Name: _____ Class: _____ Date: _____

Where Do We Look?

Learner Outcomes:

- Describe and apply techniques for determining the position and motion of objects in space
    - Describing the position of objects in space, using angular coordinates

Key Terms:

Astrolabe	Altitude
Azimuth	Zenith

Background Information: to find a particular star in the night sky is not as simple as pointing and saying, "There it is!" To find the specific location, asset of rules must be followed and accurate directions given. A star's position is like an address to a house: no two are exactly alike.

Research Question: How is the position of a star determined and how can another person find the exact same star?

Materials:

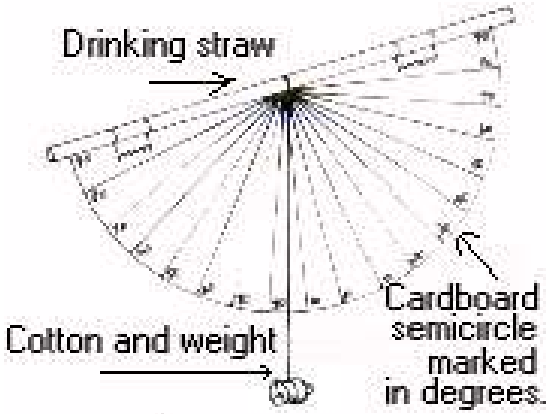
Cardboard	Scissors	Adhesive tape
Protractor	String	Thin straight object
Pen	Straight drinking straw	Circular protractor

Procedure:

1. Draw a semicircle about 20 cm in diameter on the cardboard. Us the protractor to mark 10° increments and label them. Cut out the cardboard protractor.
2. Tie one end of the string to the weight and attach the other end to the centre of the cardboard so that the weight can swing freely.

This investigation / activity has been adapted from:
Mah K, Martha J, McClelland L, et al. *Science in Action 9.* Toronto, ON: Addison Wesley.

3. Tape the straw to the top, flat section of the cardboard. See the diagram below. The angle you read from the string on your astrolabe indicates the angle your target is above the horizontal.



4. Choose an object somewhere above your head in the room and designate it as your star. Locate the star using the straw as a telescope. Make sure the weight is hanging straight down and read the altitude of the star from the scale on your astrolabe. Record this value as the altitude.
5. Your teacher will tell you where due north is. Lay the protractor on your desk and align "North" with the 0° mark on your protractor.
6. Tape the protractor in place and place a thin, straight object on the circle protractor with one end at the center of the protractor, and the other pointing in the direction of the star.
7. Measure and record the azimuth by reading the protractor clockwise from due "North".
8. Practice using your astrolabe to find the star using the directions from another student.
9. Check to see if you coordinate match those of your classmates.

Observations:

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Analysis:

1. Do your coordinates match those of any of your classmates? Explain.

2. Imagine that after locating the position of a star, you send the coordinates to the Astronomical society. A week later, they call to say they followed your directions exactly, but could not find the star. What might have happened that would make your coordinates incorrect?

3. What additional information do you need to locate a star?

4. If you were looking at a real star and you took the coordinates every night for one full year, from the same location, would the coordinates change or remain the same. Explain your answer.

Conclusion:

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Extension:

1. You can record the altitude of the sun with an astrolabe. Point the straw at the sun with one hand, and hold your other hand, palm up to the other end of the straw. Move the straw until you see a small circle of light on the palm of your hand. Read the angle on your cardboard scale to get the altitude of the sun. Take three measurements and calculate the average. Try this at the same time for five days in a row. Does the sun's altitude change, or does it stay the same? Explain.

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