VOLUME OF EARTH'S LAYERS

Science Teacher Education Program

Lesson Summary:

The core of Earth consists of iron and nickel. It includes a solid inner core and a liquid outer core. As Earth rotates, the molten metals of the outer core move in a turbulent, rotating manner, creating electric currents. These currents are believed to generate Earth's magnetic field. In this way, the energy of motion is transformed into electromagnetic energy. In this activity, students calculate the volume of Earth's layers (inner core, outer core, mantle and crust) to help them conceptualize the tremendous strength of the magnetic field generated in Earth's outer core.

Objectives:

The student will:
- understand that Earth's magnetic field is generated by motion in Earth's outer core;
- calculate the volume of a sphere;
- find the volume of Earth's layers; and
- calculate the percent of Earth's volume that each of Earth's layers comprise.

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.

[6] SD2.2   The student demonstrates an understanding of the forces that shape Earth by identifying and describing its layers (i.e., crust, mantle, core).

Math

[7] E&C-4   The student accurately solves problems (including real-world situations) by multiplying or dividing decimals to hundredths, or multiplying or dividing by powers of ten, or multiplying or dividing fractions or mixed numbers (M3.3.4).

[8] E&C-2   The student accurately solves problems (including real-world situations) by adding, subtracting, multiplying or dividing integers or positive rational numbers (M3.3.3 & M3.3.4).

[10] G-5   The student solves problems (including real-world situations) by determining the volume or surface area of spheres or compound solids (M5.3.4).

[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).

Search Terms:

- Earth's layers
- scale drawing
- inner core
- outer core
- mantle
- crust
- volume