

Experimental Design

Purpose: To find an accurate altitude of the balloon.

Hypotheses:

We believe that:

- 1 we can find the height within 10m using the law of sines
- 2 we can find the height within 30 m using geometric means
- 3 we can find the exact height using a laser range finder

Method:

Law of sines

Station 1, 2, 3 set up in a straight line

Station 3 will be directly under the balloon (found with a periscope)

Station 1 and 2 measure angles using clinometers

Once we have this info, we will plug it into the following equation:

$$\frac{\sin b}{D_a} = \frac{\sin a}{D_b}$$

Da Db

Geometric Mean

Station 1, 2, 3 set up in a straight line

Station 3 will be directly under the balloon (found with a periscope)

Station 1 and 2 measure angles using clinometers (angles must be same measure)

Measure distance from balloon to station 1 and 2

Then plug into this equation

$$\frac{D_1}{X} = \frac{D_2}{X}$$

X X

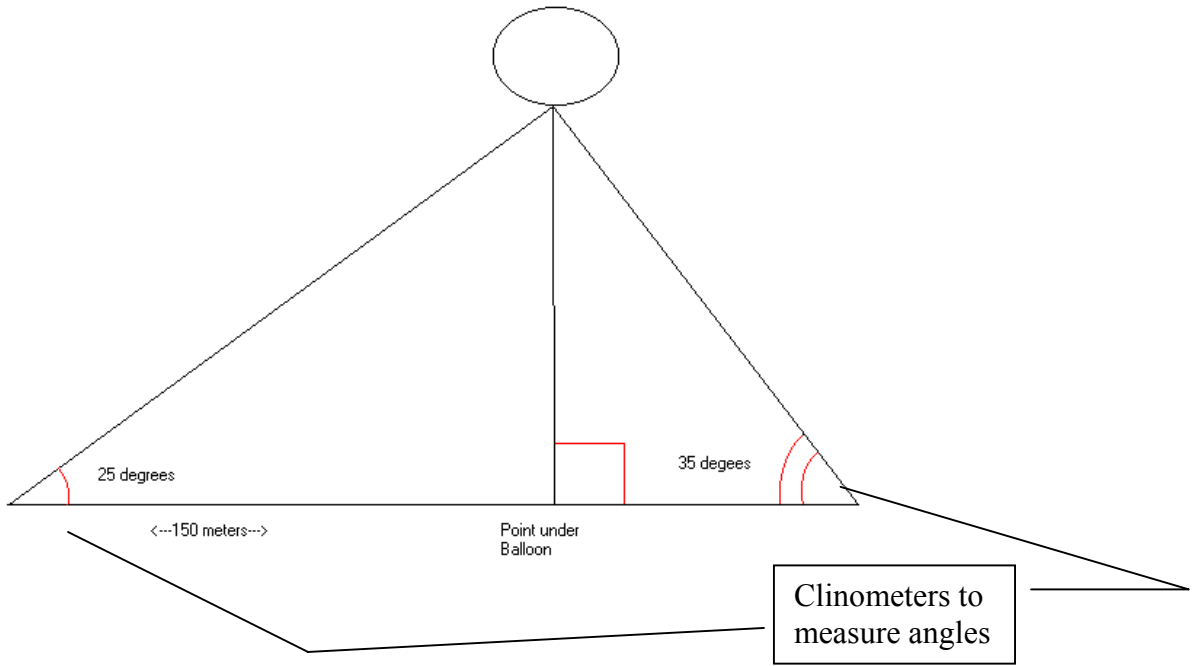
Laser RangeFinder

Find direct spot below balloon

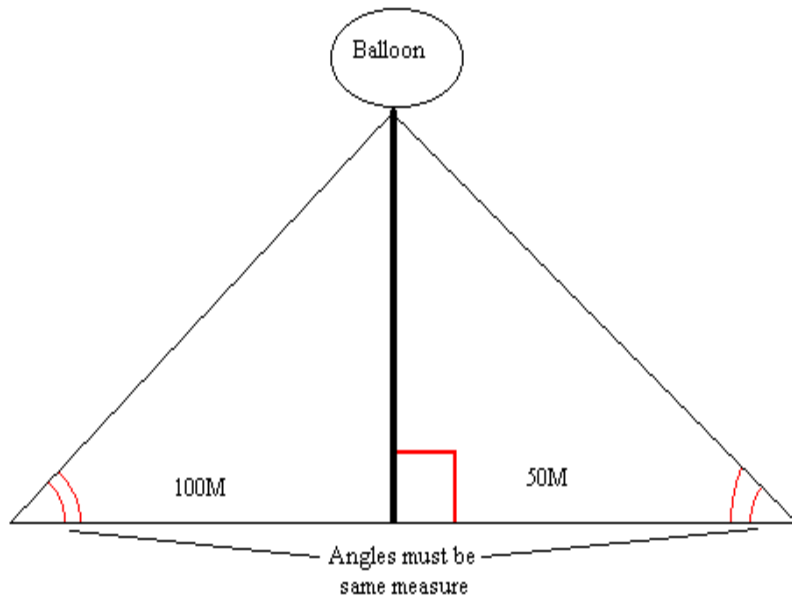
Aim RangeFinder to mirror on bottom of balloon

Record height

**Tests:
Law of Sines**



Geometric Mean



Laser RangeFinder

