



Unit 5: One Ocean (Oceanography)

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Course Description: This unit was designed to supplement existing science coursework. Students will learn about oceanography. They will get in depth explanations on the various fields studied within oceanography and learn from experts along the way.

Course Objective:

1. Students will be able to understand the physics, chemistry, and geology of the ocean.
2. Students will be able to understand the important role our oceans have on this planet.
3. Students will gain a better understanding of the natural world.

Attendance:

Students are able to complete this at their own pace. There are no deadlines for materials, and it is up to the student and parent/teacher to keep said student on their desired pace.

Internet Etiquette:

Reef Relief staff has enabled commenting on the materials. The comment sections shall be used to ask legitimate questions or voice formatting/ technological issues. Should there be any concern about this please contact us.

Materials:

All course materials and worksheets are provided in an online PDF format. If your student does not have access to a printer, feel free to write down your answers on a separate piece of paper. If needed, Reef Relief can also mail you supplemental materials.

Technical Difficulties:

Please contact us via email or phone to let us know about any technical difficulties, we will be more than happy to assist!

Course Work:

Reef Relief has provided many different videos and activities for the students. Students are not required to complete all of the materials in this unit, it is ultimately up to the student, parent or teacher. Educators will be adding new coursework periodically. When that happens, you will receive an email notification.

Skill Level:

Many activities are labeled Beginner, Medium, or Advanced and it is up to the adult to decide what they would like their student to complete. We recommend the following to evaluate:

- Beginner: Someone new to marine science or is between the ages of 5-8.
- Medium: Someone who has received a moderate amount of science education or between the ages of 9-11.
- Advanced: Someone who is comfortable with more in-depth science topics or between the ages of 12-17.

Grading:

Reef Relief will not be implementing any grading. Parents and teachers may make the personal decision to grade their student's work. There will be a section labeled answer keys that can be used to check your student's work.

Sharing of material:

Please do not share classroom materials with others. This includes but is not limited to the class password, the class link, worksheets, video, etc.

Office Hours:

Reef Relief is open Monday- Friday from 10:00 AM until 4:00PM EST. Outside events may change these hours however we will do our best to respond as promptly as possible.

Course Schedule:

The following is Reef Reliefs recommended order to participate.

UNIT 5

Pre-Quiz: We encourage every student to take the pre-quiz at the beginning of the course to evaluate their basic knowledge. The information compiled from this quiz will be used for Reef Relief's general knowledge and grant purposes.

Geological Oceanography

- Lesson 1: Introduction to Geology
 - Introduce yourself to geology. Learn the different types of rocks and geologic history.
- Lesson Notes: Introduction to Geology
 - Complete during or after the lesson for an easy way to review main topics from the lesson.
- Activity: Rock Detective (Medium)
 - Test the different rocks around your house and see if you can identify them using the instructions provided. Reef Relief suggests doing this with a parent or adult
- Additional Material: Geologic Time
 - This website has excellent easy to understand graphics and summaries of the major eras in earth's geologic history.
- Presenter Notes: Introduction to Geology

- Study Guide/Notes
- Lesson 2: Geological Oceanography
 - Learn the various geologic features of the ocean and how they form!
- Lesson Notes: Geological Oceanography
 - Complete during or after the lesson for an easy way to review main topics from the lesson.
- Activity: Plate Tectonics Video Activity (All levels)
 - Watch this video for a review on plate tectonics, and to see an activity you can do at home to mimic the types of plate boundaries. Begin at timestamp 4:09 if you'd like to skip the review of the types of boundaries and begin at the activity.
- Worksheet: Crossword Puzzle (Advanced)
 - Match the terms with its definition into the crossword
- Additional Resource: Plate Tectonics Video (Beginner to Medium)
 - Watch this video to get a quick overview of plate tectonics.
- Presenter Notes: Geological Oceanography
 - Study Guide/Notes

Physical Oceanography

- Lesson 3: Physical Oceanography
 - An introduction to physical oceanography.
- Lesson Notes: Physical Oceanography
 - Complete during or after the lesson for an easy way to review main topics from the lesson.
- Worksheet: Ocean Zones Matching (Beginner)
 - Match the correct organism to their ocean zone!
- Worksheet: Ekman's Spiral Model (Medium)
 - Explore the way the Ekman's spiral works
- Worksheet: Coriolis Effect (Advanced)
 - Show how the Coriolis effect works.
- Bonus Video: How Ocean Currents Work
- Bonus Video: The Coriolis Effect
- Bonus Video: Ekman Spiral
- Bonus Video: Ocean Zones (Beginner)
- Presenter Notes: Physical Oceanography
 - Study Guide/Notes

Chemical Oceanography

- Lesson 4: Chemistry Basics
 - Learn some of the basics of chemistry if you have not taken a chemistry class in school.

- Worksheet: Atoms vs molecules (Medium to advanced)
 - Learn the differences between atoms and molecules.
- Lesson 5: Chemical Oceanography
 - Learn about the chemical interactions that take place in our ocean.
- Lesson Notes: Chemical Oceanography
 - Complete during or after the lesson for an easy way to review main topics from the lesson.
- Science Activity: Ocean Chemistry, Build a molecule (Beginner to Advanced)
 - Use fruit, candy, or playdough to create chemical bonds that take place in the ocean
- Activity: Ocean Acidification
 - Watch this mini video to learn more about ocean acidification. Watch then complete the ocean acidification worksheets below.
- Worksheet: Ocean Acidification Coloring (Beginner)
 - Color this worksheet to learn the process of ocean acidification
- Worksheet: Ocean Acidification Follow Along (Medium)
 - Watch the Ocean Acidification video and either fill out the steps as you watch, or challenge yourself to complete the worksheet after watching.
- Worksheet: Ocean Acidification (Advanced)
 - Learn a little about chemistry and practice seeing what happens when too much carbon dioxide enters the ocean.
- Additional Material: Chemical Bonds (advanced)
- Additional Material: Hydrothermal vents
- Interview with a scientist: Sabrina Ufer
 - Join us as we talk to Sabrina about her studies involving chemical oceanography, ocean acidification, and more!
- Presenter Notes: Chemical Oceanography
 - Study Guide/Notes

Biological Oceanography

- Lesson 6: Biological Oceanography
 - Learn about the interactions between living organisms and abiotic factors. Discover how nutrients are cycled in the marine environment.
- Lesson Notes: Biological Oceanography
 - Complete during or after the lesson for an easy way to review main topics from the lesson. Worksheet:
- Draw an Aquatic Environment (Beginner)
 - Decide what living organisms are in the environment and where they live. Also decide on the water conditions.
- Worksheet: Become a Biological Oceanographer (Medium)
 - Write down or tell someone what you would study if you were a biological oceanographer.

- Make a list of what you're interested in and think about how abiotic factors interact with it.
- Interview with a Scientist: Mackenzie Kerr
 - Join Mackenzie Kerr to learn about biological oceanography and how fish DNA is connected
- Movie: The Fate of Carbon
 - Watch this episode of Changing Seas to learn about changes in the environment affecting carbon dioxide storage.
- Presenter Notes: Biological Oceanography
 - Study Guide/Notes

Post Quiz: We encourage every student to take the post-quiz at the beginning of the course to evaluate their basic knowledge. The information compiled from this quiz will be used for Reef Relief's general knowledge and grant purposes.

Answer Key: We have provided answers to most worksheet activities and have combined them into this folder for parents and teachers to check their student's work.

Archive: A bank of old versions of lessons and worksheets