Making a Small Leaf Model
Teacher Preparation

In this assignment, students will construct a model of a leaf using textbooks or diagrams as a reference. The flip-book model can be constructed on any type of green paper. The clear plastic sheets can be recycled from laminate scraps, sheet protectors cut apart, or overhead transparency sheets. Provide students with an introduction and explanation of leaf structure and tissue before they begin. Use the "Teacher Background Information to use with the Leaf Model".

CDL.7.B.17 Describe the structure and function of the major parts of a plant: roots, stems, leaves, flowers (This lesson involves leaves only)
CDL.7.B.18 Relate the structure of plant tissue to its function: epidermal, ground, and vascular

Objectives:

Students will:

- Create a leaf model
- Know the basic structure of a leaf
- Relate the structure to the function of a leaf as it relates to photosynthesis
- Write a summary of the relationship of the structure of plant tissue to its function as it relates to photosynthesis

Materials per student:

- 2 green sheets (card stock, construction paper, foam sheets) (8 1/2 X 11 in.)or 1 green sheet and one sheet of bubble wrap
- 2 sheets of clear scrap laminate, acetate sheets for overheads, or sheet protectors (cut apart)
- 1 clear straw

Available for students to share in small group:

- permanent green or black marker
- stapler and regular staples
- scissors
- clear tape

Preparation Tips:

Have various texts available for students to use as reference sources. The internet can also be used for reference.

It is a good idea to have a sample small leaf model made in advance.

Making a Small Leaf Model- ***TEACHER KEY***

Student Name_____ Date_____

Questions:

1. What is the role that each leaf layer plays in photosynthesis?

Upper Epidermis: translucent tissue that allows light to pass through it to reach the mesophyll also protects the internal tissues.
Palisade Mesophyll: contains the majority of the chloroplasts so photosynthesis occurs here.
Spongy Mesophyll: provides space for the exchange of gases during photosynthesis.
Lower Epidermis: Most of the stomata (thousands per square centimeter) are located in the lower epidermis. Although most of the cells of the lower epidermis resemble those of the upper epidermis, each stoma is flanked by two sausage-shaped cells called **guard cells**. These differ from the other cells of the lower epidermis not only in their shape but also in having chloroplasts. The guard cells regulate the opening and closing of the stomata. Thus they control the exchange of gases between the leaf and the surrounding atmosphere

2. How does the structure of the leaf allow it to carry out photosynthesis?

The structure of most leaves is broad and thin….this shape provides a large surface area to collect sunlight.
The epidermal layer is translucent, allowing light to pass through it.
Under the protective epidermal cells, the top layer of mesophyll cells (called the palisade layer) consists of tightly packed cells with many chloroplasts that collect the light and begin the reactions of photosynthesis.

3. Where does gas exchange occur in a leaf? How does this process occur?

The gas exchange occurs mainly on the lower surface of the leaf through the stoma.
The guard cells control the opening and closing of the stoma which allows for gas exchange in the leaf. Carbon dioxide enters the leaf and oxygen is released.

4. Describe the function of epidermal, vascular and ground tissue found in a leaf.

The epidermal tissue is like the "skin" of the leaf because it consists of the outermost layer of cells. The vascular tissue is similar in function to the "bloodstream", transporting water and nutrients throughout the leaf in the veins. The ground tissue composes the remaining tissues of the leaf. The ground tissue is where most photosynthesis occurs (mesophyll) and some of it also functions to support the plant structure.