Sec:____Name:_____

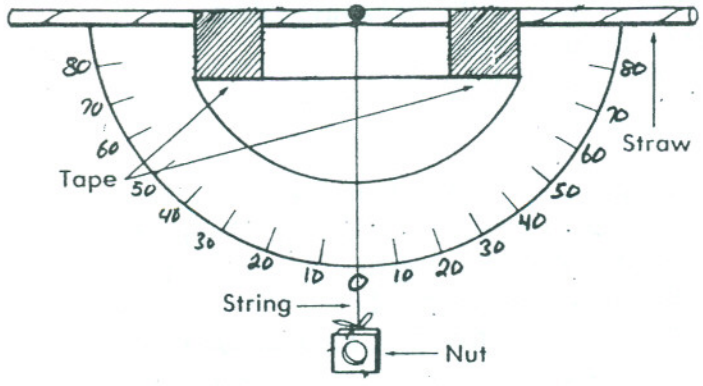
Experiment: Determining Latitude by Use of Sextant (E. Science 9-6-2a)

Purpose: To construct a simple sextant and to determine your approximate latitude in degrees.

Materials:	cardboard	U. S. map
string, 20 cm	nut	tape
plastic straw	photocopy of protractor	

Methods:

1. Tape the photocopy of the protractor onto a piece of cardboard, include the center hole of the protractor. Label 10º increments as indicated in diagram.
2. Attach one end of the string to the nut.
3. Puncture a hole with a pencil in the middle of one edge of the cardboard. Then with the free end of the string push it through the protractor's center hole. Tape the other end of the string on the back of the cardboard.
4. Tape the plastic straw to the straight edge of the protractor. Your sextant should look like the one in the diagram. (At the end of lab turn in the sextant with your group's names on it).
5. On a clear night when the North Star is visible, sight the North Star through the straw. **(We will use an imaginary setting of north star in classroom, seek instructions from your teacher).**
6. Anchor the string to the sextant using your thumb or finger. The degree marking on the sextant is the altitude of the North Star. This is your approximate latitude.
7. Record your latitude in results.
8. Repeat Steps 5 -7 another two times.
9. Use a map of the USA and read the degrees latitude of our location from the map and record in results.



Results:

	Latitude (degrees)
Trial 1	
Trial 2	
Trial 3	
Map reading	

Conclusions:

1. Calculate the average latitude of your three trials. (Show work, record in results.)

average latitude = $\frac{\text{trial 1 + trial 2 + trial 3}}{3}$ = $\frac{\quad + \quad + \quad}{3}$ = _____

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2. How does your reading of latitude by use of the sextant compares to that of the reading on a map?

3. Explain why there may be differences between your observation of latitude and the one listed in an atlas.

4. What is the purpose of having three trials and then finding an average?

Discussion:

1. If you were out on the ocean and you were navigating a ship, what very simple instrument could you use to determine your latitudinal position in the ocean?

2. One day you were going home from school, the only thing you were carrying was a geometry kit, which had a protractor, and your lunch which had a straw. You decided to go for a short sailing trip on Lake Michigan, but the wind came and blew you out and you couldn't get back to shore until dark when the winds calmed down and the sky became clear. Describe how you would **make** an instrument to keep you on the same latitude as you traveled back to shore. (Describe how you would get each part of the instrument you would design).

3. Describe how you would **use** this (number 2) instrument.

4. On a world map that shows the latitude and longitude, identify the cities that have the following coordinates.

a. 56°N; 38°E _____ b. 34°S; 18°E _____

c. 23°N; 82°W _____ d.13°N; 101°E _____

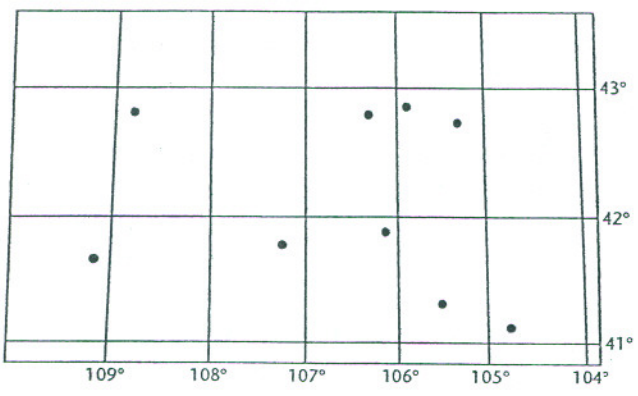
e. 38°N; 9°W _____

5. Now determine the latitude and longitude coordinates of the following cities:

a. London, England: _____ b. Melbourne, Australia _____

d. Paris, France _____ e. Anchorage, Alaska _____

c. Buenos Aires, Argentina _____



6. Each degree of latitude or longitude may be divided into minutes. There are 60 minutes in a degree. A minute may be written with a symbol '. Place a letter of each city next to its location on map.

A. Casper	42° 52'N	106° 20'W
B. Cheyenne	41° 9'N	104° 49'W
C. Laramie	41° 20'N	105° 30'W
D. Douglas	42° 45'N	105° 20'W
E. Glenrock	42° 53'N	105° 55'W
f. Rawlins	41° 50'N	107° 20 'W