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Name: _____ Date: _____

Layers of Earth

Part I: Modeling Layers Based on Chemical Composition

Look at the cross section diagram of Earth.

Color in the layers and the legend as you create the model.



LEGEND

Crust	<input type="checkbox"/>
Mantle	<input type="checkbox"/>
Core	<input type="checkbox"/>

1. What is the chemical composition (makeup) of most of the crust material?
2. Where is the crust found?
3. What is the chemical composition (makeup) of most of Earth's mantle material?
4. Why do you think the mantle materials sank lower in Earth (toward the center of gravity) as compared to the crust materials?



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Part I: Modeling Layers Based on Chemical Composition, continued

5. What is the chemical composition (makeup) of Earth's core?

6. Why do you think these core materials sank to Earth's center?

7. Which layer makes up the majority of Earth's interior?

8. Which layer is the thinnest when looking at a cross-section of Earth?

9. What characteristics or properties of Earth material are used to classify layers as crust, mantle and core?



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Part II: Modeling Layers Based on State of Matter

1. What are the three basic states of matter?
2. Which of the crust/mantle/core layers is located in the lithosphere?
3. What is the state of matter of the lithosphere?
4. Which layer that is classified based on chemical composition is also found in the asthenosphere?
5. What is unusual about the asthenosphere's state of matter?
6. Look at the model and think about a logical reason why the inner core is under more pressure than the outer core. What causes more pressure in the inner core?
7. What is a logical reason why the inner core's state of matter (solid) is different from the outer core's state of matter (liquid). Hint: Look at question 6 above.
8. Which characteristic or property of Earth material is used to classify layers as the lithosphere, asthenosphere, as well as the inner and outer core?



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Part III: Investigating Solids That Flow

Asthenosphere Plasticity Model

1. Press down gently on your bag that represents the asthenosphere. When you first press down gently on the bag, what does it feel like?
2. Now, poke the bag quickly. How does the asthenosphere respond?
3. The asthenosphere layer is a solid with **plasticity**. How does this substance act like a solid?
4. How does it act like a liquid?
5. Think about the asthenosphere's property of plasticity. How might the plasticity of the asthenosphere affect the layer directly above it--the lithosphere? How do you think the solid lithosphere and the flexible asthenosphere interact?



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Reflections and Conclusions

1. The crust, mantle, and overall core areas of Earth are classified and divided into layers based on—
2. The lithosphere, asthenosphere, inner core, and outer core areas of Earth are classified and divided into layers based on—
3. Which type, the 3-D clay half sphere or the 2-D cross-sectional diagram provides more advantages as a model? List the advantages of each in the space below.

Advantages of:	
3-D half sphere	2-D cross-sectional diagram

4. Which type, the 3-D clay half sphere or the 2-D cross-sectional diagram, has more limitations as a model? List the limitations of each in the space below.

Limitations of:	
3-D half sphere	2-D cross-sectional diagram

5. Imagine that the cool and solid lithosphere layer is cracked into pieces, like the shell of a hard-boiled egg. Do you think the pieces might move around on the “flexible” asthenosphere? Why or why not?