

B Fill-In-The-Blank Notes

April 2, 2015 9:45 AM

Name: _____

Rocks and Minerals Unit

Day 1 Notes

Chapter 3 – Chemistry Review (as Related to Minerals and Rocks)

<u>Atom</u>	<ul style="list-style-type: none">- Made up of protons (p) and neutrons (n) in the center with electrons (e-) orbiting around;- If the atom has a charge (has lost or gained an electron), then this is called an <u>ion</u>.
<u>Element</u>	<ul style="list-style-type: none">- The <u>least</u> complex of all materials naturally occurring on earth;- The <u>smallest</u> particle of an element is the atom;- Oxygen and Silicon make up <u>75%</u> of crustal rocks (and Aluminum makes up the next 8%);- Example: Na, Cl, periodic table
<u>Molecule</u>	<ul style="list-style-type: none">- When different atoms join together they make a molecule;- Example: NaCl
<u>Compound</u>	<ul style="list-style-type: none">- Chemical combination of elements;- The <u>smallest</u> particle of a compound, that still retains all the properties of the compound, is a molecule;- Example: NaCl = salt = the mineral halite.
<u>Mineral</u>	<ul style="list-style-type: none">- A <u>naturally occurring, inorganic, element or compound</u> in a <u>solid, crystalline</u> state;- Defined by its <u>chemical composition</u> and <u>internal crystal structure</u> – but only observable with special equipment in the lab;- Example: chalcopyrite, gold, calcite, ice;- Non-examples: water (not a solid), pearl (organic), glass (not a crystalline state).
<u>Rock</u>	<ul style="list-style-type: none">- A solid, cohesive aggregate of one or more minerals;- A <u>mixture</u> of minerals;- Examples: granite, sandstone, marble.- Bedrock is solid rock firmly attached to earth; outcrops of it can sometimes be seen at the surface.

Chapter 4 – Minerals

- ~ 40 minerals make up all the crustal rocks
- 10 minerals make up more than 90% of the crustal rocks
- Minerals are identified in the lab using special equipment but in the field (outside as you walk along the beach) we must observe physical properties via inspection, simple tests, and special properties

A. Inspection

- Helps but many different minerals have the same colour (calcite and quartz can both be white.)

A. Inspection

<p><u>Colour</u></p>	<ul style="list-style-type: none"> - Helps but many <u>different</u> minerals have the <u>same colour</u> (calcite and quartz can both be white.) - Many minerals come in a <u>variety</u> of colors (quartz, fluorite). - Some minerals <u>tarnish</u> (silver) - Some people are <u>colour-blind</u> - Must <u>metally</u> take the grey out. (or make sample wet)
<p><u>Lustre</u></p>	<ul style="list-style-type: none"> - Defined as the <u>shine or lack of shine</u> - Is either metallic or non metallic. - If <u>metallic</u>, it shines like a polished metal; may be flecks rather than a large smooth mirror-like metal - If non-metallic, it can be <u>vitreous (glassy)</u>, <u>dull/earthy</u>, pearly, resin (waxy), silky, greasy. - See quartz (vitreous) and galena (metallic) samples.
<p><u>Crystal shape or habit</u></p>	<ul style="list-style-type: none"> - The shape of crystal if there is <u>room</u> and <u>time</u> for it to grow as the rock is forming; - How the arrangement of the atoms in a crystal is visible to us - Usually <u>difficult</u> to find; we'll only look for it on the samples on the <u>side counter</u> -- our sets don't show crystal shape in the majority of cases. - If there is no space or time for large, visible crystals to form, then only small, <u>microscopic</u> ones form and this is called <u>massive form</u> - See Calcite (rhombohedral) and galena (cubic) samples.



B. Simple Tests

<p><u>Streak</u></p>	<ul style="list-style-type: none"> - The <u>colour</u> of the mineral's <u>powder</u> - Made by drawing a line on a ceramic <u>streak plate</u> - Mineral's color may change between samples but the streak rarely does (more <u>consistent</u> than color for id purposes.) - Metallic minerals streaks usually are at least as <u>dark</u> as the mineral sample's colour. - Non-metallic minerals' streaks are <u>white or colourless</u> - Hematite is one to know – many colours but always a <u>reddish-brown</u> streak.
<p><u>Cleavage</u></p>	<ul style="list-style-type: none"> - The tendency to split easily or separate along <u>flat</u> surfaces - Can be observed by looking for flat, <u>shiny</u> surfaces that reflect light. Don't be fooled by flat sides that were cut that way by a saw (they aren't shiny anyway). - Easy to see cleavage occurs in calcite, feldspar, mica.
<p><u>Fracture</u></p>	<ul style="list-style-type: none"> - Break along other than cleavage surfaces. - Occurs in the mineral quartz and the volcanic rock obsidian.

Simple Test continued...

<p>11</p>	<ul style="list-style-type: none"> - The resistance to being <u>scratched</u> - Hardness is different than brittleness (which means easily broken) - A real scratch can be felt by your <u>finger nail</u> (where a line can't)
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<u>Hardness</u>	<ul style="list-style-type: none"> - Hardness is different than brittleness (which means easily broken) - A real scratch can be felt by your <u>finger nail</u> (where a line can't) - <u>Diamond</u> is the hardest (10); <u>Talc</u> is the softest (1); <u>Quartz</u> is the hardest common mineral (7). - We use <u>Mohs'</u> scale of hardness (pg 28 in text) <u>pg 50 text</u> - A simplified version is: <u>1-2</u> if fingernail scratches it; <u>3</u> if penny scratches it; <u>4-5</u> if steel nail scratches it; <u>6-7</u> if IT scratches the glass.
<u>Specific Gravity</u> or <u>Density</u>	<ul style="list-style-type: none"> - Density or the mass per volume (how heavy does it feel for its size?) - <u>Heft</u> ¹⁻¹ the mineral compared to quartz (#214 in set) – if it is heavier than quartz we say it has a <u>high</u> density; if it is about the same, then <u>avg</u> density; if it is less, then <u>low</u> density.
<u>Acid Test</u>	<ul style="list-style-type: none"> - A drop of HCl fizzes if <u>calcium carbonate</u> is present to react with. - <u>Calcite</u> fizzes in the minerals - <u>Limestone</u> fizzes and <u>dolomite's powder</u> fizzes in sedimentary rocks. - <u>Marble</u> fizzes in metamorphic rocks.

C. Special Properties

<u>Magnetic</u>	<ul style="list-style-type: none"> - Ex. <u>Magnetite</u> is attracted to a magnet
<u>Taste</u>	<ul style="list-style-type: none"> - Ex. <u>Halite</u> taste like salt
<u>Double Refraction</u>	<ul style="list-style-type: none"> - Ex. <u>Calcite</u> bends light so we see two images
<u>Fluorescence</u>	<ul style="list-style-type: none"> - Ex. Some calcite and fluorite glow in <u>ultraviolet</u> light
<u>Radioactive</u>	<ul style="list-style-type: none"> - Ex. Potassium feldspar emits <u>radioactive</u> particles which would activate a Geiger counter (an instrument used to measure radioactivity)