

Lesson Logistics

Learning Outcomes

Grades 10-12
Trigonometry
Geometry
Cartesian and Polar Graphing
Orienteering
Technical Drawing and Planning

Class Organization

The sundial activity can be performed many different ways. The activity outlines two methods for drawing an ellipse, which could be performed simultaneously by two groups of students and compared for accuracy and ease of construction. Alternatively, the entire activity could be performed as a class.

Notes

This activity requires a sunny day.

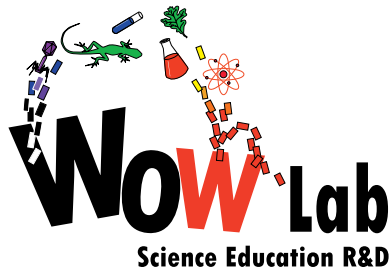
Further Exploration

Trigonometry

The second method of drawing an ellipse requires a thorough understanding of the trigonometric ratios: tangent, cosine and sine. The sundial experiment can be used as a visual method to reinforce the concept of right angled triangles, similar triangles, sine and cosine ratios, and geometry. Students could identify angles within the ellipse, expanding on the idea of time as an angle, looking at the angles of the sun and examining latitude and longitude in terms of angles.

Geometry and Graphing

Ideas that can be expanded on include the geometry of circles, ellipses and other conic sections such as hyperbolas and parabolas. Other points that could be introduced include the history and use of Cartesian and polar coordinates.



a WOW Lab

BLUEPRINT

The Human Sundial - Lesson Logistics

Compasses, Map Reading and Orienteering

The sundial can be part of an outdoor education program, focusing on using the natural environment. Aspects of constructing the sundial include reading a compass, determining the position of true north and understanding the difference between true north and magnetic north. The activity also encourages outdoor education, observing and analyzing the surrounding environment and independence from modern technology.

Astronomy

The study of the sun and celestial orbits can be discussed as part of the sundial experiment. Points to highlight include the orbit of the sun, the angle of declination of the sun, the latitude and longitude of the Earth's sphere, and other planetary motion.

Technical Drawing and Planning

To be accurate, the sundial must be carefully planned. Highlight the importance of planning, drawing and scaling before the activity. Explain the benefits of a detailed plan and a consistent notation system.