

*This is a study guide to help you to organize your notes based on the Objectives for this Module. This is not graded and is provided only as a study aid. To use it, fill in the table. Box 1 will ask you to redefine the terms or explain the concept. Box 2 will ask you to give an example or try to apply the concept to a new situation. Box 3 will ask you to provide information about where you can find this information. Provide enough information in this box for you to be able to use this box as a reference to finding the information again.*

**Learn and apply the concept of chemical bonding, specifically, covalent and ionic bonds.**

Define the three types of bonding described in the module.	Using an analogy, explain why covalent bonds are considered stronger than ionic and metallic bonds.	Where is this information located?
<p>Covalent</p> <p style="text-align: center; font-size: 48px; color: lightgray;">1</p> <p>Ionic</p> <p>Metallic</p>	2	3



**Recognize two important minerals: silicates and carbonates.**

What is a silicate?	What is a Carbonate?	Where is this information located?
1	1	3
What is the basic structure of a silicate? (Can you draw it?)	What is the basic structure of a carbonate? (Can you draw it?)	Where is this information located?
What type of bonds do silicates make?	What type of bonds do carbonates make?	Where is this information located?
Why are silicates considered "strong" minerals?	Why are carbonates considered "weak" minerals?	Where is this information located?
Give examples of silicate minerals. Describe what they look like.	Give examples of carbonate minerals. Describe what they look like,	Where is this information located?



**Discuss the relationship between plate tectonics, the Rock Cycle, and rock types (continued).**

Give an explanation of how each of these rock types are formed (settings) and why this results in different classes of each type of rock. (Give examples of each.)	Where is this information located?
<p>Igneous –</p> <p style="text-align: center; font-size: 48px; color: lightgray;">1</p> <p style="padding-left: 40px;">Intrusive</p> <p style="padding-left: 40px;">Extrusive</p> <p>Metamorphic –</p> <p style="padding-left: 40px;">Low Grade, nonfoliated</p> <p style="padding-left: 40px;">Intermediate Grade, nonfoliated</p> <p style="padding-left: 40px;">Intermediate Grade, foliated</p> <p style="padding-left: 40px;">High Grade, nonfoliated</p> <p style="padding-left: 40px;">High Grade, foliated</p> <p>Sedimentary –</p> <p style="padding-left: 40px;">Detrital (Clastic)</p> <p style="padding-left: 40px;">Chemical</p> <p style="padding-left: 40px;">Organic</p>	<div style="font-size: 48px; color: lightgray;">3</div>
<p>What types of rocks were involved in the failure of the St. Francis Dam? If the rocks disintegrated when wet, what can you deduce about the types of bonds in that rock?</p>	
<div style="font-size: 48px; color: lightgray;">2</div>	

**Relate tectonic setting, mineral formation, rock formation, and rock strength.**

<p>For each tectonics setting, explain what type of rocks you would expect to find. Starting with an explanation of bonding, explain how rocks get strong. How are strong bonds created? What tectonic setting creates strong bonds?</p>	<p>Where is this information located?</p>
<p>Convergent</p> <p style="padding-left: 40px;">Oceanic to Continental</p> <p style="padding-left: 40px;">Oceanic to Oceanic</p> <p style="padding-left: 40px;">Continental to Continental</p> <p>Divergent</p> <p style="padding-left: 40px;">Oceanic from Oceanic</p> <p>Intraplate</p>	<p style="text-align: center; font-size: 48px; opacity: 0.5;">3</p>
<p>In order from weakest to strongest, list the rock strength of these rocks: Extrusive Igneous, Intrusive Igneous, Low Grade Metamorphic, High Grade Metamorphic, and Sedimentary rocks.</p>	
<p style="text-align: center; font-size: 48px; opacity: 0.5;">2</p>	

**Relate tectonic setting and geologic history to rock formation and types found here in Indiana.**

<p>What's underneath Indiana? (List in order from surface to the mantle.)</p>	<p>What is Indiana's tectonic setting? (Are we at a plate boundary?) Based on our tectonic setting, what types of rocks would you expect to find here?</p>	<p>Where is this information located?</p>
<p style="text-align: center; font-size: 48px; opacity: 0.5;">1</p>	<p style="text-align: center; font-size: 48px; opacity: 0.5;">2</p>	<p style="text-align: center; font-size: 48px; opacity: 0.5;">3</p>

**Relate tectonic setting and geologic history to rock formation and types found here in Indiana (continued).**

What rock types do you find at the surface of Indiana from North to South?	Why don't we have the same types of rocks at the surface throughout all of Indiana?	Where is this information located?
1	2	3

**Identify important mineral and rock resources in Indiana.**

Given what you know about rocks, what types of mineral resources does Indiana have?	List examples of rocks we find here in Indiana and the minerals they have.	Where is this information located?
1	2	3