

Build a Simple Sextant



Purpose: To measure the height (altitude) of a celestial object above the horizon. To observe the apparent motion of stars, the Moon, planets, or comets by noting changes in altitude over a period of time.

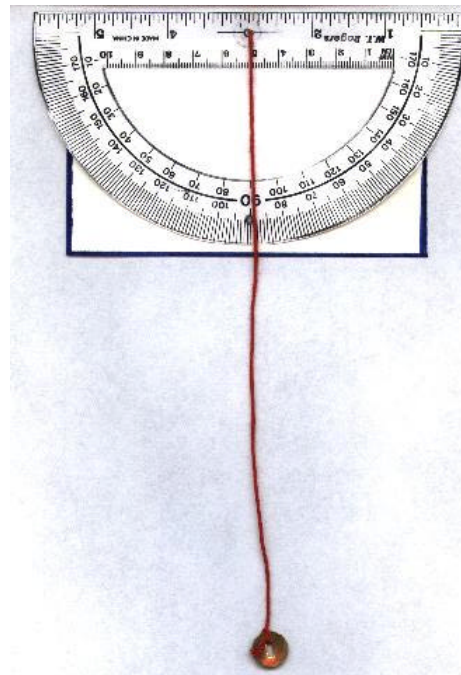
Materials:

30 cm wooden ruler (smaller is ok, but must be at least 16 cm long)
protractor
tape
string
washer or paper clips
compass (for determining directions)

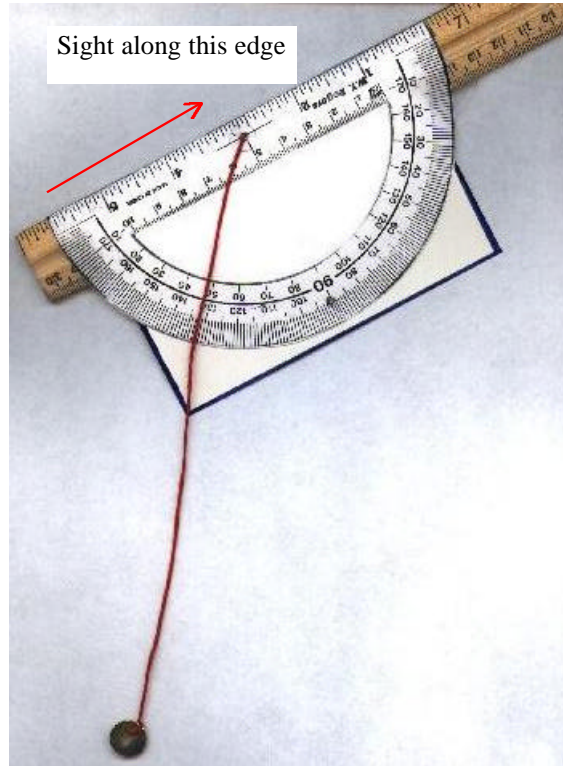
Procedure:

Part I:

- a) Tie a washer or three paper clips to one end of the string. Tie or tape the string to the midpoint of the protractor, so that the string falls across the 90 mark. The string is called a plumb line.
- b) Tape the protractor to the ruler to within an inch of the end of the ruler.



- c) Sight an object by placing your eye at one end of the ruler. The protractor will be upside down and the plumb line will hang down.



- d) Let your partner determine where the plumb line falls on the protractor. Reading the inner set of numbers on the protractor (0° to 90°), record this number on your data sheet; this is the zenith angle. Subtract this angle from 90° and you have found the object's altitude angle, or the height in degrees, of the object above the horizon.

Object	Zenith Angle	Altitude Angle (90° -zenith angle)

Part II: Observing Celestial Objects

1. When viewing any celestial object at night, find an area away from lights, trees, etc., that will reduce vision.
2. Use a compass or Polaris to find north, then find east, west, and south. Locate the celestial object in the sky (a comet, star, the Moon, or a planet) and record its compass direction.
3. Sight the object along the edge of the sextant (ruler) to determine its altitude. Record the angle indicated by the plumb line.
4. Using the data chart, record the date and time of the observation. Keep a log for several weeks' time to emphasize the celestial object's motion.

DATA					
Object:					
Observation	Date (22-09-1998)	Time (8:30 p.m. CST)	Compass Direction (e.g., NW, SW...)	Zenith Angle (e.g., 30°)	Altitude Angle (e.g., 60°)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

POST-LAB:

Questions:

1. *What does the change in position of a star in one night indicate?*
2. *How did a star appear to move in a 3-4 hour period (e.g., north to south, east to west)?*
3. *What does the change in position of a star at a particular time of night, over a period of days or weeks, indicate?*