CHAPTER 11

Teaching Suggestions

Science and Mathematics Lab

(Course 2, Lesson 10-1)

Using a Clinometer

OVERVIEW

This activity provides students with an opportunity to apply the measurement of angles to the dip angle of a geologic bedding plane. Students will be required to construct a clinometer and measure dip angles. They will also practice classifying angles.

RECOMMENDED TIME

1 class period

MATERIALS

- books (several)
- cardboard (stiff)
- pin or nail
- glue or paste
- brass fastener
- scissors
- string, 10 cm
- washer (heavy)

PREPARATION

You may want to photocopy the clinometer onto heavy card stock.

TEACHING THE LAB

1. Have students work individually or in pairs.
2. Demonstrate to students how to arrange the books to simulate the dip of rock layer. Place a book on the desk. Tilt another book so that it rests on the first book at an angle. Suggest to students that they place the books at the edge of the desk so that they can easily measure the dip. (You may want to photocopy the diagram on page 42 for each student.)

Teaching Suggestions

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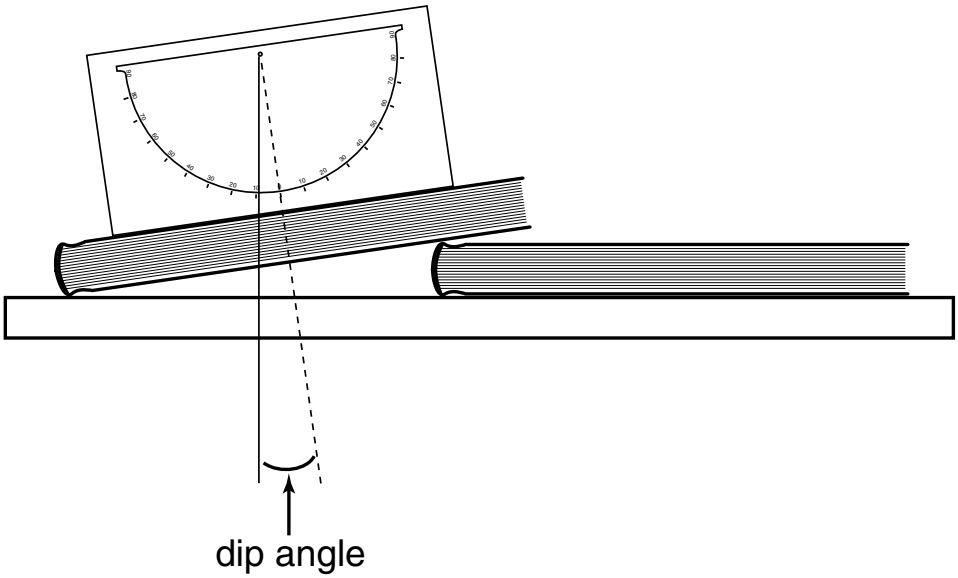
Using a Clinometer (continued)



Answers and Conclusions

1. Answers will vary. Answers may include scalene, isosceles, and right triangles.

2. 90°

3. 0°

4. The clinometer has 0° at the bottom and 90° at the sides. A protractor has 90° at the top and 0° and 180° at the sides.

CHAPTER 11

Name _____ Date _____

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Using a Clinometer

INTRODUCTION

Most sedimentary rocks were originally deposited in horizontal layers. Over long periods of geologic time, the layers were often lifted, lowered, or tilted. These changes from the horizontal resulted from geologic processes such as faulting, mountain building, and continental drift. Geologists measure the amount of tilt or dip in rock layers with an instrument called a *clinometer.* The clinometer measures the dip angle in degrees.

OBJECTIVES

In this lab, you will:

- construct a clinometer.
- use a clinometer to measure dip angles.

MATERIALS

- books (several)
- cardboard (stiff)
- pin or nail
- glue or paste
- brass fastener
- scissors
- string, 10 cm
- washer (heavy)

PROCEDURE

1. Photocopy and enlarge the clinometer until it is $6\frac{1}{2}$ inches wide. Then cut it out along the dashed lines. Glue the pattern to an equal-sized piece of cardboard. Make a small hole at the center with a pin or nail.
2. Tie the string securely around the brass fastener, push the fastener through the hole, and open the prongs of the fastener. Tie the washer to the other end of the string.
3. Test the clinometer by placing it upright on the edge of a flat desk. The string should hang over the 0° position.
4. Place one of the books on a desk. Tilt the book and support it with a second book. Place the clinometer upright on the tilted book. Measure and record the dip angle. Then sketch a diagram of the "rocks."
5. Repeat Step 4 for several different tilts.
6. Classify the type of angle you create as acute, obtuse, or right.

Name _____ Date _____

Science and Mathematics Lab

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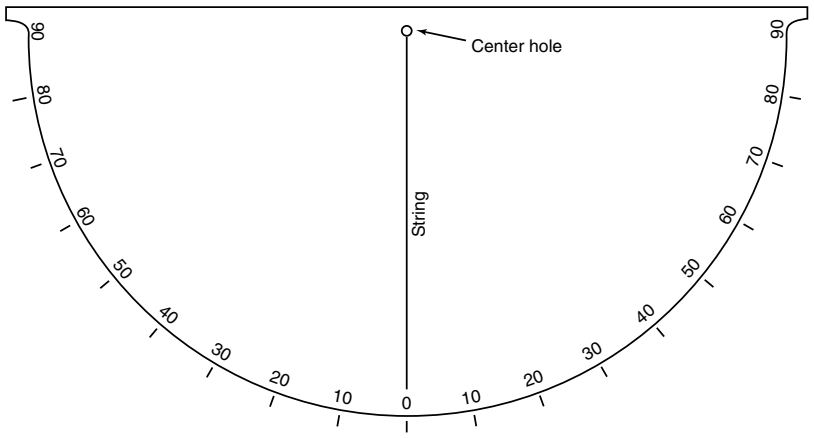
Using a Clinometer (continued)



DATA AND OBSERVATIONS

Rock Diagram	Dip Angle	Type of Angle

Questions and Conclusions

1. Draw your angles and close them with a third line so they form triangles. Identify what kind of triangles you have drawn.

2. If a bed is vertical, how many degrees of dip does it have?

3. If a bed is horizontal, what is the dip angle?

4. How does the clinometer differ from a protractor?