Metamorphic Rocks

How do we classify metamorphic rocks?
Metamorphic Rocks

- **Metamorphic Rocks** - parent rocks that have been altered or deformed by increases in temperature and/or pressure
- **Parent Rock** - preexisting rock from which metamorphic rocks are formed
Metamorphic Rocks

Methods to classify metamorphic rocks:
Metamorphic Rocks

1. Texture - the description of its minerals along with their arrangement and size
Metamorphic Rocks

✦ Foliation - when minerals rearrange in flat layers due to extreme pressure

✦ Banding - type of foliation where pressure separates minerals into alternating light and dark layers
Metamorphic Rocks

Foliation - Slate

Banding - Gneiss
Metamorphic Rocks

- **Non-foliated** - when minerals rearrange and change form, but do not form layers
Metamorphic Rocks

Non-foliated - Marble

Non-foliated - Quartzite
Metamorphic Rocks

2. **Grain Size** - size of the individual grains in the rock

- **Fine** - Phyllite
- **Medium** - Schist
- **Coarse** - Gneiss
Metamorphic Rocks

3. **Composition** - the minerals that make up the rock

- **Composition:** Calcite  
  **Rock:** Marble

- **Composition:** Mica  
  **Rock:** Slate
4. **Type of Metamorphism** - the different conditions which exist for a metamorphic rock to form
Metamorphic Rocks

- Regional Metamorphism - process in which metamorphic rocks are formed over large areas due to temperature and pressure increases
Metamorphic Rocks

- Heat from geothermal gradient and/or magma causes minerals to flow [not break] and cause the minerals to rearrange, realign and become elongated.
- Pressure from overlying rock squeezes the pore spaces out between the minerals within the rock and cause it to become more dense.
Metamorphic Rocks
Metamorphic Rocks

Conglomerate
Sedimentary

Metaconglomerate
Metamorphic
Metamorphic Rocks

- Contact Metamorphism - process in which preexisting rock changes when heat from magma or lava rearranges the minerals
Metamorphic Rocks

- Heat from magma or lava causes minerals to rearrange

NO PRESSURE
Contact Metamorphism
<table>
<thead>
<tr>
<th>Texture</th>
<th>Grain Size</th>
<th>Composition</th>
<th>Type of Metamorphism</th>
<th>Comments</th>
<th>Rock Name</th>
<th>Map Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOLIATED</td>
<td>Fine to medium</td>
<td>Mica</td>
<td>Regional (Heat and pressure increases)</td>
<td>Low-grade metamorphism of shale</td>
<td>Slate</td>
<td>![Slate symbol]</td>
</tr>
<tr>
<td></td>
<td>Fine to medium</td>
<td>Quartz</td>
<td></td>
<td>Foliation surfaces shiny from microscopic mica crystals</td>
<td>Phyllite</td>
<td>![Phyllite symbol]</td>
</tr>
<tr>
<td></td>
<td>Fine to medium</td>
<td>Feldspar</td>
<td></td>
<td>Platy mica crystals visible from metamorphism of clay or feldspars</td>
<td>Schist</td>
<td>![Schist symbol]</td>
</tr>
<tr>
<td></td>
<td>Medium to coarse</td>
<td>Amphibole</td>
<td></td>
<td>High-grade metamorphism; mineral types segregated into bands</td>
<td>Gneiss</td>
<td>![Gneiss symbol]</td>
</tr>
<tr>
<td>NONFOLIATED</td>
<td>Fine</td>
<td>Carbon</td>
<td>Regional</td>
<td>Metamorphism of bituminous coal</td>
<td>Anthracite coal</td>
<td>![Anthracite coal symbol]</td>
</tr>
<tr>
<td></td>
<td>Fine</td>
<td>Various minerals</td>
<td>Contact (heat)</td>
<td>Various rocks changed by heat from nearby magma/lava</td>
<td>Hornfels</td>
<td>![Hornfels symbol]</td>
</tr>
<tr>
<td></td>
<td>Fine to coarse</td>
<td>Quartz</td>
<td>Regional or contact</td>
<td>Metamorphism of quartz sandstone</td>
<td>Quartzite</td>
<td>![Quartzite symbol]</td>
</tr>
<tr>
<td></td>
<td>Fine to coarse</td>
<td>Calcite and/or dolomite</td>
<td>Regional or contact</td>
<td>Metamorphism of limestone or dolostone</td>
<td>Marble</td>
<td>![Marble symbol]</td>
</tr>
<tr>
<td></td>
<td>Coarse</td>
<td>Various minerals</td>
<td></td>
<td>Pebbles may be distorted or stretched</td>
<td>Metaconglomerate</td>
<td>![Metaconglomerate symbol]</td>
</tr>
</tbody>
</table>