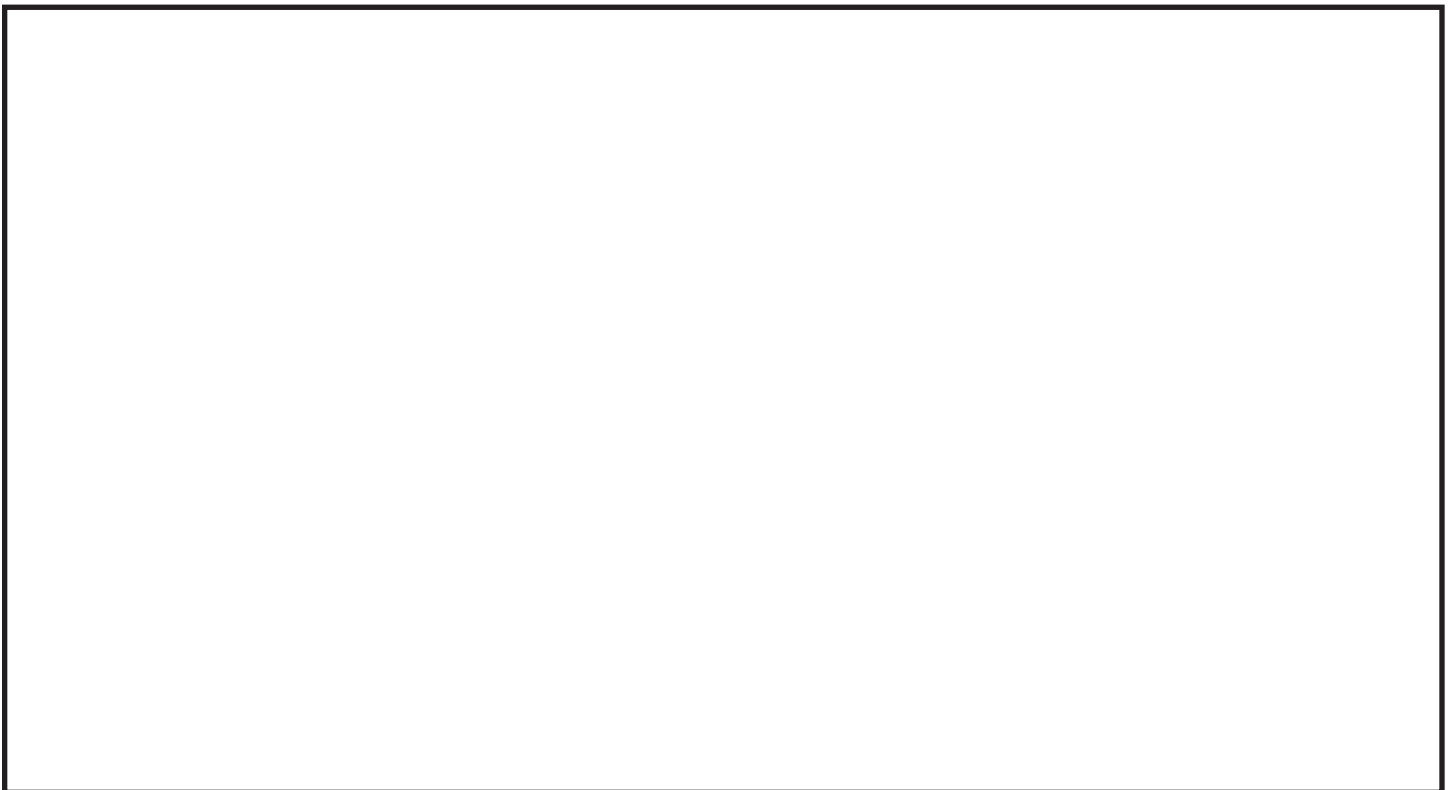
2. Research the coral reef assigned to you by your teacher so that you can make a model of it. Answer the following questions:

Name of assigned reef: \_\_\_\_\_

- a. Use the picture provided to sketch an aerial view of your coral reef in the space below.



- b. Use the picture provided to sketch a cross section of your reef. You will need to estimate changes in depth. Look at the colors – the darker the blue, the deeper it is, while brown indicates shallow areas.

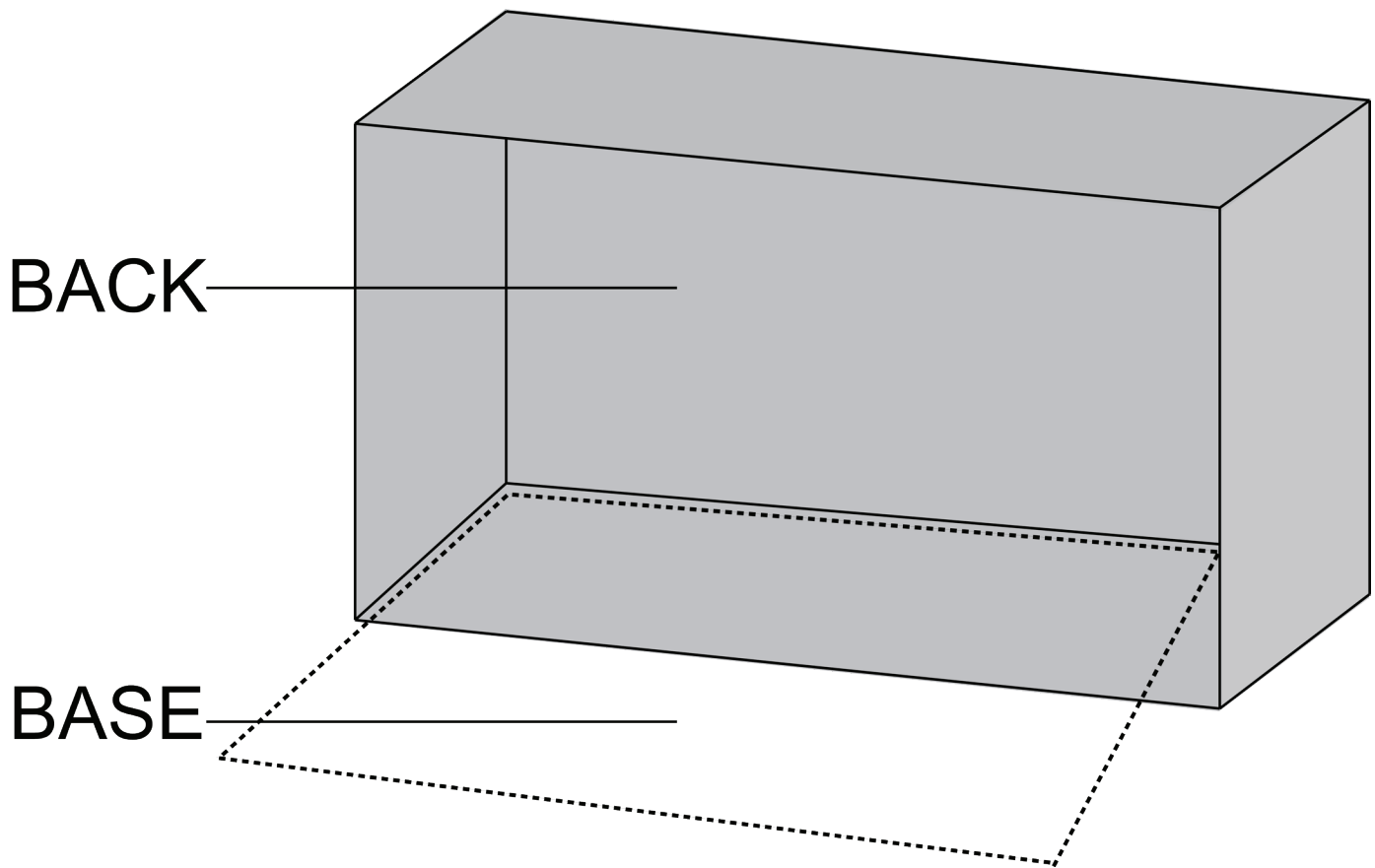


- c. Label the reef zones in your drawings from a. and b.
  - d. Where in the world is your reef located? Be sure to include the name of the ocean where the reef is located, as well as a more specific area description (country, group of islands, etc.).
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- e. What are some coral species growing on your reef? What do they look like? Use <http://www.coralsoftheworld.org/page/home/> to explore the region you described in question d.
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- f. Describe some of the other animals that live on and around your reef. Be sure to include species you would want to put in your shadowbox. Put the information from your answer to question d in the “Geographical Area” box of <http://www.marinespecies.org/aphia.php?p=checklist> to identify animals found on your reef (click on Distribution in the left hand panel if you do not see this box). You may need to do a further search of the internet to find out more information about the species. You can add a term to the “Limit to taxa belonging to” box, if you would like to find certain types of animals (for instance, enter *Elasmobranchii* here if you want to see what sharks and rays are found on your reef).



3. Create your shadowbox.

- a. Make sure the base that you use for your model fits into the shoebox. It can hang out the side, but needs to be a little bit smaller than the bottom so it can slide in and out. See diagram below.



- b. Paint the back of your box with a sky and ocean water – each taking up about 50% of the backdrop. Allow to dry.
  - c. Make a model of your coral reef out of the clay – you do not have to model the entire reef, but should include a good representation of all of the zones found there. Be sure you match the height of your clay model with the height of the ocean water you painted in your shoebox.
  - d. Add fine details to your reef by using the modeling tools provided by your teacher.
  - e. Label the different zones of your reef with a small piece of construction paper attached to a toothpick.
  - f. When the box is dry, slide your clay model into it.
  - g. Get creative – add waves, palm trees, clouds, fish, etc. (refer to your answers in #2).
4. When directed by your teacher, present your model to the class.

**GRADING RUBRIC:**

Category	4	3	2	1	Score
<b>Research Drawings</b>	Drawings are neat and informative. All zones are labeled.	Drawings are informative. All except 1 zone is labeled.	Drawings are messy or not informative. 2 zones are not labeled.	Drawings are not present or not useful. 3 or more zones are not labeled.	
<b>Research Questions</b>	All questions (d-f) are answered in complete sentences.	All questions (d-f) are answered.	3 or more of the questions (d-f) are answered.	Less than 3 questions (d-f) are answered.	
<b>Shadowbox Model Size</b>	Clay model is the correct size for the ocean portion of the background.	Clay model is within an inch of the correct size for the ocean portion of the background.	Clay model is within 1-3 inches of the correct size for the ocean portion of the background.	Clay model is more than 3 inches from being the correct size for the ocean portion of the background.	
<b>Shadowbox Accuracy</b>	Model is detailed, and accurate, including all labels.	Model is detailed and mostly accurate, including all labels.	Model is mostly accurate, including most of the labels.	Model is inaccurate with little detail and few to no labels.	
<b>Shadowbox Creativity</b>	There are more than 3 creative details.	There are 2-3 creative details.	There is 1 creative detail.	There are no creative details.	
<b>Presentation Accuracy</b>	Presentation was completely accurate.	Presentation had 1-2 minor errors.	Presentation had some inaccuracies.	Presentation had many inaccuracies.	
<b>Presentation Delivery</b>	Excellent and clear verbal articulation of ideas.	Explained ideas well.	Ideas were well stated, but lacked some clarity.	Ideas were difficult to understand.	
<b>Presentation Follow-up</b>	Student can accurately answer all questions related to the shadowbox.	Student can accurately answer about 75% of questions related to the shadowbox.	Student can accurately answer about 50% of questions related to the shadowbox.	Student appears to have insufficient knowledge about the shadowbox.	
<b>TOTAL</b>	<b>Out of 32:</b>				



# #1 MILMAN ISLET NATIONAL PARK, AUSTRALIA



# #2 TENARARO, FRENCH POLYNESIA



### #3 HUANINE, FRENCH POLYNESIA



### #4 RAIATEA, FRENCH POLYNESIA





## #5 BORA BORA, FRENCH POLYNESIA



## #6 MOTU ONE, FRENCH POLYNESIA



## #7 MOPELIA, FRENCH POLYNESIA



## #8 NIAU, FRENCH POLYNESIA

