

Clifton-Clyde High School

Plant and Soil Science

Name _____ SSN ____-____-_____

Instructor _____

RATING SCALE:
 3: Skilled, works independently
 2: Competent, may need assistance
 1: Received instruction, skill undeveloped
 0: No exposure, instruction or training

INTEGRATION:
 (M) Math (S) Science
 (E) Language Arts (C) Career Development Skill
 (L) Lab Activity

Enrollment Date ____/____/____	Completion Date ____/____/____	Hours completed _____
I certify that the student received the training in the area indicated.		
Student Signature _____	Date _____	
Instructor Signature _____	Date _____	
Administrator Signature _____	Date _____	

I. Soils

- 3 2 1 0 1. Define soil texture and soil structure (E)
- 3 2 1 0 2. Use the textural triangle to identify soil textural class (L)
- 3 2 1 0 3. Describe how particle size affects surface area and reactivity of soils (E)
- 3 2 1 0 4. Describe how soil texture affects the water holding capacity and available water of soils
- 3 2 1 0 5. Define permeability and apply it to subsoil textures (E)
- 3 2 1 0 6. Determine slope in a field and its application to land classification (M)
- 3 2 1 0 7. Determine depth of soil favorable to root development
- 3 2 1 0 8. _____
- 3 2 1 0 9. _____

II. Soil Evaluation

- 3 2 1 0 1. Determine soil texture by feel (L,S)
- 3 2 1 0 2. Characterize soil horizons (E,S)
- 3 2 1 0 3. Classify soil y texture (L,S)
- 3 2 1 0 4. Identify soil depth classes (E)
- 3 2 1 0 5. Measure soil depth and classify (M,L,S)

- 3 2 1 0 6. Identify soil slope classes (E)
- 3 2 1 0 7. Measure slope using percent (M,L,S)
- 3 2 1 0 8. Classify slope using slope class
- 3 2 1 0 9. Identify soil erosion classes (E)
- 3 2 1 0 10. Measure amount of soil removed by erosion (M,L)
- 3 2 1 0 11. Discriminate between types of gullies (E)
- 3 2 1 0 12. Identify classes of structure (E)
- 3 2 1 0 13. Determine soil structure by size or shape of aggregates (L,S)
- 3 2 1 0 14. Identify soil permeability classes (E)
- 3 2 1 0 15. Determine permeability by analyzing soil texture and structure (L,S)
- 3 2 1 0 16. Identify soil runoff classes (E)
- 3 2 1 0 17. Identify land capability classes (E)
- 3 2 1 0 18. Determine vegetative land treatments (E)
- 3 2 1 0 19. Identify mechanical land treatments
- 3 2 1 0 20. Explain lime and nutrient land treatments (E)
- 3 2 1 0 21. Fill out land judging scorecard (L)
- 3 2 1 0 22. Compete in land judging CDE (L,C)
- 3 2 1 0 23. _____
- 3 2 1 0 24. _____

III. Careers in Plants Science and Horticulture

- 3 2 1 0 1. Investigate the diversity of careers in plant science (C)
- 3 2 1 0 2. Attend a career or job fair(C)
- 3 2 1 0 3. Request post-secondary information from different colleges(C)
- 3 2 1 0 4. _____
- 3 2 1 0 5. _____

IV. The Plant Kingdom

- 3 2 1 0 1. Discuss the importance of taxonomic systems (E)
- 3 2 1 0 2. Identify the basics of current systematic taxonomic systems and how to properly employ nomenclature of plants
- 3 2 1 0 3. Give examples of crops use for food, beverages, fiber, industry and oil (E)
- 3 2 1 0 4. Describe the binomial system for naming plants (S)
- 3 2 1 0 5. Name the two classes of the Spermatophyta division of plants (E,S)
- 3 2 1 0 6. List the differences between monocots and dicots and give examples of each (S)

- 3 2 1 0 7. Describe gymnosperms and angiosperms and give two examples of each (S)
- 3 2 1 0 8. Explain how geography influences plant types (E)
- 3 2 1 0 9. _____
- 3 2 1 0 10. _____

V. Structure of Cultivated Plants

- 3 2 1 0 1. Use the terms that describe vegetative parts of the plant (S)
- 3 2 1 0 2. Identify and use terms that describe the reproductive part of the plant (E,S)
- 3 2 1 0 3. Name three types of roots (S)
- 3 2 1 0 4. Name four types of stems (S)
- 3 2 1 0 5. List all the parts of a typical leaf (S)
- 3 2 1 0 6. Give four types of venation in leaves
- 3 2 1 0 7. Explain the difference between and incomplete and a complete flower (S)
- 3 2 1 0 8. Identify all the parts on a complete flower
- 3 2 1 0 9. Describe the functions of the essential reproductive organs of the flower (E,S)
- 3 2 1 0 10. Discuss four ways flowers vary (E,S)
- 3 2 1 0 11. Name the two large categories of fruit
- 3 2 1 0 12. Discuss how plant structure is used to classify plants (E)
- 3 2 1 0 13. Identify all the parts of a typical seed (S)
- 3 2 1 0 14. _____
- 3 2 1 0 15. _____

VI. Anatomy of Plants

- 3 2 1 0 1. Compare eukaryotes to prokaryotes (S)
- 3 2 1 0 2. Describe the basic chemical composition of cells (S)
- 3 2 1 0 3. Draw and label all the parts of a plant cell (S,L)
- 3 2 1 0 4. Describe the function of the parts of a plant cell (E,S)
- 3 2 1 0 5. List the two generalized types of tissues in plants (S)
- 3 2 1 0 6. Name the four categories of meristems (S)

- 3 2 1 0 7. Identify four types of permanent tissue (E,S)
- 3 2 1 0 8. Describe the function of xylem and phloem (E,S)
- 3 2 1 0 9. Identify plant tissues and describe how they are organized (S)
- 3 2 1 0 10. Describe the anatomy of the primary root, stems, and leaves (S)
- 3 2 1 0 11. Explain the difference between primary and secondary growth (E,S)
- 3 2 1 0 12. List six steps in normal cell division (S)
- 3 2 1 0 13. Describe what happens in each of the six steps of cell division (S)
- 3 2 1 0 14. _____
- 3 2 1 0 15. _____

VII. Water

- 3 2 1 0 1. Describe the unique characteristics of water (E,S)
- 3 2 1 0 2. List the role of water in plants
- 3 2 1 0 3. Explain evapotranspiration and the factors that affect it (E,S)
- 3 2 1 0 4. Discuss how evapotranspiration is used to determine the water needs of plants (E,S)
- 3 2 1 0 5. Describe how water moves through plants (S)
- 3 2 1 0 6. Suggest three methods for determining the moisture content of soil (E,S)
- 3 2 1 0 7. Identify and explain wilt in plants (S)
- 3 2 1 0 8. Explain translocation and transpiration (S)
- 3 2 1 0 9. Discuss the effect of too little or too much water on a crop (E)
- 3 2 1 0 10. Explain a water budget (E)
- 3 2 1 0 11. _____
- 3 2 1 0 12. _____

VIII. Nutrients

- 3 2 1 0 1. Name the essential plant nutrients and describe their role in plant growth (S)
- 3 2 1 0 2. Explain how plant nutrients behave in soil (E)

- 3 2 1 0 3. Describe soil testing for determining plant nutrient needs and fertilizer sources (E,S)
- 3 2 1 0 4. Describe what soil pH is and how it is managed (S)
- 3 2 1 0 5. Name the sixteen essential nutrients for plant growth (S)
- 3 2 1 0 6. Categorize the sixteen essential elements into those supplied by the air and water, primary nutrients, secondary nutrients, and micronutrients
- 3 2 1 0 7. Draw the nitrogen cycle (S)
- 3 2 1 0 8. Describe the effect organic matter has on soil fertility (E)
- 3 2 1 0 9. Discuss how soil pH influences the availability of nutrients (E,S)
- 3 2 1 0 10. Describe the deficiency signs of five nutrients (E,S)
- 3 2 1 0 11. Explain how many pounds of nitrogen phosphate, and potash are in a bag of fertilizer (M,C)
- 3 2 1 0 12. Use conversion factors when working with fertilizers (M)
- 3 2 1 0 13. _____
- 3 2 1 0 14. _____

IX. Temperature

- 3 2 1 0 1. Define cool season and warm season crops (E)
- 3 2 1 0 2. Discuss the effect temperature has on plant dormancy (S)
- 3 2 1 0 3. Give the germination temperatures for five plants (S)
- 3 2 1 0 4. Identify and explain the hardiness zones in the United States (E)
- 3 2 1 0 5. Describe the use of growing degree days (E)
- 3 2 1 0 6. Calculate the growing degree days (M)
- 3 2 1 0 7. Discuss the growing degree day differences across the United States (E)
- 3 2 1 0 8. Define vernalization (S)
- 3 2 1 0 9. Discuss damage caused by frost (E)

- 3 2 1 0 10. List the effects temperature may have on plants
- 3 2 1 0 11. Discuss the concept of thermoperiod (S)
- 3 2 1 0 12. _____
- 3 2 1 0 13. _____

X. Light

- 3 2 1 0 1. Describe the nature of light (S)
- 3 2 1 0 2. Explain absorption and reflection (S)
- 3 2 1 0 3. Describe light quality and light intensity (E)
- 3 2 1 0 4. Define long-day, short-day, and day-neutral (E)
- 3 2 1 0 5. Give three examples of plants that are long-day, short-day, and day-neutral
- 3 2 1 0 6. Define photoperiodism (E,S)
- 3 2 1 0 7. List factors to consider when using artificial illumination
- 3 2 1 0 8. Describe light absorption and photomorphogenesis (E,S)
- 3 2 1 0 9. Name all the processes that light can affect (S)
- 3 2 1 0 10. _____
- 3 2 1 0 11. _____

XI. Photosynthesis

- 3 2 1 0 1. Discuss the importance of photosynthesis and carbohydrate production to the global ecology and to agricultural crop plant production (E,S)
- 3 2 1 0 2. Describe the general process of carbon fixation by plants (E,S)
- 3 2 1 0 3. List five important steps or control points in photosynthesis (S)
- 3 2 1 0 4. Explain the difference between the light and dark reactions (S)
- 3 2 1 0 5. Describe the differences between the C-3 and C-4 pathways in photosynthesis
- 3 2 1 0 6. Write the general chemical reaction for photosynthesis and explain it in words (E)
- 3 2 1 0 7. List four requirements of photosynthesis (S)

- 3 2 1 0 8. Explain why plants are considered a carbon sink (E,S)
- 3 2 1 0 9. Name the products of photosynthesis (E,S)
- 3 2 1 0 10. Detail a photosystem (S,L)
- 3 2 1 0 11. _____
- 3 2 1 0 12. _____

XII. Respiration

- 3 2 1 0 1. Describe the steps of respiration (E,S)
- 3 2 1 0 2. Compare respiration to photosynthesis (E)
- 3 2 1 0 3. List three differences between respiration and photosynthesis (E)
- 3 2 1 0 4. Give the generalized reaction for respiration (S)
- 3 2 1 0 5. List four factors that affect the rate of respiration (S)
- 3 2 1 0 6. Name the three biochemical pathways involved in respiration (S)
- 3 2 1 0 7. Discuss the importance of respiration (E,S)
- 3 2 1 0 8. Explain how respiration influences crop production (E,S)
- 3 2 1 0 9. Define aerobic and anaerobic (S)
- 3 2 1 0 10. _____
- 3 2 1 0 11. _____

XIII. Basics of Plant Growth

- 3 2 1 0 1. Name three regions of growth on plants (S)
- 3 2 1 0 2. Discuss five assumptions about cells (E,S)
- 3 2 1 0 3. Name three functions of cells (S)
- 3 2 1 0 4. Describe the structure of DNA (E,S)
- 3 2 1 0 5. Explain how DNA directs the growth of plants (E)
- 3 2 1 0 6. Discuss the relationship between DNA, genes, and chromosomes (E,S)
- 3 2 1 0 7. Explain how plant growth regulators and hormones act (S)
- 3 2 1 0 8. Describe the sequencing of bases in DNA (E)

- 3 2 1 0 9. Discuss the relationship between DNA and RNA (S)
- 3 2 1 0 10. List four general examples of plant growth regulators (S)
- 3 2 1 0 11. Diagram a growth curve for a plant (L)
- 3 2 1 0 12. Discuss the interaction of heredity and environment on plant growth (E,S)
- 3 2 1 0 13. _____
- 3 2 1 0 14. _____

XIV. Vegetative Growth

- 3 2 1 0 1. Describe the growth of stems, leaves and roots (S)
- 3 2 1 0 2. List the differences between annuals, biennials and perennials (S)
- 3 2 1 0 3. Name the three stages or phases of plant development (S)
- 3 2 1 0 4. List factors that lead to "natural" plant death
- 3 2 1 0 5. Identify the six steps for germination to occur (S)
- 3 2 1 0 6. Describe the scarification process (E,S)
- 3 2 1 0 7. Explain seed dormancy (S)
- 3 2 1 0 8. List five factors affecting plant growth
- 3 2 1 0 9. Describe senescence in plants and fruit (S)
- 3 2 1 0 10. Discuss how light possibly affects seeds during germination (E,S,L)
- 3 2 1 0 11. Identify the role of water in germination (S)
- 3 2 1 0 12. _____
- 3 2 1 0 13. _____

XV. Plant Propagation

- 3 2 1 0 1. Discuss the differences between sexual and asexual plant propagation (E,S)
- 3 2 1 0 2. Describe the production of gametes and the processes of pollination and fertilization (E,S)
- 3 2 1 0 3. Differentiate between self-fertilization and cross-fertilization (E,S)
- 3 2 1 0 4. Explain how plants produce seed (E,S)

- 3 2 1 0 5. Name four requirements for seeds to germinate and grow (S)
- 3 2 1 0 6. Explain dormancy (S)
- 3 2 1 0 7. List five ways plants may be propagated without seed and give examples of each (S,L)
- 3 2 1 0 8. Describe micropropagation (S)
- 3 2 1 0 9. Explain the basic principles of genetics (E,S)
- 3 2 1 0 10. Identify how a mutation is helpful and how it may be created (E,S)
- 3 2 1 0 11. Discuss how and why people improve plants (E,S)
- 3 2 1 0 12. _____
- 3 2 1 0 13. _____

XVI. Genetic Engineering and Biotechnology

- 3 2 1 0 1. Define biotechnology, genetic engineering, and related terms (S)
- 3 2 1 0 2. Understand the basic processes of biotechnology research
- 3 2 1 0 3. Recognize the degree of progress made in biotechnology research up to this point
- 3 2 1 0 4. Describe future impacts of biotechnology research and biotechnology (E)
- 3 2 1 0 5. Discuss environmental, ethical, control, and conflict-of-interest concerns brought about by biotechnology research (E,S)
- 3 2 1 0 6. Name five plants altered by genetic engineering
- 3 2 1 0 7. List four goals of genetic engineering in plants (S)
- 3 2 1 0 8. Explain how DNA controls formation of proteins (S)
- 3 2 1 0 9. Describe a transgenic plant (E)
- 3 2 1 0 10. Diagram how the genetic code is translated (L)
- 3 2 1 0 11. Give three advantages of genetic engineering over traditional selective breeding (E)

- 3 2 1 0 12. _____
- 3 2 1 0 13. _____

XVII. Principles of Landscaping

- 3 2 1 0 1. Describe the three major career fields within the landscape profession (E,C)
- 3 2 1 0 2. List the main objectives of good residential landscaping
- 3 2 1 0 3. List the five principles of landscape design and examples of each
- 3 2 1 0 4. List three hard paving and three soft paving materials
- 3 2 1 0 5. List the technical procedures for landscape maintenance
- 3 2 1 0 6. Calculate the volume of mulch needed to cover a landscape bed. (M,C)
- 3 2 1 0 7. _____
- 3 2 1 0 8. _____

XVIII. FFA/SAE

- 3 2 1 0 1. Prepare and compete in the Meats CDE (L,C)
- 3 2 1 0 2. List steps for improving the SAE (E)
- 3 2 1 0 3. Apply for chapter/district proficiency awards (E,L,C)
- 3 2 1 0 4. Examine goals and future plans for SAE (E,C)
- 3 2 1 0 5. Make arrangements for an SAE visitation by the instructor (E,C)
- 3 2 1 0 6. Demonstrate how to closeout a record book (M,L,C)
- 3 2 1 0 7. Perform end of year balances (M,L,C)
- 3 2 1 0 8. Complete an enterprise analysis (E,M,L,C)
- 3 2 1 0 9. _____
- 3 2 1 0 10. _____