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STANDARDS

- **CCSS:** RST.9-10.1, 3, 4, 5, 7, 8, 9, 10; RST.11-12.1, 3, 4, 8, 9, 10; W.9-10.4, 7, 8; W.11-12.4, 7, 8; SL.9-10.1, 3, 6; SL.11-12.1, 3, 6
- **NGSS:** ESS 2.D, HS-LS2-6
- **OLP:** 1.B, 1.B.3, 5.A.2, 5.B.1, 5.B.2, 5.B.5, 5.C.25, 5.C.33, 5.C.34

ONLINE CONTENTS

- [Environmental Conditions Quiz](#)

ENVIRONMENTAL CONDITIONS

This lesson is a part of the *Environmental Conditions* unit, which explains the abiotic factors that corals need to thrive. Below is a summary of what is included in the entire unit.

UNIT CONTENTS

A. [Background Information](#)

- Environmental Conditions
- Abiotic Factors

B. Lessons

[Conditional Corals](#)

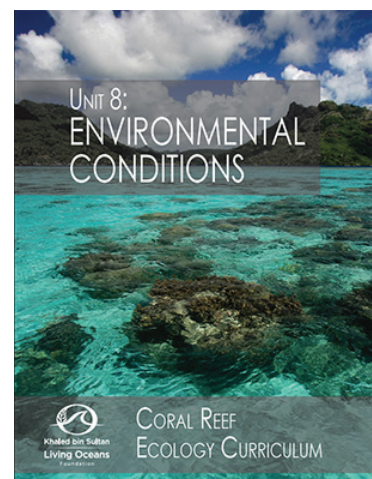
- A lab to evaluate the water quality at potential sites for a new coral reef colony

[Deep Conditions](#)

- A lesson to research deep-water corals and compare them to shallow-water corals

[Read it! Shivering for Science](#)

- A worksheet to accompany the [Shivering for Science](#) field blog





LESSON 1

CONDITIONAL CORALS

You are a coral reef conservationist. For the past few months, you have been growing different species of corals in your coral nursery in the hopes that you can eventually transplant them to the wild and repopulate different areas. You are trying to determine the best location to start a new coral reef colony with the corals from your nursery. You know that corals need very specific conditions to thrive. Assuming that all of the species you are growing fall into the general parameters discussed in this unit, evaluate the data for each of the locations to determine which is best for your new coral habitat.

You have sent out scientists to bring back water samples from eight different locations. Some of the water quality tests had to be determined at the site. They have been written on the water sample label. The rest will be performed in the lab, today.

PROCEDURES:

1. Get your assigned water sample from your teacher.
2. Write down the name of the location you will be surveying and transcribe the data on the label to *Data Table 1*.
3. Perform the remaining four water quality tests by following the directions accompanying each type of test. These tests are: salinity, turbidity, nutrients, and pH.
4. Share your data with the class. Be sure to write down all of the class data in *Data Table 2*.
5. Answer the questions below.

DATA TABLE 1: Measurement of environmental conditions at Site _____.

Environmental Condition	Measurement
Depth	
Water temperature	
Light (for photosynthesis)	
Salinity	
Turbidity	
Nutrients (nitrate)	
pH	
Substrate	



DATA TABLE 2: Environmental conditions of possible coral reef habitats

Environmental Condition	Site A	Site B	Site C	Site D	Site E	Site F	Site G	Site H
Depth								
Water temperature								
Light (for photosynthesis)								
Salinity								
Turbidity								
Nutrients (nitrate)								
pH								
Substrate								

INSTRUCTIONS: Answer the questions below.

1. Define the different environmental conditions tested in this lab. What range do most corals tolerate/need for each one?

Environmental Condition	Definition	Range of Coral Tolerance
Depth		
Water temperature		
Light		
Salinity		
Turbidity		



Environmental Condition	Definition	Range of Coral Tolerance
Nutrients		
pH		
Substrate		

2. Which site(s) have a depth where most corals live? With your pencil or colored pencil, lightly shade in these boxes in the row for this measurement in Data Table 2.

3. Why was temperature measured in the field and not in the lab?

4. Which site(s) have a temperature that most corals prefer? With your pencil or colored pencil, lightly shade in these boxes in the row for this measurement.

5. Which site(s) have a moderate amount of sunlight? With your pencil or colored pencil, lightly shade in these boxes in the row for this measurement.

6. Which site(s) have a salinity that most corals can tolerate? With your pencil or colored pencil, lightly shade in these boxes in the row for this measurement.

7. Think about how you measured turbidity. Does a lower or higher depth indicate more turbidity? Explain your answer.

8. Which site(s) have a low turbidity? With your pencil or colored pencil, lightly shade in these boxes in the row for this measurement.

9. Which site(s) have a low level of nutrients? With your pencil or colored pencil, lightly shade in these boxes in the row for this measurement.

10. Which site(s) have a pH that most corals prefer? With your pencil or colored pencil, lightly shade in these boxes in the row for this measurement.

11. Which site(s) have a substrate where most corals can attach and/or grow? With your pencil or colored pencil, lightly shade in these boxes in the row for this measurement.

12. Name the three locations with the most number of shaded boxes.

13. Do you think it is just about the number of boxes to be shaded in? Could one or more of these environmental conditions be more important for coral survival? Explain your answer.

14. List the eight environmental conditions in order from most important to least important for coral survival. Explain why you put #1 as the most important. Explain why you put #8 as the least important.



15. Which site do you think is the best location for starting a new coral colony with your baby corals?

16. After discussing the locations with your classmates (when directed by your teacher), write a paragraph about whether you agree or disagree with the outcome and why.

17. How can this experiment be made more valid?

18. What sources of error are in this experiment?