**Course: Plant and Soil Science I**

**Unit:** Standard 1 Objective 3: Identify career opportunities in plant science.

**Unit Objectives:**

1. Identify and describe the major areas of plant science.
2. Identify career opportunities in plant science, and determine the education and training they entail.

Materials Needed (Equipment):

-Puzzle kits for interest approach (can be made using any pictures)

-Copies of Careers Summary Worksheet or Agricultural Careers Web Quest

Facilities: Classroom, Computer Lab

Interest Approach:

Instructor will either assign groups or post them before students enter or arrange desks (if applicable) into groups of 4-5. Each group will be given a small puzzle kit. Instruct students to leave all materials where they sit until you give the instructions. Make sure that one group has a picture to the puzzle, one group has a picture to the WRONG puzzle and the rest of the groups have no picture at all. Tell students "When I say go, you will be timed on how fast you can put the puzzle together on your desk...GO!" You may end the activity when the first team wins or continue on for some time to focus on the difficulties of the groups with no or the wrong picture. Have a prize available to the winners (candy bars for example). When you end the activity, ask students to share how the activity went, what was good/bad? Why did some groups finish faster than others? Be sure to point out that not everyone had the picture or PLAN available to them. These groups likely struggled. Make the connection that having a plan generally leads to more success. "Thank you for your level of competition in the puzzle activity. As we have seen having a plan is important to our success, and it can't just be any plan as a couple of the groups found (the ones with the wrong picture). Over the last few days, we have explored the history, benefits, and reasons for being an FFA member. Today, we are going to make sure that you are successful in your FFA career over the next 4 years, so you have success rather than frustration--this all begins with a good PLAN!

Objective A: Identify and describe the major areas of plant science.

Objective B: Identify career opportunities in plant science, and determine the education and training they entail.

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| **Curriculum (Content)**  **(What to teach)** | **Instruction (Methodology)**  **(How to teach)** |
| What could I do if I worked in plant science?  What skills will I need to acquire?  What kind of education will I need to pursue?  Botanical Society of America  Areas of Specialization in Botany  PLANT BIOLOGY SPECIALTIES  ANATOMY - microscopic plant structure (cells and tissues).  BIOCHEMISTRY - chemical aspects of plant life processes. Includes the chemical products of plants (PHYTOCHEMISTRY).    BIOPHYSICS - application of physics to plant life processes.  CYTOLOGY - structure, function, and life history of plant cells.  ECOLOGY - relationships between plants and the world in which they live, both individually and in communities.    GENETICS - plant heredity and variation. Plant geneticists study genes and gene function in plants.    MOLECULAR BIOLOGY - structure and function of biological macromolecules, including biochemical and molecular aspects of genetics.    MORPHOLOGY - macroscopic plant form. Morphologists also study the evolution and development of leaves, roots and stems.  PALEOBOTANY - biology and evolution of fossil plants.  PHYSIOLOGY - functions and vital processes of plants. Photosynthesis and mineral nutrition are two exampIes of subjects studied by plant physiologists.  SYSTEMATICS - evolutionary history and relationships among plants.  SYSTEMS ECOLOGY, uses mathematical models to demonstrate concepts like nutrient cycling.  TAXONOMY is the subdiscipline of identifying, naming, and classifying plants.  APPLIED PLANT SCIENCES  AGRONOMY - crop and soil sciences. Agronomists make practical use of plant and soil sciences to increase the yield of field crops.  BIOTECHNOLOGY - using biological organisms to produce useful products. Most people today have a narrower view of biotechnology as the genetic modification of living organisms to produce useful products. Plant biotechnology involves inserting desirable genes into plants and having those genes expressed.  BREEDING -development of better types of plants. Breeding involves selecting and crossing plants with desirable traits such as disease resistance.  ECONOMIC BOTANY - plants with commercial importance. Economic botany includes the study of botany harmful and beneficial plants and plant products.  FOOD SCIENCE AND TECHNOLOGY - development of food from vanous plant products.  FORESTRY - forest management for the production of timber, and conservation.  HORTICULTURE - the production of ornamental plants and fruit and vegetable crops. Landscape design is also an important subdiscipline in horticulture.  NATURAL RESOURCE MANAGEMENT - the responsible use and protection of our natural resources for the benefit of society.  PLANT PATHOLOGY -diseases of plants. Plant pathologists are concerned with both the biological aspects of disease and with disease management, or control.  OTHER SPECIALTIES  EDUCATION - providing knowledge and insight about plants, plant biology, and the crucial ecological roles of plants. Includes teaching in schools, museums and botanical gardens, development of educational materials, and science writing.  EXPLORATION - search for new, undiscovered plants.  HISTORY - development of botany as a scientific discipline.  ORGANISMAL SPECIALTIES  BRYOLOGY - the study of mosses and similar plants. Bryologists study all aspects of these plants, including their identification, classification, and ecology.    LICHENOLOGY - the biology of lichens, dual organisms composed of both a fungus and an alga.  MYCOLOGY - the biology of fungi. Fungi have a tremendous impact on our world. They are crucial in the biosphere because they help recycle dead organic material. Some fungi are important producers of biological products such as vitamins and antibiotics.  MICROBIOLOGY - the study of microorganisms. Microbiologists may be specialized by organism (for example, microbiologists that study bacteria) of by a branch of biology (for example, MICROBIAL ECOLOGY).  PTERlDOLOGY - the study of ferns and similar plants. Pteridologists study all aspects of fem biology.  PHYCOLOGY - the study of algae, which are the base of the food chain in the aquatic environments of the world. Phycologists that study algae in oceans are sometimes called MARINE BOTANISTS. | Show students the list and description of Plant Science specialization/career areas at:  http://www.botany.org/bsa/careers/bot-spec.html |

**Activity: Individual Student Career Summary:** Assign each student one specialization area in the plant science career field. They are to research that area and write a one page career summary. They should include the following information:

1. What does this career area involve?
2. Education requirements
3. Starting salary
4. Average salary
5. Who hires individuals in this area?
6. Is there a particular area in the country where this career field is heavily located?

OR

Have them use the internet to research three careers that interest them in Horticulture. Fill out the, “Agricultural Careers Web Quest” Work sheet. Students can also present on careers researched. **ll proceed to the front**

Evaluation: Unit may be evaluated off of the paper written, presentation given or work completed on the Web Quest. A formal exam will not be given.

References: <http://www.cteonline.org/portal/default/Curriculum/Viewer/Curriculum?action=2&cmobjid=177736&view=viewer&refcmobjid=132922-> Interest Approach

<http://www.botany.org/bsa/careers/bot-spec.html> - Botanical Society of America

Areas of Specialization in Botany

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Career Summary Report**

**Due:\_\_\_\_\_\_\_\_**

You have been assigned \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ area as a plant science career field. You are to research this area and write a one-page career summary. Your summary should include the following information:

1. What does this career area involve?
2. Education requirements
3. Starting salary
4. Average salary
5. Who hires individuals in this area?
6. Is there a particular area in the country where this career field is heavily located?

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Career Summary Report**

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