

Lesson A2–5

Understanding Flower Anatomy

Unit A. Horticultural Science

Problem Area 2. Plant Anatomy and Physiology

Lesson 5. Understanding Flower Anatomy

New Mexico Content Standard:

Pathway Strand: Plant Systems

Standard: II: Address taxonomic or other classifications to explain basic plant anatomy and physiology.

Benchmark: II-B: Classify plants based on physiology for taxonomic or other classification.

Performance Standard: 1. Classify plants as monocots or dicots.

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

1. Describe the parts of a flower.
2. Explain the purpose of a flower.
3. List some different types of flowers.
4. Describe the difference between monocot and dicot flowers.

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*, Second Edition. Danville, Illinois: Interstate Publishers, Inc., 2003.

Schroeder, Charles B., et al. *Introduction to Horticulture*, Third Edition. Danville, Illinois: Interstate Publishers, Inc., 2000.

List of Equipment, Tools, Supplies, and Facilities

Writing surface

Overhead projector

Transparencies from attached masters

Copies of student lab sheet

Fresh flowers from a garden or florist shop (Some types which work well are tulips, daffodils, flowering crab apple tree, lilies)

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

Anther

Calyx

Corolla

Complete flower

Fertilization

Filament

Incomplete flower

Imperfect flower

Ovary

Perfect flower

Petals

Pistil

Pistillate

Pollen

Pollination

Sepals

Stamen

Staminate

Stigma

Style

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.

Begin a discussion on sexual reproduction. Ask what students know about sexual reproduction in animals. Although the initial responses may be slow, given time, most students will be able to tell you about animal reproduction. Now, switch to plant sexual reproduction. What do students know? Are there girl and boy plants? (Yes, sometimes.) Do plants “have sex”? (Yes.) Do plants have sperm and eggs? (Yes.) Do plants have genitalia? (Yes, although we call them “flowers”) If students are having fun with this last concept, you may comment on the wearing of flowers to a dance or having a vase of flowers on your dinner table!

Summary of Content and Teaching Strategies

Objective I: Describe the parts of a flower.

Anticipated Problem: What are the parts of a flower?

- I. Flowers are the most obvious part of most plants. They are made of many intricate and important parts. Most flowers contain both male and female parts.
 - A. The male part of the flower is called the **stamen**. The stamen is made of the stalk-like **filament** which holds up the sack-like **anther**. The anther contains **pollen**, the grain released by flowers, which contains the sperm. Flowers that only have male parts are called **staminate**.
 - B. The female part of the flower is called the **pistil**. The pistil is made up of a sticky organ which is receptive to pollen called the **stigma**, a rod-shaped middle part called the **style**, and a swollen base containing eggs called the **ovary**. Flowers that only have female parts are called **pistillate**.
 - C. Flowers also often have parts which are neither male nor female. These are the **petals**, usually colorful leaf-like structures which often attract animals and insects. When all of the petals are fused together, we call them a **corolla**. Beneath the petals are more leaf-like structures which are often green, called **sepals**. The sepals support the petals and protect the flower before it opens. When all of the sepals are fused together, we call them a **calyx**.

Use the fresh flowers and LS: A2–5A to practice naming the parts of a flower. Oral group recital of parts is an excellent way to practice and check student progress on learning names. Use TM: A2–5A as a visual aid.

Objective 2: Explain the purpose of a flower.

Anticipated Problem: What is the purpose of a flower?

- II. The purpose of a flower is for a plant to be able to reproduce sexually. Although we use flowers for many purposes both aesthetic and practical, the real job of a flower is to have sex with other flowers. The process of sexual reproduction in plants follows.
 - A. The first step in sexual reproduction is for the stamen to release its pollen. The pollen is carried by animal, wind, gravity, or many other methods to the stigma of another flower. When the pollen from one flower lands on the stigma of a compatible flower, we call it **pollination**. Flowers are adapted to pollinate each other in an astounding number of different ways using an equally amazing number of methods, called vectors, to help them.
 - B. Once the pollen reaches the stigma, it starts to grow down into the style, depositing sperm in the ovary. When the sperm combines with the eggs in the ovary, we call it **fertilization**.
 - C. After the eggs have been fertilized, the ovary and surrounding tissue start to enlarge to become a fruit and the fertilized eggs become seeds.

Many good videos are available on flower pollination. Nature specials have also been produced on the subject. Seeds of a plant called Brassica rapa can be bought under the name of Wisconsin Fast Plants. These plants go through their entire life cycle and can be closely observed in a matter of three or four weeks. Use TM: A2–5B as a visual aid.

Objective 3: List some different types of flowers.

Anticipated Problem: What are some different types of flowers?

- III. Flowers come in many shapes, sizes, and colors. Not all of them have all of the structures mentioned before.
 - A. A flower which has both male and female parts is called a **perfect flower**.
 - B. A flower which is missing either male or female parts is called **imperfect flower**.
 - C. If a flower has sepals, petals, pistils, and stamens, we call it a **complete flower**.
 - D. If a flower is missing one of those, we say that it is an **incomplete flower**.
 - E. Imperfect flowers are always incomplete. Incomplete flowers may or may not be imperfect.

Use the recommended resources to strengthen student understanding of this objective. If you have access to them, bring in flowers of the different types. Hollies and squash often have flowers which are imperfect. Many trees have no petals including maples and oaks.

Objective 4: Describe the difference between monocot and dicot flowers.

Anticipated Problem: How is a monocot flower different from a dicot flower?

- IV. A good way to tell the difference between a monocot and a dicot is to look closely at the flowers.
- A. Monocots have flowers with flower parts in multiples of three.
 - B. Dicots have flowers with flower parts in multiples of four or five.

Give the students a flower and ask them to determine whether the flower came from a monocot or a dicot.

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 to determine which objectives need to be reviewed or re-taught.

Application. Apply information informally in practicing using fresh flowers. Use LS: A2–5A.

Answers to Sample Test:

Part One: Matching

1. g 2. c 3. i 4. h 5. d 6. f 7. b 8. e 9. a

Part Two: Completion

Pistil
Stamen
Stigma
Ovary
Pollen

Part Three: Short Answer

1. A monocot has flower parts in multiples of three. A dicot flower has flower parts in multiples of four or five.
2. A calyx is made of fused sepals. A corolla is made of fused petals.
3. Pollination occurs when the pollen lands on the stigma. Fertilization occurs when the egg and sperm unite.

Test

Lesson A2–5: Understanding Flower Anatomy

Part One: Matching

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

- | | | |
|--------------------|----------------------|----------|
| a. Anther | d. Incomplete flower | g. Petal |
| b. Complete flower | e. Imperfect flower | h. Sepal |
| c. Filament | f. Perfect flower | i. Style |

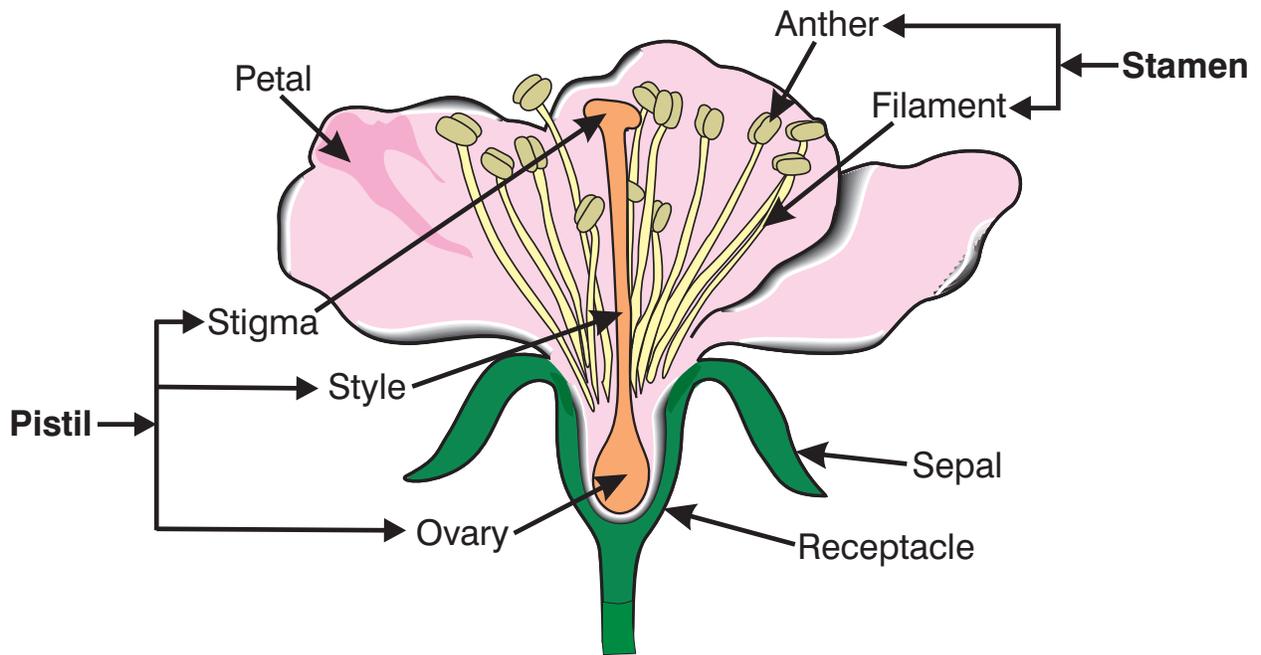
- _____ 1. Colorful leaf-like structure which attracts pollinators.
- _____ 2. Structure which holds up the anther.
- _____ 3. Structure which holds up the stigma.
- _____ 4. Green leaf-like structures that protect the flower bud.
- _____ 5. Flower which is missing sepals.
- _____ 6. Flower which has both stamens and pistils.
- _____ 7. Flower which has stamens, pistils, sepals, and stamens.
- _____ 8. Flower which is staminate or pistillate.
- _____ 9. Structure which holds the pollen.

Part Two: Completion

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

1. The name for the entire female part of the flower is the _____.
2. The name for the entire male part of the flower is the _____.
3. Pollen flying through the air sticks on the _____.
4. The part of the flower which holds the eggs is the _____.
5. Plant sperm is contained in the _____.

PARTS OF A FLOWER



(Courtesy, Interstate Publishers, Inc.)

Lab Sheet

1. Closely observe the flower and draw a picture of what you see. Label the following structures.

Anther
Filament
Ovary
Petals
Pistil
Pollen
Sepals
Stamen
Stigma
Style

Carefully cut open the ovary with a sharp knife. What do you see inside?

2. How many pistils does the flower have? How many stamens? Is this a monocot or a dicot?