Inside Our Earth

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Course Name: 7th Grade Integrated Science

Core Curriculum Standard Fulfilled: II. Students will understand the

relationship between properties of matter and Earth's structure.

Core Curriculum Objective Fulfilled: 2. Analyze how density affects

Earth's structure.

Intended Learning Outcomes (ILOs) Fulfilled:

3. Demonstrate Understanding of Science Concepts and Principles3a. Know and explain science information specified for their grade

level.

3c. Compare concepts and principles based upon specific criteria.

5. Demonstrate Awareness of Social and Historical Aspects of Science

5b. Give instances of how technological advances have influenced the progress of science and how science has influenced advances in technology.

Time Needed To Complete Inquiry: 45 minutes

Inquiry: This exercise is not inquiry based, but is intended to summarize and expand the information that students have used to develop their model of Earth's interior structure.

Prior Knowledge Needed: model of Earths' layers, basic introduction to the elements, reading tables, processing data

Introduction: Review density as it relates to Earth's layers. Review students' models of Earth's layers. Discuss technology and how it is used to collect data about Earth's layers. Briefly discuss the factors of temperature and pressure and relate them to something the students know. For example, when you dive in the deep end of a swimming pool, you can feel the pressure increase around your body. When a substance compresses, it gets hotter. An example of this are hydraulic lines (such as for brakes and power steering) on tractors and cars. Another example is the compression of air and gas by the pistons in car engines.

Materials / Resources Needed for the Investigation: student worksheet

Procedure of Investigation: Students will analyze the chart showing the measured densities of Earth's layers and draw conclusions based on their knowledge of density.

Data Collection: No collection. Students will use the information given to them.

Data Analysis: Students will use the information to answer the questions.

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Introduction: You have recently learned about the density of different solids and liquids. In this activity, you will analyze some actual data from Earth's layers and draw some conclusions about their densities.

Layer	Density (g/cm ³)	Phase	Composition	Average Temperature °C
Inner Core	12.7 – 13.0	Solid	Iron	4300
Outer Core	9.9 – 12.1	Liquid	Iron, Nickel	3700
Mantle	3.3 – 5.5	Solid and Semi-Solid ("plastic")	Magnesium, Iron, Silicate	1000
Crust	2.7 – 3.0	Solid	Silicate, Magnesium, Aluminum	-45 to 54

Analysis: Use the data above to answer the following questions in complete sentences.

1. How do we know the Earth has layers? Cite at least two examples of evidence you have explored.

2. What happens to the density of Earth as you move towards the center?

3. It is thought that the Earth was a molten (liquid) ball of rock when it formed. Why did some elements sink to the center?

