Summary Chart of Rock Types

Igneous	Sedimentary	Metamorphic
- Forms by magma or lava; cooling and crystallizing - Intrusive- cools slowly, large crystals form, Ex. Granite, Gabbro - Extrusive – cools quickly, small or no crystals form. Ex. Obsidian = Glassy Pumice = frothy Porphyry = 2 sizes of crystals from 2 stages of cooling Basalt = Small Crystals - Mafic – dark, ferromagnesians Ex. Basalt, gabbro - Felsic – light coloured, granite, rhyolite.	- Clastic- eroded sediments glued together Ex. Shale (small particles), sandstone, conglomerate (larger particles). - Chemical – precipitates out of solution – crystals of light colour. Ex. Limestone, dolomite. - Biological – made by plants and animals; often see fossils Ex. Some limestones, chert	- Forms from heat and/or pressure, changes a rock - Heat causes: Sed. Meta Limestone → Marble Sandstone→ Quartzite (see interlocking crystals of same colour, larger than sedimentary chemical crystals) - Pressure causes: - Sed. Meta. Meta. Shale → Slate→Phyllite → Meta. Meta. Schist → Gniess - Ig. Meta. Granite → Gneiss

To look for when ID'ing rock types:

Igneous	Sedimentary	Metamorphic
- Interlocking crystals (large or small) of different colours or dark colours - Glassy, frothy, porphyry	- Clastic – rounded particles glued together; fossils - Chemical – interlocking crystals of light colours	Heat – interlocking, larger crystals of light colour Pressure – Folliation, compositional banding

Rock Cycle

Part A

Complete the following diagram of the rock cycle. Note there should be nine (9) arrows and they should all be labeled based upon what type of rock it is becoming.

IGNEOUS

SEDIMENTARY **METAMORPHIC**

Part B

Describe the rock cycle in words.

1. Explain in detail what can happen to any rock (3 sentences).

2. Summarize the rock cycle in one sentence.

EARTH SCIENCE 11
GEOLOGY

ROCKS 1. Chapter 5 page 62 - 79

1. Name the three main types of rocks. Describe how each type is formed.

omit 2. Igneous rock are of two types. Name and describe each. What are some possible differences between them?

3. What is the difference between magma and lava?

4. What are the characteristics of felsic rocks? Name one rock that is of this type. Where does the name, felsic, derive from?

5. What are the characteristics of mafic rocks? Name one rock that is of this type. Where does the name, mafic, derive from?

6. What does the texture of an igneous rock depend upon? Name the possible textures of igneous rocks.

7. A porphory is a special type of igneous rock. Describe it's texture.

8. You will be learning to describe igneous rocks as intrusive (plutonic) or extrusive (volcanic). What are the characteristics of these two types?

9. What characteristic of sedimentary rocks separates them from the other two types of rocks?

10. You will be learning to identify clastic sedimentary rocks only. What defines as rock as a clastic sedimentary rocks?

11. There are three main types of clastic rocks. Name them and give their particle size.

12. Using figure 5.9 on page 70, indicate the speed at which the water is likely to be moving at when it deposits the particles to form each of the three clastic types.

13. Deposition of the particles is not enough to form a sedimentary rock. What else must happen?

14. Stratification is a special feature of sedimentary rocks. What is it?

15. What is the origin of the word metamorphic?

16. What actions can cause metamorphic rocks to form?

17. Name the three main types of metamorphic rocks in order from that formed first with little heat and pressure to that formed last with a great deal of heat and pressure.

18. Foliation is a feature of metamorphic rocks. What is foliation?

Name: _____

Rocks and Minerals Review Points

TEST BREAK DOWN: Written: /6, Multiple Choice /24, Practical /9 = Total /39

What to specifically study: STUDY these points plus your labs and fill-in-the-blank notes (from the beginning of this unit.)

- Rocks are made up of minerals
- The most common elements in Earth's crust O (50%), Si (25%), Al (8%)
- Refresh yourselves on how to use the Mineral Data Sheet (one will be provided for the test!) Also note that all minerals that you need are listed on the mineral data sheet but no rocks are. You have to memorize the rock names but not the mineral names.
- Fool's gold = pyrite and chalcopyrite
- Go over how to do the mineral tests: hardness, cleavage, streak, acid test, special properties, etc.
- Draw rock cycle diagram with all nine, labeled arrows
- Igneous forms from magma cooling and crystallizing
- Sedimentary forms from sediments being glued together
- Metamorphic forms from pre-existing rocks undergoing heat and/or pressure
- Intrusive rocks – cool inside earth slowly (where there is lots of insulation) forming large crystals, ie granite, gabbro
- Extrusive rocks – cool on surface of earth quickly forming small crystals (ie rhyolite), glassy texture (obsidian), or frothy (pumice)
- Memorize which rocks are what type (see labs): Igneous = granite, basalt, gabbro, obsidian, pumice, etc; Sedimentary =a) clastic: conglomerate (pebbles glued) , sandstone (sand glued), shale (silt and clay glued), chemical: limestone; Metamorphic: slate, phyllite, schist, gneiss, marble, quartzite
- Parent rocks of metamorphic rocks (what did they used to be before heat and pressure changed them?): slate was shale, quartzite was sandstone, marble was limestone, etc.
- Acid test: calcium carbonate is present in calcite (mineral), limestone (sedimentary) and marble (metamorphic)
- As river slows, it drops the largest sediments first then finer and finer as it slows further. So conglomerate will be formed from the first drop, then sandstone, then shale.
- Foliation (mica lines up due to pressure ie in mountain building) in metamorphic rocks such as slate, phyllite, schist, gneiss (has compositional banding too)
- Some general rules to distinguish the three rock types from each other (there is a practical section):
    - Igneous – interlocking crystals (cooled slow if large) or glassy or frothy (cooled quickly) textures
    - Sedimentary – grains glued together
    - Metamorphic – see foliation, obvious mica flakes, folding, compositional banding

Name:_____

Rocks & Minerals

1. Explain the difference between a rock and a mineral.

2. Which two elements make up 75% of the earth's crust?

3. Minerals can be identified by inspection and by simple tests.
   a) Name two reasons why colour is not a very good tool of identification.
   b) Luster may be metallic or non-metallic. Name two types of non-metallic luster.
   c) What seems to be the rule for the colour of the streak of metallic and non-metallic minerals?
   d) Describe the method used to test the hardness of a mineral.
   e) A black mineral with a black streak, metallic luster, no visible cleavage, and a hardness of 6 would likely be:
   f) Name three special properties used to identify minerals.

4. a) How are igneous rocks formed?
   b) What are extrusive and intrusive rocks?
   c) How are crystal size and cooling rates related in igneous rocks?

5. a) How are sedimentary rocks formed?
   b) What is the difference between clastic and chemical?
   c) Put these in order of sediment size from largest to smallest: sandstone, conglomerate, shale.

6. a) How are metamorphic rocks formed?
   b) What are thermal and dynamic metamorphism?
   c) When metamorphosed, limestone becomes what?

7. Use the rock cycle (draw it) to show the links between the three types of rocks.

8. Using the following descriptions classify the rock described as <u>igneous</u> (<u>extrusive</u> or <u>intrusive</u>), <u>sedimentary</u> (<u>clastic</u> or <u>chemical</u>), or <u>metamorphic</u>.
   a) black, glassy texture, conical fracture
   b) a mass of rocks and pebbles glued together
   c) a layered, black rock, very compacted, obvious foliation
   d) easily fizzes with acid, gray, fossil visible

9. Describe how a fossil is formed and in what type(s) of rocks.

10. If not already done, now complete the practical rock and mineral test (when it is your turn).

esgr&mrv

Label each of the following as characteristics of: **I – Intrusive Rocks; E – Extrusive Rocks; or N – neither.**

1 _____ Has a long period of crystallization
2 _____ Generally has a coarse texture
3 _____ May have a glassy texture
4 _____ Basalt is an example
5 _____ Cools slowly
6 _____ Sandstone is an example
7 _____ Forms most of the bedrock below the oceans
8 _____ Schist is an example
9 _____ Also known as plutonic rock
10 _____ Granite is an example

Label each of the following as characteristics of: IV – Igneous Volcanic; IP – Igneous Plutonic; S – Sedimentary; Met – Metamorphic Rock; or Min - Mineral

1 _____ Marble
2 _____ Shale
3 _____ Gypsum
4 _____ Gneiss
5 _____ Gabbro
6 _____ Pumice
7 _____ Garnet
8 _____ Limestone
9 _____ Granite
10 _____ Quartzite