

Measure the Circumference of the Earth

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The method of measuring the Earth's circumference was carried out in Alexandria, Egypt for the first time in the 3rd century BC. Eratosthenes was astronomical knowledge, philosopher, mathematician and director of the Alexandria Library. One day Eratosthenes read in one of the books on the papyrus that there was no shadow at the stick-erected upright at noon on June 21 in the city of Syene near the Nile River. There was a shadow of the stick at noon on June 21st in the city of Alexandria. Why were the shadows of the sticks different in the two cities? There was only one answer to this question: "The Earth was curved." The distance between Alexandria and Syene had to be 7 degrees on the surface of the Earth according to the difference between the shadow lengths of the two sticks. Seven degrees equals one in fifty of the 360 degrees circumferences of the Earth. Eratosthenes sent a man to Syene from Alexandria on foot to measure the distance between Alexandria and Syene. Thus, Eratosthenes measured the distance between the two cities is 800 km. He multiplied by 800 km to 50 and calculated that the Earth's circumference is 40,000 km.

The "Measuring the Earth's Circumference " activity allows students in the same longitude to calculate the Earth's circumference by their own measurements. In order to perform this activity you should contact a school with the same longitude as your school. Students of the same longitude school and your students should measure the shadow lengths of identical sticks on the same date and at the same time. Students will measure the Earth's circumference using the distance between the two schools and angle difference.

Earth's circumference = Distance between two schools \times 360 / Angle difference

As a result of this activity students;

- They will be able to measure the Earth's circumference, size, volume and average density.
- They will be able to interpret the daily movements of the Earth and the Sun by examining the change of shadow length.
- They will be able to predict and interpret the shape and curvature of the Earth because of different shadow length in different locations.
- They will find the opportunity to apply abstract basic mathematical concepts, in particular the concepts of geometry and trigonometry and will understand how important they are in their daily lives.