



Objective: After today's lesson, you will be able to...

- ❑ Tell me what the word "aggregate" means and at least three things aggregate is used to make.
- ❑ List the 5 steps in the mining cycle
- ❑ List some of the geologic materials used in building your home.
- ❑ Describe the Mohs Hardness Scale. Make a scale of mineral hardness for objects found at home. Use the scale by finding the relative hardness of three rock specimens.
- ❑ List at least five geologic specimens that have important uses.
- ❑ Describe what a fossil is and how it is used to tell how old a formation is. Identify two examples of local fossils.

5 min.	<p><b>Aggregate?</b></p> <p>Aggregate means the granular materials used for construction or manufacturing. Just think of Sand, gravel, or crushed stone when you're talking about aggregate.</p>	Flip chart
10 min.	<p><b>Mining Cycle:</b></p> <p>Can we go out anywhere and dig sand and gravel? No. We have to <b>EXPLORE</b> for it. We go out and look at the geology and drill for it.</p> <p>When we find a deposit, we have to tell everybody how we are going to mine it. The law requires us too <b>PLAN</b> how we are going to mine it way before we start. The law requires us to make sure we know what we are about to do so no one gets hurt and we don't harm the environment.</p> <p>We then <b>MINE</b> the aggregate using all kinds of equipment.</p>	<p>Flip Chart</p> <p>Show sand and gravel</p>

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	<p>After we get the material out of the ground, we <b>PROCESS</b> it into a useable product. We use water and equipment to separate the sand from the gravel and clean it.</p> <p>Now we have a useable product which benefits our community. But are we finished?</p> <p>No. We have to do the most important thing now, we must <b>RECLAIM</b> the land. We have to fill the hole and make the land useable again.</p>	
<p>5 min.</p>	<p>Tell me what aggregate is used to make...</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Concrete</li> <li><input type="checkbox"/> Asphalt pavement</li> <li><input type="checkbox"/> Road base, gravel roads</li> <li><input type="checkbox"/> Glass</li> <li><input type="checkbox"/> Ceramics</li> </ul> <ul style="list-style-type: none"> <li>• Over 9 million tons of aggregate for each person/yr.</li> <li>• 38,000 tons used for one mile of road</li> <li>• Avg. house requires 400 tons.</li> </ul>	<p>Show examples of products</p> <p>Asphalt Core Concrete Core</p>
<p>5 min.</p>	<p>Review:</p> <p>What are the three types of aggregate?</p> <ul style="list-style-type: none"> <li>• Sand</li> <li>• Gravel</li> <li>• Crushed Stone</li> </ul> <p>What are the five steps in the mining cycle?</p> <ul style="list-style-type: none"> <li>• Explore</li> <li>• Plan</li> <li>• Mine</li> <li>• Processing</li> <li>• Reclamation</li> </ul>	<p>Write answers on flip chart</p>

<p>5 min.</p>	<p><b>Geologic Materials</b>....List some of the geologic materials used in building your home and at least two types of products made with aggregate.</p> <ul style="list-style-type: none"> <li>• Foundation- concrete</li> <li>• Driveway- asphalt</li> <li>• Wiring- copper or aluminum</li> <li>• Bricks- clay</li> <li>• Granite counter tops</li> <li>• Shingles- sand/petroleum</li> <li>• Fuels for heating- petroleum/natural gas</li> <li>• Piping- metals/clay</li> </ul> <p>What do we have to do to get these materials?</p> <ul style="list-style-type: none"> <li>• Mining/Wells- extraction from the earth...</li> </ul>	
<p>15 min.</p>	<p><b>Moh’s hardness scale.</b> Hardness testing is used to help identify minerals and is a measure of a mineral’s resistance to scratching.</p> <p>A German mineralogist named Friedrich Moh developed a quantitative scale of mineral hardness on which the softest mineral (talc) has a hardness of 1 and the hardest mineral (diamond) has a hardness of 10.</p> <p>Higher numbered minerals will always scratch lower numbered minerals, but it will not work the other way.</p> <p>Demonstrate hardness testing using test kit on the following minerals:</p> <ul style="list-style-type: none"> <li>• Gypsum</li> <li>• Calcite</li> <li>• Feldspar</li> <li>• Quartz</li> </ul> <p>Deomonstrate a hardness kit using common items found in the home.</p> <p>2.5- Fingernail</p>	<p>Show hardness scale in book.</p> <p>10 Diamond</p> <p>9 Corundum</p> <p>8 Topaz</p> <p>7 Quartz</p> <p>6 Feldspar</p> <p>5 Apatite</p> <p>4 Fluorite</p> <p>3 Calcite</p> <p>2 Gypsum</p> <p>1 Talc</p>

	<p>3.5- Copper Penny 4.5- Wire Nail 5.5- Steel Knife 6.5- Glass 7.0- Quartz</p> <p>Test two types of aggregate:</p> <ul style="list-style-type: none"><li>• Limestone</li><li>• Chert Gravel</li></ul> <p>How can I tell which one is harder? Scratch it...</p> <p>Other mineral properties other than hardness include: Metalic or non-metalic Color Streak Crystal structure</p>	
10	<p>Let’s talk <b>Fossils!</b> What is a fossil?</p> <p>The remains of plants or animals that have been preserved in rock are called fossils.</p> <p>Fossils are very important to geologists because they help us tell how old rocks are and they show us how plants and animals looked in the past.</p> <p><b>Index fossils</b> are fossils that can be used to decide approximately when a rock stratum was deposited. Index fossils are fossils can be used to limit the date of a rock layer to a certain geological age, and have been discovered in many different areas.</p> <p>For example, trilobites are from the Paleozoic Era, and ammonites are from the Mesozoic Era, etc. - fossils that are typical of a certain time period.</p> <p>On the other hand, there are fossils that can be used to determine what sort of environment fossil layers were deposited in (A river or a lake?</p>	<p>Explain the geologic record using an example fossil- Ammonite. Use with pictures from book.</p> <p>Illustrate how index fossils can identify the age of rocks using flip chart</p> <p><i>Ammonite or Trilobite</i></p>

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	<p>Shallow or deep? Warm or cool? etc.) These fossils are called <b>facies fossils</b>. For example, if coral fossils are discovered, which only lived in warm, shallow seas, it can be assumed that such a sea existed, long ago. (Picture: Ammonite from about 180 million years ago)</p> <p>Show variety of local fossils: Crinoids, brachiopods, bryozoans (Birdsong Shale). Brachiopod (Chert Gravel, MS River) Petrified Wood (Upland Complex) Mastodon molar (Pleistocene) T-Rex tooth (Jurassic)</p> <p>Ask a question? What is the Mississippi State Stone...Give away petrified wood specimen.</p>	

Resources include:

- Activity Work Sheet
- Specimens/Examples as indicated

**COMMUNITY  
PARTNER**



**ROCKHOUND UNIVERSITY  
Student Activity Worksheet**

What are three types of AGGREGATE?

1.	2.	3.
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<b>MINING CYCLE includes what 5 steps?</b>
1.
2.
3.
4.
5.

<b>List 3 things made with aggregate...</b>
1.
2.
3.

My share of aggregate is about \_\_\_\_\_ tons every year?

It takes about 38,000 tons of aggregate to build one mile of road. True or False? \_\_\_\_\_

**What are some GEOLOGIC MATERIALS  
used in building your home?**

A simple black outline of a house with a gabled roof and a rectangular base, intended for students to draw or write about geologic materials used in building.

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PARTNER**



**ROCKHOUND UNIVERISTY  
Student Activity Worksheet**

**Match the MOHS HARDNESS  
Number with the MINERAL**

10	Corundum
9	Quartz
8	Talc
7	Gypsum
6	Topaz
5	Feldspar
4	Fluorite
3	Apatite
2	Calcite
1	Diamond

A soft mineral with the hardness of 3 will scratch a mineral with a hardness of 8... True or False? \_\_\_\_\_

**What is the hardness?**

<b>Fingernail</b>	
<b>Copper Penny</b>	
<b>Wire Nail</b>	
<b>Steel Knife</b>	
<b>Glass</b>	
<b>Quartz</b>	

**What is a FOSSIL?**



Identify this fossil... \_\_\_\_\_