Chapter 3 Rock Notes

Rock Cycle

- A _______ is any __________ mass of ________________ or mineral-like matter that occurs ________________ as part of our planet.
  - A _______ is a mixture of one or more ________________.
- The _____ major types of rocks are:
  1. _______________ rock is formed by the ______________________ of molten _____________.
  2. _______________ rock is formed from the ___________________ products of ________________ rocks that have been transported, deposited, compacted, and cemented.
  3. _______________ rock is formed by the __________________ of pre-existing rock ________ within Earth by heat, pressure, and/or chemically active fluids.
- ________________ among Earth’s water, air and land can cause rocks to ________________ from one type to another.
- The continuous processes that cause rocks to change make up the _____________ ________.
- __________ is molten material that forms deep ________________ the Earth’s surface.
- _______ is magma that reaches the ________________.
- ________________ is a process in which rocks are ________________ down by water, air, and living things.
- ________________ is weathered pieces of Earth elements.
- **Energy that Drives the Rock Cycle**
  - Processes driven by _______ from the Earth’s ________________ are responsible for forming both ________________ rock and ________________ rock.
  - ________________ and the movement of weathered materials are ________________ processes powered by energy from the ________.
  - ________________ processes produce ________________ rocks.

Igneous Rocks

- **Formation of Igneous Rocks:**
  - ________________ ________________ rocks are formed when ________ hardens beneath Earth’s surface.
rocks are formed when hardens.

**Classification of Igneous Rocks:**
- Igneous rocks can be classified based on their ____________ and ____________.
- **Texture:**
  - ____________ texture is caused by ____________ cooling resulting in larger crystals.
  - ____________ texture is caused by ____________ cooling resulting in smaller, interconnected mineral grains.
  - ____________ texture is caused by ____________ cooling.
  - ____________ texture is caused by ____________ of cooling resulting in varied sized minerals.
- **Composition:**
  - ____________ rocks are made mostly of ____________-colored quartz and feldspar.
  - ____________ rocks are made mostly of ____________-colored silicate minerals and plagioclase feldspar.
  - ____________ rocks are between ____________ light-color minerals and ____________ dark-colored minerals.
  - ____________ composition rocks are made mostly from ____________ and ____________-rich minerals.

![Table 1: Classification of Major Igneous Rocks](image)

**Sedimentary Rocks**
- **Formation of Sedimentary Rocks:**
  - ____________:
    - ____________ involves the weathering and removal of rock.
- ______________ occurs when an agent of ______________ - water, wind, ice, or gravity - loses energy and ______________ sediments.
  - ______________ and ______________:
    - ______________ is a process that ______________, or ______________, sediments.
    - ______________ takes place when ______________ minerals are ______________ in the tiny spaces among the sediments.

- **Classification of Sedimentary Rocks:**
  - Sedimentary rocks can be classified into _____ main groups according to _____ _______ _______ _______.
  - _______________ _______________ rocks are composed of ______________ bits of rocks and minerals.
    - Classified by ______________ size.
    - Common rocks include:
      - __________ (most abundant), ______________, & ______________
  - _______________ _______________ rocks form when ______________ substances precipitate, or ______________, from water.
    - Common rocks include:
      - ______________ - most abundant chemical rock
      - ______________ known as chert, flint, jasper, or agate
      - ______________ such as rock salt or gypsum

<table>
<thead>
<tr>
<th><strong>Clastic Sedimentary Rocks</strong></th>
<th><strong>Chemical Sedimentary Rocks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Texture (grain size)</strong></td>
<td><strong>Composition</strong></td>
</tr>
<tr>
<td>Coarse (over 2 mm)</td>
<td>Calcite, CaCO₃</td>
</tr>
<tr>
<td>Gravel (rounded fragments)</td>
<td>Fine to coarse crystalline</td>
</tr>
<tr>
<td>Conglomerate</td>
<td>Travertine</td>
</tr>
<tr>
<td>Medium (1/16 to 2 mm)</td>
<td>Coquina</td>
</tr>
<tr>
<td>Gravel (angular fragments)</td>
<td>Various size shells and shell</td>
</tr>
<tr>
<td>Breccia</td>
<td>fragments loosely cemented</td>
</tr>
<tr>
<td>Sand</td>
<td>Chalk</td>
</tr>
<tr>
<td>Sandstone</td>
<td>Fossiliferous Limestone</td>
</tr>
<tr>
<td>Fine (1/16 to 1/256 mm)</td>
<td>Microscopic shells and clay</td>
</tr>
<tr>
<td>Mud</td>
<td>Chalk</td>
</tr>
<tr>
<td>Siltstone</td>
<td>Chert (light colored)</td>
</tr>
<tr>
<td>Very fine (less than 1/256 mm)</td>
<td>Flint (dark colored)</td>
</tr>
<tr>
<td>Mud</td>
<td>Rock Gypsum</td>
</tr>
<tr>
<td>Shale</td>
<td>Rock Salt</td>
</tr>
<tr>
<td></td>
<td>Altered plant fragments</td>
</tr>
<tr>
<td></td>
<td>Fine-grained organic matter</td>
</tr>
<tr>
<td></td>
<td>Bituminous Coal</td>
</tr>
</tbody>
</table>
- ____________ of sedimentary rocks are clues to _______ and ___________ the rocks formed.
  - Examples: _____________________, _______________________, & _____________________

**Metamorphic Rocks**
- ____________ means, “to change form”
- Most ________________ changes occur at elevated ________________ and ________________.
- Conditions for formation are found a few kilometers ________________ the Earth’s surface and extend into the ________________ ________________.
- **Formation:**
  - ________________ ________________ occurs when ________________ moves into a rock.
    - Occurs _______ a body of ________________
    - Changes are ________________ by a rise in ________________.
  - ________________ ________________ results in large-scale ________________ and high-grade ________________.
    - Directed ________________ and high ________________ occur during mountain building.
    - Produces the ________________ volume of ________________ rock.
- **Agents of Metamorphism**
  - ___________: Provides the energy needed to drive chemical reactions.
  - ________________: Causes a more compact rock with greater density.
    - ___________ water-based solutions escaping from the mass of ________________
    - Promote ________________ by ________________ original minerals and then ________________ new ones.

- **Two Main Categories of Classification:**
  - ________________ ________________
    - Has a ________________ or ________________ appearance.
- Does not have a ____________ texture.

<table>
<thead>
<tr>
<th>Rock Name</th>
<th>Texture</th>
<th>Grain Size</th>
<th>Comments</th>
<th>Parent Rock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slate</td>
<td>Metamorphic</td>
<td>Very fine</td>
<td>Smooth dull surfaces</td>
<td>Shale, mudstone, or siltstone</td>
</tr>
<tr>
<td>Phyllite</td>
<td>Foliated</td>
<td>Fine</td>
<td>Breaks along wavy surfaces, glossy sheen</td>
<td>Slate</td>
</tr>
<tr>
<td>Schist</td>
<td>Foliated</td>
<td>Medium to Coarse</td>
<td>Micaceous minerals dominate</td>
<td>Phyllite</td>
</tr>
<tr>
<td>Gneiss</td>
<td>Nonfoliated</td>
<td>Medium to Coarse</td>
<td>Banding of minerals</td>
<td>Schist, granite, or volcanic rocks</td>
</tr>
<tr>
<td>Marble</td>
<td>Nonfoliated</td>
<td>Medium to coarse</td>
<td>Interlocking calcite or dolomite grains</td>
<td>Limestone, dolostone</td>
</tr>
<tr>
<td>Quartzite</td>
<td>Nonfoliated</td>
<td>Medium to coarse</td>
<td>Fused quartz grains, massive, very hard</td>
<td>Quartz sandstone</td>
</tr>
<tr>
<td>Anthracite</td>
<td>Nonfoliated</td>
<td>Fine</td>
<td>Shiny black organic rock that fractures</td>
<td>Bituminous coal</td>
</tr>
</tbody>
</table>