HOW HIGH IS THE AURORA?

OVERVIEW

Lesson Summary:

In the 1920s, Carl Stromer from Norway used a mathematical formula called triangulation to determine the height of the aurora. Students use triangulation to figure out the height of a tall object in their school using a simple hand-held instrument called a
Height-O-Meter.

Objectives:

The student will:

- measure the height of objects;
- use triangulation to determine the height of an object;
- construct an instrument called a Height-O-Meter;
- measure in degrees, calculate averages and interpret data; and
- conclude that similar triangulation techniques were used by Carl Stromer to figure out the height of the aurora.

GLEs Addressed:

Science

[5-8] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

[5] SE2.1 The student demonstrates an understanding that solving problems involves different ways of thinking, perspectives, and curiosity by investigating a problem or project over a specified period of time and identifying the tools and processes used in that project.

[5] SG4.1 The student demonstrates an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base by investigating that scientists' curiosity led to advancements in science.

Math

[5] S&P-2 The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating; drawing or justifying conclusions) by using information from a variety of displays (tables, bar graphs, line graphs, or Venn diagrams) (M6.2.2).

[6] S&P-3 The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating; drawing or justifying conclusions) by using mean, median, mode, or range (M6.2.3).

[7] S&P-3 The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating, making predictions; drawing or justifying conclusions) by determining mean, median, mode, or range (M6.3.3).

[7] PS-5 The student demonstrates the ability to apply mathematical skills and processes across the content strands by using real-world contexts such as science, humanities, peers, and community (M10.3.1 & M10.3.2).

[8] PS-5 The student demonstrates the ability to apply mathematical skills and processes across the content strands by using real-world contexts such as science, humanities, peers, community, and careers (M10.3.1 & M10.4.2).

[10] MEA-2 The student demonstrates understanding of measurement techniques by applying right triangle trigonometry (sine, cosine, and tangent) to find missing dimensions in real-world applications (M2.4.4).

Search Terms: Carl Stromer, Height-o-Meter, triangulation, mathematics, tangent, angle, aurora, Northern Lights