Rock Star 101

Introduction to Rocks

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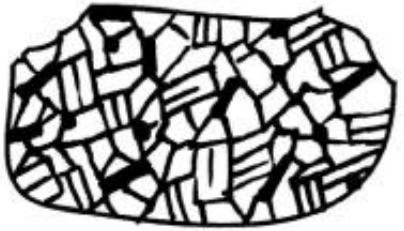
Lesson 1:
Rocks are made of minerals.

ROCKS ARE LIKE COOKIES!
MINERALS ARE THE INGREDIENTS!

cookie



rock

INGREDIENTS

Sugar - white, sweet, shiny

Flour - white, starchy, dull

Oats - tan-brown, flakes

Chocolate Chips - brown, soft, sweet, squishable

Raisins - brown, sweet, sticky, wrinkly

Salt - white, granular, salty taste

Baking Powder - white, powdery, bitter taste

MINERALS

Quartz - clear, hard, breaks like glass

Feldspar - orange, hard, tabular, 2 directions of cleavage

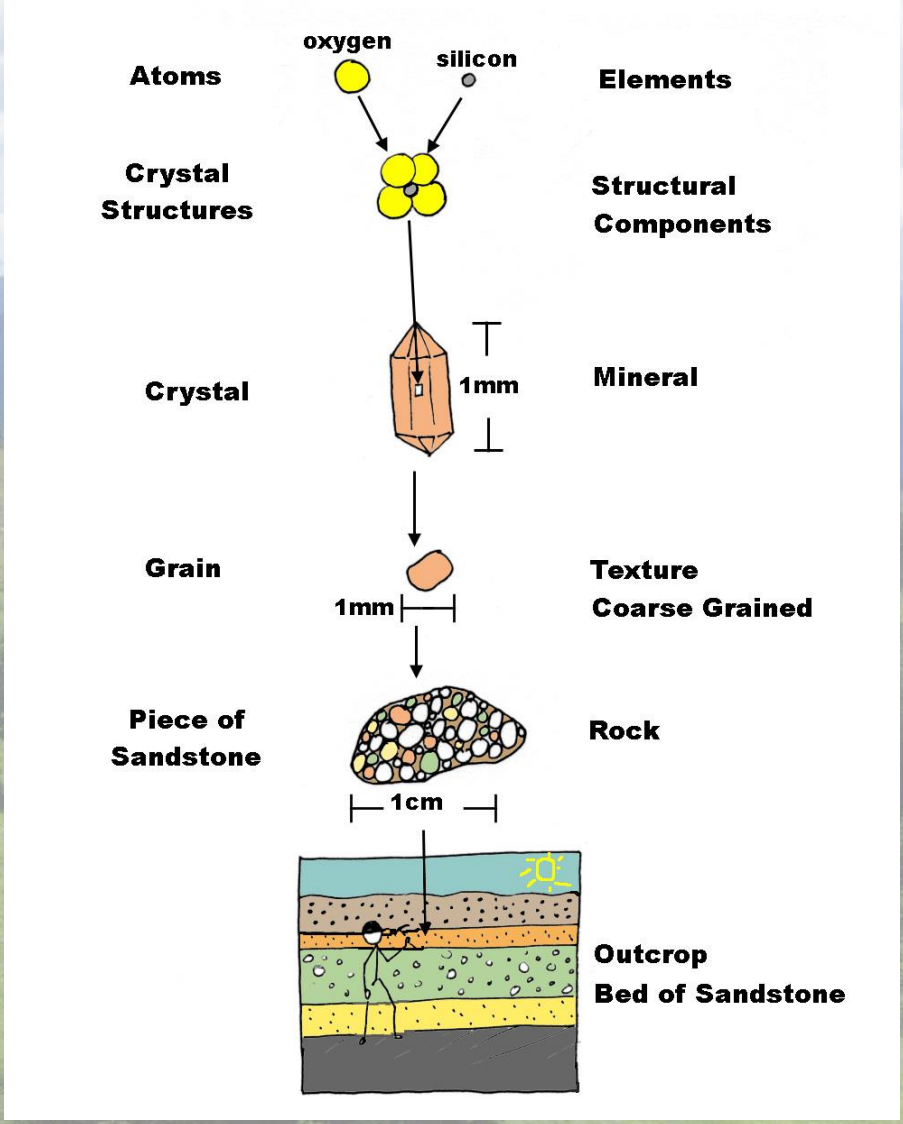
Biotite - black, soft, flakey

Amphibole - black, hard, thin columns

Muscovite - tan, soft, flaky

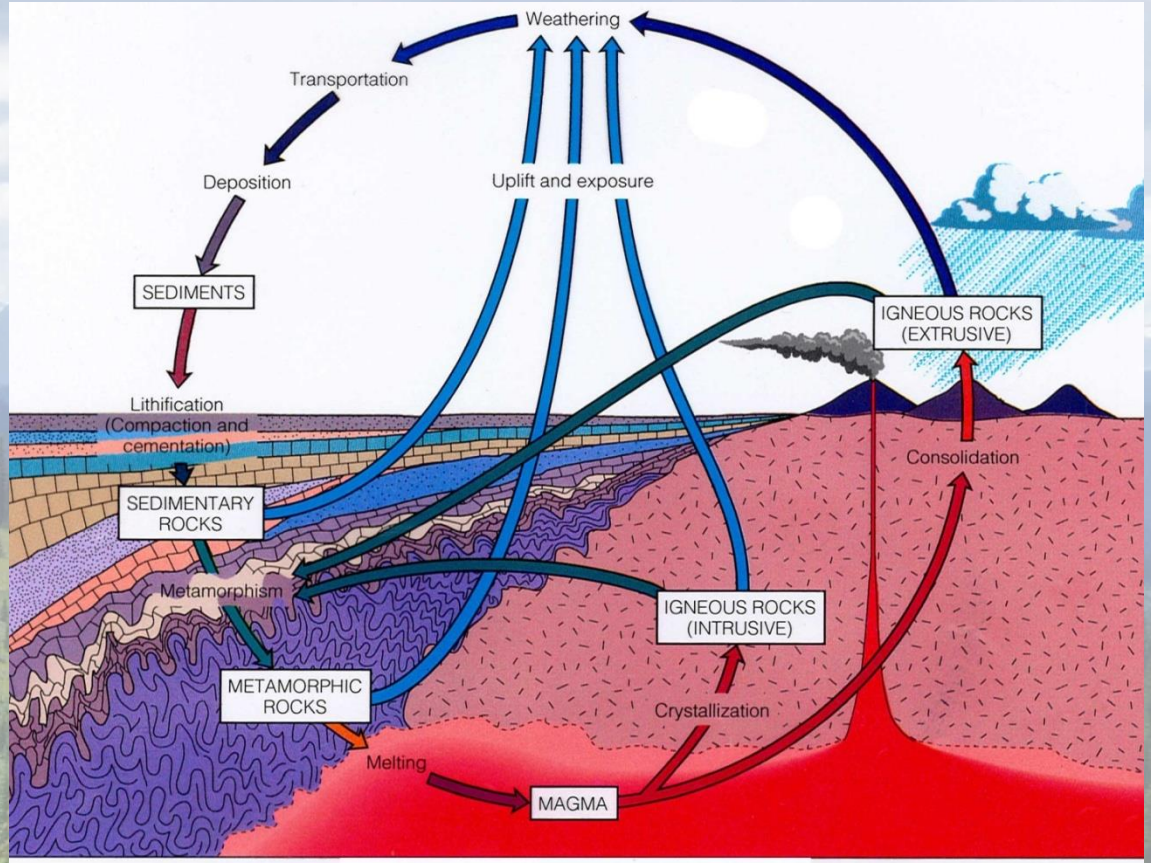
Magnetite - black, dull metallic luster, magnetic

Element, Mineral, Rock, Outcrop



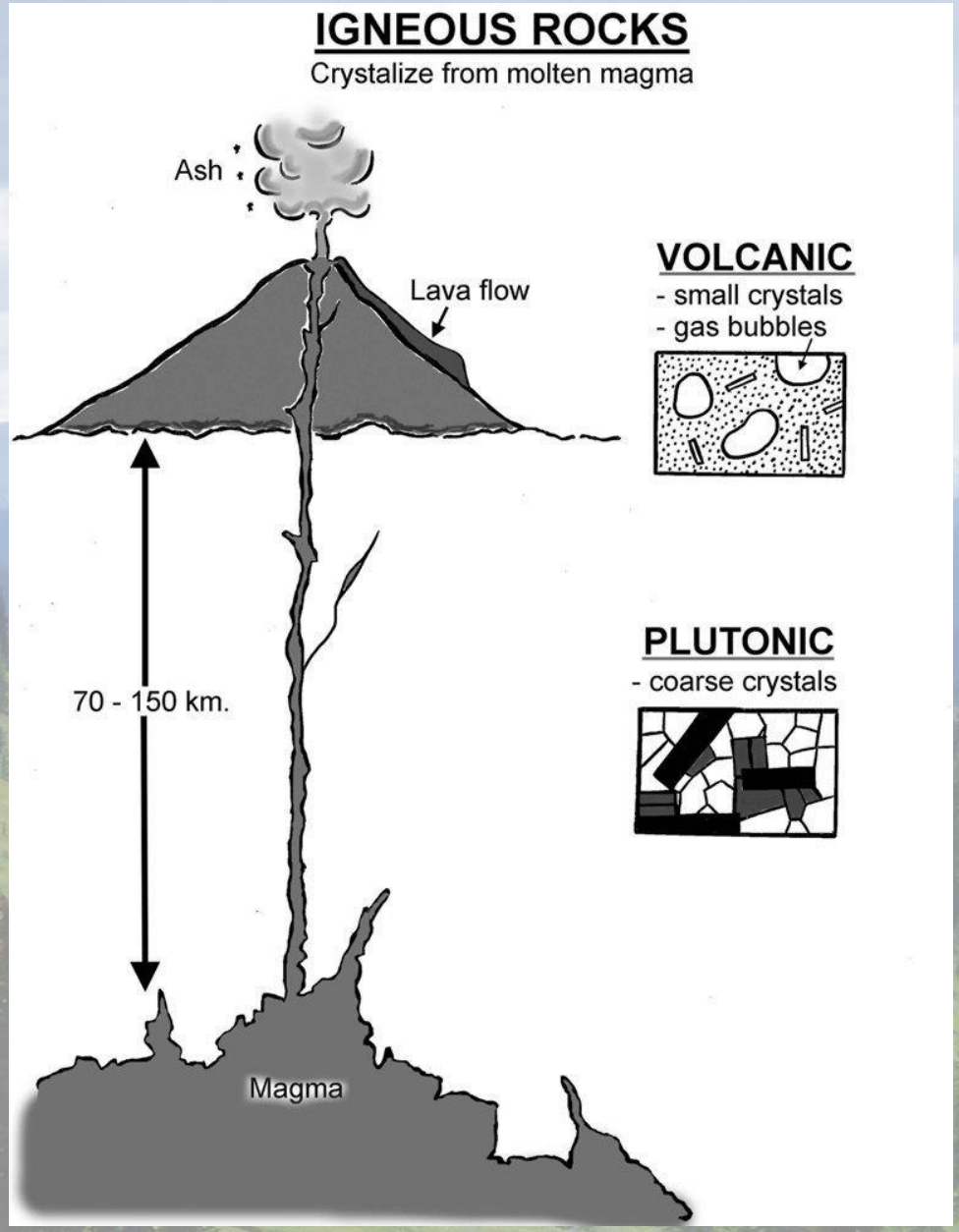
Lesson 2:

Rock formation is cyclic.



Transparency 4 (Figure 1-15)
The rock cycle

Lesson 3:
Igneous rocks crystallize from molten magma.



Igneous Rock Type1: Plutonic

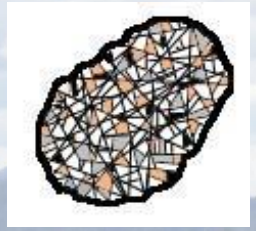
Formed underground, cooled very slowly, formed coarse mineral crystals

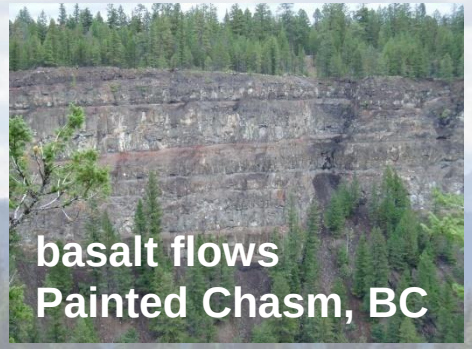
- Grains you can see (s**peckled**)
- Crystalline (**sparkly** fresh surfaces)
- Hard
- No layers, no holes

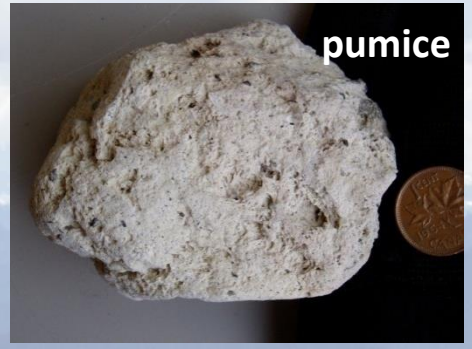
The colour of a rock depends on the mineral ingredients; the minerals that make up an igneous rock depend on the elements in the magma.

Igneous Rock Type 2: Volcanic

Formed at or near Earth's surface, cooled quickly, formed fine mineral crystals



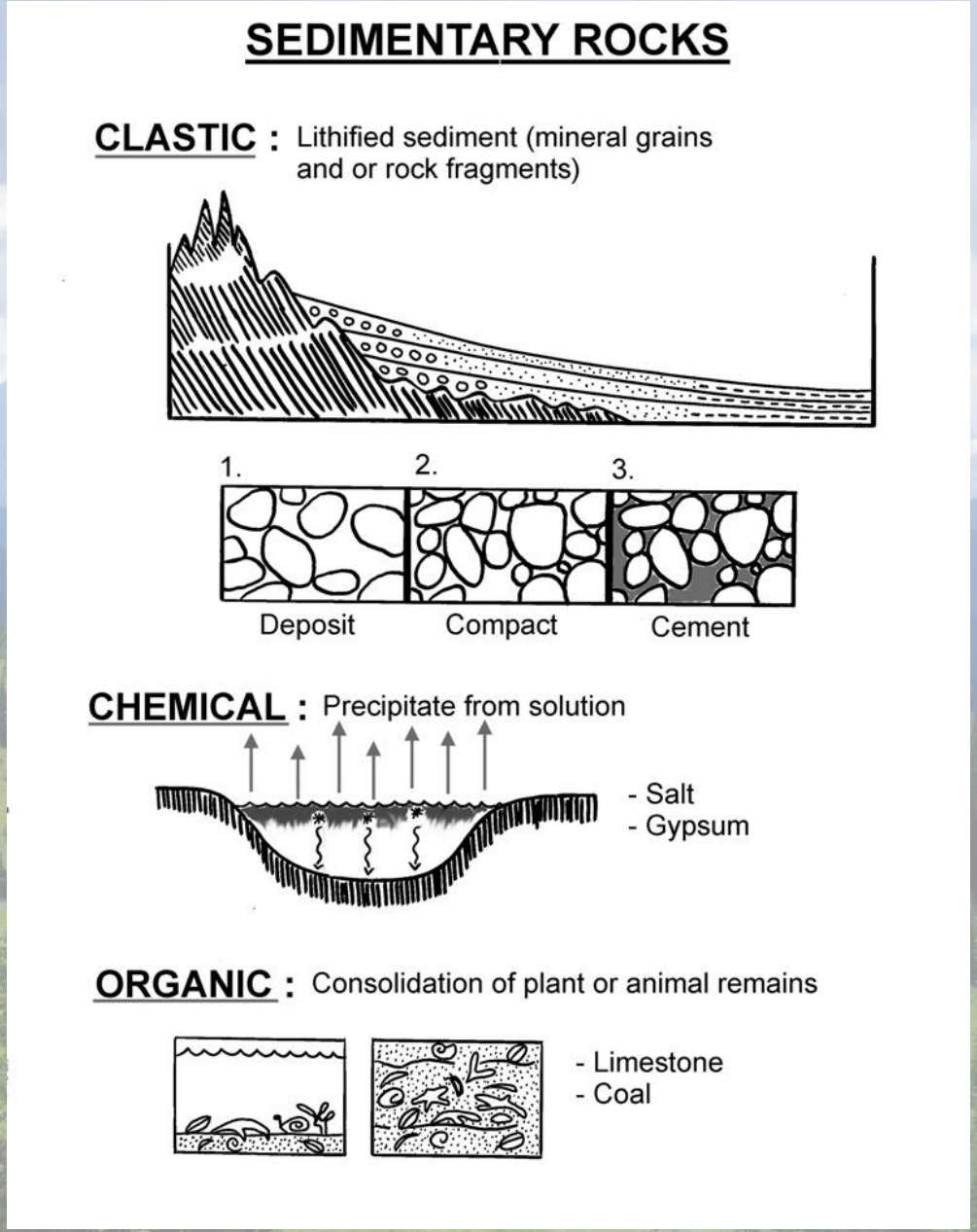




- Grains too small to see with naked eye (looks like one colour) or glass (no crystals)
- Crystalline (very tiny, **sparkly** fresh surfaces)
- ±Trapped gas bubbles (**holes = vesicles**)
- Hard (most)

Lesson 4:

Sedimentary rocks are ***deposited*** at Earth's surface and are ***compacted*** and ***cemented*** when buried.



Sedimentary Processes

Exposed rocks are broken down **mechanically** (e.g. frost, roots, burrowers) and **chemically** (e.g. oxidized, dissolved)

Driven by gravity, loose sediment is **transported** and **deposited** by wind, water and ice.

Lithification of sediments to form solid rock occurs during **burial.**


Weathering rocks, Manning Park


Frost wedging, Manning Park


Hope Slide


Fraser River


Britannia Creek


Alpine glacier

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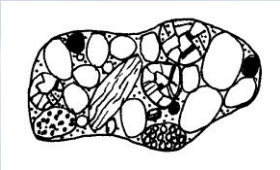
Clastic Sedimentary Rocks: made of broken down rocks; they named according to grain size and composition



- Broken +/- rounded **grains** from mega-boulder size to pebbles to sand to mud; grains may be rocks or minerals; ± fossils
- **Layered** at various scales
- Relatively soft and **friable**
- Grains held together by mineral **cement**
- **Dull** looking (not crystalline)

Chemical Sedimentary Rocks:
precipitate from solution

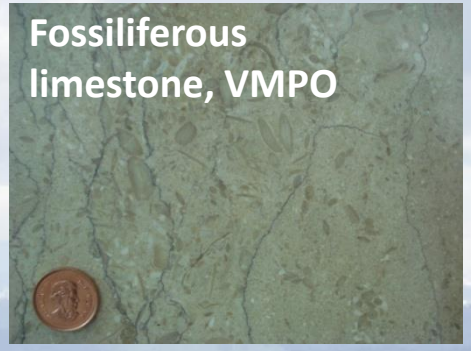

Gypsum
Elkhorn Quarry, BC


Sylvite (potash), SK

- Crystalline
- Soft

Organo-Sedimentary Rocks:
consolidated organic remains


Limestone quarry,
Texada Island


Fossiliferous
limestone, VMPO

- Commonly crystalline (readily altered)
- ± Skeletal remains
- Soft
- Reacts with acid (fizzes)

- Black (carbon)
- Shiny
- Light weight
- Plant remains
- Soft


Coal Fording
River Mine, BC

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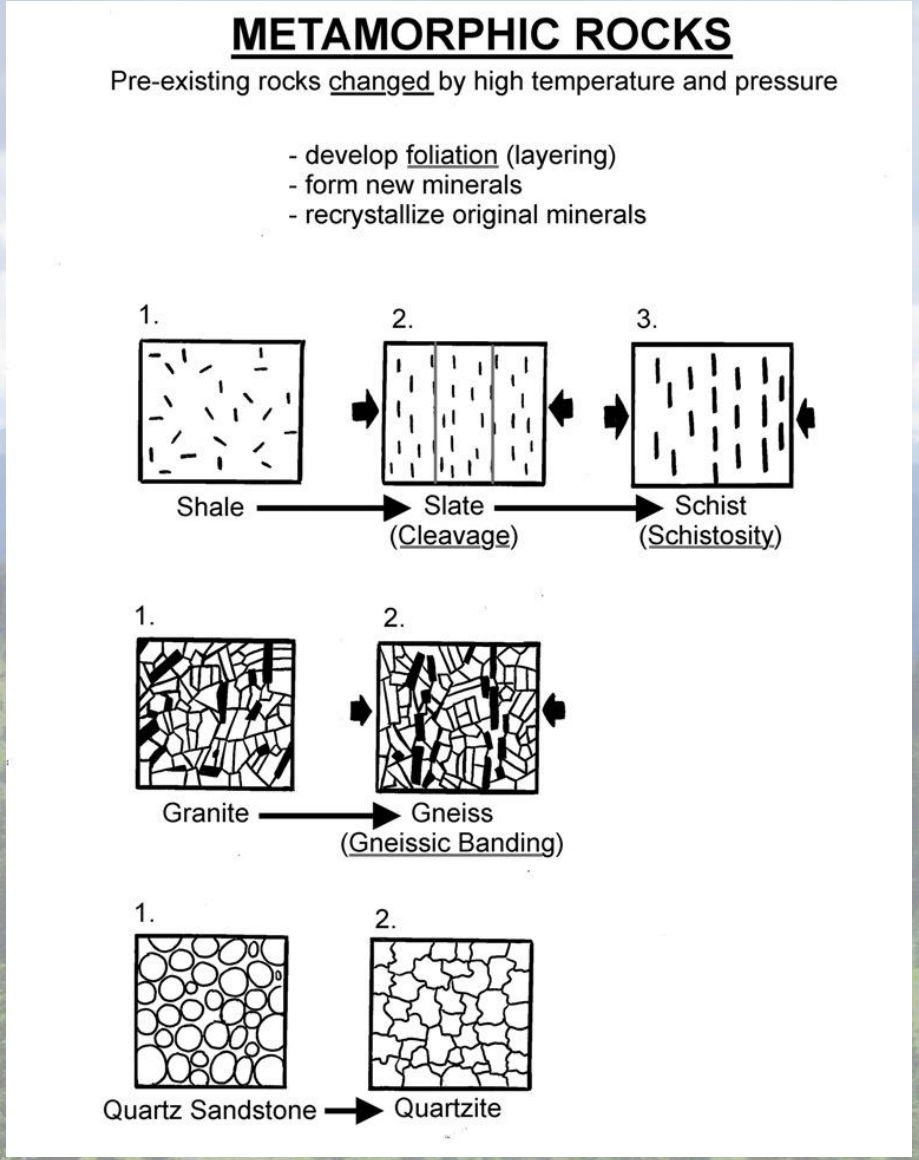
Lesson 5:

Metamorphic rocks form from any type of pre-existing rock subjected to high ***pressure*** and/or high ***temperature***.



Metamorphic Rocks: associated with deep burial, mountain building and ***deformation*** of the crust

- Crystalline, coarse or fine (sparkly)
- Wavy, irregular layering
- No holes
- No fossils

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Foliated Metamorphic Rocks: Prominent layering defined by aligned minerals (e.g. Flat micas (sheen), elongate feldspars)

Type of Foliation:

Gneissic banding

Schistosity
+ sheen

Slatey Cleavage
+ clinky sound

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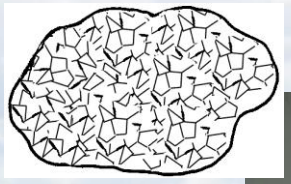
Non-Foliated Metamorphic Rocks: massive-appearing, discontinuous, wavy lamination, crystalline



Parent rock = limestone

Parent rock = quartzose sandstone

Rock Quiz

1. Category of rocks that begin in a molten state are called _____.
2. The geologic term for molten rock is _____.
3. The rock property that reveal how fast molten rock has cooled is _____ _____.
4. The holes preserved in some volcanic rocks are called _____.
5. Which statement is true? A)Sedimentary rocks are made of mineral crystals. B)Sedimentary rocks are made of grains of minerals and rock.
6. Compared to the other main categories of rocks, sedimentary rocks _____ and _____.
7. Metamorphic means _____. The two main agents of change are _____and _____.
8. A key property of many metamorphic rocks is _____.
9. Which type of rock may contain fossils?
10. Which of these main rock types make up the bedrock of BC?

1. Igneous 2. magma 3. crystal size 4. vesicles 5. B) 6. relatively soft, may contain fossils, have flat layers, easily weather, form only at Earth's surface 7. change form; heat and pressure 8. foliation (layering) 9. sedimentary 10. all 3