

Practice Questions for Lecture 5  
Geology 1200

Use these questions to test your knowledge of Lecture 5. The exams will be similar in format, except that they will deal with more than one chapter, and will have more questions total.

A. Short answer:

1. \_\_\_\_\_ is the breaking down of rocks into rock fragments.
2. \_\_\_\_\_ is the transporting of rock fragments.
3. \_\_\_\_\_ weathering can change the size and shape of rock structures.
4. \_\_\_\_\_ wedging breaks up large rocks because water increases in volume when it freezes.
5. The primary cause of mechanical \_\_\_\_\_ is the removal by erosion of overlying rock and soil.
6. The single most important factor controlling the rate of **chemical** weathering is \_\_\_\_\_.
7. The most effective type of mechanical weathering in a summertime coastal environment would be \_\_\_\_\_ crystal growth.
8. Different kinds of \_\_\_\_\_ within a rock expand at different rates when heated.
9. The outside of a large rock experiences more temperature \_\_\_\_\_ than the inside of the rock.
10. The addition of water to the surface of a rock influences the rate of \_\_\_\_\_.

B. Match the terms

- |                                            |                                         |
|--------------------------------------------|-----------------------------------------|
| 1. Abrasion _____                          | a. deep soils                           |
| 2. Frost wedging _____                     | b. red iron oxide topsoil and subsoil   |
| 3. Carbonic Acid _____                     | c. weathers basalt, leaving rust behind |
| 4. Mechanical Exfoliation _____            | d. dissolution of limestone             |
| 5. Hydrolysis _____                        | e. exposed rock expands upward          |
| 6. Rainforests _____                       | f. turns feldspar into clay             |
| 7. Oxidation _____                         | g. significant in deserts               |
| 8. Laterite _____                          | h. beach weathering                     |
| 9. thermal expansion and contraction _____ | i. Ice in cracks breaks rocks           |
| 10. salt crystal growth. _____             | j. breaks rocks in streams, glaciers    |

### C. True or False?

1. The B horizon generally lies above the E horizon. True or False?
2. The single most important factor controlling the rate of **chemical** weathering is water. True or False?
3. In **chemical** weathering, water carries ions to reaction sites, participates in the reactions, and carries away products of the reactions. True or False?
4. The dissolution of limestone to form caves results from water combining with carbon dioxide to form carbonic acid. True or False?
5. In geology, the term “oxidation” often refers to the chemical combination of a mineral’s ions with oxygen. True or False?
6. Hydrolysis refers to the displacement of a mineral’s ions by the  $H^+$  or  $OH^-$  ions from water. True or False?
7. In general, chemical weathering would occur most rapidly in a cool, dry climate. True or False?
8. Carbon dioxide is added to the atmosphere by volcanic eruptions. True or False?
9. **Soil** is the upper portion of regolith, containing both minerals and organic matter. True or False?
10. The color of the E horizon results from humus that has leached downward from the A horizon. True or False?

D. Multiple choice:

1. All of the following events could indicate an impending eruption

**EXCEPT:**

- (a) discovery of new hot springs around the volcano.
- (b) a measurable bulge or swelling of the volcano.
- (c) swarms of small earthquakes in the region.
- (d) a highly eroded, volcanic peak.

2. The principal factor(s) influencing upward magma migration before cooling is (are):

- (a) the magmatic water content.
- (b) the magmatic gas content, combined with magma viscosity.
- (c) the climate and temperature regime that affects the land surrounding the volcano.
- (d) the time since the last eruption, combined with the density of the rocks overlying the volcano.

3. Plants promote chemical weathering by:

- (a) producing organic acids upon decay.
- (b) consuming carbon dioxide in photosynthesis.
- (c) shading the ground surface from rainfall.
- (d) shading the ground surface from intense sunlight.

4. Animals influence the rate at which chemical weathering takes place primarily by:

- (a) secreting acid that dissolves rocks and minerals.
- (b) increasing the exposure of rocks and minerals to weathering agents.
- (c) grinding rocks and minerals into smaller pieces.
- (d) ingesting the minerals that are necessary for nutrition.

5. Stability (resistance to weathering) of silicate minerals follows the inverse of their order of crystallization (Bowen's Series). The correct sequence of stability for the minerals below would be (**most stable-first, least stable-last**):

- (a) olivine, pyroxene, mica, quartz.
- (b) pyroxene, olivine, mica, quartz.
- (c) mica, pyroxene, olivine, quartz.
- (d) quartz, mica, pyroxene, olivine.

6. Clay minerals are formed predominately from the hydrolysis of:

- (a) feldspars.
- (b) nonsilicate minerals.
- (c) quartz.
- (d) metal ores.

7. Nutrient-poor soils are derived from a parent material that resists chemical weathering, such as:

- (a) limestone.
- (b) sandstone.
- (c) granite.
- (d) basalt.

8. In which of the following locations would a rich soil accumulate most quickly?

- (a) A relatively flat topography in a moist, mid-latitude climate.
- (b) A steep topography in a dry, cold climate.
- (c) A relatively flat topography in a very dry, hot climate.
- (d) A steep topography in a moist, mid-latitude climate.

9. In a temperate region, the most distinctive feature of the O horizon of a soil is:

- (a) the abundance of finely ground rock particles.
- (b) the abundance of both organic matter and living organisms.
- (c) its inability to maintain fertility because of constant leaching of materials to lower soil horizons.

10. The most distinctive feature of the E horizon is:

- (a) its dark color from the accumulation of humus.
- (b) its mixture of both large and small rock particles.
- (c) its lack of both organic matter and soluble minerals.
- (d) its high concentration of oxides

E. Short answers.

- a. How does **oxidation** work?
- b. What type of rock is vulnerable? (Hint: what type of rock is made of the minerals that are least stable here at the surface?)
  
- c. How does **hydrolysis** work?
- d. What minerals are vulnerable to hydrolysis?
- e. How do plants use hydrolysis?
- f. What minerals result from the hydrolysis of Feldspars?
- g. Why are clays easy for streams to move down to the sea?
  
- h. How does **dissolution** work?
- i. What happens to Calcite ( $\text{CaCO}_3$ ) when you drop very dilute acid on it?
- j. How is mildly acid rain formed without pollution?
- k. What type of rock is vulnerable to dissolution?