

Notes on Sedimentary Rocks, Weathering and Erosion- Chapter 10, 12

Name _____

Date _____ Class _____

Vocabulary List (Number, write and define these words on another sheet of paper, those that have a * please illustrate, be creative!) (45)

cementation	rock cycle*	breccia*	compaction*
sediment	clastic	sedimentary rock	concretion*
erosion	conglomerate*	evaporate*	soil*
strata*	evaporites	fossil*	weathering*
stratification*	abrasion	butte*	carbonation
chemical weathering	creep*	erosion	exfoliation
horizon*	humus*	hydrolysis	ice wedging*
landslide	leaching*	oxidation	mechanical weathering
mesa*	monadnock	mudflow	peneplain
regolith	rockfall	sheet erosion	slump
soil profile	solifluction	talus*	alluvial fan*
mass movement (wasting)			

Sedimentary Rocks

A. Introduction

1. _____ of the rocks on the earth's surface are sedimentary
2. Sedimentary rocks form on or very near _____

B. Kinds of sediments

1. _____ - tiny fragments of clay minerals
2. _____
3. _____ - larger grains of quartz
4. _____ - larger pieces of broken rock
5. _____ - animals with shells die and form ocean sediments
6. _____ - when water evaporates and leaves behind mineral deposits

C. Movement of sediments

1. Sediments are moved by _____
2. The faster the water moves, the larger the _____ that will be moved
3. As moving water slows down, the larger sediments will drop out first
4. The smaller size particles remain _____ in the water; they take a long time to settle to the bottom
5. Eventually most sediments are deposited in the _____ in layers

D. Types of sedimentary rocks

1. _____ (detrital or fragmental) sedimentary rocks
 - a. Formed from broken pieces or fragments of rocks, such as clay, sand and gravel
 - b. _____
 - made of rounded pebbles mixed with clay and sand
 - form in where streams/rivers slow down and deposit large sediments
 - (angular rocks= breccia)
 - c. _____
 - made of small, sand-sized grains of quartz
 - formed from sand on beaches, in river beds and in sand dunes
 - Sand grains are usually glued together
 - d. _____
 - the clay in fragments in shale are mica flakes, so it has a smooth texture

- the clay particles are flat and are easily pressed together
- rocks made of clay can be easily split apart in layers

2. _____
 - a. Formed directly or indirectly from material once alive
 - b. _____ - sedimentary rocks made up mostly of calcium in the shells of clams, oysters, etc.
 - c. _____ - animals with shells that grow together in a reef
 - d. _____ - small pieces of animal shells and crystal pressed together
 - e. _____ - formed from the remains of living things that lived millions of years ago

3. Chemical sedimentary rocks

- a. formed by chemical means that do not involve any _____
- b. formed when water evaporates and leaves deposits behind called _____
- c. limestone- formed from tiny grains of calcite deposited in _____
- d. _____ - natural form of halite (common table salt); form thick layers or beds

E. Formation of sedimentary rocks

1. _____ - process which changes sediment into rock
2. The two parts of lithification are:
 - a. _____ - caused by pressure of overlying layers
 - b. _____ - glueing together of sediments by minerals dissolved in water
3. Kinds of natural cement:
 - a. _____ (from quartz)
 - b. _____ (from calcite) - most common

F. Destruction of rocks

1. _____ - the process of breaking rocks apart and moving away the sediments
2. _____ - the slow breakup of rock by the atmosphere
 - a. mechanical or physical weather (disintegration)
 - takes place when rocks are split or broken into small pieces of the same material without changing the composition
 - Types of mechanical weathering:
 - 1) _____ - expansion and contraction splits rocks
 - 2) _____ - roots split rocks
 - 3) _____ - landslides move and break rocks
 - 4) _____ - colliding of tiny fragments with rock
 - b. chemical weathering (decomposition)
 - takes place when the minerals in the rock change into different substances
 - Agents (causes) of chemical weathering:
 - 1) _____ - dissolves minerals holding rocks together
 - 2) _____ - called oxidation; combines with iron to cause rust

G. Feature of (how to recognize) sedimentary rocks

1. _____ (stratification)- layers or beds of sedimentary rocks
2. _____ - remains or evidence of past animal or plant life
 - a. Imprints – leaf, feather, or bone impression
 - b. Petrification- bones or trees turn to stone
 - c. Trace fossils – dinosaur footprints
3. _____ - formed by action of wind or water on sand
4. _____ - when minerals precipitated from solutions, build up around an existing rock particle- geodes

Rock Chart

Sediment	Original	Metamorphic Rock
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Mud (Mica)		Slate
	Slate	
Magma		Gneiss
	Sandstone	
		Marble
Fossils		

Chapter 12 Weathering and Erosion

1. What are the two ways rock material weather?

- _____ - physically breaking rock into smaller pieces
- _____ - breaks down rock by changing its chemical composition

A. Mechanical Weathering

1. How does granite exfoliate?

- long cracks called joints develop on surface and break into _____

2. Describe ice wedging?

- Water seeps into cracks and joints of rocks, freezes its volume increasing by _____
- Each freeze causes the crack in rock to grow wider and deeper, eventually _____

3. How can plants and animals aid in mechanical weathering?

- _____ - roots work their way into cracks in rocks, as the root grows it splits the rock
- _____ - burrowing (prairie dogs) exposes new rock surfaces to weathering

4. What is abrasion?

- The collision of rocks with one another caused by _____

B. Chemical Weathering

1. What two changes occur in chemical weathering?

- change in the _____ of the mineral and the physical appearance is altered

2. What is hydrolysis?

- When water combines with certain minerals such as feldspar then it becomes altered through _____ - to become a clay called kaolin
- when minerals are altered, the dissolved minerals can be carried through the soil into lower layers of rock, this is called _____

3. Explain the process that creates limestone caves:

- carbon dioxide and water combine to form _____, which slowly dissolves limestone (made up of calcite), the process is called carbonation and produces underground caves

4. Why is some soil red especially in the southeastern U.S.?

- through the process of _____, metallic elements (iron) react with oxygen causing the soil to become a 'rusty' color

5. What does oxidation do to automobiles over time?

- Oxidation corrodes a car to begin to rust causing the appearance of the car to be ruined, damaging the floor of the passenger compartment causing _____ to enter the car, also weaken suspension, steering and brake systems

6. What is acid rain and what causes it?

- _____ that is more acidic than ordinary rain, due to high levels sulfur and nitrogen which is produced near cities (cars, power plants-pollution)

7. How can a plant chemically alter a rock?

- _____ (colonial organisms) can live on bare rock and release weak

acids breaking rock down over time (this is how life got started on land)

C. Rates of Weathering

1. Why does rock composition affect the rate of weathering?
 - Some rocks are more resistant to weathering (_____) because of the mineral makeup such as quartz (one of the hardest minerals) is resistant to mechanical weathering
 - Sedimentary rocks such as _____ contain calcite that weather faster due to carbonation
2. What is the second factor that affects rate of weathering?
 - Amount of _____, the more of an outcrop that is exposed the quicker it will erode without soil covering it
3. How do climates affect the rate of weathering?
 - Lots of rainfall or a climate with constant freezing and thawing or variable weathering conditions all accelerate weathering (rain forests, Eastern U.S.)
 - Weathering takes place slowly in _____
4. What has happened to Cleopatra's Needle from Egypt?
 - A granite Egyptian obelisk over 3,000 years old was moved from Egypt (hot and dry) to _____
 - More mechanical and chemical weathering in past 100 years than previous _____!
5. How does topography affect the rate of weathering?
 - The greater the elevation and slope of a landscape the faster the _____

D. Weathering and Soil

1. How are humus, bedrock, regolith and soil related?
 - bedrock is solid rock that weathers over time to produce regolith (_____), the uppermost rock fragments further weather and become soil, soil also contains a dark organic _____ which is the remains and wastes from organisms
2. How do soils differ from different bedrocks?
 - parent rock containing feldspar will produce a _____, granite would weather into a _____ (quartz)
3. How are soils different in a soil profile?
 - _____ - the topsoil, a mixture of organic material (humus) and small rocks
 - _____ - the subsoil beneath the A hor. contains the minerals leached from the topsoil
 - _____ - bottom layer consists of bedrock in the first stages of mechanical weathering so it will eventually become B-horizon then A
4. Describe the soil found in humid, tropical climates:
 - soils are called _____, rich in iron and aluminum, a very thin A horizon due to so much rainfall (usually a thin layer of humus due to all of the organic material above), not a good soil for farming
5. Describe soil in an arctic and desert climate:
 - Hardly any _____, soil is very thin containing mostly regolith
6. Describe the soil in a temperate climate:
 - both mechanical and chemical weathering taking place, each soil horizon can be a _____
 - _____ - soil that contains clay, quartz and iron, rainfall >65 cm, Eastern U.S.
 - _____ - soil that contains calcium carbonate which combines with hydrogen to make very fertile soil, West of the Mississippi
7. Based on topography what makes for the best and worst soils for cultivation?
 - Worst- _____, soils layers are not thick due to slopes contain only weathered rocks, no humus
 - Best- _____ retain water have a thick wet soil with a high concentration of organic

matter, the best area is fairly flat with good drainage producing a fertile soil

D.Erosion

1. What is erosion?
 - Transport of weathered product to other areas caused by _____
(ocean currents, waves, rivers, streams and groundwater)
2. What are two ways to upset the balance of soil erosion?
 - _____ (over farming, development) and unusual climate conditions
3. How does gullying occur?
 - _____ in plowed land allow water to run swiftly over the soil as it is washed away the furrow grows to become a gully making it useless farmland
4. What is sheet erosion?
 - soil erosion that strips away layers of the topsoil that can eventually expose bedrock
 - Farmers need A-horizon soil for the _____, plants cannot grow in B-horizon soil
5. What are four methods that farmers can use to prevent soil erosion?
 - _____ - soil is plowed in bands that follow the shape of the land, preventing water from running down steep slopes
 - Strip-cropping- crops are planted in alternated bands (corn than alfalfa), often combined with contour plowing-reduces soil erosion by 75%!
 - _____ - construction of step-like ridges, used in Asia for rice crops
 - _____ - each year a different crop is planted gives soil a chance to recover
6. What is talus?
 - Piles of sediment that accumulate at the base of a _____
7. What is the difference between a landslide and a mudflow?
 - both are rapid movement of material but landslides involve bedrock that has weathered and falls down a slope, a mudflows occur in _____ during sudden heavy rainfall or a lahar that liquefies the land causing it to move down a slope houses and all!
8. What is slump?
 - Loose soil slides down a hill due to _____ and loss of friction with underlying rock
9. What is solifluction?
 - A slow mass movement, which means 'soil flow,' occurs in _____ where subsoil is permanently frozen, in the summer only the top layer thaws causing it to become muddy and slowly flow downslope
10. What is the most effective of all mass (wasting) movements?
 - _____ - extremely slow downhill movement of weathered rock usually going unnoticed unless a fence or other object is present
11. What are the two forces that created landforms?
 - One process bends, breaks and lifts the Earth's crust, creating elevated landforms- _____
 - Second process is the wearing action of weathering and erosion reducing the land surface to sea level creating _____
12. What eventually happens to mountains when they get 'old'?
 - Weathering and erosion reduces them to _____ (low rolling hills such as New England) and _____ (protrusions above the peneplains of weather resistant granite)
13. How does a mesa form?
 - A _____ grows smaller into a table-like area due to erosion
14. How is a butte formed, how do they differ in dry and humid regions?
 - Mesa eventually erode into buttes
 - Dry regions- have steep walls with flat tops, humid regions- _____