Collaborative Projects

The Noon Day Project

Measuring the Circumference of the Earth

Every September and March the Center for Innovation in Science and Engineering Education (CIESE) hosts a collaborative Internet activity called the “Noon Day Project” in which schools from all over the world contribute measurement data in order to re-create an experiment that was done over 2200 years ago by Eratosthenes, the chief librarian at the library in Alexandria, Egypt. Here’s how the measurement works. By knowing the angle that the sun makes with a stick placed perpendicular to the ground at two different latitudes on the earth, you can determine the angle that the two locations make with the center of the earth (i.e. the central angle). This information along with knowing the north-south distance between the two locations is enough information to calculate the circumference of the earth.

In order to get the appropriate sun angle information two schools located at different places on the earth need to measure the length of the shadow cast by the stick when the sun is highest in the sky. In the figure the students are measuring their sun angle when the sun is directly overhead of the equator. At this time the sun angle and the central angle are the same since the sun’s rays are parallel and the angles are alternate interior angles on the opposite side of the transversal.

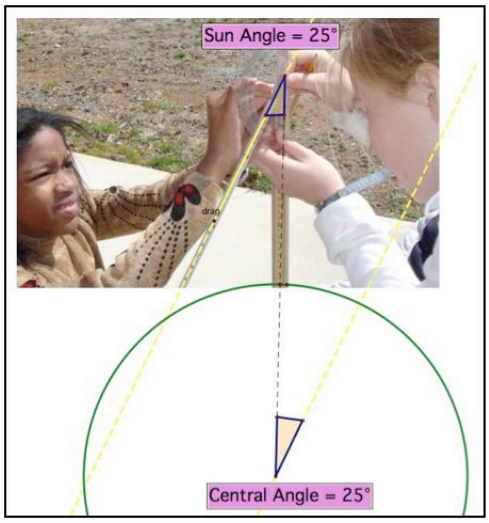

Figure. Noon Day Measurement

References

CIESE Collaborative Projects – Noon Day
http://ciese.org/curriculum/noonday

The Study of Shadows – West Orange, New Jersey
https://www97.intel.com/education/odyssey/day_167/day_167.htm

Noon Day Teacher Guide (to be revised)
http://ciese.org/noonday/teacherguide.html

Resources (to be updated)
http://ciese.org/noonday/references.html

World Year of Physics 2005
Measure the Earth with Shadows
http://www.physics2005.org/projects/eratosthenes/index.html

World Year of Physics 2005
Teacher's Guide – The Eratosthenes Project
http://www.physics2005.org/projects/eratosthenes/TeachersGuide.pdf

Eratosthenes Project on Facebook
https://www.facebook.com/groups/Eratos/

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Ihor Charischak
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http://climeconnections.blogspot.com/2012/09/noon-day-project-september-2012.html