***The World of Chemistry***

**Episode 18 - The Chemistry of Earth**

1. a. What name is given to a naturally occurring substance that has a definite composition?   
     
     
   b. If this substance is concentrated and is considered valuable, it is called a(n) \_\_\_\_\_\_\_\_.
2. Iron is the most common element in the “whole” earth. Only about 6% of the crust is made up of iron. What does this tell us about the distribution of minerals on the earth?
3. What are the three ways that minerals are concentrated or formed on earth?

a.

b.

c.

1. Marble and limestone, common building materials, are composed of what mineral?
2. What is the similarity about the destruction of buildings and statues and the formation of caves?
3. What is the main chemical component of sand?
4. What is the difference in silicates like asbestos, mica, and quartz?
5. What is the name of the process used to obtain pure elements like silicon?
6. Why was pure silicon important for the “information age”?
7. The density of silicate rocks varies between 2 and 3 g/mL. The density of iron is about 9 g/mL. How do these values relate to what we know about the structure of the earth?

**Answer Key**

1. a. What name is given to a naturally occurring substance that has a definite composition?

*Mineral*

b. If this substance is concentrated and is considered valuable, it is called a(n) *ore*.

1. Iron is the most common element in the “whole” earth. Only about 6% of the crust is made up of iron. What does this tell us about the distribution of minerals on the earth?

*Minerals are not evenly distributed - there is differentiation.*

1. What are the three ways that minerals are concentrated or formed on earth?
   1. *Transfer by magma*
   2. *Hydrothermal processes*
   3. *Sedimentation*
2. Marble and limestone, common building materials, are composed of what mineral?

*Calcium carbonate*

1. What is the similarity about the destruction of buildings and statues and the formation of caves?

*Both processes are caused by acid acting on calcium carbonate.*

1. What is the main chemical component of sand?

*Silicon dioxide*

1. What is the difference in silicates like asbestos, mica, and quartz?

*The way silicon - oxygen tetrahedra are bonded to their neighbors (1, 2 or 3 dimensions) affects the properties of the silicate.*

1. What is the name of the process used to obtain pure elements like silicon?

*Zone refining*

1. Why was pure silicon important for the “information age”?

*Pure silicon is needed for the computer chips and integrated circuits found in so many items.*

1. The density of silicate rocks varies between 2 and 3 g/mL. The density of iron is about 9 g/mL. How do these values relate to what we know about the structure of the earth?

*The more dense iron in found in greater amounts near the core; the less dense silicates are found near the surface.*