Study Questions: Introduction

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Science

1. As the term is used in the physical sciences, what is *science*?
2. What is meant by the term *reproducible observation*?
3. What is a *scientific fact* (also known as a *scientific datum* in the singular, or *scientific data* in the plural)?
4. What makes an observation into something we might properly consider to be a *scientific fact*?
5. What is the term we use to describe an explanation of how two or more scientific facts are related to each other?
6. What is it about a *scientific hypothesis* that makes it different from guessing or speculation? That is, what characteristic is necessary for a potential explanation to be considered a scientific hypothesis?
7. What makes a *scientific theory* different from a *scientific hypothesis*?
8. Give an example of some aspect of the world or of human experience involves questions that science can properly address. ____
9. Give an example of some aspect of the world or of human experience involves questions that science can **not** properly address. ____
10. What is the current best scientific estimate for the age of the Earth?
11. What are the primary layers of Earth's interior, listed from the inside out? (See Figure 1.20)
12. About how thick is Earth's crust?
13. What is the only major layer of Earth's interior that is in the liquid state?
14. We know about the layering of Earth's deep interior primarily through the analysis of how seismic waves from earthquakes propagate through the Earth. The composition of meteorites helps us constrain the composition of Earth's interior. Earth has a core composed of ____.
15. Earth's temperature increases with depth to its highest temperature in the center. Pressure also increases to a maximum at the center. The inner core is in the ____ state of matter. (*Hint:* liquid, solid, or gas)
16. The mantle is in the ____ state of matter, and the part of the mantle that is deeper than the base of the lithosphere is able to flow in response to stress. (*Hint:* liquid, solid, or gas)
17. The outer core is in the ____ state of matter. (*Hint:* liquid, solid, or gas)
18. The rigid-elastic outermost part of the Earth is composed of discreet plates that are in motion relative to each other. That layer is called the ____.
19. Just below the plates is a zone in the upper mantle, called the ____, that is hot enough so that a small amount of partial melting occurs and the remaining solid rock is very weak.
20. What do we mean by the ***density*** of something?
21. What is the density of liquid water?
22. What is the average composition of continental crust, expressed as a rock type?
23. How thick can continental crust get? That is, how thick is the thickest continental crust?
24. What is the average thickness of continental crust?
25. How old are the oldest rocks in continental crust?
26. What is the average composition of oceanic crust, expressed as a rock type?
27. What is the average thickness of oceanic crust?
28. How old are the oldest rocks in oceanic crust?
29. How does the average density of oceanic crust compare with the average density of continental crust?
30. What is the upper mantle made of?
31. In what state of matter is the mantle (predominantly)? (*Hint:* liquid, solid, or gas)
32. What is Earth's core mostly composed of, expressed in terms of elements (e.g., oxygen, silicon, aluminum, iron, calcium, carbon, sulfur, hydrogen, helium, lithium, magnesium, manganese, potassium, kryptonite, guacamole, etc.)?
33. In what state of matter is the outer core? (*Hint:* liquid, solid, or gas)
34. In what state of matter is the inner core? (*Hint:* liquid, solid, or gas)
35. What does the word "lithosphere" mean literally?
36. What does the word "asthenosphere" mean literally?
37. The lithosphere includes all or part of two of Earth's major layers (see Figure 1.20). Which two?

38. Where is the lithosphere relative to other layers in Earth's interior?
39. Where is the asthenosphere relative to other layers in Earth's interior?
