View features and determine the size of the moon

**Purpose:**
Use a map of the Moon's features to identify as many of the different features as possible. As well as measure the size of the Moon given the distance to the Moon. This is interesting to compare to the size of the Earth.

**Equipment and Time Needed:**
Part A:
- At least 2 sheets of paper
- A telescope or binoculars
- Map of moon
Part B:
- A piece of stiff paper or cardboard
- A ruler or meter stick
- A calculator
- You might also want an observing partner to help take measurements

**Procedure Part A:**
View the Moon twice, once with your naked eye and once with a telescope or binoculars. Each time draw a map of the Moon with as many features as you can. Then use the map on the next page to identify and label the features you have drawn. Try to draw as many features as you can, you won’t get full points for only two or three craters and a maria. Try to use a phase like first quarter so the features are easier to see.

Draw each image on a piece of paper and staple it to this page to be turned in.
*can we use the map found at the following website? http://www.theskyplus.com/lunarmap.html*

**Data Part A:**

**Naked Eye Viewing:**
- Date of Naked Eye Viewing: ________________
- Phase of Moon for Naked Eye Viewing: ___________

**Telescope or Binocular Viewing:**
- Date of Viewing: _____________
- Phase of the Moon: ____________
- Instrument used: _______________

**Procedure Part B:**
1) Cut a circular hole in the paper or cardboard. This hole should be between 0.25 and 0.5 inches in diameter.
2) On the night of a full Moon move the hole back and forth from your eye until you match the size of the Moon to the size of the hole. Your choice of hole size might mean having someone else hold the paper.

3) When you have matched the hole and the Moon, measure the distance between your eye and the piece of paper. Do this a few times to make sure you get accurate measurements.

   Date: __________________________

   Diameter of the Hole: ___________ (in centimeters)

   Distance from your eye to the paper: ___________( in centimeters)

4) Once this is done follow the calculations below to determine the size of the Moon. Compare this with the actual size of the Moon.

   The Moon’s distance is $3.844 \times 10^{10}$ cm

   $\text{Size of the Moon} = \text{diameter of the Hole} \times (\text{Distance to Moon} / \text{Distance to Paper})$

   Divide this number by 100,000 to convert to kilometers

   $\text{Size of the Moon} = \text{______________ km}$

Questions:
1) When viewing the features on the moon, how did your drawings differ?
2) Was it easier to see the features on the moon when it was full or at 1st quarter?
3) When you calculated the size of the moon, how close did you come to the accepted value?
4) What could you have done differently to get a better result?