



# Daffodil Lab

You will need (per person):

- 1 daffodil flower—large flowers are best; avoid small flowers or doubles
- 1 paper plate
- 1 copy of “Parts of the Daffodil: Daffodil Botany Drawing” from the ADS web site at [www.daffodilusa.org/references](http://www.daffodilusa.org/references)

Optional items:

- 1 entire daffodil plant with bulb and roots
- 1 pair of scissors per person (may be blunt nose)
- 1 pair of tweezers per person
- magnifying glasses or microscope(s)
- 1 scalpel per person (useful for making thin slices to view under a microscope)

## 1. Introduction

- a. Biology—the branch of science that studies life
  - i. Botany—branch of biology that studies plants
    - 1. Plants are divided into Classes
    - 2. There are two Classes of seed producing plants
      - a. Gymnosperms—plants that do not produce flowers; includes plants that produce seeds in cones, such as pine and fir trees
      - b. Angiosperms—plants that produce flowers
        - i. Have participants name some flowering plants. (Don't forget flowering trees, fruits and vegetables.)
        - ii. Daffodils are Angiosperms.

## 2. Name the main parts of a daffodil plant. What does each part do?

- a. Root—absorbs water and minerals from the soil and transports them to the stem; anchors the plant; stores food

- b. Bulb
  - i. the basal plate at the bottom is a modified stem; carries food, water and minerals; supports the leaves and flowers
  - ii. the bulb proper or the main part of the bulb consists of modified leaf sheathes; stores food
- c. Leaf blades—contains chlorophyll, the green pigment that absorbs sunlight; makes food (photosynthesis)
- d. Flower stem – carries food, water and minerals; supports the flower
- e. Flower—reproductive structure; can make more of the plant

### 3. Dissect a flower

- a. Safety
  - i. If using sharp scissors, only use when told; don't wave them around
  - ii. If using scalpel (very sharp), only use when told; make cuts carefully with blade down on the paper plate and fingers out of the way
- b. Stem—use scissors to cut through the flower stem in various directions: across, down, diagonal, and compare with each other. What do you see? (channels or openings in the stem, water)
- c. Line up the stem slices on a paper plate.
  - i. The xylem channels transport water and nutrients up the stem.
  - ii. The phloem channels transport food made by the leaves to all growing parts of the plant.
  - iii. The stem stores surplus food for growth during the season and over winter to support new growth in the spring.
  - iv. Bulbs are modified stems and also store food for the plant.
- d. Does your daffodil have sepals? (the outer ring of flower parts, usually green, that protects the young flower bud)
  - i. In daffodils the sepals are fused to the outer flower petals.
  - ii. Do the outer petals look different than the inner ones? How?
  - iii. When sepals and petals look similar they are called tepals.
- e. How many petals does your daffodil have? (normally 6—3 outer, 3 inner, unless it is a double, when either or both groups can be doubled)
  - i. Notice that the bottoms of the petals (or tepals) and the cup are fused together. This is called the flower tube.
  - ii. Use your fingers to pull off each petal or cut them off with your scissors.
  - iii. Line up the petals on your paper plate.
- f. Use your scissors or fingers to cut down the sides of the cup and remove the cup.
  - i. What is the purpose of the flower petals and cup? (to attract pollinators, such as bees and other insects by color and scent)
- g. The reproductive part of the flower is what you have left.
  - i. Look at the stamen—male part of the flower
    - 1. How many stamens can you count? On a daffodil the stamens are all of the stalks except for the taller, different one in the center.
    - 2. Stamens consist of a filament (stalk) with an anther (pollen sac) on top.
    - 3. Stamens are the outer male structures that surround the center female part.

4. Filaments support the anthers.
  5. Anthers contain and release the pollen.
  6. How many stamens does your flower have? (6)
  7. Use your tweezers, scissors or fingers to remove the stamens on your flower. Try to leave the taller, center female part of the flower.
  8. Touch the stamens and see if any pollen comes off and sticks to your finger. This happens to insects that visit the flower searching for pollen or nectar.
  9. Line up the stamens on your plate.
  - ii. Look at the female part—the pistil or carpel.
    1. Stigma—the top end of the tallest structure
    2. Style—the tube that supports the stigma
    3. Ovary—the oval shaped structure at the bottom of the style
      - a. Cut open the ovary in any direction: across, down, or diagonal and compare with each other. What do you see? (ovules or immature egg cells)
      - b. How many ovules can you count? After an ovule is pollinated it becomes a seed.
  - iii. Pollination—the transfer of pollen from the male to the female part of a flower, which can result in seed being formed in the ovary.
    1. Touch the top of the stigma. It may be sticky so pollen will stick there.
    2. Can you guess how the pollen gets from the stigma to the ovary? (it grows down the style)
4. Optional: Look at flower parts under a magnifying glass or microscope.
- a. If using microscopes, review how to use the microscope first.
  - b. Have students look at very small pieces of flower parts, like pollen, ovules, or a small bit of petal or stem

Additional terms that can be introduced

5. Photosynthesis—means “putting together with light”
  - a. The chlorophyll in leaves uses the energy from sunlight plus water and carbon dioxide to manufacture simple sugars or food the plant needs to survive.
  - b. This process gives off oxygen.
6. Perfect flowers—have all the standard parts including male and female organs. Are daffodils perfect flowers? (yes)
7. There are two subclasses of angiosperms
  - a. Monocots
    - i. They have flowers with petals in numbers of three.
    - ii. They have one seed leaf or cotyledon—the first leaf to appear after the seed sprouts.
  - b. Dicots
    - i. They have flowers with petals in numbers of four or five.
    - ii. They have two seed leaves or cotyledons—the first leaves to appear after the seed sprouts.
  - c. Are daffodils monocots or dicots? (monocots)