

Is It Alive?

Identifying Life by Structure

Cells – the basic structure

Remember from our discussions cells are the basic structure of life. When you are looking for life you may want to look for some of the following things when looking for life.

1. Cell Wall – plants contain cell walls which give them rigidity and strength.
2. Cell Membrane – both plants and animals have cell membranes
3. Cytoplasm – the internal liquid of the cell.
4. Nucleus – the organelle which contains the DNA and “brains” of the cell.

Microscope

One of the difficulties of determining if something contains cells is that you cannot see them with your eyes alone. Microscopes allow us to see structure which we cannot see with our eyes.

We will be using a **compound light microscope** to see if we can find cell structure in a substance. These microscopes have two sets of lenses:

1. Eyepiece – magnifies an object 10 times (10x) its original size
2. Nose-piece – contains four lenses
 - A. 4x
 - B. 10x
 - C. 40x
 - D. 100x
3. The total magnification of the microscope is found by taking the eyepiece magnification and multiplying it by the nose piece magnification. So ...
4. $10x$ (eyepiece) \times $4x$ (nose-piece) = $40x$ magnification

Looking for Structure – Practice

We will begin our search for life by first looking at plant and animal cells to practice finding cells and to see what different cells look like.

Onion Cells

- a. Cut a quarter inch slice from an onion.
- b. Remove a single ring from the slice.
- c. With a forceps, peel the epidermal layer (thin clear layer) from the inside portion of the ring.
- d. All you will need is a piece about 1/4” by 1/4” piece
- e. Lay the tissue immediately on a drop of water on a clean slide.
- f. Place one drop of Iodine Stain on top of the tissue.
- g. Lower a cover slip on top
- h. Put your slide on the microscope stage and look at it under the low power.

- A. Draw your first observations of the onion cells. Draw your first observations of cells using 40x.**

Do all of the structures (cell walls, nucleus, cytoplasm) absorb the stain equally?

- B. Record your observations of the onion cell. Using 100x or 400x focus on one cell and carefully draw a picture of what you see below.**

Mouth Epithelial Cells

- a. with the edge of a flat, clean toothpick, gently scrape a small amount of tissue from the inner surface of your cheek
- b. Stir the scrappings into a drop of water on a clean slide.
- c. Stain the slide using eosin
- d. Add a clean coverslip
- e. Look for a group of cells (they will look similar to fried eggs, either single or in groups) on low power.
- f. Switch to high power to draw the cells.

Record your observations of the cheek cells. Using 400x focus on one cell or group of cells and carefully draw a picture of what you see below.

What are the main differences you see between the cheek (animal) cells and the onion (plant) cells?

WAS/IS IT ALIVE?

There are a number unknown substances set up around the room on the counters. Your job is to determine if they are alive or were alive at one point in time and to record your observations. Make your observations carefully. Life may be hidden somewhere in the substance and it may take some work to determine the exact nature of the life (i.e. you may have to search around on your slide).

For each unknown record the following information:

- 1. A general description of the substance as you see it with your naked eye.**
- 2. A determination if it has anything that was or is alive in the substance.**
- 3. A drawing of the life or former living thing found in the substance. Note any cellular structures which identify it as/was alive.**

#1. Observations:

Was/Is there anything alive in this sample?

Drawing with identification of structures if answer is yes.

#2. Observations:

Is it alive?

Drawing with identification of structures if answer is yes.

#3. Observations:

Was/Is there anything alive in this sample?

Drawing with identification of structures if answer is yes.

#4. Observations:

Is it alive?

Drawing with identification of structures if answer is yes.