

Name: _____ Date: _____ Pd: _____

Unit 3 Formative Assessment – Rocks, Minerals, & Soil

Chapter 2: Minerals

1. What do all types of rock have in common?

All rocks are composed of minerals, whereas minerals are classified by its composition of atoms (elements)

2. Mineral properties depend on composition and _____.
- a. **structure** b. luster c. cleavage d. streak
3. What are the *five (5)* characteristics of a mineral?

1) Naturally occurring

2) Inorganic

3) Solid

4) Specific chemical composition

5) Definite crystalline structure

4. What is the most common mineral in Earth's crust?
- a. **Silicate** b. halite c. oxide d. sulfate
5. Minerals are classified by _____.
- a. Color b. **composition** c. size d. density

Chapter 3: Rocks & Rock Cycle

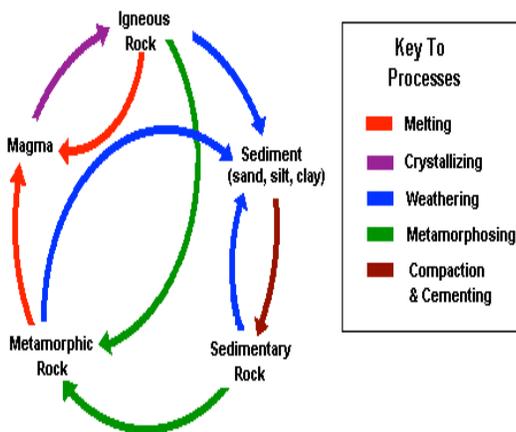
6. Where is the energy source found that drives the processes that form igneous and metamorphic rocks?
- a. the sun b. the wind c. **earth's interior** d. moving water
7. Where is the energy source found that drives the processes that form sedimentary rocks?
- a. **the sun** b. the wind c. earth's interior d. moving water

8. Describe the **three (3)** types of rock (include how they form and their distinguishing unique characteristics):

A) **Igneous** – Forms from cooling magma/lava which then hardens → Intrusive (slow cooling) vs Extrusive (fast cooling)

B) **Sedimentary** – Weathering and erosion produces sediments that are transported, deposited, compacted, and cemented

C) **Metamorphic** – Forms from pre-existing rocks that are exposed to intense heat and pressure



9. In the following diagram, **LABEL** each arrow describing the process from one point in the rock cycle to

* Magma → Igneous Rock = Crystallizing

* Igneous Rock → Sediment = Weathering

* Sediment → Sedimentary Rock = Compaction/Cementation

* Sedimentary Rock → Sediment = Weathering

* Sedimentary Rock → Metamorphic Rock =

Metamorphosing (Heat & Pressure)

* Metamorphic Rock → Magma = Melting

* Igneous Rock → Magma = Melting

* Igneous Rock → Metamorphic Rock = Metamorphosing

* Metamorphic Rock → Sediment = Weathering

10. The three groups of rocks are classified by _____.

- a. color b. grain size c. chemical composition d. **how they formed**

11. As the rate of cooling of igneous rocks increases, the size of the crystals that form _____.

- a. **decreases** b. increases c. is not affected d. cannot be determined

12. What is the difference between *contact* and *regional* metamorphism?

- **Contact – Molten rock comes in contact with solid rock producing metamorphic rock**
- **Regional – Large region of Earth's crust is affected by same high temp & pressure in producing metamorphic rock**

13. Contrast weathering, erosion, and deposition.

*** Weathering – Physical/chemical processes that break down rock**

*** Erosion – Weathered material is further broken down & moved/transported**

*** Deposition – Sediments are dropped and settles out in layers as agents diminish**

14. What are foliated rocks and how do they form?

Thin, sheet-like layers/bands formed around a metamorphic rock due to re-organization of minerals during heat/pressure process

15. What is the correct order of the processes involved in sedimentary rock formation? *Use the words:* compaction, cementation, deposition, weathering, and erosion

Weathering → Erosion → Deposition → Compaction → Cementation

Chapter 5: Soil

16. Which of these factors affects the rate of weathering?

- a. climate
- b. surface area of the exposed rock
- c. chemical composition of the exposed rock
- d. **all of the above**

17. Compare and contrast mechanical (physical) and chemical weathering.

*** Mechanical – Physical breaking down/weathering of rock without changing its mineral (chemical) composition**

*** Chemical – Transformation of rock by altering/changing its mineral (chemical) composition**

18. What are **three (3)** types of mechanical weathering?

A) Frost Wedging

B) Unloading

C) Biological Activity

19. What is the most important agent of chemical weathering?

- a. carbonic acid
- b. sulfuric acid
- c. **water**
- d. minerals

20. Which of the following is NOT a major component of soil?

- a. mineral matter
- b. air
- c. humus
- d. **earthworms**

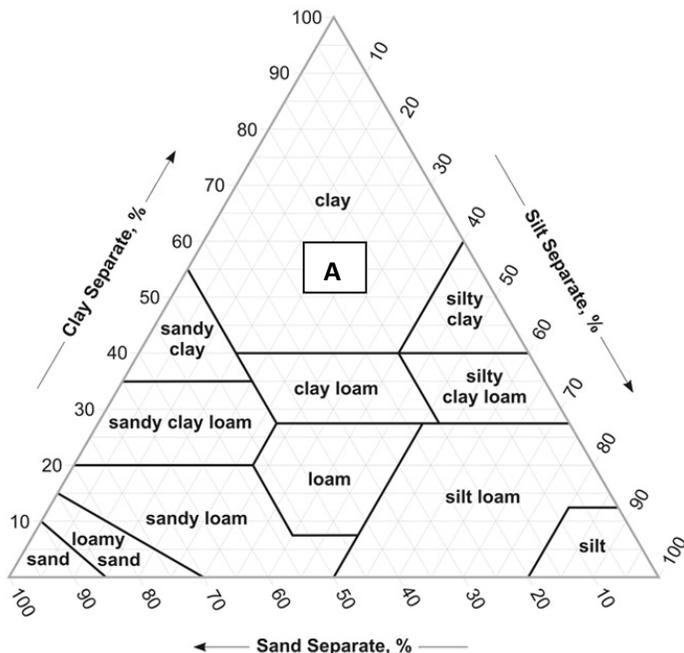
21. The factor that has the greatest effect on soil formation is _____.

- a. **climate**
- b. parent material
- c. time
- d. slope of orientation

22. In which area will soil formation be the greatest?

- a. A steep slope in a warm, wet climate
- b. A flat area in a cold, wet climate
- c. **A flat area in a warm, wet climate**
- d. A north-facing area on a steep slope

**** Use the soil texture diagram below to answer the following questions:**



23. Type of soil texture consisting of 10% clay, 60% silt, and 30% sand:

Silt Loam

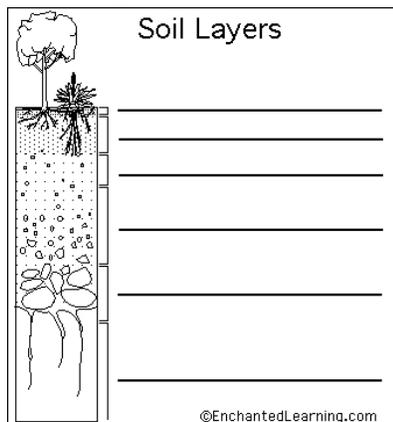
24. Point "A" in the diagram consists of:

clay = **55** %

silt = **20** %

sand = **25** %

25. Label the soil horizons shown in the diagram below using some of the following words: *partially weathered parent material, clay, topsoil, subsoil, loose and partly decayed organic matter, unweathered parent material, mineral matter mixed with organic material, bedrock*



Top-to-Bottom:

(O) Horizon → Humus → Loose & partially decayed organic matter

(A) Horizon → Topsoil → Mineral matter mixed with organic material

(E) Horizon → Eluviation → "Zone of Leaching" - organic material seeps out of

(B) Horizon → Subsoil → Clay

(C) Horizon → Regolith → Partially weathered parent material

(R) Horizon → Bedrock → Un-weathered parent material

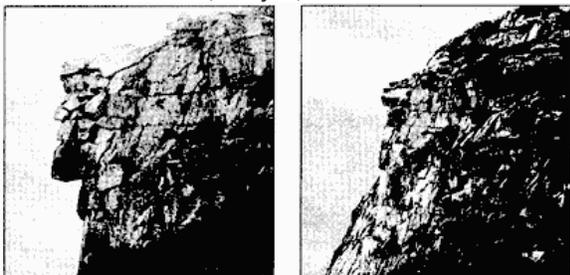
26. Compared to the past, rates of soil erosion are _____.
- a. about the same b. **faster** c. slower d. more unpredictable
27. Which of the following human activities has caused an increase in soil erosion?
- a. clear-cut logging c. plowing land for farming
- b. clearing land for construction d. **all of the above**
28. What is the force behind mass movements?
- a. the sun's energy b. flowing water c. **gravity** d. moving ice
29. What factor commonly triggers mass movements?
- a. saturation of surface materials with water c. removal of vegetation
- b. earthquakes d. **all of the above**
30. When a block of material moves downslope along a curved surface, this mass movement is called _____.
- a. rockfall b. rockslide c. **a slump** d. creep
31. What is the slowest type of mass movement?
- a. slump b. **creep** c. mudflow d. earthquake
32. What kind of soil is best for water holding capacity?

Clay → Low permeability & low porosity due to smallest particle size compared to sand and silt

**** Old Man's Loss Felt in New Hampshire**

FRANCONIA, N.H. — Crowds of visitors were drawn to Franconia Notch on Sunday to mourn the loss of New Hampshire's well-known symbol — the Old Man of the Mountain granite profile. The 700-ton natural formation was just a pile of rocks after breaking loose from its 1,200-foot-high mountainside perch. It was unclear when the outcropping fell because clouds had obscured the area Thursday and Friday; a state park trail crew discovered the collapse Saturday morning. The famous mountain's history dates millions of years. Over time, nature carved out a 40-foot-tall profile resembling an old man's face, and it eventually became New Hampshire's most recognizable symbol.

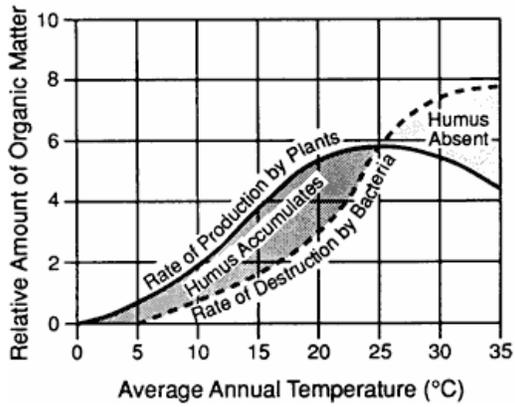
The Buffalo News, May 5, 2003



Granite profile of the Old Man of the Mountain is shown before the collapse, and after

33. Which agent of erosion is most likely responsible for the collapse of the granite profile?
- a. running water
- b. glacial ice
- c. wave action
- d. **mass movement**

** The graph below shows how environmental temperatures affect the amount of organic material (humus) added to and removed from soils in humid regions:



34. The graph supports the conclusion that soils in regions with average annual temperatures about 25°C have _____.

- a. **little humus present**
- b. highest production of humus
- c. low breakdown of humus
- d. same amount of humus as soils in cooler regions