

### **Flower Structure and Reproduction**

Flowers are the plant's reproductive structures. Angiosperms are types of plants that bear fruits and flowers. Flowers are usually both male and female, and are brightly colored to attract insects to help them carry pollen used for sexual reproduction. Not all flowers are colorful, though. These flowers usually use the wind for pollination.

#### **Parts of the Flower**

The receptacle is the part of the branch on which a flower forms. Color the **receptacle (B)** brown. **Sepals** are leaf like structures that surround and protect the flower before it blooms. Color the sepals (C) green. **Petals** are the colorful part of the flower that attracts insects and even other small animals, such as mice, birds, and bats. Color the petals (D) a bright color of your choice. All flowering plants have flowers, but some are not brightly colored. The petals of these flowers are reduced or absent and the plant relies on the wind or water for pollination.

The flower has both male and female reproductive parts. The female reproductive structures are called carpels. In most flowers, the carpels are fused together to form a **pistil**. Color the pistil (P) pink. The pistil has three parts, which can be seen in zoomed in picture. The **stigma** at the top is often sticky and is where the pollen attaches. Color the stigma (J) purple. The **style** is the long tube that attaches the stigma to the ovary. Sperm from the pollen will travel down this tube to the ovules. The ovules, or eggs, are stored in the **ovary** until they are fertilized. Plants can only fertilize eggs of the same species. Special chemicals prevent sperm from fertilizing the eggs of flowers that are not the same kind. Color the style (K) red, and the ovary (L) pink. Color the ovules (O) black.

The male reproductive structures are called the **stamens**. Color the stamens (H) blue. Each stamen consists of an **anther** (A), which produces **pollen**, and a **filament** (F), which supports the anther. In the zoomed in picture, color the anther dark blue, and the filament light blue. Pollen produced by the anther is carried by insects or other animals to the pistil of another flower where it may fertilize the eggs.

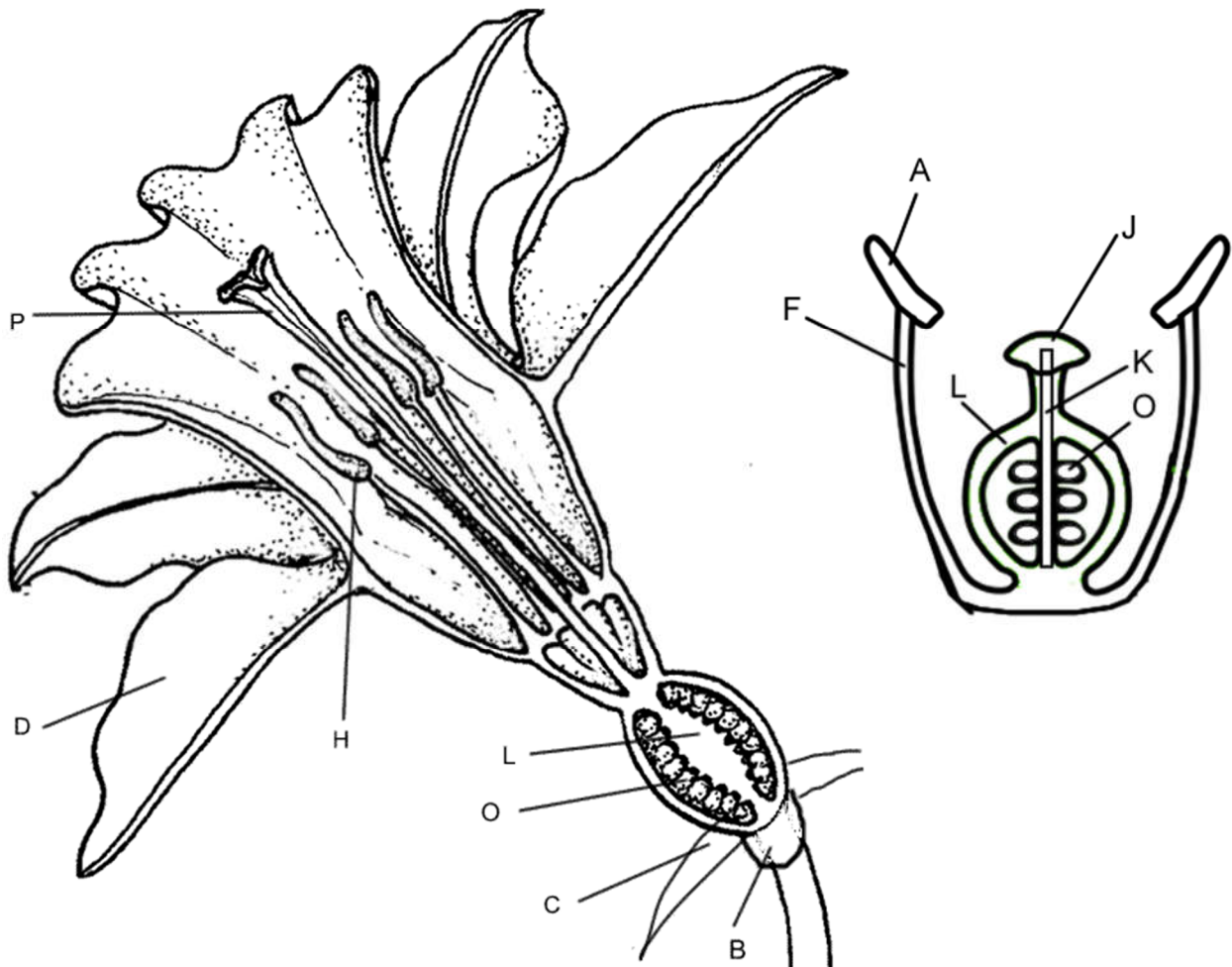
#### **Plant Reproduction**

Sexual reproduction in plants occurs when the pollen from an anther is transferred to the stigma. Plants can fertilize themselves: called self-fertilization. Self-fertilization occurs when the pollen from an anther fertilizes the eggs on the same flower. Cross-fertilization occurs when the pollen is transferred to the stigma of an entirely different plant.

When the ovules are fertilized, they will develop into seeds. The petals of the flower fall off leaving only the ovary behind, which will develop into a fruit. There are many different kinds of fruits, including apples and oranges and peaches. A fruit is any structure that encloses and protects a seed, so fruits are also "helicopters" and acorns, and bean pods. When you eat a fruit, you are actually eating the ovary of the flower.

## Questions

1. What is an angiosperm?
2. Why are flowers brightly colored?
3. Name two animals that might pollinate a plant.
4. If the petals of a flower are reduced or absent, how is the plant pollinated?
5. The female reproductive structures are called the:
6. Name the three parts of the pistil:
7. Where are the ovules stored?
8. Name the two parts of the stamen:
9. Describe sexual reproduction in plants.
10. The ovary develops into what structure?



## Leaf Anatomy

The leaf is the primary photosynthetic organ of the plant. It consists of a flattened portion, called the blade, that is attached to the plant by a structure called the **petiole**. Sometimes leaves are divided into two or more sections called leaflets. Leaves with a single undivided blade are called simple, those with two or more leaflets are called compound.

The outer surface of the leaf has a thin waxy covering called the **cuticle** (A), this layer's primary function is to prevent water loss within the leaf. (Plants that leave entirely within water do not have a cuticle). Directly underneath the cuticle is a layer of cells called the **epidermis** (B). The vascular tissue, xylem and phloem are found within the veins of the leaf. Veins are actually extensions that run from to tips of the roots all the way up to the edges of the leaves. The outer layer of the vein is made of cells called **bundle sheath cells** (E), and they create a circle around the xylem and the phloem. One the picture, **xylem** is the upper layer of cells (G) and is shaded a little lighter than the lower layer of cells – **phloem** (H). Recall that xylem transports water and phloem transports sugar (food).

Within the leaf, there is a layer of cells called the mesophyll. The word mesophyll is Greek and means “middle” (meso) “leaf” (phyllon). Mesophyll can then be divided into two layers, the **palisade layer** (D) and the **spongy layer** (F). Palisade cells are more column-like, and lie just under the epidermis, the spongy cells are more loosely packed and lie between the palisade layer and the lower epidermis. The air spaces between the spongy cells allow for gas exchange. Mesophyll cells (both palisade and spongy) are packed with chloroplasts, and this is where photosynthesis actually occurs.

Epidermis also lines the lower area of the leaf (as does the cuticle). The leaf also has tiny holes within the epidermis called **stomata**. Specialized cells, called **guard cells** (C) surround the stomata and are shaped like two cupped hands. Changes within water pressure cause the stoma (singular of stomata) to open or close. If the guard cells are full of water, they swell up and bend away from each other which opens the stoma. During dry times, the guard cells close.

**Color the structures bolded above.** Make sure that the entire picture is colored and that the color matches the words. For simplicity, only part of the picture is labeled.

### Questions:

1. What two tissues are found within a vein? \_\_\_\_\_
2. What does the word “mesophyll” mean? \_\_\_\_\_
3. What two layers of the plant contain chloroplasts? \_\_\_\_\_
4. The outermost layer of cells: \_\_\_\_\_
5. The waxy covering of the leaf.: \_\_\_\_\_
6. These cells function to open and close stomata. \_\_\_\_\_
7. Outer layer of the vein: \_\_\_\_\_
8. Column like cells that lie just under the epidermis. \_\_\_\_\_

9. Openings that allow for gas exchange. \_\_\_\_\_
10. The stalk that connects the leaf to the stem. \_\_\_\_\_
11. What does the xylem transport? \_\_\_\_\_
12. What does the phloem transport? \_\_\_\_\_

**Leaf Anatomy KEY**

- Cuticle (light blue)
- Epidermis (yellow)
- Guard cells (pink)
- Palisade Mesophyll (dark green)
- Phloem (purple)
- Xylem (orange)
- Spongy Mesophyll (light green)
- Bundle Sheath (dark blue)

