

Name: \_\_\_\_\_

Measuring the Earth

Date: \_\_\_\_\_ Period: \_\_\_\_\_

Earth Science

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## Lab Activity: Spheres of the Earth

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### INTRODUCTION:

The Earth consists of a number of layers with unique compositions. When Earth was first beginning to form, the layers of Earth organized and separated from one another based upon density differences. These layers are now defined and recognized by changes in temperatures, pressures and velocities of seismic waves as they propagate throughout Earth's interior.

### OBJECTIVE:

In the following activity, you will create a cross-section of Earth that shows the layers of Earth's interior and the atmosphere that are drawn to scale [100 km = 1 cm].

### VOCABULARY:

Lithosphere

Hydrosphere

Atmosphere

Troposphere

Asthenosphere

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## PROCEDURE A:

1. Cut a 90 cm piece of register tape and secure each end of the paper to the table.
2. Using a ruler, draw a line across the register paper 10 cm from one end, parallel to that end. Label this line "CENTER OF THE EARTH".
3. Calculate the "Scale Thicknesses" of each of the layers in the data below using the scale  $100 \text{ km} = 1 \text{ cm}$ . Be sure to round your answer to the nearest tenth.

Layer	Average Thickness	Scale Thickness	Distance from the Center
Inner Core	1221 km	12.2 cm	0.0 - 12.2 cm
Outer Core	2259 km		12.2 - 34.8 cm
Mantle	2598 km		34.8 - 60.8 cm
Asthenosphere	200 km		60.8 - 62.8 cm
Lithosphere	100 km		62.8 - 63.8 cm
Layer	Average Thickness	Scale Thickness	Distance from the Surface
Troposphere	10 km	.1 cm	0.0 - 0.1 cm
Stratosphere	60 km		0.1 - 0.7 cm
Mesosphere	80 km		0.7 - 1.5 cm
Thermosphere	460 km		1.5 - 4.6 cm

4. Using these calculations, draw in the remaining lines to complete your scale model. Neatly label each layer with its correct name. Draw a person or tree on the surface of the lithosphere to indicate that this is the outermost surface of the Earth.

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## PROCEDURE B:

Go over the boundaries between the layers with a black colored pencil or a pen. Then, using colored pencils, lightly and neatly shade the layers using the following color scheme:

Layer	Color
Inner Core	Brown
Outer Core	Red
Mantle	Orange
Asthenosphere	Yellow
Lithosphere	Gray
Troposphere	Light Blue
Stratosphere	White
Mesosphere	Dark Blue
Thermosphere	Purple

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## DISCUSSION QUESTIONS:

1. Why could the hydrosphere never be found above the atmosphere?
2. Which layer of Earth's interior is the thinnest and what is the density of that layer?
3. What element is found in the crust, the hydrosphere, and the troposphere?
4. List the layers of the Earth's interior from least dense to most dense.
5. What is the pressure 3000 km below the surface of the Earth?

**CONCLUSION:** How are Earth's layers organized?