

# Soil Erosion

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## ► Part One: Matching

**Instructions:** Match the term with the correct definition.

- |                     |                  |
|---------------------|------------------|
| a. geologic erosion | f. sediment      |
| b. runoff           | g. saltation     |
| c. suspension       | h. cover crops   |
| d. rill erosion     | i. water erosion |
| e. soil erosion     | j. wind erosion  |

- \_\_\_\_ 1. Condition in which medium-sized soil particles bounce along the surface of the soil
- \_\_\_\_ 2. Natural erosion that occurs on land never disturbed by humans
- \_\_\_\_ 3. Soil deposited on the bottom of streams and rivers
- \_\_\_\_ 4. The process by which small soil particles are lifted into the airstream, where they remain for miles
- \_\_\_\_ 5. Vegetation planted on excavated soil to hold it in place
- \_\_\_\_ 6. The loss of soil due to the movement of wind over the land
- \_\_\_\_ 7. The result of rain that falls faster than the water can be absorbed by the soil
- \_\_\_\_ 8. The process by which small channels that can be removed by normal tillage methods are formed in the soil by running water
- \_\_\_\_ 9. The process by which soil is moved
- \_\_\_\_ 10. The loss of soil due to water movement

## ► Part Two: Multiple Choice

**Instructions:** Write the letter of the correct answer.

- \_\_\_\_ 1. Which describes gully erosion?
- Occurs when the wind lifts medium-sized soil particles into the air
  - Occurs when rills continue to wash away and become more severe
  - Results when thin layers, or sheets, of soil are worn away
  - Usually occurs on sloping land, where small channels are formed by running water

- \_\_\_\_\_ 2. What term is associated with the wind lifting medium-sized soil particles into the air?
- salinization
  - saltation
  - surface creep
  - suspension
- \_\_\_\_\_ 3. What type of erosion removes topsoil at an excessive rate and usually results from human activity on the land?
- accelerated
  - glacial
  - land slippage
  - natural (geologic)
- \_\_\_\_\_ 4. What is runoff?
- The deposition of soil in the bottom of streams, riverbeds, ditches, etc.
  - Erosion that occurs on a slope that is saturated with water, causing soil to slip down the hillside or mountain
  - Erosion that results when the front edge of a glacier pushes soil, rocks, fallen trees, and other materials
  - The result of rain that falls faster than it can be absorbed into the soil, allowing the water to flow over the surface into streams and rivers
- \_\_\_\_\_ 5. What type of erosion results when thin layers of soil are removed from the surface, often going unnoticed?
- gully
  - rill
  - sheet
  - splash

► **Part Three: Short Answer**

**Instructions: Complete the following.**

- The erosion process involves three distinct steps. They are:
  
  
  
  
  
  
  
  
  
  
- Explain how gully erosion is different from rill erosion.

# Soil Degradation

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## ► Part One: Matching

**Instructions:** Match the term with the correct definition.

- |                     |                    |
|---------------------|--------------------|
| a. compaction       | f. desertification |
| b. alkalization     | g. construction    |
| c. soil degradation | h. deforestation   |
| d. salinization     | i. soil erosion    |
| e. contamination    |                    |

- \_\_\_\_\_ 1. An accumulation of soluble salts
- \_\_\_\_\_ 2. A result of years of tillage with heavy machinery, which often breaks down soil structure
- \_\_\_\_\_ 3. The removal of trees from forested lands
- \_\_\_\_\_ 4. The seeping of chemicals, oil, and other substances into the land
- \_\_\_\_\_ 5. The process by which soil is moved
- \_\_\_\_\_ 6. A condition resulting from the removal of productive plant cover
- \_\_\_\_\_ 7. An accumulation of exchangeable sodium
- \_\_\_\_\_ 8. The altering of land by building roads, houses, offices, factories, and other structures
- \_\_\_\_\_ 9. A lowering of the quality of soil or the loss of soil productivity

## ► Part Two: Multiple Choice

**Instructions:** Write the letter of the correct answer.

- \_\_\_\_\_ 1. What soil management strategy can provide organic matter, continuous cover, and food for soil organisms?
- a. groundcover
  - b. pest and nutrient management
  - c. soil compaction
  - d. tillage
- \_\_\_\_\_ 2. Construction, contamination, and erosion cause \_\_\_\_\_.
- a. soil degradation
  - b. soil improvement
  - c. soil productivity
  - d. soil sustainability

- \_\_\_\_\_3. Which of the following statements is true regarding construction?
- Construction improves the soil when unproductive grasses and trees are removed.
  - Construction degrades the soil by replacing productive land with structures that prevent the production of plants or animals.
  - Digging deep into the earth brings up nutrient-rich soil that raises fertility when it is spread on the surface.
  - Heavy equipment improves soil productivity indirectly by improving soil structure.
- \_\_\_\_\_4. What is an accumulation of exchangeable sodium in the soil that is harmful to plant growth?
- acidification
  - alkalization
  - acceleration
  - salinization
- \_\_\_\_\_5. What is the primary cause of salinization and alkalization?
- “mining” of nutrients
  - deforestation and overgrazing
  - improper irrigation practices
  - use of too much fertilizer

► **Part Three: Short Answer**

**Instructions: Complete the following.**

- How can land that was formerly used as dumps, mines, or factory sites be rehabilitated?
- What is the effect on soil of growing crops without replacing plant nutrients and organic matter that have been removed?
- Name the types and give examples of three human activities that have degraded our soils.
- What are six management strategies that limit soil degradation?

# Soil Chemistry

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## ► Part One: Matching

**Instructions:** Match the term with the correct definition.

- |           |                        |
|-----------|------------------------|
| a. acid   | f. soil pH             |
| b. anion  | g. soil depth          |
| c. cation | h. colloids            |
| d. ion    | i. soil fertility      |
| e. pH     | j. soil organic matter |

- \_\_\_\_ 1. The measure of alkalinity or acidity of a substance
- \_\_\_\_ 2. A negatively charged ion
- \_\_\_\_ 3. A substance that releases hydrogen ions
- \_\_\_\_ 4. The depth of soil material favorable for plant root growth
- \_\_\_\_ 5. A positively charged ion
- \_\_\_\_ 6. The measure of acidity or alkalinity of the soil
- \_\_\_\_ 7. An element with an electrical charge
- \_\_\_\_ 8. Consists of plant, animal, and microbial residues in various stages of decay
- \_\_\_\_ 9. The ability of a soil to provide nutrients for plant growth
- \_\_\_\_ 10. The very smallest particles of organic and mineral matter

## ► Part Two: Multiple Choice

**Instructions:** Write the letter of the correct answer.

- \_\_\_\_ 1. Which is true of an acidic solution?
- There are more  $H^+$  ions than  $OH^-$  ions.
  - There are an equal number of  $H^+$  and  $OH^-$  ions.
  - There are more  $OH^+$  ions than  $H^-$  ions.
  - There are more  $H^-$  ions than  $OH^+$  ions.

- \_\_\_\_ 2. Which of the following statements is true?
- Acidic soil generally becomes less acidic if a liming program is not followed.
  - Buffering capacity increases with the amounts of clay and organic matter.
  - Clay soils must be limed more often than sandy soils.
  - Most common liming materials are highly soluble in water.
- \_\_\_\_ 3. The amount of agricultural limestone needed to establish the desired pH range for the cropping system being used is known as the:
- Alkali agent
  - Buffering factor
  - Lime requirement
  - pH adjustment
- \_\_\_\_ 4. \_\_\_\_ is the total number of exchangeable cations a soil can hold.
- Anion magnetism mechanism
  - Cation exchange capacity
  - Colloidal load facility
  - Ion substitution capability
- \_\_\_\_ 5. Most soil organisms depend on \_\_\_\_ for food and energy.
- Anions and cations
  - Mineral matter
  - Organic matter
  - Soil colloids

► **Part Three: Short Answer**

**Instructions: Complete the following.**

1. Is a fertile soil always productive?
2. What is the relationship between reaction rate and the size of the liming material?
3. List five environmental conditions that influence nutrient deficiencies.

# Fertilizer Formulations

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## ► Part One: Matching

**Instructions:** Match the term with the correct definition.

- |                        |                            |
|------------------------|----------------------------|
| a. bulk blending       | f. inorganic fertilizer    |
| b. complete fertilizer | g. single-grade fertilizer |
| c. conditioner         | h. fertilizer              |
| d. fertilizer grade    | i. filler                  |
| e. fertilizer ratio    | j. organic fertilizer      |

- \_\_\_ 1. Indicates the primary nutrient content of the fertilizer
- \_\_\_ 2. Physically mixing solid fertilizer materials into multi-nutrient mixtures
- \_\_\_ 3. Improves the quality of the fertilizer and makes it easier to use
- \_\_\_ 4. A fertilizer containing only one element
- \_\_\_ 5. Contains all three of the primary elements but not necessarily all 13 mineral nutrients
- \_\_\_ 6. A material originating from a non-living source
- \_\_\_ 7. States the relative amounts of nitrogen, phosphate and potash in fertilizers
- \_\_\_ 8. Sand, clay granules, ground limestone, or ground corn cobs used to bring a load of bulk fertilizer to a desired weight
- \_\_\_ 9. A material originating from plants or animals that releases useful amounts of a plant nutrient when added to the soil
- \_\_\_ 10. An organic or inorganic material applied to soil or water which provides nutrients that increase plant growth, yield, and nutritional quality

## ► Part Two: Multiple Choice

**Instructions:** Write the letter of the correct answer.

- \_\_\_ 1. Which of the following identifies the amount, source, time of application, and placement of each nutrient needed to produce the crop grown in a given field each year?
  - a. Fertilizer analysis
  - b. Fertility guide
  - c. Nutrient management plan
  - d. Soil test analysis

- \_\_\_\_\_ 2. Which of the following lists the fertilizer elements in the bag and their percent content?
- Fertilizer analysis
  - Fertilizer grade
  - Fertilizer ratio
  - Multi-nutrient fertilizer
- \_\_\_\_\_ 3. Which of the following statements is true regarding inorganic fertilizers?
- Nitrogen is usually the predominating nutrient, with phosphorus and potassium being in lesser quantities.
  - Nutrients are only made available to plants as the material decays in the soil.
  - Nutrients are in a soluble form and are quickly available for plant use.
  - The material is bulky, and the exact amount of fertilizer applied is difficult to measure.
- \_\_\_\_\_ 4. Knowing that  $P_2O_5 \times 0.44 = P$ , how much actual phosphorus would be in a 100-pound bag of 30-10-5 fertilizer?
- 2.2 pounds
  - 4.4 pounds
  - 10 pounds
  - 13.2 pounds
- \_\_\_\_\_ 5. A fertilizer containing only one element is called a:
- Bulk fertilizer
  - Complete fertilizer
  - Mixed fertilizer
  - Single-grade fertilizer

### **Part Three: Short Answer**

**Instructions: Complete the following.**

1. What factors influence the selection of fertilizers?
  
  
  
  
  
  
  
  
  
  
2. What are two disadvantages of bulk blending?



# Applying Fertilizers

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## ► Part One: Matching

**Instructions:** Match the term with the correct definition.

- |                   |                              |
|-------------------|------------------------------|
| a. broadcasting   | g. pre-emergence             |
| b. buildup        | h. preplant                  |
| c. fertigation    | i. site-specific application |
| d. foliar feeding | j. starter                   |
| e. pop-up         | k. tissue testing            |
| f. post-emergence | l. top dressing              |

- \_\_\_\_ 1. Measures nutrient levels in plant tissue
- \_\_\_\_ 2. Amount of material required to increase the soil test to the desired level
- \_\_\_\_ 3. Fertilizing after the crop has emerged from the ground
- \_\_\_\_ 4. Fertilizer applied before a crop is planted
- \_\_\_\_ 5. Spreading fertilizer evenly on the soil surface
- \_\_\_\_ 6. Fertilizer applied while planting
- \_\_\_\_ 7. Fertilizer placed in the row with the seeds
- \_\_\_\_ 8. Fertilizing after the planting but before the crop emerges from the ground
- \_\_\_\_ 9. Same as broadcasting, except that the fertilizer is spread over a growing crop and is not mixed into the soil
- \_\_\_\_ 10. Method of injecting fertilizer into irrigation water
- \_\_\_\_ 11. Offers the quickest response of any fertilizing method
- \_\_\_\_ 12. Also known as variable rate technology (VRT); uses computer technology to alter the rate of fertilizer application as the fertilizer applicator passes across the field

## ► Part Two: Multiple Choice

**Instructions:** Write the letter of the correct answer.

- \_\_\_\_ 1. \_\_\_\_\_ is the amount of fertilizer required to replace the amount that will be removed by the crop to be grown.
- a. Broadcast
  - b. Buildup
  - c. Maintenance
  - d. Top dressing

