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ABSTRACT

This booklet, one of a series developed by the Frederick County Board of Education, Frederick, Maryland, provides an instruction module for an individualized or flexible approach to 7th, 8th, and 9th grade science teaching. Subjects and activities in this series of booklets are designed to supplement a basic curriculum or to form a total curriculum, and relate to practical process oriented science instruction rather than theory or module building. Included in each booklet is a student section with an introduction, performance objectives, and science activities which can be performed individually or as a class, and a teacher section containing notes on the science activities, resource lists, and references. This booklet introduces pupils to the study of ocean floor topography. The estimated time for completing the activities in this module is one week. (SL)

AIDS TO INDIVIDUALIZE THE TEACHING OF SCIENCE

Marvin G. Spencer

MINI-COURSE UNITS

BOARD OF EDUCATION OF FREDERICK COUNTY

1973

Frederick County Board of Education

Mini Courses for

Life, Earth, and Physical Sciences

Grades 7, 8, and 9

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1973

FOREWORD

The contents represented in these modules of instruction, called mini es, is an indication of our sincere desire to provide a more individualized and flexible approach to the teaching of science.

Data was accumulated during the school year relative to topics in life, earth, and physical science that were felt to be of greatest benefit to students. The final selection of topics for the development of these courses during the workshop was made from this information.

It is my hope that these short courses will be a vital aid in providing a more interesting and relevant science program for all middle and junior high school students.

Dr. Alfred Thackston, Jr.
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FEATURES OF THE OCEAN FLOOR
(OCEAN FLOOR TOPOGRAPHY)

Prepared by

John Fradiska

CONTENTS

Estimated Teaching Time

1 week

FEATURES OF THE OCEAN FLOOR
(OCEAN FLOOR TOPOGRAPHY)

INTRODUCTION:

The sea floor is a whole new world. Unexpected differences were discovered and important oceanographic research is continuing today.

Mapping the ocean floor requires methods that are different and unique. Only indirect methods can be used in determining the shape of the ocean floor. Why?

OBJECTIVES:

1. Identify the ocean features that make up the topography of the ocean floor.
2. Describe the ocean features that exist within the oceans.
3. Compare and contrast the continental shelf and continental slope.
4. Describe the methods used to measure the depth of the ocean and determine ocean features.

ACTIVITIES:

A. Complete the following reading assignment using

Pathways in Science, pp. 138-142, 1969 edition
or
Earth Science, pp. 245-248, 1965 edition
or
Modern Earth Science, pp. 496-499, 1965 edition

and complete the study sheet on the next page.

STUDY SHEET - ACTIVITY A

Describe the following ocean features and give the size if possible.

1. Continental shelf

2. Continental slope

3. Sea floor

4. Ocean ridge

5. Trench (trough)

6. Canyon

7. Guyots

8. Seamount

9. Plain (abyssal)

10. Ocean basin

11. Island

B.. Mapping the ocean floor is based on echo sounding, seismographic surveys and sonar or radar methods. Describe in writing the operation (how it works) for echo sounding (echo sounder) and seismographic survey. To complete this assignment, use one of the following:

Pathways in Science, No. 2, pp. 138-139, 1969
or
Earth Science, pp. 234-235, 1965
or
Modern Earth Science, pp. 495-496, 1965

C. Construct an ocean profile.

To complete this assignment you will need Exercise 58 - Oceanic Profile from Activities in Earth Science, p.137, by Namowitz.

EXERCISE 58 - OCEANIC PROFILE

Objective: To construct a profile of the Atlantic Ocean basin.

Materials: Pencil, ruler

Activity: Construct a profile along the 39th parallel from the Blue Ridge along the floor of the Atlantic to a point on the European coast.

Procedure: Turn the graph paper so that the long side is facing you. Use the heavy horizontal line three squares from the top as sea level. In your horizontal scale, make one small square equal 100 miles; in your vertical scale, make one small square equal 1000 feet. In the data supplied below, the distance is taken from the Blue Ridge eastward.

Distance (miles)	Elevation (feet)	Distance (miles)	Elevation (feet)	Distance (miles)	Elevation (feet)
0	+ 3,000	1,300	-20,400	2,800	- 6,000
10	+ 1,000	1,640	-15,000	2,940	-12,000
200	0	2,200	-12,000	3,250	-13,800
290	- 600	2,460	- 6,000	3,580	-12,000
320	-12,000	2,660	- 3,000	3,610	- 3,000
540	-18,000	2,685	0	3,840	0
1000	-20,400	2,700	- 3,000	3,865	+ 2,200

Observations: From your completed profile determine the approximate width and gradient per mile of the following features:

	Width	Gradient
Atlantic Coastal Plain		
Continental Shelf (N.A.)		
Continental Slope (N.A.)		

How much would the Atlantic Ocean have to rise to completely submerge the Atlantic Coastal Plain (at this point)? _____

Compare and contrast the European shelf and slope with the North American shelf and slope. _____

_____

_____

After completing the profile, label all ocean features.

D. Construct a second profile of an ocean basin and label all ocean features. The necessary information for completing this profile is given below.

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STUDY SHEET - ACTIVITY D

Problem: To construct a profile of an ocean basin.

Materials: Pencil. ruler, graph paper and ocean profile data

Procedure: Plot the data obtained from the echo sounder and label all features on the floor of the ocean. The scale to use is - horizontal scale 50 miles equals one unit and the vertical scale, 50 feet equals one unit.

Ocean Profile Data

Distance	Elevation and Water Depth
0 miles	+ 100 feet
25	+ 50 feet
50	0
90	- 50
150	- 100
225	- 200
375	- 300
450	- 400
475	- 425
500	- 500
525	- 550
575	- 600
595	- 640
650	- 650
675	- 675
700	- 695
750	- 725
800	- 725
850	- 725
900	- 625
1000	- 550
1100	- 400
1150	- 250
1200	- 150
1225	- 100
1300	- 50
1325	0

Results: The completed graph

Conclusion:

E. After reviewing previous reading assignments and completing the following reading assignment, you will be expected to complete Study Sheet - Activity E.

Pathways in Science 2, pp. 141-142, 1969

Earth Science, pp. 232-234, 1965

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STUDY SHEET - ACTIVITY E

1. Explain the difference between the continental shelf and continental slope.

2. Trenches in the ocean floor are formed by _____.

3. An under sea volcano could be called _____.

4. How do land heights compare to ocean depths?

5. What information can be obtained from a seismographic survey that cannot be determined by echo sounding or sonar recording.

F. View the film "Challenge of the Ocean". Check with your teacher about viewing this film.

EVALUATION:

See your teacher for an evaluation of this mini course.

Activity A. The textbooks listed in the student section should be available for use within the classroom. The study sheet A should be duplicated and made available for student use.

B. As a follow up with activity B, a discussion of the velocity of sound in water and the formula for determining ocean depth should occur before continuing with this unit.

C. A copy of Exercise 58 - Oceanic Profile can be obtained from Activities in Earth Science, page 137, by Namowitz. Make a spirit master of Exercise 58 and duplicate the necessary copies. To help the student identify the ocean features on the profile, use transparency No. 03, Oceanographic Features, Hubbard Scientific Company, Northbrook, Illinois.

D. The second profile of an ocean basin could be used as a means of evaluation if you so desire. Make the necessary copies of study sheet D before assigning the activity.

E. Check the student section for the necessary reading materials and duplicate copies of study sheet E.

F. Order the film "Challenge of the Ocean", F594 from the Instructional Materials Center.

Note: It is suggested that the teacher determine the evaluation. The completed ocean profiles and study sheets might serve as an evaluation.

Evaluation Form for Teachers

1. Name of the mini course _____

2. Was this unit appropriate to the level of your students?

3. Explain how this mini course was used with your students. (Individual, small group, or total class)

4. Identify the plus factors for this course.

5. List the changes that you would recommend for improvement.

7. Did you use any other valuable resources in teaching this unit? If so, please list.

PLEASE RETURN TO SCIENCE SUPERVISOR'S OFFICE AS SOON AS YOU COMPLETE THE COURSE.

ADDITIONAL SCIENCE MINI-COURSES

	Prepared by
LIFE SCIENCE	
A Study for the Birds	Terrence Best
Creepy Critters (Snakes)	Terrence Best
How's Your Plumbing?	Paul Cook
Guess Who's Been Here for Dinner	Paul Cook
Plants - The "Other" Living Things	Sharon Sheffield
Let's Look at You - The Human Organism	Sharon Sheffield
Classification: Why is There a Need?	Melvin Whitfield
Protist: The "Unseen" Kingdom	Melvin Whitfield
EARTH SCIENCE	
Coastline Development	Nelson Ford
Ocean Currents	John Fradiska
Features of the Ocean Floor (Ocean Floor Topography)	John Fradiska
Space and Its Problems	John Geist
Invertebrate Fossils: Clues to the Distant Past	John Geist
An Attempt towards Independent Study in Astronomy	John Geist
PHYSICAL SCIENCE	
Household Chemistry	Ross Foltz
Notions on Motions	Kenneth Howard
Environmental Chemistry	Fred Meyers