

LAB 17-2

Name _____ Date _____

Studying Stomata

This lab should be completed after reading *ByDesign Biology* Lesson 17-2.

Safety



- Ensure that equipment is not mishandled during the lab.

Introduction

Plants have an epidermal layer. Like animals, this epidermal layer provides protection and waterproofing, keeping the plant healthy. In the epidermal layer of plants, there are special pores called stomata that allow gas exchange with the environment. The stomata are surrounded by thick cells called guard cells.

There are several methods that can be used to see the stomata of leaves. If the leaves are exceptionally thin, samples can be placed directly on a microscope slide. This method requires very high light intensity to pass through the leaf and make the stomata visible. A more effective way to see the stomata is by making an imprint of the leaf. A thin layer of clear nail polish is applied to the leaf and allowed to dry. This layer can be removed with tape and then affixed to a microscope slide. What you see on the slide is an imprint of the epidermal layer of the leaf.

In this activity, you will work with a lab partner to examine leaf imprints to determine the structure and density of stomata on leaves.

Procedure

1. Obtain three leaves from different types of plants.
2. On the underside of a leaf, paint a thick patch of clear nail polish, at least 1 cm². Let the nail polish dry completely.
3. Tape a piece of clear tape to the dried nail polish.
4. Gently peel the nail polish patch from the leaf by pulling up the tape. This will create an impression of the leaf. Transfer the tape to a clean microscope slide. Use scissors to trim away any excess tape.
5. Repeat steps 2–4 for the remaining leaves.
6. Label each slide with the plant name.

Question

Do all leaves have the same number of stomata?

Objective

- View and compare the stomata of leaves from different plant species.

Materials

3 leaves of different species
Clear nail polish
Clear tape
Microscope
3 microscope slides

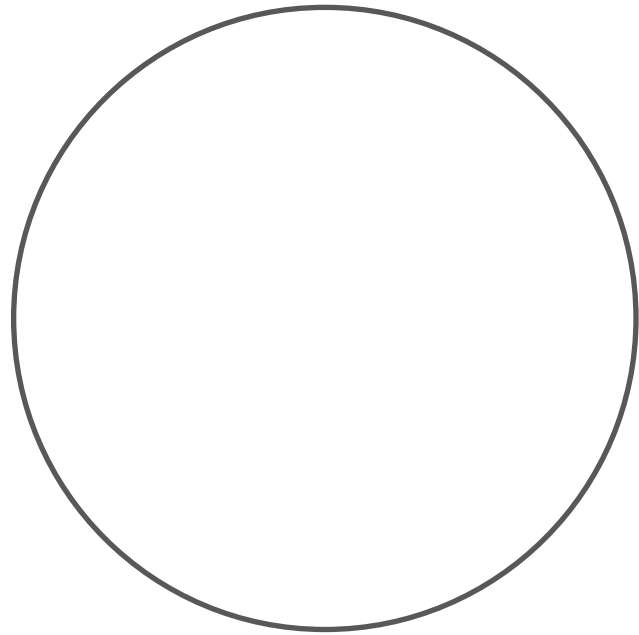
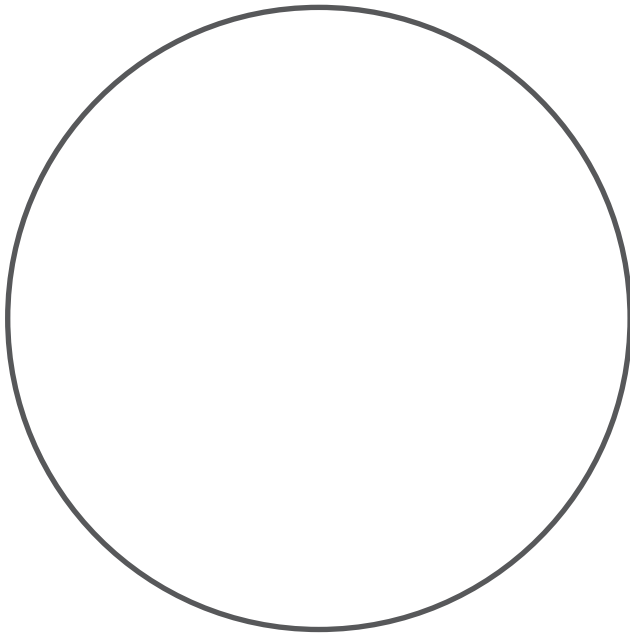
7. Place a slide on the microscope and examine under medium power. Once focused on medium power, search for an area where there are numerous stomata.
8. In the **Data** section, draw the leaf surface and label the stomata and guard cells.
9. Count the number of stomata that can be seen in a single field of view. Record the result in the data table.
10. Move the slide to another area of the leaf imprint and conduct another stomata count. Move the slide and conduct a third count. Then calculate the mean number of stomata for the three observations.
11. Take turns with your lab partner on the remaining leaf imprints. Repeat steps 6–10 with the remaining samples.

Data

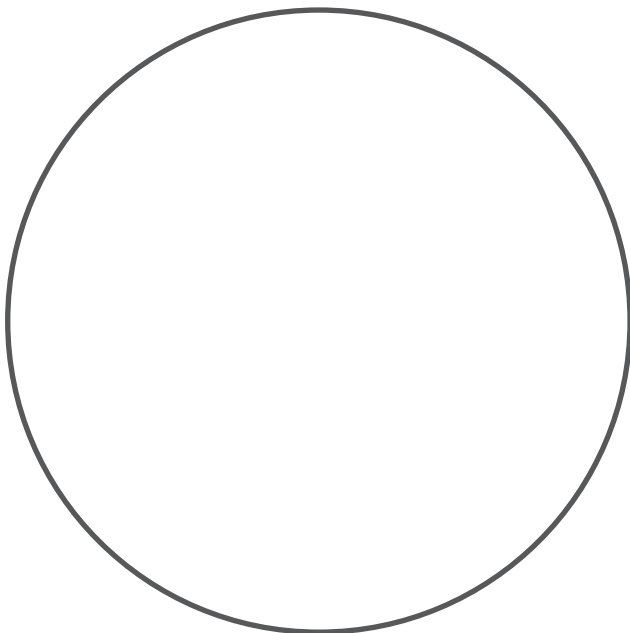
1. In the space below, sketch your observations under the microscope for each leaf imprint. Write the name of the plant and label the stomata.

Plant: _____

Plant: _____



Plant: _____



2. In the space below, create a data table to record the observations related to the activity.

Questions

1. Which leaf had the most stomata? Why do you think this was the case?

2. Describe how guard cells function to open and close stomata.

- 3.** During what time of day would you expect stomata to be closed? Explain your answer.

4. If you repeated the experiment by taking a leaf imprint from the top of the leaf, how would you expect the number of stomata to compare to your results? Explain your answer.

- 5.** What input(s) and output(s) move through stomata?

- 6.** How are stomata involved in transpiration?

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