

This assignment can be used as **summative** coursework.

Introduction:

These activities can be found at the At Home Astronomy website:
<http://cse.ssl.berkeley.edu/AtHomeAstronomy/>, Activities 7 and 8

In this activity you will be constructing a simple astrolabe and using it to make measurements of the altitude of the Sun.

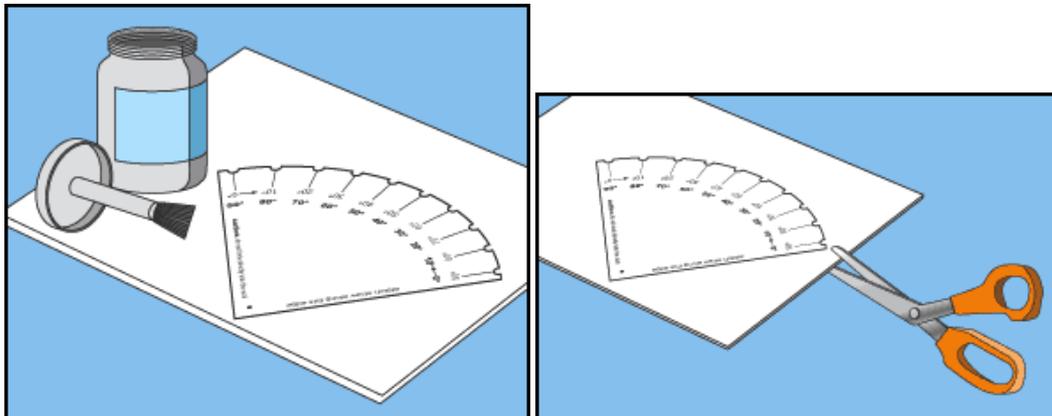
Part I: Constructing an Astrolabe

Needed Tools:

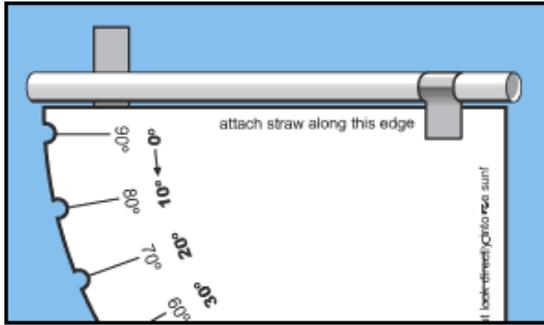
- piece of cardboard, manilla folder, or other stiff paper
- piece of dark string or thread, 30 cm long
- small weight (washer or rock will work)
- plastic drinking straw or other hollow tubing
- astrolabe drawing
- glue
- scissors
- tape
- paper hole punch

Instructions for making an astrolabe:

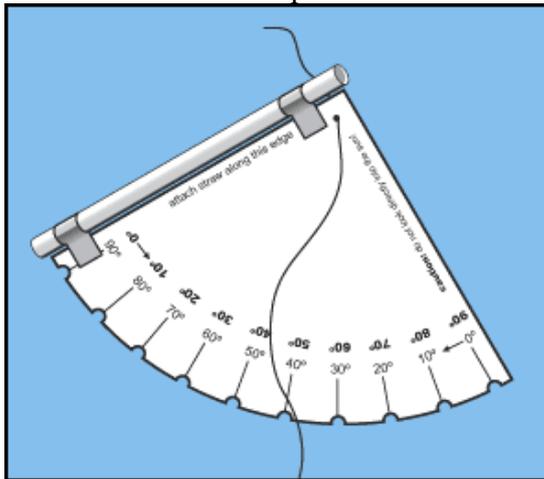
- Print out a copy of the [astrolabe drawing](#).
- Glue the copy of the astrolabe drawing to a piece of cardboard or file folder. Cut the astrolabe out with scissors.



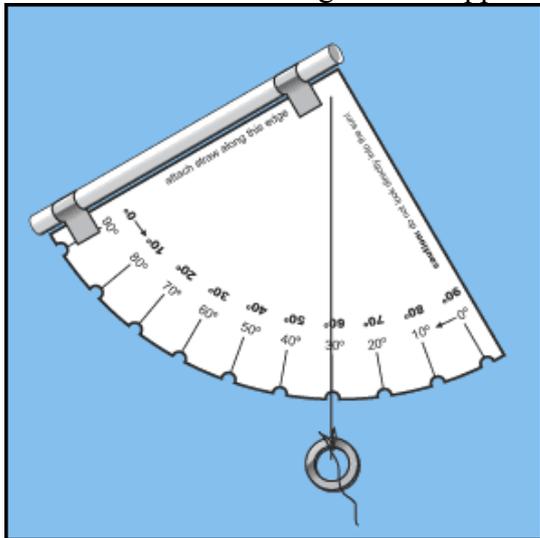
- Using scissors or a paper hole-puncher, carefully make a small notch at each of the lines marked along the curved edge of the astrolabe. These notches will come in handy when you're measuring the angle between two celestial objects and you have to hold the astrolabe horizontally.
- Cut a drinking straw to the same length as the sides of the astrolabe.
- Tape the drinking straw to the edge of the astrolabe marked "Attach straw to this edge." Be careful to not tape the straw on the astrolabe, but just on the edge.



- Carefully poke a small hole through the astrolabe where the "X" is marked, pass the string through it, and either knot the string at the back of the cardboard or tape it there.



- Tie the small weight to the opposite (front) end of the string as shown.



Part II: Using a Simple Astrolabe and the Altitude of the Sun

Needed Tools:

- The astrolabe constructing in Part I

Instructions:

Using the Astrolabe

- To become familiar with how an astrolabe works, practice measuring the altitude (angular height) of trees or buildings. To make a proper measurement, look at the top of the object through the straw.
- Have someone read the altitude in degrees from the side of the astrolabe. The point where the string crosses the scale is the proper measurement.
- Practice using your astrolabe by measuring and recording another tree or building of a different height.

Measuring the Sun's Altitude

- Because it is harmful to look directly at the Sun, a new method for measuring the Sun's altitude must be used. Hold the astrolabe so that the straw points in the direction of the Sun. Do not look through the straw.
- Aim the straw so that you see the shadow of the straw on your hand. Move the straw slightly until a small circle of light forms on your hand. The straw is now pointing directly at the Sun.
- Ask someone to read the Sun's altitude (in degrees) where the string crosses the scale. Take note of the time of day the reading was made.
- One day a week, at the same time each day, measure the altitude of the Sun with your astrolabe. Make three consecutive measurements and record them. Be sure to include the date and time.
- Build a chart containing the above information and take the mean or average of the Sun's altitude for each day. Examine your data and answer the questions below.

Please turn in:

1. This sheet as your cover sheet.
2. Altitude of the Sun chart
3. Your typed or neatly written answers to the following questions:
 - a) Did you observe a change in the Sun's altitude?
 - b) How is the Sun's altitude changing?
 - c) Is there a pattern to the change?
Hint: think about the time of year and the length of the day
 - d) How would you explain these changes?

