

Unit A: Basic Principles of Plant Science with a focus on Field Crops

Lesson 5: Understanding Flower Anatomy

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.

Recommended Teaching Time: 2 hour

Recommended Resources: The following resources may be useful in teaching this lesson:

- A PowerPoint has also been developed with use of this lesson plan
- <http://www.youtube.com/watch?v=RuYrFwDuYn0> (pollination video clip)
- <http://www.enchantedlearning.com/subjects/plants/printouts/labelflower.shtml> (flower worksheet)

List of Equipment, Tools, Supplies, and Facilities:

Writing surface
Projector
PowerPoint Slides
Transparency Masters
Copies of the flower worksheet
Copies of student lab sheet
Fresh flowers from your area

Terms: The following terms are presented in this lesson (shown in bold italics and on PowerPoint Slide #2):

- 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.

Have students raise their hand if they can explain how animals reproduce. This should have been covered in their Animal Husbandry class or will be sometime during the semester. Just like animals reproduce to produce young, plants also reproduce in order to make more plants. Let's take a look at the process plants go through in order to reproduce.

**** Use this activity to lead discussion over the flower parts.**

Summary of Content and Teaching Strategies

Objective 1: Describe the parts of a flower.

**** Under recommended resources there is a website that has the definition of the parts of a flower. It also provides a flower that is ready to be labeled. As you go through the following information have the students label the flower. Have the students do this after each flower part you talk about.**

(PowerPoint Slide # 3)

- 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.

(PowerPoint Slide # 4)

- 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**.

(PowerPoint Slide # 5)

- 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**.

(PowerPoint Slide # 6)

- 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***.

****Together as a group have the students repeat the names of the flower parts to help them learn the names and to check student progress on learning the names. Use TM: 5-1 as a visual aid. PowerPoint slide # 7 can be used as well. As a review, have the students guess the parts of the flower before you click on the PowerPoint for the word to appear.**

Objective 2: Explain the purpose of a flower.

(PowerPoint Slide # 8 and #9)

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.

(PowerPoint Slide # 10 and #11)

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. A quick video clip over flower pollination is listed in the recommended resources. Use TM: 5-2 as a visual aid.**

Objective 3: List some different types of flowers.

(PowerPoint Slide # 12)

III. Flowers come in many shapes, sizes, and colors. Not all of them have all of the structures mentioned before.

- A. If a flower has sepals, petals, pistils, and stamens, we call it a ***complete flower***.
- B. If a flower is missing one of those, we say that it is an ***incomplete flower***.

(PowerPoint Slide # 13)

- C. A flower which has both male and female parts is called a ***perfect flower***.
- D. A flower which is missing either male or female parts is called ***imperfect flower***.
- E. Imperfect flowers are always incomplete. Incomplete flowers may or may not be imperfect.

****If you have access to flowers, bring in flowers of the different types. Pass them around for the students to get a better look.**

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

(PowerPoint Slide # 14)

- 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 fresh flowers and LS: 5-1 to practice naming the parts of a flower. This will serve as a great review for the students. When you are finished with the lab, have a class discussion over their findings.

Also 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. A few summary questions can be found on PowerPoint slide #15 and #16).

Application: Apply information informally in practicing using fresh flowers.
Use LS: 5-1

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.

Sample Test

Name _____

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 _____.

Part Three: Short Answer

Instructions. Provide information to answer the following questions.

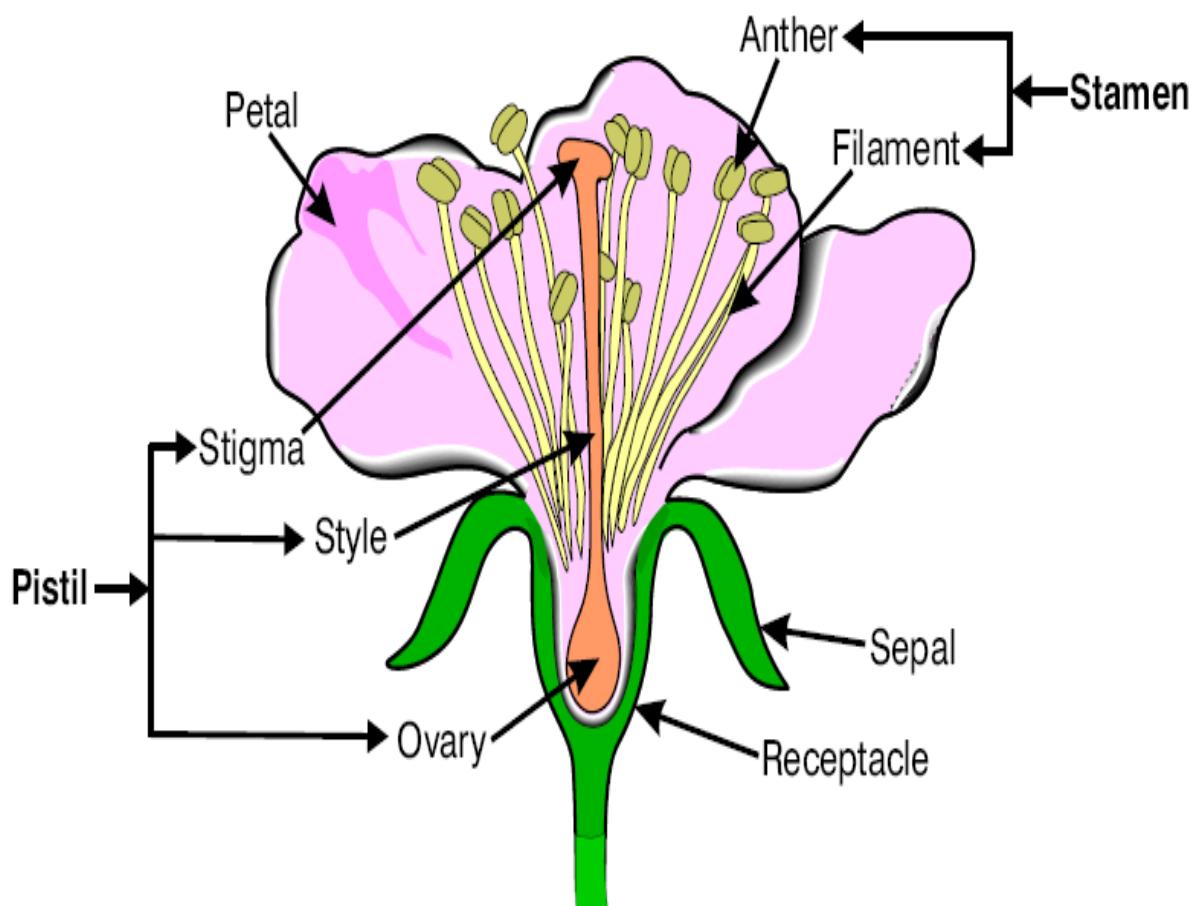
1. What is the difference between a monocot flower and a dicot flower?

2. What is the difference between a calyx and a corolla?

3. What is the difference between pollination and fertilization?

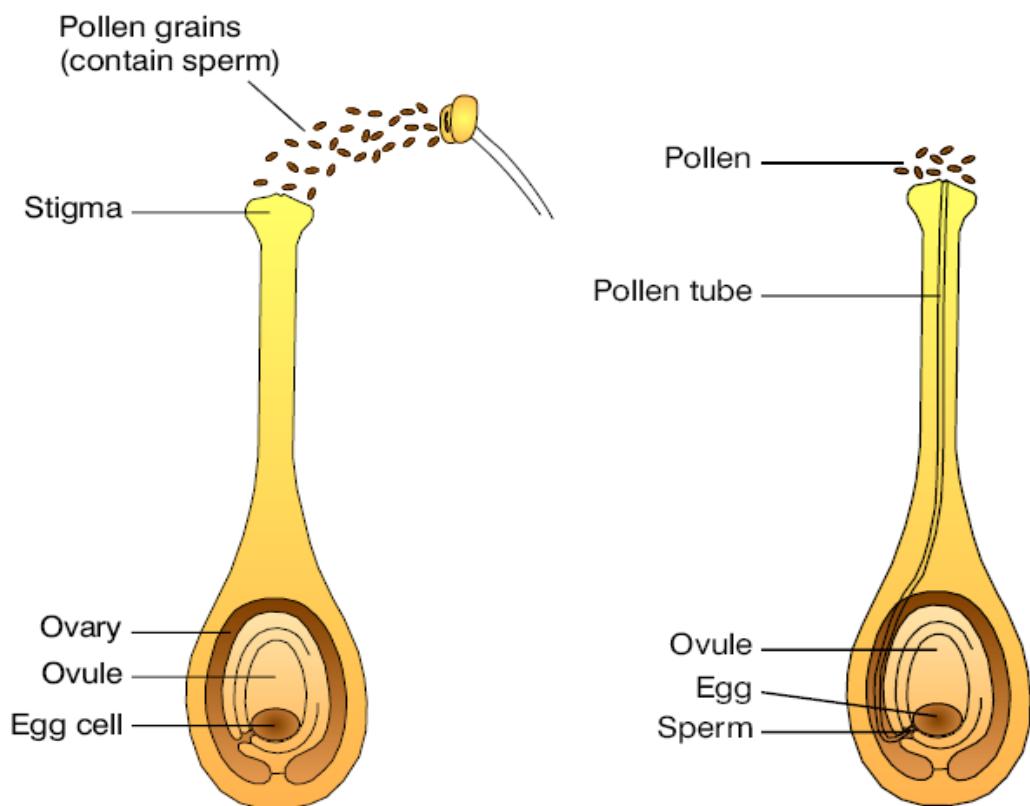
TM: 5-1

PARTS OF A FLOWER



(Courtesy, Interstate Publishers, Inc.)

POLLINATION AND FERTILIZATION



(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?