

Under the Deep Blue Seas

Grade Level: First Grade

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Length of Unit: Six Lessons (eight days), each day about 60 minutes.

I. ABSTRACT

In this unit, first grade students will take an in-depth look at oceans. Through a variety of reading materials and hands-on, multi-sensory activities, they will develop an appreciation for the ocean environment and its diverse creatures. Students will learn to locate the four major oceans as they discover that ocean water is salty and covers most of the earth. They will study the landscape of the ocean floor and gain an understanding of the concepts of coast, shore, waves, tides and currents. Students will examine various sea animals and learn about the dangers that threaten them and how each of us can help to save our oceans.

II. OVERVIEW

A. Concept Objectives

1. Understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. (Colorado State Science Standard #3)
2. Understand the processes of scientific investigation and conduct, communicate about, and evaluate such investigations. (Colorado State Science Standard #1)
3. Develop an awareness of how to use and construct maps, globes and other geographic tools to locate and derive information about places and environments. (Colorado State Geography Standard #1)
4. Understand the composition of the earth. (Colorado State Science Standard #4)

B. Content from the *Core Knowledge Sequence*

1. Most of the world is covered with water. (p. 37)
2. Locate Oceans: Pacific, Atlantic, Indian, Arctic. (p. 37)
3. Oceans are salt water (unlike fresh water rivers and lakes). (p. 37)
4. Coast, shore, waves, tides—high and low. (p. 37)
5. Currents, the Gulf Stream. (p. 37)
6. Landscape of the ocean floor: mountain peaks and deep valleys-trenches. (p. 37)
7. Diversity of ocean life: from organisms too small for the eye to see with the eye (plankton), to giant whales. (p. 37)
8. Dangers to ocean life: for example, over-fishing, pollution, oil spills. (p. 37)
9. Review of names and locations of the seven continents previously studied in first grade geography lesson. (p. 27)

C. Skill Objectives

1. Students will utilize a variety of tools (globe, different sized maps) to locate oceans and continents.
2. Students will identify and label oceans on a world map.
3. Students will identify the fraction $\frac{3}{4}$ by making a pie graph.
4. Students will discuss and record observations of science experiments.
5. Students will create their own picture of the ocean floor including the ocean's major landscape features and label the features.
6. Students will each make a large landscape feature of the ocean floor to contribute to a large classroom ocean mural.
7. Students will observe and discuss pictures of the shoreline and how it changes due to tides.

8. Students will locate and trace coastlines of the continents on their world maps.
9. Students will simulate wave action by blowing into a shallow pan of water.
10. Students will locate and label the Gulf Stream on their world maps.
11. Students will create a picture of the shoreline and waves.
12. Students will identify the characteristics of various sea creatures.
13. Students will record facts learned about sea animals on their KWL charts from Lesson One.
14. Students will construct models of sea creatures to be placed on a class mural.
15. Students will participate in comparing and contrasting the physical characteristics of ocean animals
16. Students will participate in identifying and describing dangers to ocean life.
17. Students will use problem-solving skills to generate a class list of possible solutions to the problems of over-fishing, pollution and oil spills.
18. Each student will write three facts or possible solutions related to dangers to the sea on his or her journal page (Appendix L). Students will illustrate one of their facts or solutions.
19. Each student will write additional ideas on his or her KWL chart (from Lesson One) in the "What I Have Learned" column of the chart.

III. BACKGROUND KNOWLEDGE

- A. For Teachers
 1. Hirsch, Jr., E. D. *What Your First Grader Needs to Know*. New York: Dell Publishing, 1997. 0-385-31987-8.
 2. Carter, K. J. *A New True Book, Oceans*. Chicago: Children's Press, 1982. 0-516-41639-1.
 3. Ganeri, A. *The Oceans Atlas*. New York: Dorling Kindersley, 1994. 1-56458-475-5
- B. For Students
 1. The students will have a basic understanding of the names and locations of the seven continents.

IV. RESOURCES

- A. *The Earth Is Mostly Ocean*, by Allan Fowler (Lesson One)
- B. *Oceans, A True Book*, by Darlene R. Stille (Lessons One, Three, Four and Five)
- C. *Diving Into Oceans, Ranger Rick's Nature Scope* (Lesson One)
- D. *The Magic School Bus on the Ocean Floor*, by Joanna Cole (Lesson Two)
- E. *A New True Book, Oceans*, by Katharine J. Carter (Lessons Three, Four, and Five)
- F. *What Your First Grader Needs to Know*, by E. D. Hirsch, Jr. (Lessons Three, Five and Six)
- G. *Make It Work! Oceans*, by A. Haslam and B. Taylor (Lessons Three and Four)
- H. *Life in a Tide Pool*, by Allan Fowler (Lessons Four and Five)
- I. *Life in the Oceans*, by Lucy Baker (Lessons Four and Five)
- J. *Our Oceans, Experiments and Activities in Marine Science*, by Paul Fleisher (Lesson Four)
- K. *The Atlantic Ocean*, by Julia Waterlow (Lesson Four)
- L. *Look Who Lives In...The Ocean*, by Alan Baker (Lesson Five)
- M. *Shoreline, Look Closer*, by Barbara Taylor (Lesson Five)
- N. *The Biggest Animal Ever*, by Allan Fowler (Lesson Five)
- O. *The Ocean Alphabet Book*, by Jerry Pallotta, (Lesson Five)
- P. *The Ocean Atlas*, by Anita Ganeri (Lesson Five)

- Q. *Young Explorer's Guide to Undersea Life*, by Pam Armstrong (Lesson Five)
- R. *Underwater Animals*, by Helen Cooney (Lesson Five)
- S. *A New True Book, Oil Spills*, by Darlene R. Stille (Lesson Six)
- T. *Jack, the Seal and the Sea*, by Gerald Aschenbrenner (Lesson Six)
- U. *Oil Spill*, by Melvin Berger (Lesson Six)
- V. *World About Us, Polluting the Oceans*, by M. Bright (Lesson Six)
- W. *Jack, the Seal and the Sea*, Video adapted by Joanne Fink, Reading Rainbow Production (Lesson Six)

V. LESSONS

Lesson One: Finding the Earth's Oceans (50 minutes)

A. Daily Objectives

1. Concept Objective(s)
 - a. Develop an awareness of how to use and construct maps, globes, and other geographic tools to locate and derive information about places and environments.
2. Lesson Content
 - a. Review of the names and locations of the seven continents previously studied in first grade geography lesson.
 - b. Naming and locating the four oceans: Pacific, Atlantic, Indian and Arctic.
3. Skill Objective(s)
 - a. Students will utilize a variety of tools (globe, different sized maps) to locate oceans and continents.
 - b. Students will identify and label oceans on a world map.

B. Materials

1. Globe
2. Large class-size world map
3. Student copy of world map (Appendix C)
4. Overhead projector
5. Transparency of world map (Appendix C)
6. Transparency marker
7. *The Earth Is Mostly Ocean*, by Allan Fowler
8. *Oceans, A True Book*, by Darlene R. Stille
9. Large butcher paper, KWL chart and markers
10. Individual student KWL charts (Appendix A)
11. One blue and one brown crayon for each student
12. *Sing a Sea Song* (Appendix B) adapted from *Diving Into Oceans, Ranger Rick's Nature Scope*—one copy for each student
13. A pocket folder for each student to be used as a science folder

C. Key Vocabulary

1. Maps—a representation of the earth's surface on a flat surface
2. Globe—a representation of the earth's surface on the surface of a sphere
3. Ocean—one of four large bodies of saltwater that separates the earth's continents
4. Continents—any of seven main land masses on the Earth's surface
5. Earth—the planet on which we live

D. Procedures/Activities

1. Make a class size KWL chart on large butcher paper. Encourage the children to share what they know (K) about oceans and record their responses on the chart under the "What We Know" (K) section. Then have students formulate

questions of what (W) they want to learn about oceans and record them on the chart in the (W) section. Distribute individual KWL charts (Appendix A) and science folders. Have the children write or draw two entries in the first two columns. The individual KWL charts will be kept in science folders so that the students can record additional information on them as the unit progresses. The charts will also become part of the ocean booklets they will make at the end of the unit. Keep the large class chart on the wall throughout the unit to add new questions and ideas.

2. Have the students move to the reading center area. Read *The Earth Is Mostly Ocean* by Allan Fowler and *Oceans, A True Book* by Darlene R Stille (pp. 10-12). Discuss and share the pictures in the books.
3. Use a globe and show where each of the four oceans is located. Then name and point out the four oceans on a large class map. Review the names and locations of the seven continents learned in a previous lesson. Discuss and demonstrate how the children can identify the oceans in relationship to the continents on the large class map. Have several children come up to the class map and locate an ocean by pointing to the ocean and naming it.
4. Teach the children "Sing A Sea Song" to the tune of *My Bonnie Lies Over the Ocean* (Appendix B). Have the children sing the song several times.
5. On a transparency of the world map (Appendix C), locate the four oceans and label them. Have the students repeat each letter after the teacher as the teacher spells out and writes the individual ocean names on the transparency.
6. Distribute individual size world maps (Appendix C) identical to the transparency. On their individual maps, have the children practice locating the oceans by pointing to the locations as the teacher names each one. The teacher circulates among the students to see that they are identifying the oceans correctly and calls on individual students to point to the ocean named on the overhead so the children can self-check their responses.
7. Write the four ocean names on the board. Have the children label the oceans on their individual maps. Then have them color the continents brown and the oceans blue. Students may refer to the overhead transparency, globe, or class-sized map for this activity. Have students put their maps in their science folders to be later placed in their ocean booklets.

E. *Assessment/Evaluation*

1. Students will be evaluated on the labeling of the Pacific, Indian, Atlantic and Arctic Oceans on their maps.
2. Colored individual maps will be evaluated to determine student understanding of the relationship between oceans and continents.

Lesson Two: Comparing the Ocean's Salt Water to Fresh Water (one hour)

Note: This Lesson Requires Prior Teacher Preparation

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Understand the processes of scientific investigation and conduct, communicate about, and evaluate such investigations.
 - b. Develop an awareness of how to use and construct maps, globes and other geographic tools to locate and derive information about places and environments.
2. Lesson Content
 - a. Most of the world is covered with water. The earth is three-fourths water.

- b. Oceans are salt water—unlike fresh water rivers and lakes.
 - 3. Skill Objective(s)
 - a. Students will identify the fraction $\frac{3}{4}$ by making a pie graph.
 - b. Students will discuss and record observations of science experiments.
- B. *Materials*
 - 1. Globe
 - 2. Construction paper circle three inches in diameter for each student
 - 3. Large construction paper circle six inches in diameter for teacher
 - 4. A set of crayons for each student
 - 5. “Sing a Sea Song” (Appendix B) adapted from *Diving Into Oceans*
 - 6. Teacher copy of Salt Water, Fresh Water Experiment (Appendix D)
 - 7. Student copies of Student Observation Page (Appendix E)
 - 8. *The Magic School Bus On the Ocean Floor* by Joanna Cole
 - 9. Paper towels—one for each student
 - 10. Water—two six ounce cup for every two students
 - 11. Salt— $\frac{1}{4}$ cup for every two students
 - 12. 1 cup measuring cup with 6 oz. designation
 - 13. $\frac{1}{4}$ cup measuring cup
 - 14. Overhead projector
 - 15. Transparency of Student Observation Page (Appendix E)
 - 16. Transparency marker
 - 17. For the science experiment, for every two students in class:
 - a. a pencil top eraser
 - b. a marshmallow
 - c. a piece of crayon (about one inch)
 - d. a Starburst candy with the wrapper on
 - e. a die
 - f. two large 16 oz. plastic cups
 - g. a plastic spoon
- C. *Key Vocabulary*
 - 1. Salt—a substance for seasoning and preserving food
 - 2. Salt water—ocean or sea water containing dissolved salts; it has a salinity of about 35 parts per 1000
 - 3. Salinity—the amount of saltiness in water
 - 4. Fresh water—water with a salinity of less than 0.5 parts per 1000; that is, no salt taste
 - 5. Density—the quality or state of being dense; mass per volume
 - 6. Dense—marked by compactness or crowing together of mass
 - 7. Mass—the stuff of which things are made; has weight and occupies space
- D. *Procedures/Activities*
 - 1. Prior to the lesson, teacher sets up materials for the experiment (see Appendix D).
 - 2. Teacher and students sing the “Sing a Sea Song” together from Lesson One to review the four oceans.
 - 3. Briefly discuss and review what students have learned about oceans so far. Use a globe to emphasize that the earth is mostly water and that oceans cover almost three-fourths of the planet.
 - 4. Distribute a construction paper circle to each student to help him or her understand the concept of $\frac{3}{4}$. Using the six inch circle, model folding the circle in half and then in half again to form four quadrants. Have children follow along

with teacher to fold their individual circles. Then, have the children color three of the four quadrants blue. Explain to students that this represents the three-fourths of the earth's surface that is covered with oceans.

5. Have the students move to the reading center area. Read *The Magic School Bus On the Ocean Floor* by Joanna Cole. Read up to page 11 emphasizing the information about the salty ocean. Also, discuss and share the pictures in the book as well as any new information about oceans and sea life. Tell children that they will be doing a science experiment that compares how different objects float in fresh water and sea or salt water.
6. Introduce Salt Water, Fresh Water experiment (see Appendix D for directions) by discussing differences between ocean water and fresh water from lakes, rivers, and ponds.
7. Introduce and model experiment (Appendix D). Explain to students what they will be doing in the experiment and allow discussion time for students to predict what may happen. Students will be working with a partner and they will record their observations on the Student Observation Page (Appendix E).
8. Direct and assist students in performing the experiment (Appendix D). Estimated time to perform experiment is 15 to 20 minutes. Encourage students to record results on their own Observations Page during the experiment.
9. After materials are collected and set aside, discuss observations and list them on a transparency of the Student Observation Page; children may add to their individual observation charts if they failed to do so during the experiment.
10. Teacher and students draw conclusions together. On overhead, the teacher writes a sentence generated by the students describing what they learned from the experiment. Students may copy the sentence or more advanced students may write their own conclusion sentence on their Student Observation Page. Then instruct the children to draw a picture of their favorite part of the experiment and color it.
11. Have students place their completed Observation Page in their science folders. At the end of the unit, these sheets will be stapled into their ocean booklets.

E. *Assessment/Evaluation*

1. Teacher will assess each student performing the experiment using the Teacher Observation Checklist (Appendix F).
2. Individual observation sheets will be evaluated for responses and completeness. Appropriate responses would be similar to: "I saw that objects float more easily in salt water than in fresh water," or, "It is much easier to float in salty ocean water than in fresh water in a lake."

Lesson Three: Landscapes of the Ocean Floor (one hour)

Note: This Lesson Requires Prior Teacher Preparation

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Understand the composition of the earth.
2. Lesson Content
 - a. Landscape of the ocean floor: mountain peaks and deep valleys-trenches.
3. Skill Objective(s)
 - a. Students will create their own picture of the ocean floor including the ocean's major landscape features and label the features.
 - b. Students will each make a large landscape feature of the ocean floor to contribute to a large classroom ocean mural.

B. *Materials*

1. Several books of your choice showing diagrams of the ocean floor which may include the following:
 - a. *A New True Book, Oceans* by Katharine J. Carter
 - b. *What Your First Grader Needs to Know*, by E. D. Hirsch, Jr.
 - c. *Make It Work! Oceans*, by A. Haslam and B. Taylor
 - d. *Oceans, A True Book* by Darlene R. Stille
2. Clear basin with sand, shells, rocks, coral, including mountains and valleys made from modeling clay, then filled with water
3. Large butcher paper for mural
4. Various art supplies for creating class mural—construction paper, cardboard, glue, sand
5. A set of crayons, a set of colored markers and a water color paint set for each student
6. 9" × 11" piece of white construction paper for each student
7. A science folder for each student from Lesson One
8. Large KWL chart from Lesson One

B. *Key Vocabulary*

1. Mountain—an elevated mass larger than a hill
2. Peak—a projecting point, the top of a mountain
3. Trench—a deep V-shaped valley under the ocean
4. Valley—a low tract of land between hills or mountains
5. Hill—a raised area of land of less size than a mountain
6. Volcano—a mountain emitting clouds of vapor, gases, ashes and lava
7. Coral reef—a deposit of dead coral skeletons and living corals found in shallow waters or on the sea floor
8. Continental shelf—the underwater land that slants down and away from the edge of the world's continents

D. *Procedures/Activities*

1. Prior to lesson, fill a clear basin with water after placing sand, rocks, shells and coral on the bottom. Also place clay models of mountains, valleys, and trenches at bottom to simulate the ocean floor.
2. Review by orally discussing facts learned about the ocean so far in the unit. Teacher records facts learned on the large class KWL chart from Lesson One and tells students that they will learn about the ocean floor.
3. Ask students, "What do you think the floor of the ocean looks like?" Record responses on blackboard.
4. Have students come to the reading area and read the first two paragraphs on p. 284 in the book *What Your First Grader Needs to Know* by E. D. Hirsch, Jr.
5. Read several books of your choice that show diagrams of the ocean floor and discuss the ocean's landscape features. The following books are recommended:
 - a. *A New True Book, Oceans* by Katharine J. Carter (pp. 20-22)
 - b. *Make It Work! Oceans*, by A. Haslam and B. Taylor (pp. 10-11)
 - c. *Oceans, A True Book* by Darlene R. Stille, "The Ocean Floor" section (pp. 32-34)
6. As you read the pages and examine the pictures of the landscape features, point out the specific characteristics of mountains, hills, valleys and trenches.
7. Have children come to the science table to examine the basin containing the simulation of the ocean floor. Encourage the children to describe each of the various geographic features, noting the differences between them.

8. Have children return to their seats and divide them into two groups. The first group will work on making their own picture of the ocean floor on a 9" × 11" piece of white construction paper using a variety of materials (markers, crayons, etc.) to depict and label the four major landscape features—mountain peaks, hills, valleys and trenches. Meanwhile the children in the second group will each pick one of the four major features. They will make one large feature and attach it to the large butcher paper to depict the ocean floor on the class mural. After fifteen minutes, have the two groups switch activities. The large mural will be kept on the wall for future use.
 9. When both groups have completed the two activities, have children put their individual pictures of the ocean floor in their science folders. They will include this activity sheet in their science booklets at a later time.
 10. Close the lesson by comparing what was learned about the ocean floor to the prediction recorded on the blackboard and sing the *Sing a Sea Song* (Appendix B) together.
- E. *Assessment/Evaluation*
1. Student landscape pictures will be evaluated using Teacher Landscape Rubric (Appendix G).

Lesson Four: The Highs and Lows of Oceans (one hour)

Note: This Lesson Requires Prior Teacher Preparation

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand the composition of the earth.
 2. Lesson Content
 - a. Coast, shore, waves, tides—high and low
 - b. Currents, the Gulf Stream
 3. Skill Objective(s)
 - a. Students will observe and discuss pictures of the shoreline and how it changes due to tides.
 - b. Students will locate and trace coastlines of the continents on their world maps. (Appendix C)
 - c. Students will simulate wave action by blowing into a shallow pan of water.
 - d. Students will locate and label the Gulf Stream on their world maps. (Appendix C)
 - e. Students will create a picture of the shoreline and waves.
- B. *Materials*
1. Several books of your choice which may include the following:
 - a. *A New True Book, Oceans* by Katharine J. Carter
 - b. *Life in a Tide Pool* by Allan Fowler
 - c. *Life in the Oceans* by Lucy Baker
 - d. *Make It Work! Oceans* by Andrew Haslam and Barbara Taylor
 - e. *Oceans, A True Book* by Darlene R. Stille
 - f. *Our Oceans, Experiments and Activities in Marine Science* by Paul Fleisher
 - g. *The Atlantic Ocean* by Julia Waterlow
 2. 9" × 13" baking pan filled with three pints of water
 3. Materials to make an ocean in a bottle (see Appendix H)
 - a. clear soda bottle

- b. mineral oil
 - c. water
 - d. blue food coloring
4. Individual world maps in science folders from Lesson One (Appendix C)
 5. Sets of water paints, crayons, markers, and construction paper for each student to create pictures of shoreline
 6. “Sharpie” thin marker for each student
 7. Science folders from Lesson One
 8. Class size world map
 9. Overhead projector
 10. Transparency of world map from Lesson One
- C. *Key Vocabulary*
1. Coast—the edge of the land touching the sea
 2. Shore—the place where the ocean meets the land
 3. Waves—the regular movement of the surface of water caused by wind
 4. Tides—the regular rise and fall of the ocean caused by the pull of the moon and the sun
 5. Current (or stream)—the movement of a body of water in a particular direction
 6. Low tide or ebb tide—when the water moves out from the shore
 7. High tide or flood tide—when the water moves into the shore
- D. *Procedures/Activities*
1. Prior to lesson, teacher creates a wave bottle as per instructions in Appendix H.
 2. Have children come to reading area and read about waves, tides and shores in *Life in a Tide Pool* by Allan Fowler (pp. 3-14) and in *A New True Book, Oceans* by Katharine J. Carter (pp. 23-28). Then, show pictures from various sources of waves, tides, and shores. These sources may include: pages 8 and 9 in *Life in the Oceans* by Lucy Baker; pages 12 and 13 in *The Atlantic Ocean* by Julia Waterlow; pages 4 to 9 in *Oceans, A True Book* by Darlene Stille.
 3. Using these pictures, discuss with the class clues that show high and low tides affecting the ocean’s shore. Tie the term shore to coast so students will develop an understanding of coastline. Demonstrate tracing the coastline of the seven continents on the large class map.
 4. Have students return to their desks and take out their world maps from Lesson One (Appendix C). Students will trace with their Sharpie marker the coastlines of the seven continents on their individual maps and then set the maps aside for further use.
 5. Have students go to the science table to practice simulating ocean waves. Explain that the water in the 9” × 13” baking pan is similar to the ocean on a windless day. Ask them what will happen if they blow on the water. Have several students volunteer to blow on the water and discuss what is observed. What happens when they blow harder? Encourage students to come to the conclusion that the harder the wind blows, the bigger the waves produced. Keep the pan of water on the science table so children can each have an opportunity to create waves at a later time after they have completed the next assigned activity.
 6. Show the students the Ocean in the Bottle made by the teacher prior to beginning this lesson. Explain how the bottle was made and demonstrate how to tilt the bottle to produce gently rolling waves. Have several students practice making waves and discuss what is being observed. Tell the children that the Ocean in the Bottle will remain on the science table for several days so that when they complete their work, they can use it to create and observe ocean waves.

7. Have students come to the reading area and read about currents and the Gulf Stream in several sources. Suggested pages to read include: pages 16 and 17 in *Make It Work! Oceans* by A. Haslam and B. Taylor; pages 10 and 11 in *The Atlantic Ocean* by Julia Waterlow or pages 29-32 in *A New True Book, Oceans* by Katharine J. Carter. Carefully examine the illustrations of the Gulf Stream and finger trace it on the class size world map.
 8. Have students return to their seats and retrieve their individual world maps (Appendix C). On the overhead transparency of the world map from Lesson One draw and label the Gulf Stream explaining that it is located in the Atlantic Ocean. Have students draw and label the Gulf Stream on their individual maps with their Sharpie markers.
 9. To conclude the lesson, have the children water paint a picture of the ocean's shoreline on a 9" × 11" piece of construction paper. When dry, this picture will be put in the science folders to be included in their ocean booklets.
- E. *Assessment/Evaluation*
1. Evaluate the student world maps for accuracy and completion. The continent coastlines should be outlined correctly and the Gulf Stream drawn and labeled in the correct place on their maps.

Lesson Five: Amazing Creatures of the Ocean (two lessons, one hour each)

Note: This Lesson Requires Prior Teacher Preparation

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.
 2. Lesson Content
 - a. Diversity of ocean life from organisms too small for the eye to see (plankton) to giant whales.
 3. Skill Objective(s)
 - a. Students will identify the characteristics of various sea creatures.
 - b. Students will record facts learned about sea animals on their KWL charts from Lesson One.
 - c. Students will construct models of sea creatures to be placed on a class mural.
 - d. Students will participate in comparing and contrasting the physical characteristics of ocean animals.
- B. *Materials*
- #### **DAY ONE**
1. Several books of your choice which discuss life under the oceans:
 - a. *A New True Book, Oceans* by Katharine J. Carter
 - b. *Oceans, a True Book* by Darlene R. Stille
 - c. *The Ocean Alphabet Book* by Jerry Pallota
 - d. *The Ocean Atlas* by Anita Ganeri
 2. A set of crayons, markers, and a pencil for each student
 3. 9" × 11" construction paper and scissors
 4. Class size KWL chart from Lesson One
 5. Individual student KWL charts from Lesson One (Appendix A)
 6. Butcher paper and assorted colored markers for a large class-size Sea Animal Chart

7. A collection of assorted seashells, starfish, clams, coral, sand dollar, etc.
8. Small magnifying glass—one per student
9. Each student's science folder
10. Instructions found in Appendix I

DAY TWO

1. Several books of your choice, which discuss life under the oceans:
 - a. *Life in a Tide Pool* by Allan Fowler
 - b. *Life in the Oceans* by Lucy Baker
 - c. *Look Who Lives in the Ocean* by Alan Baker
 - d. *Shoreline, Look Closer* by Barbara Taylor
 - e. *The Biggest Animal Ever* by Allan Fowler
 - f. *What Your First Grader Needs to Know* by E. D. Hirsch, Jr.
 - g. *Young Explorer's Guide to Undersea Life* by Pam Armstrong
 - h. *Underwater Animals* by Helen Cooney
 2. Assorted arts and crafts materials: construction paper, glue, sandpaper, ribbons, paper plates, tape, clay, toothpicks, crayons, markers, water paints, sand, cardboard, several 1-2 inch Styrofoam balls, set of tempera paints
 3. Scissors
 4. Butcher paper and assorted colored markers for a large class-size Sea Animal Chart
 5. Each student's science folder
 6. Class Sea Animal chart from previous day
 7. Instructions found in Appendices I and J
 8. One copy for each student of Animal Facts Quiz (Appendix K)
- C. *Key Vocabulary*
1. Vertebrate—an animal with a backbone
 2. Invertebrate—an animal that does not have a backbone
 3. Coral reef—a structure built in warm waters from the hard remains of small animals called polyps, or corals
 4. Environment—the set of conditions in the area where an animal lives
 5. Mammal—an animal that has a backbone and feeds its young with mother's milk
 6. Plankton—tiny plants and animals that float on or near the top of the ocean
 7. Polyp—a tiny ocean animal that turns into limestone when it dies and forms coral reefs
- D. *Procedures/Activities*
- DAY ONE—Ocean Animals and Coral Reefs
1. Prior to lesson draw Sea Animal Chart on large butcher paper (see Appendix I).
 2. Have children come to the reading area. Read the section "Ocean Plants and Animals" (pp. 33-38) in *A New True Book, Oceans* by Katharine J. Carter to give an overview of ocean animals. Briefly discuss pictures of sea animals on these pages.
 3. To introduce students to the wide variety of sea animals, read *The Ocean Alphabet Book* by Jerry Pallotta. After reading the book through once, go back to each illustration and encourage the students to name the different characteristics of each sea-animal as they carefully study the animal's detailed picture. Record several responses on the Sea Animal Chart.
 4. Read the Section "Coral Reefs" pages 25 to 31 in the book *Oceans, A True Book* by Darlene R. Stille or read about coral reefs pages 30-33 in the *Oceans Atlas* by Anita Ganeri. Point out and discuss by comparing and contrasting the sea creatures in the pictures—polyps, sea urchins, sea anemones, clams, sponges,

hermit crabs, plankton, and tropical fish. Encourage the students to name their favorite creature and give three words to describe it—color, size, and shape. Again, record responses on the Sea Animal Chart.

5. Have students go to the science table.
6. Show students collection of shoreline animals—assorted clams, shells, starfish, sand dollars, and coral. Give each student the opportunity to feel one and carefully examine the different physical characteristics with a magnifying glass. On the blackboard write the names of two or three of the sea objects and encourage the students to give descriptive words for each of them. Record student responses on the board.
7. Have students return to their seats to make sea animal flipbooks (see Appendix I). Children will follow step-by-step instructions as per teacher modeling. Each student will draw a detailed picture of two sea-animals studied in class and write at least three descriptive words for each sea animal. Students may refer to the large Sea Animal Chart, the descriptive animal information on the blackboard or to any of the ocean resource books used in this unit. The ocean resource books should be made available for students' use at this time (see Bibliography). Have several students share their flipbooks and then have all students put their flipbooks in their science folders.
8. Close this portion of the lesson by encouraging students to talk about what they have learned about oceans. Record their responses on the large, class size KWL chart under the category "What We Have Learned About Oceans."
9. Have the children take out his or her own individual KWL charts from Lesson One. Using the large chart as a model, encourage them to write a minimum of three things they have learned about oceans. They may copy sentences from the large chart or they may write their own sentences.

DAY TWO—More Ocean Animals (including Whales)

1. Prior to this session make another Sea Animal Chart (see Appendix I) for recording information about the larger sea animals, which will be studied in this session.
2. Review information on sea animals studied yesterday by reading one or more of the following.
 - a. "Plankton Facts" in *Life in the Oceans* by Lucy Baker pp. 10-17
 - b. *Life in a Tide Pool* by Allan Fowler pp. 17-29
 - c. *Shoreline, Look Closer* by Barbara Taylor pp. 8-13Review the different characteristics of several of the sea animals in the pictures by referring to entries on the class Sea Animal Chart.
3. Explain to the students that they will continue to learn about sea animals. The different characteristics of the animals will be noted as before but on a new Sea Animal Chart for larger sea animals.
4. Have the children come to the reading area. Read about different sea animals on pp. 284-285 in *What Your First grader Needs to Know* by E. D. Hirsch, Jr.
5. Read to the children about the following specific sea-animals: jellyfish, squid, sharks, sea turtles, sea lions, dolphins, whales, and octopus. Use the following resources which have excellent descriptions and illustrations of these sea creatures:
 - a. *Look Who Lives in the Ocean* by Alan Baker
 - b. *The Biggest Animal Ever* by Allan Fowler
 - c. *Underwater Animals* by Helen Cooney
 - d. *Young Explorer's Guide to Undersea Life* by Pam Armstrong

6. As you read about each animal, carefully examine the pictures and have the students describe the characteristics of the animal. Record the responses on the Sea Animals Chart for larger animals.
 7. After reading, discussing and describing the animals, refer back to the class Sea-Animals Charts. Encourage the children to compare and contrast the characteristics of several of the sea animals listed on the charts.
 8. As a closing activity, have each child choose one sea animal to depict. Encourage them to make a three-dimensional model of their animal using various art materials. Have them attach it to the class mural of the ocean's landscape that was studied in Lesson Three. For ideas to share with students when they are making their models see Appendix J. Adding the sea animals will transform the class mural into a large diorama of the ocean.
 9. Give the students an Animal Facts Quiz (Appendix K).
- E. *Assessment/Evaluation*
1. Student sea animal flip books and animal models will be evaluated for details and accuracy by the teacher.
 2. Written Animal Facts Quiz (Appendix K)

Lesson Six: Ocean Life Threatened (two lessons, one hour each)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. (Colorado State Science Standard #3)
 2. Lesson Content
 - a. Dangers to ocean life—over-fishing, pollution and oil spills.
 3. Skill Objective(s)
 - a. Students will participate in identifying and describing dangers to ocean life.
 - b. Students will use problem-solving skills to generate a class list of possible solutions to the problems of over-fishing, pollution and oil spills.
 - c. Each student will write three facts or possible solutions related to dangers to the sea on his or her journal page (Appendix L). Students will illustrate one of their facts or solutions.
 - d. Each student will write additional ideas on his or her KWL chart (from Lesson One) in the “What I Have Learned” column of the chart.

B. *Materials*
DAY ONE

1. Several books of your choice which discuss threats to ocean life:
 - a. *A New True Book, Oil Spills* by Darlene Stille
 - b. *Jack, the Seal and the Sea* by Gerald Aschenbrenner
 - c. *What Your First Grader Needs to Know* by E. D. Hirsch, Jr.
 - d. *World About Us, Polluting the Oceans* by M. Bright
2. Video—*Jack, the Seal and the Sea* adapted by Joanne Fink
3. One large piece of chart paper
4. A set of colored markers for chart recording
5. Individual student KWL charts from Lesson One (Appendix A)
6. Student individual science folders

DAY TWO

1. *Oil Spill* by Melvin Berger
2. One large piece of chart paper
3. A set of colored markers for chart recording
4. Student individual science folders
5. A set of crayons, markers, and a piece of 9" × 11" white construction paper for each student for a booklet cover
6. One copy for each student of the How to Keep Our Oceans Safe Journal Page (Appendix L)
7. One copy for each student of Oceans Unit Test (Appendix M)

C. *Key Vocabulary*

1. Pollutant—a dirty and poisonous product such as car fumes or waste products that damage the environment
2. Toxic waste—the wastes from industry that are poisonous to plants and animals
3. Pesticides—chemicals used to kill pests that feed on crops; may sometimes be dangerous to creatures other than the pests they control
4. Pollution—the introduction of compounds, elements, or any other matter into places which results in living things being harmed
5. Oil—also known as petroleum, an important source of energy often used to make different types of fuel
6. Refining plants—factories that make fuels and other chemicals from oil
7. Extinct—when the last member of a species has died out

D. *Procedures/Activities*

DAY ONE—Dangers to Sea Life

1. To introduce this lesson read the section “Humans and the Ocean World” pp. 285-286 in *What Your First Grader Needs to Know* by E. D. Hirsch, Jr.
2. Have the children watch the video *Jack, the Seal and the Sea* by Gerald Aschenbrenner and adapted by Joanne Fink. This is a thirty-minute Reading Rainbow video that takes the children on a Discovery Voyage. After reading the book by Aschenbrenner, the video gives real life pictures of a variety of marine life. It then shows a clean-up effort after a disastrous oil spill in Alaska. This video is often available at Public Libraries.
3. If the video is unavailable, read one of the following books to the students:
 - a. *A New True Book, Oil Spills* by Darlene Stille
 - b. *Jack, the Seal and the Sea* by Gerald Aschenbrenner
 - c. *World About Us, Polluting the Oceans* by M. Bright
4. After viewing the video or reading one of the above books, discuss the various dangers to the ocean. On a large piece of chart paper entitled “Dangers to Sea Life” record the ideas shared by students during the discussion. Also, encourage students to identify the benefits that humans receive from the oceans that are in danger due to pollution, over-fishing and oil spills.
5. Have students take out their individual KWL charts from Lesson One. Instruct them to write at least one sentence about the dangers to sea life in the “What I Have Learned About Oceans” column on their charts.
6. Close the lesson by singing the *Sing A Sea Song* from Lesson One.

DAY TWO—Keeping Our Oceans Safe

1. Briefly review the dangers to sea life, referring to the “Dangers to Sea Life” Chart from the previous day’s lesson.
2. Have the children come to the reading area. Read the book *Oil Spill* by Melvin Berger putting emphasis on the pages dealing with how we can help our oceans.

3. Encourage students to problem solve and share their ideas on how people can protect our oceans. Record student responses on a large piece of chart paper entitled “Keeping Our Oceans Safe.”
 4. Have children return to their seats to do some journal writing (Appendix L). The students will write about three facts or possible solutions related to cleaning up the ocean environment. They may copy sentences from the large class chart “Keeping Our Oceans Safe” or write their own creative sentences. Then they will illustrate one of these facts or solutions on the top of their journal page. These papers are to be kept in each individual student’s science folder.
 5. Give Oceans Unit Test (Appendix M).
- E. *Assessment/Evaluation*
1. “How to Keep Our Oceans Safe Journal Page” will be evaluated for completeness, accuracy and ideas. Students should have included at least three ways people can help our oceans.
 2. Oceans Unit Test (Appendix M)

VI. CULMINATING ACTIVITY

- A. Students will make ocean booklets. First, they will review the papers that they have saved in their science folders, completing or correcting them as needed—finishing coloring, completing sentences or lists, etc. The teacher will point out which papers are to be included in the booklets. Each student will draw a detailed picture of the ocean on a 9” × 11” piece of construction paper titled “My Ocean Booklet” and include features of the ocean landscape and sea animals of their choice. They will use this as a cover for their booklet and staple it to all of their booklet papers. Each student will turn this booklet in for a grade.
- B. Students will be given time to share their ocean booklets with their classmates.
- C. Teachers (especially those in the Denver Area) should consider a field trip to Ocean Journey in Denver where the students can see many of the sea-animals they have studied.

VII. HANDOUTS/WORKSHEETS

- A. Appendix A: KWL Chart
- B. Appendix B: Sing A Sea Song
- C. Appendix C: World Map
- D. Appendix D: Salt Water, Fresh Water Experiment
- E. Appendix E: Student Observation Page
- F. Appendix F: Teacher Observation Checklist for Experiment
- G. Appendix G: Teacher Landscape Rubric
- H. Appendix H: Ocean In a Bottle (Wave Bottle)
- I. Appendix I: Directions for Flip Book and Animal Chart
- J. Appendix J: Directions for Creating Ocean Animal Models
- K. Appendix K: Animal Facts Quiz
- L. Appendix L: How to Keep Our Oceans Safe Journal Page
- M. Appendix M: Oceans Unit Test

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Appendix B—Sing A Sea Song¹

Sing A Sea Song

(Sing to the tune of “My Bonnie Lies over the Ocean”)

The Earth is all covered with ocean.
The Earth is all covered with sea.
The Earth is all covered with ocean.
More water than land, don't you see?

Chorus:

Water, water, there's water all over the earth, the earth.
Water, water, there's water all over the earth.

So salty and cold is the ocean.
So salty and cold is the sea.
So salty and cold is the ocean.
Too cold and too salty for me.

Repeat chorus

Atlantic, Pacific, the Arctic,
And then there's the Indian too.
These oceans all cover our planet.
I named all of them, now can you?

Repeat chorus

¹ Adapted from *Diving into Oceans*, Ranger Rick's Nature-Scope

Appendix C—World Map



Appendix D—Salt Water, Fresh Water Experiment

A. Materials

1. Paper towels—for drying small items
2. Black permanent marker for cup labeling
3. One measuring cup with 6 oz. designated
4. A pencil and Student Observation Page (Appendix E) for each student
5. For every two students:
 - a. two 16 oz. cups
 - b. a plastic spoon
 - c. a sandwich bag
 - d. $\frac{1}{4}$ cup salt
 - e. a marshmallow
 - f. a one inch piece of crayon
 - g. a Starburst candy with the wrapper on
 - h. a dice
 - i. a dry pencil top eraser

B. Prepare ahead of time






1. Fill two cups for each pair of students with six ounces of water in each cup.
2. Label cups *S* for salt water and *F* for fresh water.
3. In each cup labeled *S* pour $\frac{1}{4}$ cup of salt.
4. In a small sandwich bag place the following items for each pair of students:
 - a. a small, dry pencil top eraser
 - b. a marshmallow
 - c. a one inch piece of crayon
 - d. a Starburst candy with the wrapper on
 - e. a dice
 - f. a plastic spoon

C. Procedure

1. The teacher models the following steps in the experiment.
 - a. Checks that he or she has the appropriate materials.
 - b. Discusses the appropriate use of materials and appropriate behavior when working with a partner.
 - c. Discusses the appropriate steps for conducting the experiment: planning experiment, conducting the experiment, making observations, recording observations, and making conclusions based on the observations.
 - d. Emphasizes the importance of making careful observations and recording all observations.
2. The teacher demonstrates with a student how to do the experiment emphasizing that partners will take turns when placing objects in the water. One partner will place the object in the salt water and remove it carefully after recording the results. This student will then dry the item with a paper towel and pass it to the other student to place in the fresh water.
3. The teacher models the steps in placing the first object in both types of water and recording the results on his or her Observation Sheet. Each time, before placing a new object in the salt water or fresh water, the students must make sure that the object is dry and stir the water with their spoon.
4. Teacher tells students to follow the above steps for each item, recording what they see on their Student Observation Pages each time an item is placed in a cup. Both students in the pair will record all results on his or her own Student Observation Page.

Appendix E—Student Observation Page (For Salt Water, Fresh Water Experiment)

MY OBSERVATIONS

OBJECT		SALT WATER	FRESH WATER	COMMENT
Pencil Top Eraser				
Starburst Candy				
Crayon				
Dice				
Marshmallow				

Mark an **F** for **FLOATS** or **S** for **SINKS** for each object.

PICTURE OF MY EXPERIMENT

From this experiment, I learned

Appendix F—Teacher Observation Checklist for Experiment

Teacher Expectations		Observed Behavior	
		Yes	No
1.	Student is using materials appropriately.		
2.	Student is cooperating with partner.		
3.	Student is carefully following the steps necessary to complete the experiment, as modeled by the teacher.		
4.	Student is carefully observing each object as it is placed in both types of water.		
5.	Student is carefully recording the results on their Student Observation Page as each item is placed in the water.		
6.	Student is appropriately returning materials and cleaning up his or her work area.		

Appendix G—Teacher Landscape Rubric

DIRECTIONS Enter the number that best represents the student work done on their Ocean Landscape pictures.

Assessment	Description
4	Advanced
3	Proficient
2	Partially Proficient
1	In Need of Improvement

	Skill	Score
1.	Student accurately sketched, colored and labeled one or more mountain peaks.	
2.	Student accurately sketched, colored and labeled one or more ocean hills.	
3.	Student accurately sketched, colored and labeled one or more ocean valleys.	
4.	Student accurately sketched, colored and labeled one or more ocean trenches.	
5.	The student's ocean hills are distinguishable from their ocean peaks.	
6.	The student's ocean valleys are distinguishable from their ocean trenches.	
7.	The student's landscape features combine together to produce a single ocean landscape.	
8.	The student's work is done neatly including quality coloring, labeling, and sketching.	

Appendix H—Ocean In a Bottle (Wave Bottle)²

A. Materials

1. A clear plastic bottle with a cap that seals tightly, e.g. A clear two-liter soda bottle.
2. Mineral oil from any drugstore
3. Water
4. Blue food coloring

B. Procedure

1. Clean the bottle thoroughly. Then fill it about half full with fresh water.
2. Add a few drops of the blue food coloring.
3. Fill the bottle all the way to the top with mineral oil and screw the cap on tightly. Seal the cap with clear tape wrapping the tape around several times to prevent leaks.
4. The clear oil and the blue water will not mix. Have the students tilt the bottle back and forth to see waves rolling gently from one end of the bottle to the other.

² Adapted from *Our Oceans, Experiments and Activities in Marine Science* by Paul Fleisher

Appendix I—Directions for Flip Book and Animal Chart (both used in Lesson Five)

FLIP BOOK DIRECTIONS

Have the children follow along step by step as the teacher demonstrates the following.

1. Take a 9" × 11" piece of construction paper and fold it in half lengthwise to make a 4 ½" × 11" folded sheet (hot dog fold).
2. Keeping the paper folded, fold it again widthwise (hamburger fold) to make a 4 ½" × 5 ½" double folded sheet.
3. Have the children unfold the second fold only and draw a line where the crease is on their paper on the top facing side only.
4. Have the children cut along the line they just drew starting at the unfolded edge of the paper and stopping where the paper is folded being careful to cut the top piece of paper **ONLY**.
5. This creates a flipbook with a left flap and right flap.
6. Instruct students to draw and label pictures of their two favorite sea animals, one on each of the two top flaps of their flipbooks.
7. Instruct the students to raise each flap, one at a time, and on the sheet of paper underneath that is visible, write three or more descriptive words describing the animal they have drawn on the flap.

ANIMAL CHART DIRECTIONS

1. On a large oblong piece of butcher paper, title the chart: *Our Class Sea-Animal Chart*.
2. Divide the paper into three columns.
3. At the top of each column write one of the following headlines:
 - a. Name of animal
 - b. Sketch of animal
 - c. Descriptive Features (color, size, shape, texture, behavior)
4. Use the chart to record information about the animals being studied in class. List the animal names vertically on the chart and enter information about each one horizontally on the chart as you record student responses.

Appendix J—Directions for Creating Ocean Animal Models

Here are several simple suggestions that students may use when creating a model of their sea animal.

Starfish: Provide students with a large square of sandpaper. They may trace a starfish pattern (provided by the teacher) or draw their own shape of a starfish on the sandpaper. Then cut out the starfish shape and add details to it.

Sea Urchin: Students use a round piece of clay or a 1-2 inch Styrofoam ball for the body. Then they insert toothpicks into the body to represent the sharp little spines. Optionally, the students may paint their animal with tempera paints.

Jelly fish: Students use a white paper plate for the body. Invert the plate and glue or tape pieces of long curly ribbon onto it. Optionally, color or paint the plate.

Assorted Fish, Whales, Dolphins: Using large pieces of butcher paper, have the students draw and cut out two identical shapes of their sea creature. They can do this by folding a large piece of butcher paper in half, drawing the sea creature on the top piece, and then cutting through both pieces. Have the children draw features and details on their animal—eyes, fins, mouth, teeth, blowhole, arms, etc. When they are done drawing the details, have them glue the inside edges of the two pieces of paper together leaving one side open. Stuff the pattern with old newspaper or tissue paper and then glue the final edge shut.

Appendix K—Animal Facts Quiz

TEACHER DIRECTIONS The teacher will read each of the question and answer choices to the students. The teacher will instruct the students to circle the correct answer choice.

1. The largest animals in the world are _____.
a. blue whales b. sharks c. dinosaurs
2. Octopuses have _____ arms.
a. 4 b. 6 c. 8
3. Whales breath through _____.
a. gills b. a blowhole c. lungs
4. Very tiny animals that float on or near the top of the ocean are called _____.
a. plankton b. fish c. minnows
5. When the last member of a species has died out, that animal is said to be _____.
a. dangerous b. extinct c. a mammal
6. When we poison the oceans with garbage, litter or oil spills, it is called _____.
a. irrigation b. evaporation c. pollution
7. A sea animal that is round with hundreds of sharp little spines sticking out of its body is called a _____.
a. hermit crab b. sea urchin c. starfish
8. To scare away fish that attack them, squid _____.
a. dive deep b. swim fast c. spray ink
9. One of the most playful and intelligent of all sea creatures is the
a. dolphin b. jellyfish c. shark
10. A small sea animal that makes its home in the shells of other animals is called _____.
a. lobster b. swordfish c. hermit crab

**Appendix L—How to Keep Our Oceans Safe
Journal Page**



Appendix M—Oceans Unit Test

TEACHER DIRECTIONS The teacher will read each of the question and answer choices to the students. The teacher will instruct the students to circle the correct answer choice.

1. An ocean is a large body of _____.
a. fresh water b. salt water c. land
2. Ponds and lakes are made of _____.
a. trenches b. salt water c. fresh water
3. Waves are made by _____.
a. wind b. fish c. the moon
4. There are _____ major oceans.
a. 8 b. 6 c. 4
5. The bottom of the ocean is called the _____.
a. desert b. ocean floor c. prairie
6. The world's four oceans are the Atlantic, Indian, Arctic, and the _____.
a. Pacific b. Aegean c. Mediterranean
7. An ocean current in the Atlantic Ocean is the _____.
a. Lake George b. Gulf Stream. c. Labrador Current
8. The place where the ocean meets the land is called
a. shore b. island c. tide
9. Four features of the ocean floor are mountains, hills, valleys, and _____.
a. currents b. trenches c. rivers
10. When the water level drops in the ocean and the edge of the water moves farther away, it is called _____.
a. high tide b. low tide c. Gulf Stream