



Modern Times Earth Measurement: The Eratosthenes Experiment Experience of a Science High School in the Philippines



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ABSTRACT

We present here the experience of select Grade 12 scholars of the Philippine Science High School CALABARZON Region Campus in the Philippines in conducting the 2022 edition of the Eratosthenes Experiment organized by Ellinogermaniki Agogi of Greece. The preparatory activities of the students and the teachers are detailed including the establishment of the collaboration and communication for the Earth circumference measurement with Daqing Petroleum High School in China. Short student interviews are also included as qualitative feedback. Finally, the representation of the Campus to the 2022 DiSTARS Summer School in Greece as a reward for winning the Photo Contest of the Eratosthenes Experiment is also described.

Eratosthenes and His Method

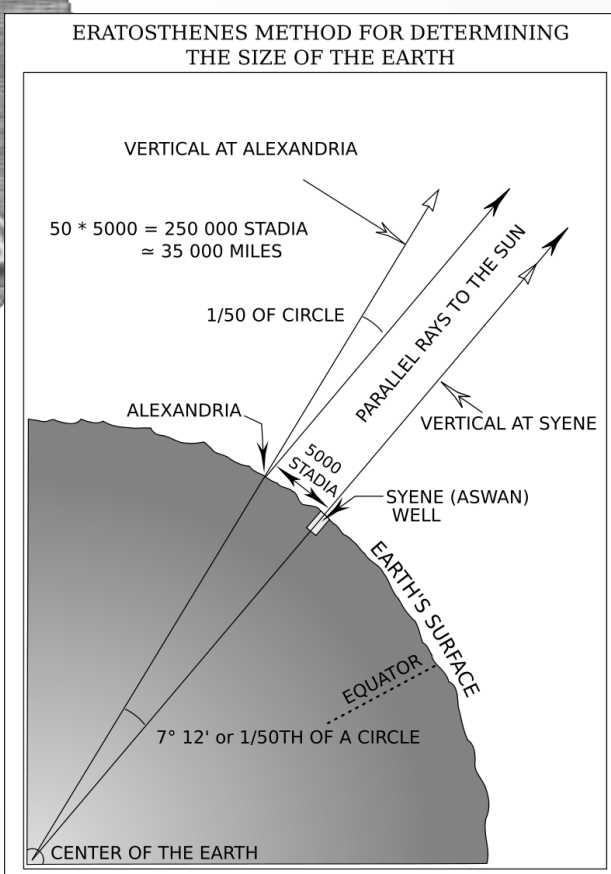
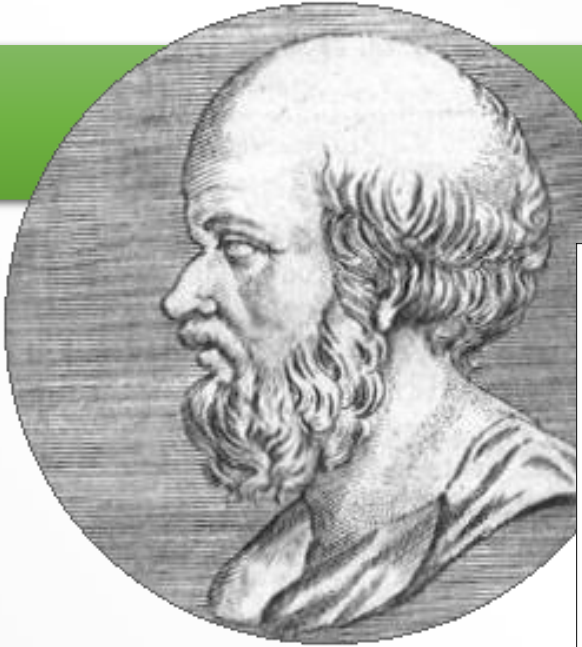


Figure 1.
a) Eratosthenes
b) diagram of the method employed by Eratosthenes to determine the Earth's circumference (Photo Credit: Wikipedia.org)

Eratosthenes was a Greek mathematician who devised a method to determine the circumference of the Earth using geometry. He used the angles cast by the shadows of two vertical poles placed in two cities and separated by a known distance. His experiment is still being conducted at present to further refine and have an up-to-date measurement of the Earth's circumference.

Eratosthenes Experiment

The modern day measurement of the Earth's size is still being conducted twice a year – on **March 20/21** and on **September 23/24** – and facilitated worldwide by the Research & Development Department of **Ellinogermaniki Agogi**, an educational institution based in **Pallini, Greece**. A call for participation is posted online via eratosthenes.ea.gr and an interactive world map is generated to show the participating schools.

For the March 21 edition of the Eratosthenes Experiment, the **Philippine Science High School CALABARZON Region Campus (PSHS-CALABARZON RC)** in the **Philippines** joined the event and was partnered with **Daqing Petroleum High School** in **China** for the measurement of the Earth's circumference using our shared data.

Ten (10) Grade 12 students and two (2) teacher-facilitators from PSHS-CALABARZON RC participated in the conduct of the experiment on **March 21, 2022, local noon time**.

Upon calculation using the gathered data from the Campus grounds and using the shared data with the partner school, the group yielded a **8.9%** error while a **0.19%** error was determined using the shared data with Daqing Petroleum High School.

Student Feedback The students have shown their creativity in the photo documentations of the experiment one of which was eventually submitted for the Photo Contest part of the experiment. The students enjoyed the conduct of the experiment and was even used as a reference extra-curricular participation for a university scholarship application of one of the participating students.

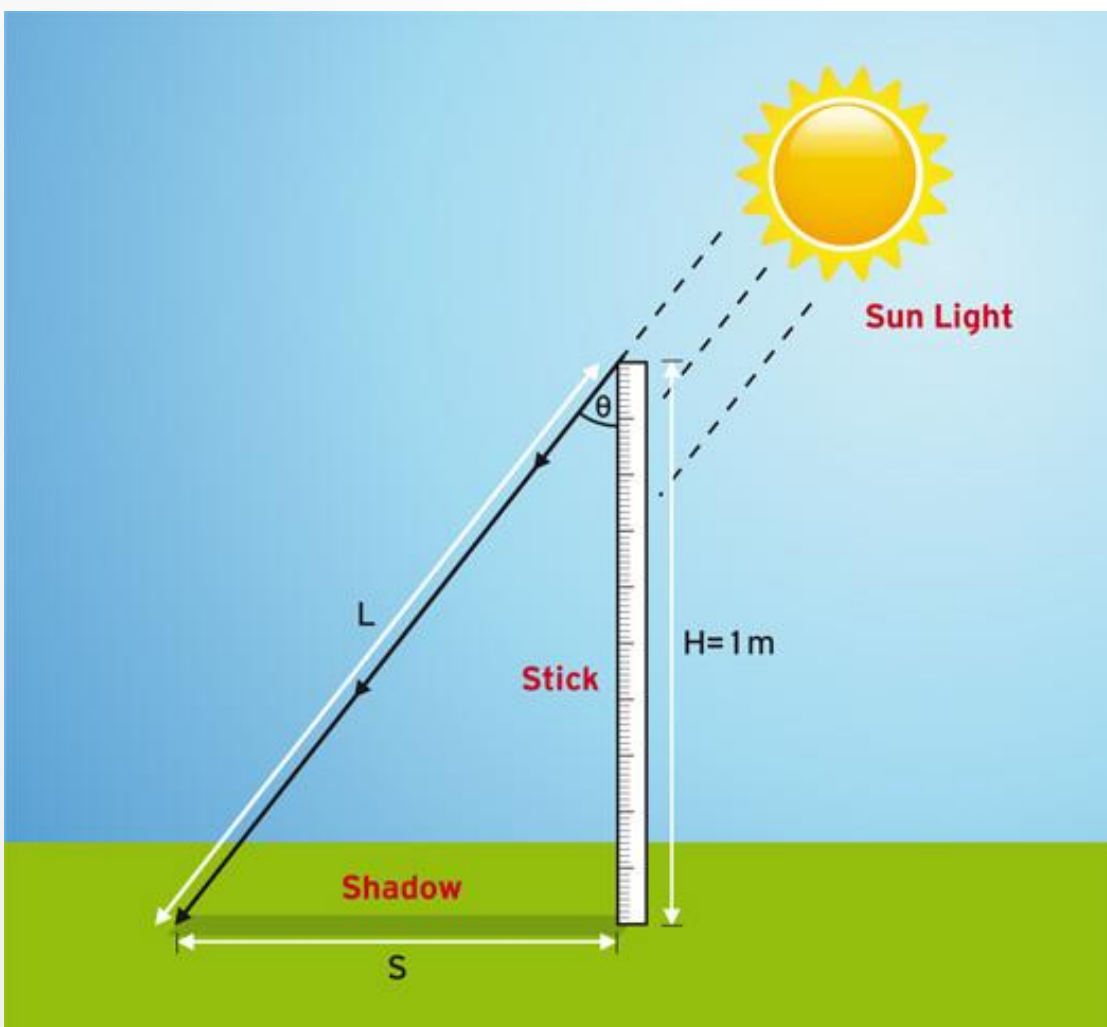


Figure 2. Diagram of the prescribed process of gathering data needed for the measurement of the Earth's circumference (Photo Credit: eratosthenes.ea.gr)



Figure 3. Actual shadow measurement at PSHS-CALABARZON RC grounds on March 21, 2022, local noon time (Photo Credit: AKManay)

Students' Creative Output and 2022 DiSTARS Summer School

The Campus won First Place in the Photo Contest of this edition of the Eratosthenes Experiment. As a prize, one of the teacher-facilitators was included in the 2022 DiSTARS Summer School held in Marathon, Greece from July 10-15, 2022. It is hoped that participation can be continued in the coming years to contribute to the refinement and update of the Earth circumference through the Eratosthenes Experiment.

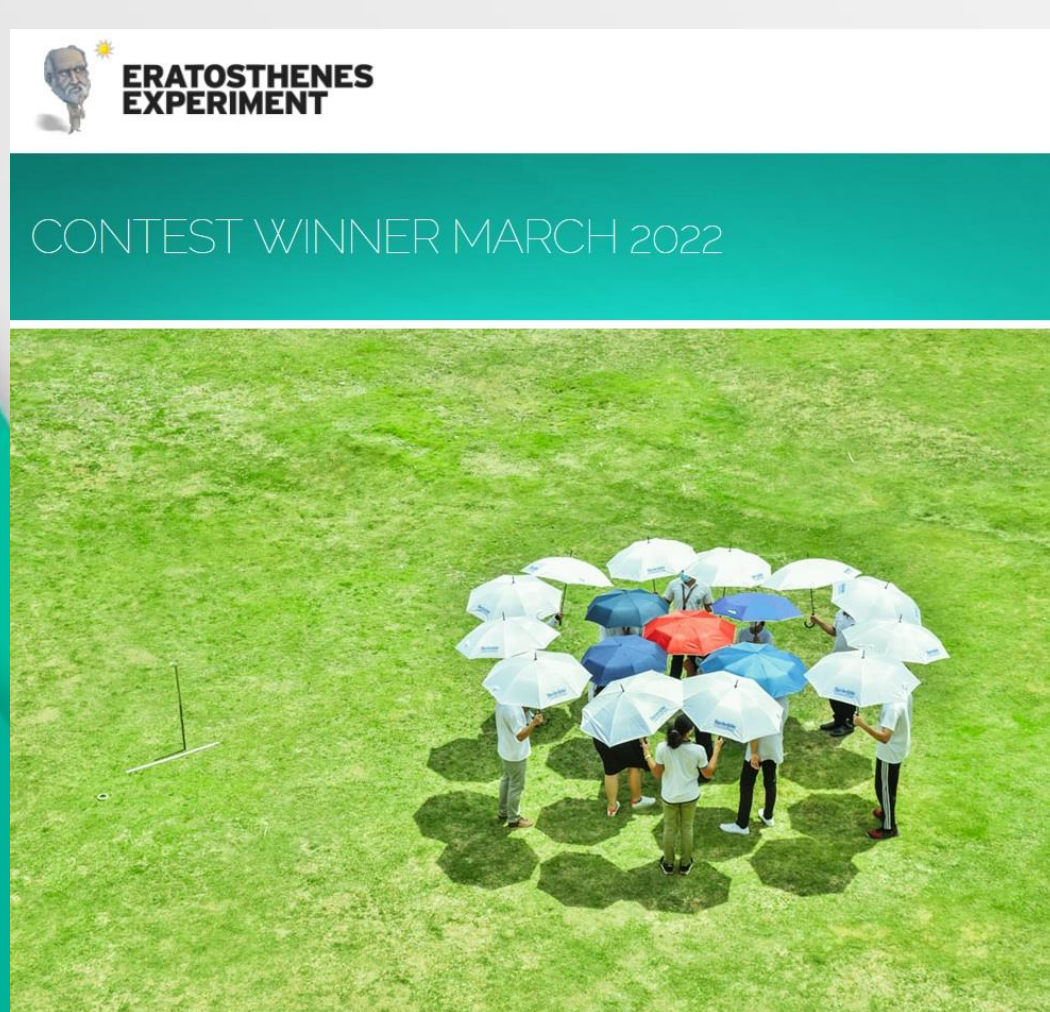


Figure 4. The winning photo for the 2022 edition of the Eratosthenes Experiment Photo Contest (Photo Credit: Ellinogermaniki Agogi)



Figure 5. The participants of the 2022 DiSTARS Summer School held in Greece and participated in by one of the teacher-facilitators of PSHS CALABARZON RC (Photo Credit: NUCLIO)