Lesson C1–1

Recognizing the Importance of Plant and Soil Science

Unit C. Plant and Soil Science

Problem Area 1. Career Opportunities in Plant and Soil Science

Lesson 1. Recognizing the Importance of Plant and Soil Science

New Mexico Content Standard:

Pathway Strand: Systems

Standard: **VII:** Understand roles within teams, work units, departments, organizations, inter-organizational systems and the larger environment.

Benchmark: **VII-A.** Examine company performance and goals to appreciate AFNR organizations and the AFNR industry.

Performance Standard: **1.** Examine the role and major function of AFNR organizations to better utilize AFNR guidelines.

Student Learning Objectives. Instruction in this lesson should result in students achieving the following objectives:

1. Identify the various roles of plants in everyday life.
2. Identify the various segments of plant and soil science.
3. Identify important types of plants and explain their uses.

List of Resources.

The following resources may be useful in teaching this lesson:

Recommended Resources. One of the following resources should be selected to accompany the lesson:

Biondo, Ronald J. and Jasper S. Lee. Introduction to Plant and Soil Science and Technology. (2nd Ed.) Danville, Illinois: Interstate Publishers, Inc., 2003 (Textbook and Activity Manual, Chapter 1)

Other Resources. The following resources will be useful to students and teachers:

Parker, Rick. Introduction to Plant Science. Albany: Delmar Publishers, 2000 (Chapter 1)

List of Equipment, Tools, Supplies, and Facilities

Writing surface
Overhead projector
Transparencies from attached masters

Terms.

The following terms are presented in this lesson (shown in bold italics):

Agronomy
Cereal grain
Fibers
Fiber crops
Field crops
Floriculture
Foliage
Food crop horticulture
Forage
Forestry
Grain crops
Grasses
Herb
Horticultural crops
Interiorscaping
Landscape horticulture
Legumes
Oil crops
Olericulture
Ornamental crops
Ornamental horticulture
Plant domestication

Plant science
Pomology
Soil
Soil science
Spice
Sucrose
Sugar crops
Tree farms
Turf

Interest Approach. Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Ask students to name the top five crops in terms of amount produced in your state. (Refer to the state department of agriculture's annual agricultural summary for a listing of these crops and amount of each crop produced.) Create a listing of five columns on the board. Put the name of one of the top five crops at the top of each column. Then as the students to name uses of each of the various crops. Create a list of uses in the column below each crop.

Summary of Content and Teaching Strategies

Objective 1: Identify the various roles of plants in everyday life.

Anticipated Problem: What are the various roles plants play in everyday life?

I. Plants are the base of the food chain for all living things. Plants are able to utilize inorganic elements and incorporate them into living tissues. Many organisms rely on plants for the energy to carry out life processes. The roles that plants play in the everyday life of all living things are numerous. A few of the most important roles are:

   A. Edible plants—Whole plants or portions of plants, such as seeds and fruits, are used as a food source for many types of animals, including humans. The most important food plants are the grains of the grass family, particularly wheat, rice, corn, sorghum, and barley. In parts of the world where these crops do not grow well, such as countries found in the tropics, starchy root crops are grown for the same purpose. Some examples of these crops are yams, sweet potatoes, and manioc or cassava. About 88 percent of the world's total caloric intake and about 80 percent of its protein intake comes from plant food sources. In addition to food, plants are also used in the production of beverages. Some of the major beverages derived from plants are coffee, tea, and fruit juice.

   B. Industrial uses—There are several important products produced from plants, such as wood, fibers, oils, and rubber. Many of the fibers that are used in textile manufacturing come from cotton, flax, and hemp plants. The wood from timber production is used to

make furniture, homes and many other products. Many chemicals such as acetic acid, methanol, and turpentine are obtained from trees.

C. Medicinal uses—The importance that plants play in the development of medicines is becoming increasingly evident. Scientists continue to study many different types of plants to try and understand the various chemical compounds found within them. Many people believe that the key to curing many of our most deadly diseases such as cancer and AIDS may lie within some yet undiscovered plant compound.

D. Oils—Many plants store oil as a food reserved in the seeds and fruits of the plant. Most of these plant oils are used in the production of food for humans, but some are used in industry. The soybean is the most significant oil plant. Others also play an important role in plant oil production such as coconut, sunflower, peanut, cottonseed, and rapeseed.

Use a variety of techniques to help students master this objective. Students should use text materials to help understand the various roles plants play in everyday life. Chapter 1 of Introduction to Plant Science is recommended. Use TM: C1–1A and TM: C1–1B to assist in the discussion on this topic.

Objective 2: Identify the various segments of plant and soil science.

Anticipated Problem: What are the various segments of plant and soil science?

II. ***Soil science*** is the study of the structure, composition, fertility, use, and protection of soil. ***Soil*** is the top layer of the earth's crust. ***Plant science*** is the study of the structure, functions, growth, and protection of plants. Plant science can be divided into three major segments: field crops, horticultural crops and forestry.

A. Field crops—***Field crops*** include plants grown in large fields and are used for oil, fiber, grain, and similar products. Field crops such as corn and wheat are often grown for their seed, but other parts may also be used. ***Agronomy*** is a specialized area of plant science that deals with field crops. Agronomy includes the relationship between plants and the soil.

B. Horticultural crops—***Horticultural crops*** are grown for food, comfort, and beauty. There are two major areas of horticulture. They are ornamental and food crop production.

C. ***Ornamental horticulture*** is growing and using plants for their beauty. It contains three areas as well. ***Floriculture*** is the production and use of plants for their flowers and foliage. ***Foliage*** is the stems and leaves of the plant. ***Landscape horticulture*** is growing and using plants to make the outdoor environment more appealing. It includes shrubs, flowering plants, and lawn areas. ***Interiorscaping*** is using plants inside buildings to create an attractive indoor environment.

D. ***Food crop horticulture*** is growing plants for food. This can be divided into the two areas of olericulture and pomology. ***Olericulture*** is the science of producing vegetable crops. ***Pomology*** is the science of producing fruits and nuts.

E. Forestry—***Forestry*** is the science of growing trees and producing wood products. ***Tree farms*** are cultured forests that have been carefully planned, established and maintained. A great deal of labor and management goes into assuring high quality timber.

Use a variety of techniques to help students master this objective. Students should use text materials to help understand the various segments of plant and soil science. Chapter 1 of Introduction to Plant and Soil Science and Technology is recommended.

Objective 3: Identify important types of plants and explain their uses.

Anticipated Problem: What are some important types of plants and what are their uses?

III. Very few plants that play an important role in everyday life are harvested in the wild. Most of the important plants have been domesticated. ***Plant domestication*** is removing plants from their native wild environment and growing them under controlled conditions. The important field and horticultural crops of North America can be divided into seven categories. They are:

A. Grain crops—***Grain crops*** include plants grown for their edible seeds not including the horticultural crops. ***Cereal grain*** is the seed of grass-type plants grown for food and animal feed. Important grain crops include rice, corn, wheat, oats, barley, rye, and sorghum.

B. Sugar and Oil crops—These crops are produced for two food commodities: sweeteners and vegetable oil.

C. ***Sugar crops*** are used as a source of sucrose. ***Sucrose*** is a carbohydrate that provides energy for physical activity by the body. The major sugar crops are sugar beets and sugar cane. Other sources are honey, maple syrup, and some kinds of sorghum.

D. ***Oil crops*** are plants grown for the vegetable oil contained in their seed and fruit. Some of the major crops of this area are soybeans, cotton, canola, and corn. Other common oil seeds are sunflower, safflower, peanut, coconut, linseed, and palm.

E. Fiber crops—***Fiber crops*** are grown for the fiber produced in their fruit, leaves, or stems. ***Fibers*** are tiny threadlike structures used in manufacturing cloth, paper, and other materials. Cotton is the major fiber crop. Others include flax, kenaf, hemp, jute, and ramie.

F. Vegetable, Fruit, and Nut crops—These crops are grown primarily for food. There are several different plants that are included in this category. Vegetable crops may be grown for different parts of the plant, such as leaves, stems, seed, and roots.

G. Forage—These crops are primarily grasses and legumes. ***Grasses*** are nonwoody plants that have parallel veins in their leaves. ***Legumes*** are broadleaf plants that have the potential of fixing nitrogen from the air in the soil. ***Forage*** is the leaves and stems of plants used for animal feed. It is most nutritious while the plants are sill young and before seed maturity. These crops by be harvested by animals grazing in a pasture or cut, dried, and stored to be fed later.

H. Ornamental and Turf crops—***Ornamental crops*** include flowers, shrubs, vines and other species grown for their beauty and personal appeal. ***Turf*** comprises plants used to pres-

ent a pleasing appearance and protect the soil. These plants are low-growing, fine-leaved grasses used in lawns and to cover the ground to prevent soil erosion.

I. Other crops—There are many other crops grown for a variety of uses. Beverage crops, such as coffee, tea, and cocoa, are typically grow in tropical areas. Herbs and spices are grown in small quantities throughout North America. These crops have little food value, but are used to improve the flavor of food and make it more attractive. An ***herb*** is a non-woody plant with leaves, seed, or other parts used as medicine or to enhance food. A ***spice*** is an aromatic plant part that is used to season food. Distinguishing between herbs and spices is difficult. Even with the best definitions, some overlap exists. Medicinal plants are those used in making human medicines.

Use a variety of techniques to help students master this objective. Students should use text materials to help understand the various segments of plant and soil science. Chapter 1 of Introduction to Plant and Soil Science and Technology is recommended.

Review/Summary. Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at the end of each chapter in the recommended textbooks may also be used in the review/summary.

Evaluation. Focus the evaluation of student achievement on mastery of the objectives as stated in the lesson.

Answers to Sample Test:

Part One: Matching

1 = g, 2 = c, 3 = b, 4 = a, 5 = f, 6 = h, 7 = d, 8 = e

Part Two: Completion

1. Legumes
2. 88, 80
3. Plant domestication
4. planned, established
5. Soil science

Part Three: Short Answer

Grain crops; Sugar and Oil crops; Fiber crops; Vegetable, Fruit, and Nut crops; Forage; Ornamental and Turf crops; Other crops. Example of category will vary. See Objective 3 in this lesson for assistance in scoring this question.

Sample Test Name_____

Test

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Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

a. Agronomy	d. Olericulture	g. Forestry
b. Floriculture	e. Plant science	h. Turf
c. Soil	f. Fibers	

_____ 1. The science of growing trees and producing wood products.

_____ 2. The top layer of the earth's crust.

_____ 3. The production and use of plants for their flowers and foliage.

_____ 4. A specialized area of plant science that deals with field crops.

_____ 5. Tiny threadlike structures used in manufacturing cloth, paper, and other materials.

_____ 6. Plants used to present a pleasing appearance and protect the soi.l

_____ 7. The science of producing vegetable crops.

_____ 8. The study of the structure, functions, growth, and protection of plants.

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

1. _____ are broadleaf plants that have the potential of fixing nitrogen from the air in the soil.
2. About _____ percent of the world's total caloric intake and about _____ percent of its protein intake comes for plant food sources.
3. _____ _____ is removing plants from their native wild environment and growing them under controlled conditions.
4. Tree farms are cultured forests that have been carefully_____, _____, and maintained.
5. _____ _____ is the study of the structure, composition, fertility, use, and protection of soil.

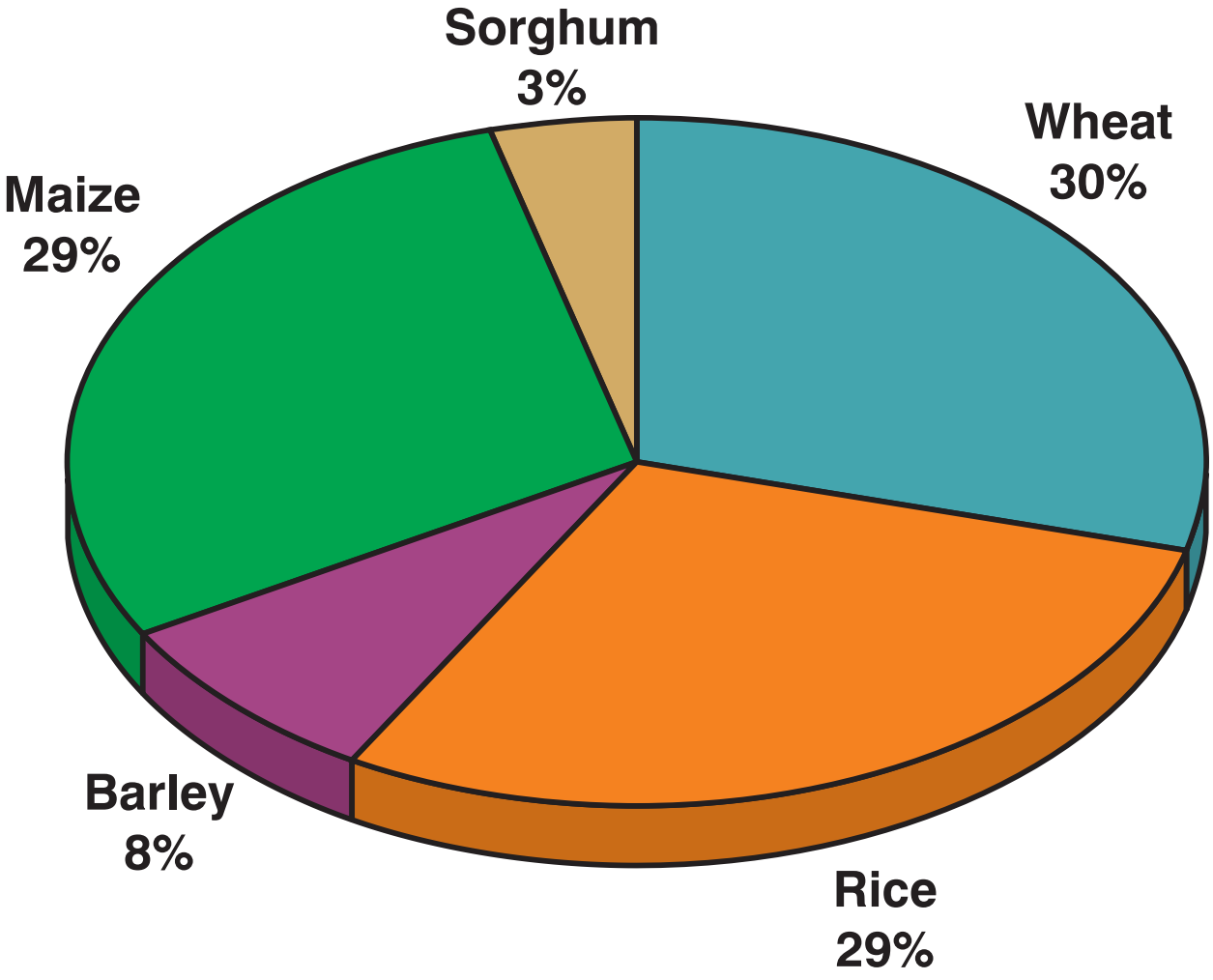
Part Three: Short Answer

Instructions. Provide information to answer the following question.

List the seven categories of important field and horticulture crops in North America. For each category, give an example of a crop that would be found in that category.

TM: C1–1A

WORLD GRAIN PRODUCTION STATISTICS



TM: C1–1B

WORLD OILSEED CROP PRODUCTION STATISTICS