How are the cells of producers such as plants different from the cells of consumers such as animals?

As you have been learning, producers—plants, algae, and some microorganisms—play a unique role within an ecosystem. Through photosynthesis, producers transfer energy from the sun into energy stored in food. The sugars might be used right away or they might be stored for later use by the producer or by consumers that eat it. What is different about the structure of plant cells that allows them to do this? Find out by investigating the cells of plants and then comparing them to animal cells.

Inquiry - How are the cells of producers such as plants different from the cells of consumers such as animals? How do plant cell structures relate to their function as producers?

Look at this structure of a typical plant. . How does the plant get water from the soil to the leaves?

You are going to watch a LABsent video that is going to show you the cells of four different producers. You will investigate how the cellular structure of plants relates to their ability to produce food through the process of photosynthesis. You are going to see the cells of celery, onion, spinach and Elodea.

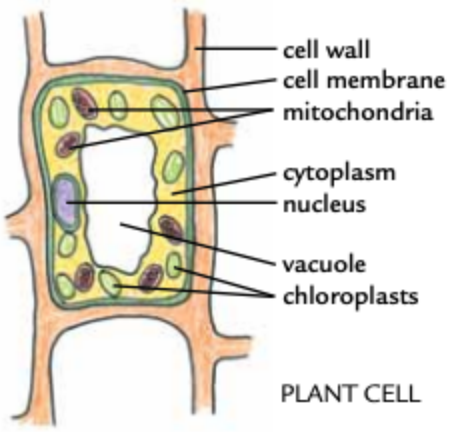
Procedure

1. Watch the LABsent video https://labaids.s3.us-east-2.amazonaws.com/labsent-videos/IALS_Activity_82.mp4
2. In the table below, draw your observations of a cell from each plant. Record the type of plant and the level of magnification. Include details inside the cell and along the edge of the cell membrane of your drawing.

Name of plant:	Name of plant:
Magnification:	Magnification:
Drawing	Drawing
Name of plant:	Name of plant:
Magnification:	Magnification:
Drawing	Drawing

Analysis

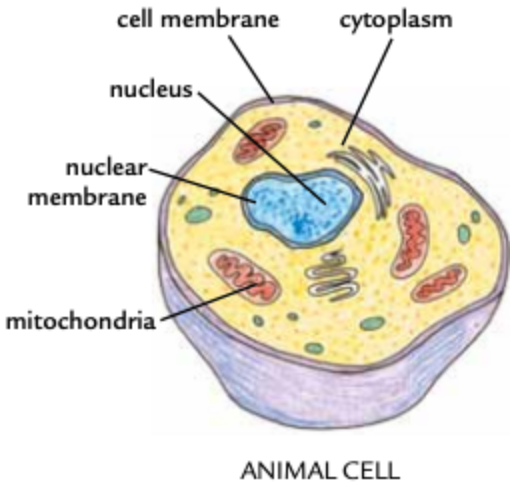
1. Using various microscope techniques, scientists have identified the structures most commonly found in plant cells. Some of these structures are shown in the diagram of the plant cell below. Not all plant cells contain every structure, though most plant cells do contain the majority of them. However, some of these structures are very difficult to observe if you only use a light microscope.
    a. Which cell structures appear to be ones that you observed? List them.



    b. Which cell structures were not visible to you? List them.

2. Compare the various plant cells you observed. Which cell structures did all of the plant cells appear to have in common?

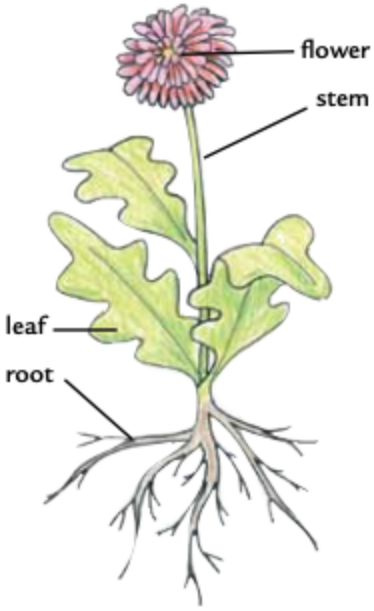
3. Look at the simplified diagram of an animal cell shown at the right. Animal cells, as well as plant cells, contain many structures; this diagram shows only some of these structures.
    a. Which cell—plant or animal—is the cell of a consumer?



    b. Compare the plant cell diagram with the animal cell diagram. Based on these diagrams, what structures would you expect to find in both plant and animal cells?

    c. Based on your comparisons, which structure(s) within a plant cell do you think is most important in food production?

4. Many plants have leaves, stems, roots, and—during the blooming season—flowers. Which of these parts are likely to absorb sunlight and carry out photosynthesis?



   a. Of the cells you observed—celery stem, onion, Elodea leaf, and the other plant leaf—which would you expect to carry out photosynthesis?

   b. What cell structures are seen only in cells that absorb sunlight and carry out photosynthesis?

5. Invasive species like kudzu, purple loosestrife, and hydrille are plants that are growing successfully in different parts of the United States. This is partly because they are very well adapted to absorb sunlight and carry out photosynthesis.
   a. What effect do you think the growth and spread of these introduced plants will have on native plants? Explain.

   b. What effect do you think the growth and spread of these introduced plants will have on animals in the native ecosystems? Explain.