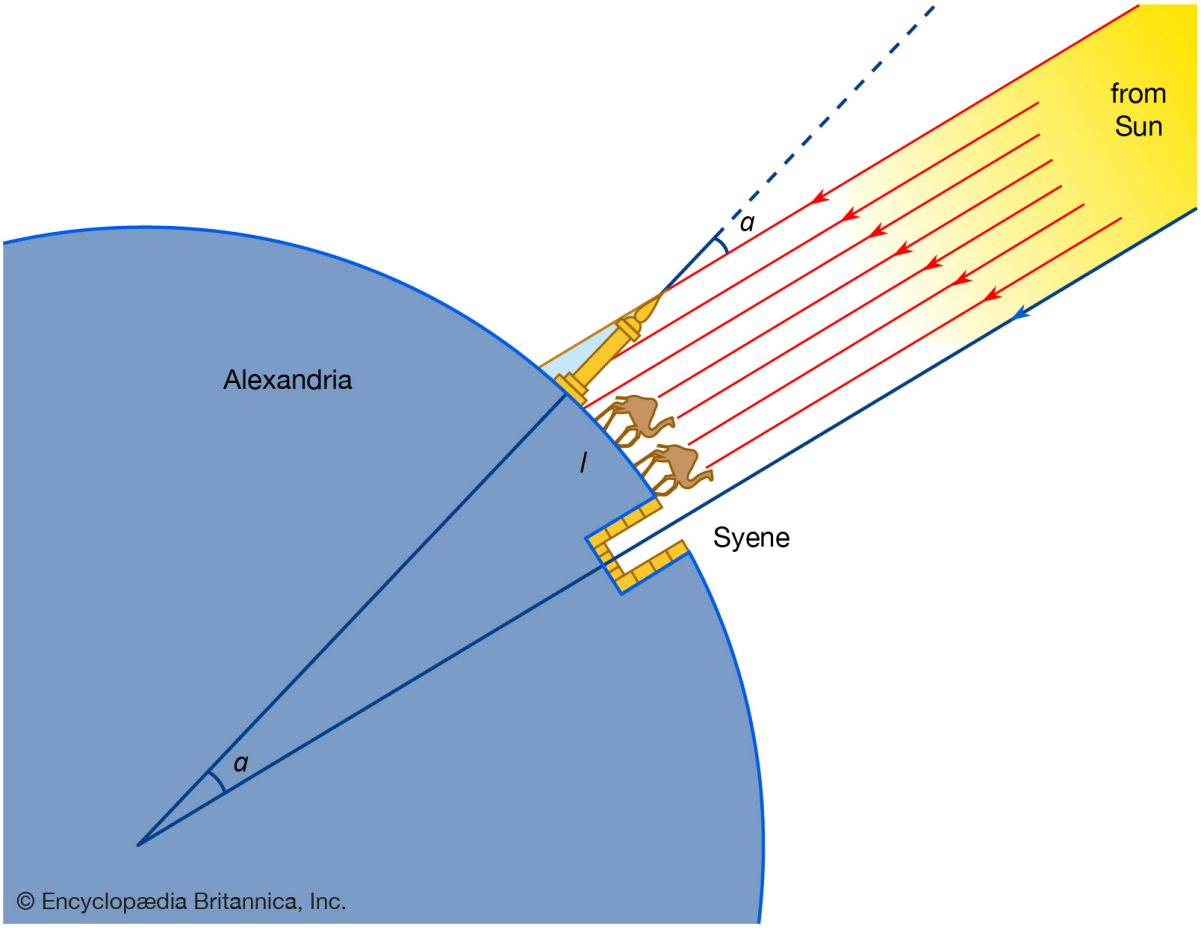
The experiment consists in trying to reproduce the method used by Eratosthenes to measure the radius of the Earth by just taking measurements on the surface. In order to do it we need to apply knowledge from the theory of euclidean geometry. The only material you need is an object (like a pole) to create a shade and something to measure both the length of the object and the length of the shade.
Reading: https://www.aps.org/publications/apsnews/200606/history.cfm



The logic is as follows: we need to measure the angle α from the shade created by the pole and the distance l between the pole and the place where the sun is directly overhead. Once we have α and l we can calculate r.

NAME:

1. You can reproduce this experiment from anywhere on the planet. Let's refer to the location where you set the pole and measure the shade as point A (see figure below). Similarly we will refer to the point on earth where the sun is directly overhead (at its zenith) as point B. You can use the following link in order to track point B at a specific date and time: https://www.timeanddate.com/worldclock/sunearth.html

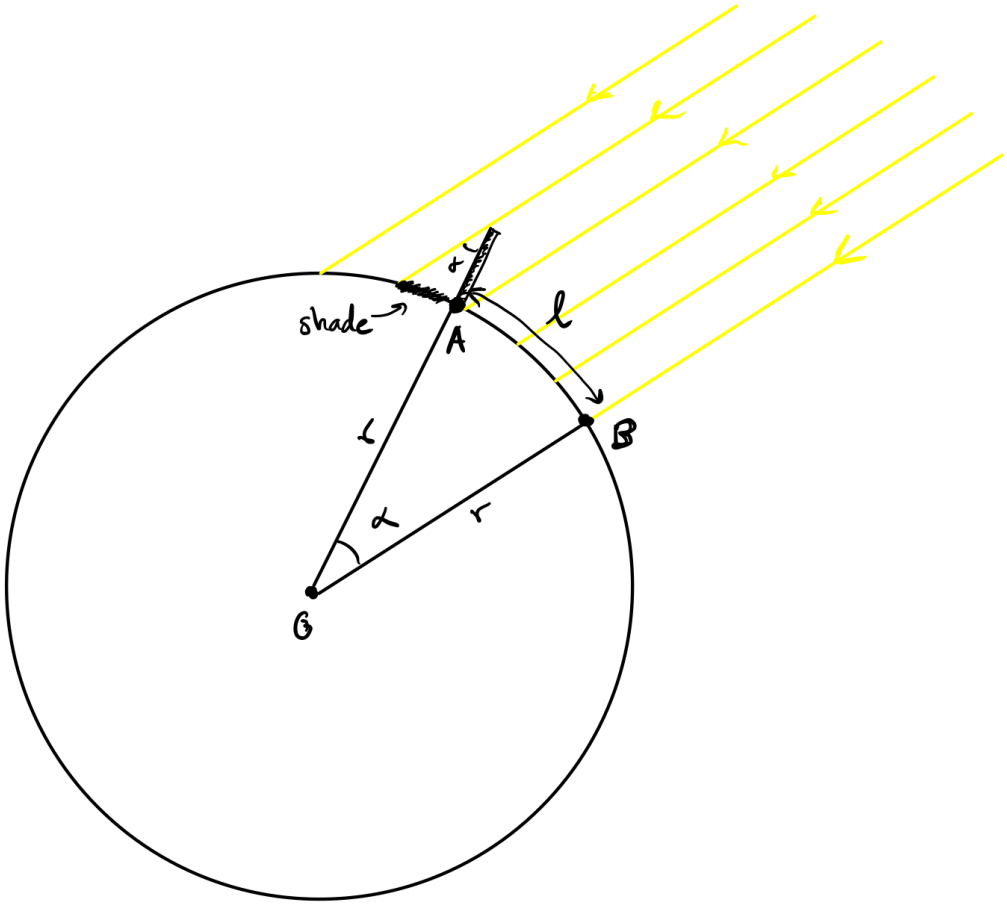


Table 1: Collect data in this table as precisely as you can

Date and time	**Point A (location of the pole)**	**Point B (sun is overhead)**

2. Like Eratosthenes, you will also need the distance l between points A and B. But here you will cheat: you can search that on the internet. If you know the latitude and longitude of each point, you can use this link to get the distance between them: https://www.movable-type.co.uk/scripts/latlong.html

Distance between point A and B

3. In order to find the angle α you will need to measure the height of the object h and the length of the shade that the object produces d. Once you have these two, you should use a trigonometric formula to find the angle α. Hint: notice how the shade, object and light ray forms a right triangle if we zoom in at point A (see figure below). Make sure h and d are both in the same units!

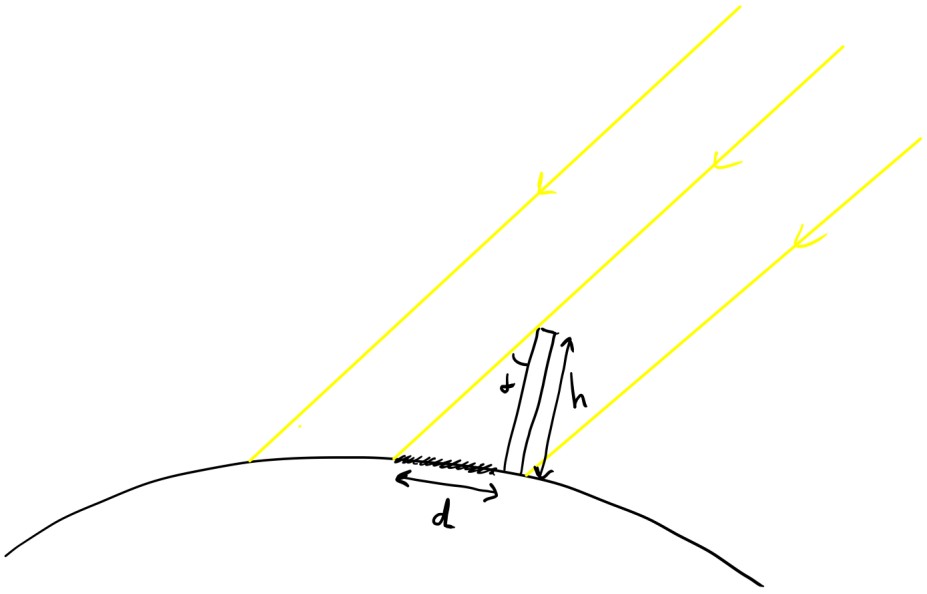


Table 3: Collect data in this table as precisely as you can

Height of the object h	**Length of the shade d**	**Formula for α and result**

4. Once you know α and l, what formula will you use to find the radius r of the earth? See the figure above Table 1 and review the definition of an angle. Apply the formula to find r. Make sure that the units are consistent (l and r should have the same units and α should be in radians)

5. Now that you calculated r, compare it to the currently accepted value for the radius of the earth (from Wikipedia). What is your percentage or error? List a few potential sources of error in your measurement that may have contributed to the mismatch?

6. Finally, I want to see a picture of your experimental setup. It must show the object that you chose and the shade that it created and that you measured.