

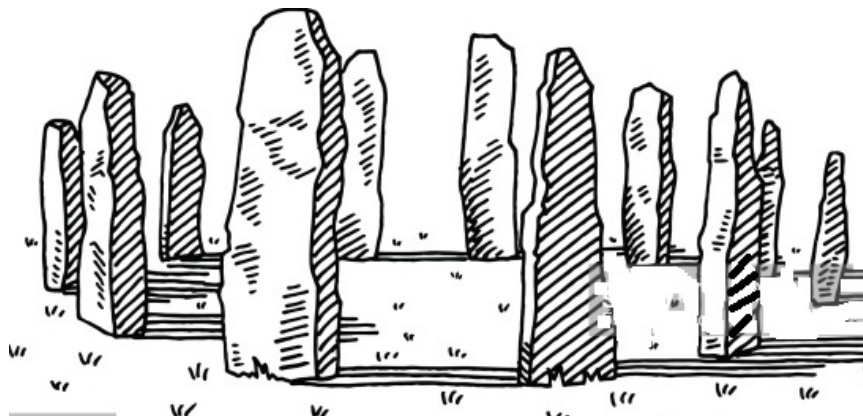
INTERMEDIATE SCIENCE 9

UNIT 1: SPACE

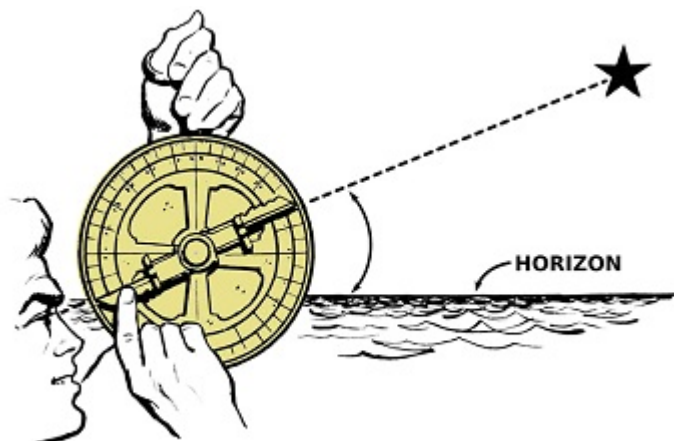
WORKSHEET # 5: EARLY TECHNOLOGY FOR SPACE OBSERVATION



1. **Stone circle** is a monument of standing stones arranged in a circle. The ancient stone circles were used as astronomical viewing places. The ancient stone circle builders employed advanced geometry, and had intimate knowledge of astronomy, and were skilled engineers



2. **Astrolabe** is a device that was used by early astronomers to pinpoint the locations of objects in space. It was developed around the time of Ptolemy. Astronomers used them to help locate and predict the positions of the Sun, Moon and stars



3. **Telescope :** is an instrument that aids in the observation of remote objects by collecting electromagnetic radiation (such as visible light). It uses lenses to gather and focus light to provide a magnified view



STUDENT ACTIVITY: CONSTRUCTING AND USING AN ASTROLABE

The astrolabe is a device that was used by early astronomers to pinpoint the locations of objects in space. The instrument itself has had various forms and has been in use for more than 2000 years. In this activity, you will use an astrolabe to determine the angle and height of objects in different positions around your classroom

Safety:

Never look directly at the Sun in this or any other activity.

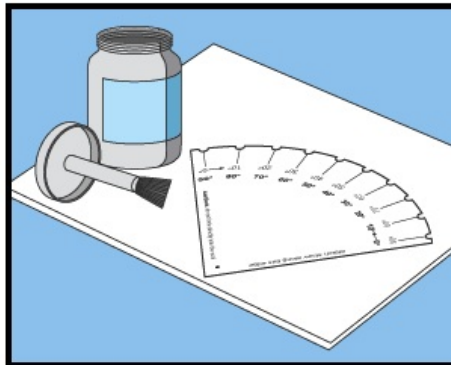
Materials

- Astrolabe drawing
- Straw
- Pen
- Cardboard
- String
- Washer
- Glue or Tape

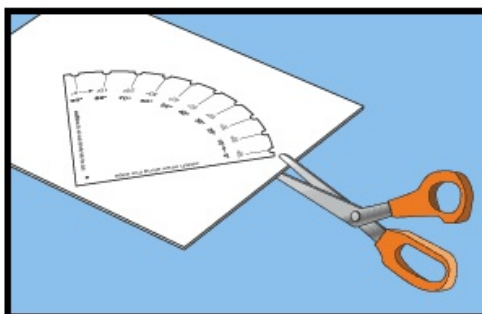
What to do:

1. Construct the astrolabe

- Glue the copy of the astrolabe drawing to a piece of cardboard or file folder.

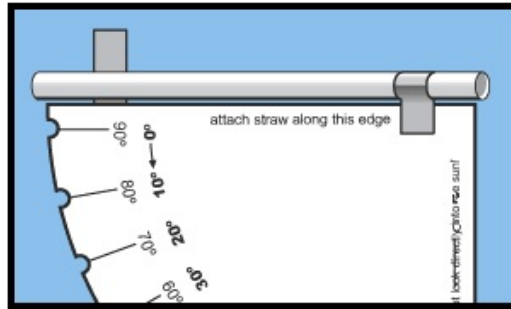


- Cut the astrolabe out with scissors.

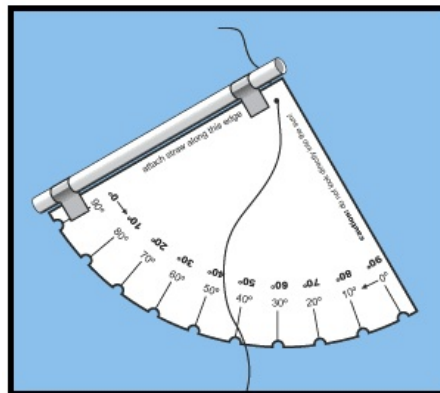


- Using scissors or a paper hole-puncher, carefully make a small notch at each of the lines marked along the curved edge of the astrolabe. These notches will come in handy when you're measuring the angle between two celestial objects and you have to hold the astrolabe horizontally
- Cut a drinking straw to the same length as the sides of the astrolabe

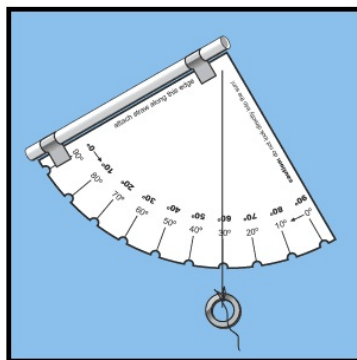
- Tape the drinking straw to the edge of the astrolabe marked "Attach straw to this edge." Be careful to not tape the straw on the astrolabe, but just on the edge.



- 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.
- You have now constructed an astrolabe!



2. Measuring the Altitude of objects with the astrolabe

- To become familiar with how an astrolabe works, practice measuring the altitude (angular height) of objects in the classroom. 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 other objects in the classroom. Record your information in the table below

Object	Altitude
Top hinge of door	

What Did You Find Out?

1. Describe the difficulties of locating objects using this technique.

2. What could be done to improve this way of measuring?

3. Compare your coordinates (angle and height measurements) with those of a classmate. Why are they different?

4. How does the time of day you take a measurement of an object in the sky using an astrolabe affect the ability of someone else to find the same location?

