QUIDES

1)Measure the distance from your school (or the place where the experiment on 20 or 21th of March will be implemented) to the equator with google earth . Be careful with this measurement to find the right distance (you must move along the same longitude from your place to equator)

Using Google Earth

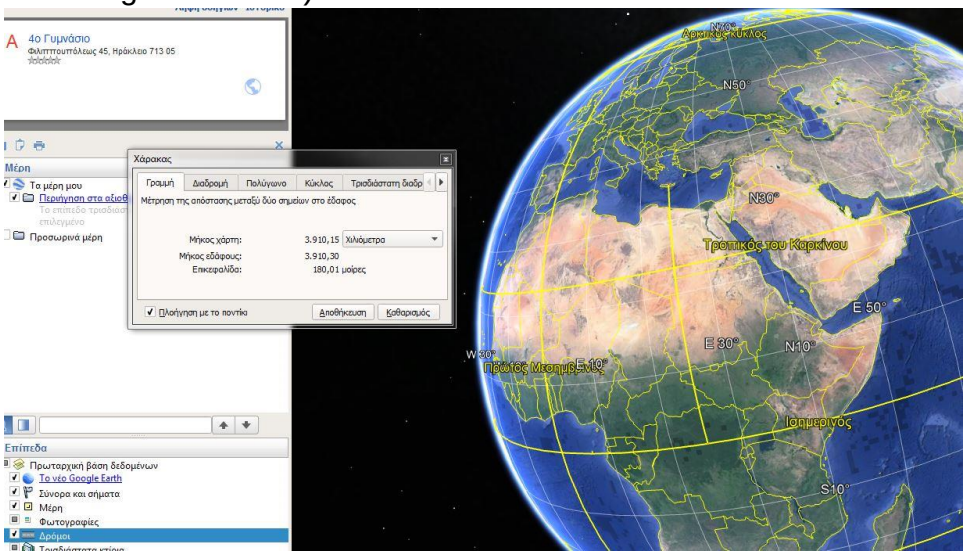
On Google Earth:

A. Select View > Lat/Lon Grid.

B. Select Tools>Ruler or click  to measure length, area, and circumference as follows:.

1. Position the imagery you want to measure within the 3D viewer and make sure you are viewing the earth from top-down (type U) and with terrain turned off for best accuracy. Measuring is calculated using the lat/lon coordinates from point to point and does not consider elevation.
2. From the Tools menu, select Ruler. The Ruler dialog box appears. Consider moving the dialog box to a region of your screen that doesn't obstruct the 3D viewer.
3. Choose the type of shape Line. All versions of Google Earth can measure with Line or Path.
4. Choose the unit of measure for length as kilometers.
5. Click on the 3D viewer to set the beginning point for your line on your school's location and then on the point of the tropic of Cancer that is on the same meridian as your school.
   A red dot indicates the beginning point of your shape, and a yellow line connects to it as you move the mouse.

6. The distance between the two points appears in the box (see Figure 1 below).

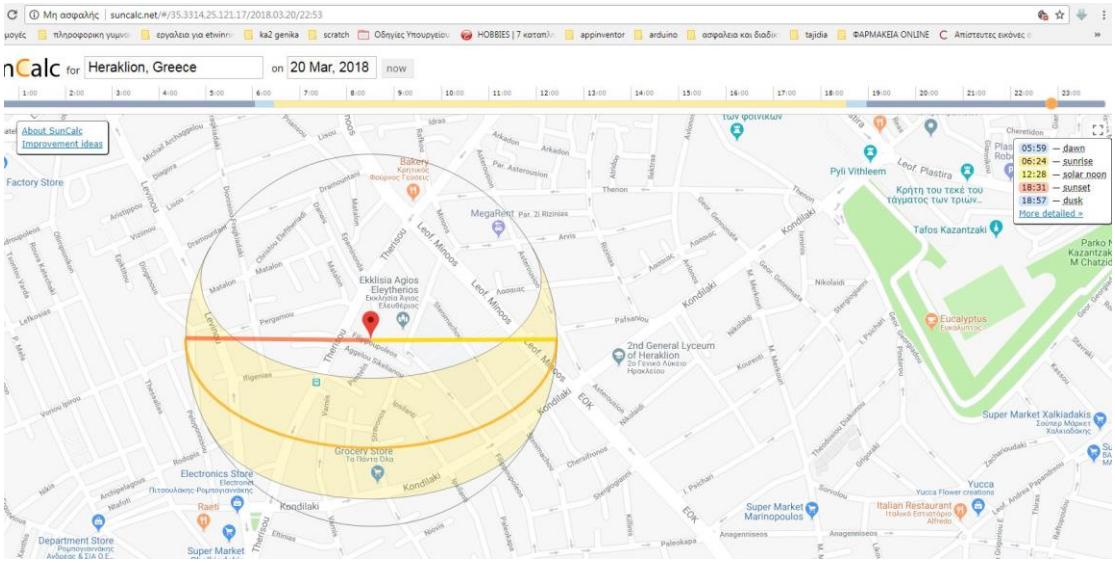


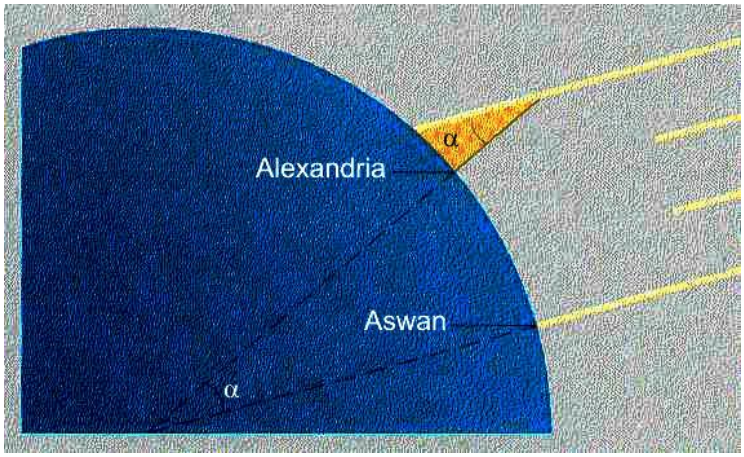
SOME DETAILS FOR 4TH SECONDARY SCHOOL
35o 19 ‘ 54 “ LATITUDE 25o 7’ 54 “ longitude

3910 km is the distance from 4TH SECONDARY SCHOOL to equator

DISTANCE FROM YOUR PLACE TO EQUATOR	KM
4TH SECONDARY SCHOOL OF IRAKLION	3910

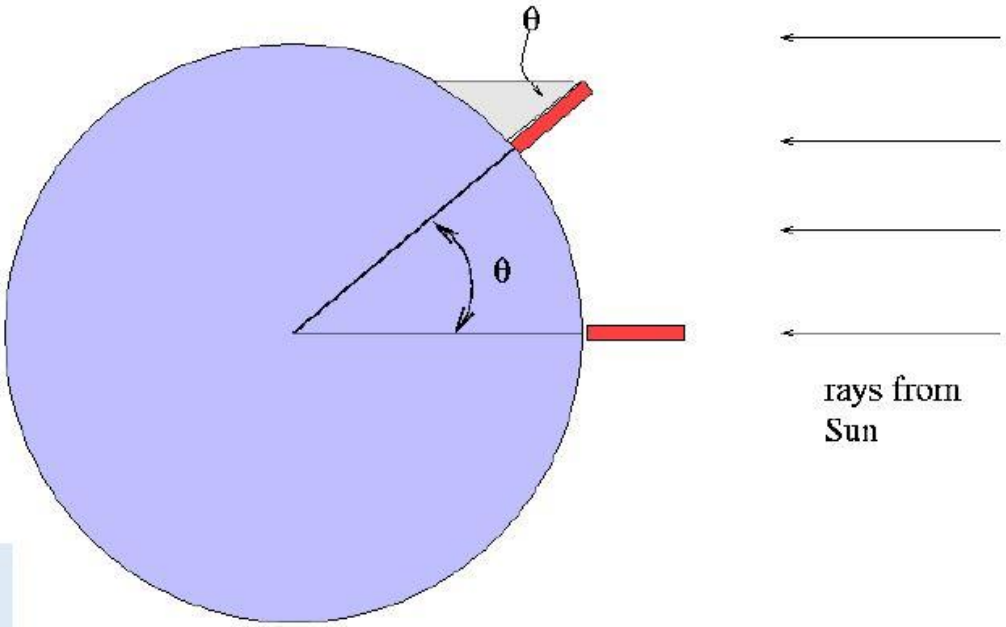
2)Find in this link http://suncalc.net the time at which we have the less shadow in each school (see the time for the solar noon) on 20th of March. (The link for 4th Secondary School of Iraklion is http://suncalc.net/#/35.3314,25.121,17/2018.03.20/22:53)





NAME OF EACH PLACE	THE TIME FOR THE SOLAR NOON IN EACH PLACE
4TH SECONDARY SCHOOL OF IRAKLION	12:28

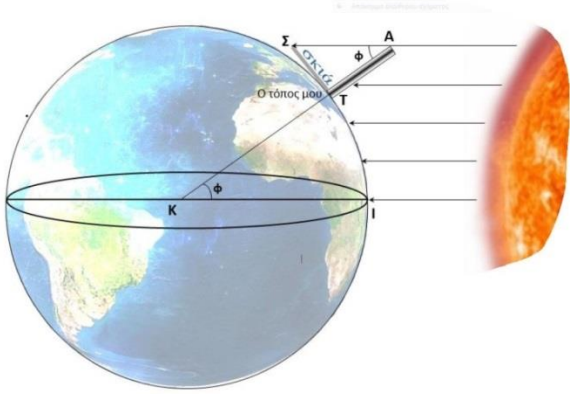
3) Counting the angle



By measuring the shadow of a pillar, round 100 cm (vertical wand on the ground) we will be able to calculate the radius of the Earth, as Eratosthenes estimated it.

We know that Earth is a sphere and when the rays of the Sun reach it are parallel. The epicentric angle in the center of the Earth and the angle that the pillar with its shadow forms are alternate, so they are equal. We can calculate this tangential angle by measuring the shadow and the height of the post. So we have

$$\text{Tan}(\theta) = \frac{\text{length of shade in cm}}{\text{engthof post in cm}}$$



From the trigonometric tables we find that the angle (θ) is =……..

Measuring Earth's Perimeter

Now all students have to do is reproduce Eratosthenes calculations.

Remember the S is the distance from your school (or the place where the experiment on 20 or 21th of March will be implemented) to the equator.

The Earth's perimeter is calculated from the relationship

$$\text{Perimeter} = \frac{S*360}{\theta}$$

So the radius of the Earth is :

R = Perimeter / (2* 3,14) km