



## Unit: The Characteristics of Life

### Lesson Plan 4: Characteristics 1: Organisms are Made of Cells

#### Objective(s):

Students will be able to:

- Define key terms (unicellular, multicellular, prokaryote, eukaryote)
- Explain how cells organize and work together in large organisms
- Identify the main parts of cells

#### Materials:

- Video from Discovery Education: (Subscription Required) Understanding Cells. Ancient Lights. 1998. Discovery Education. 12 December 2009. <<http://streaming.discoveryeducation.com/>>.
- Discovery Education Blackline Masters worksheets (Subscription Required, Linked to Video)

#### Anticipatory Set:

In the last lesson we discovered the characteristics of life. Now we will take a closer look at each characteristic. Today we will focus on the idea that all organisms are made of cells.

#### Lesson:

- I. PowerPoint presentation  
Have students take notes.
- II. Video and Blackline Masters worksheets  
Segment title: "The Characteristics of Life" (time 4:37 to 21:25)

#### Lab Activity:

Onion Cell Lab

#### Evaluation:

- Student worksheets
- Lab observations
- Quiz on vocabulary and cell parts



## Characteristics and Classification of Organisms Part 3

### Characteristic 1: Organisms are made of cells

•**Unicellular:**

- organisms made of one single cell

•**Multicellular:**

- organisms made of many cells

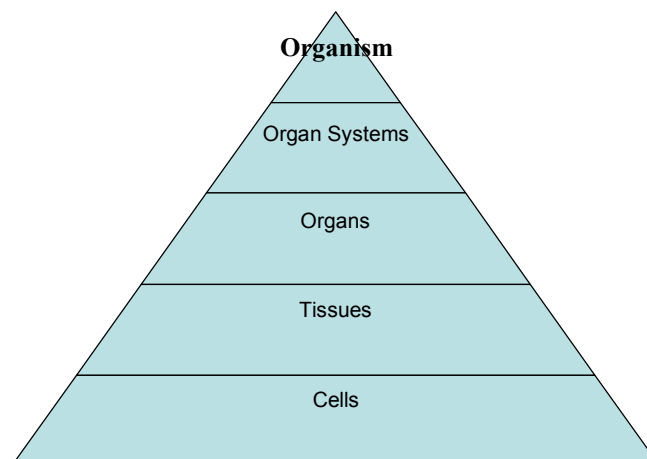
•**Prokaryotes:**

- unicellular organisms, such as bacteria, that lack membrane-bound organelles

•**Eukaryotes:**

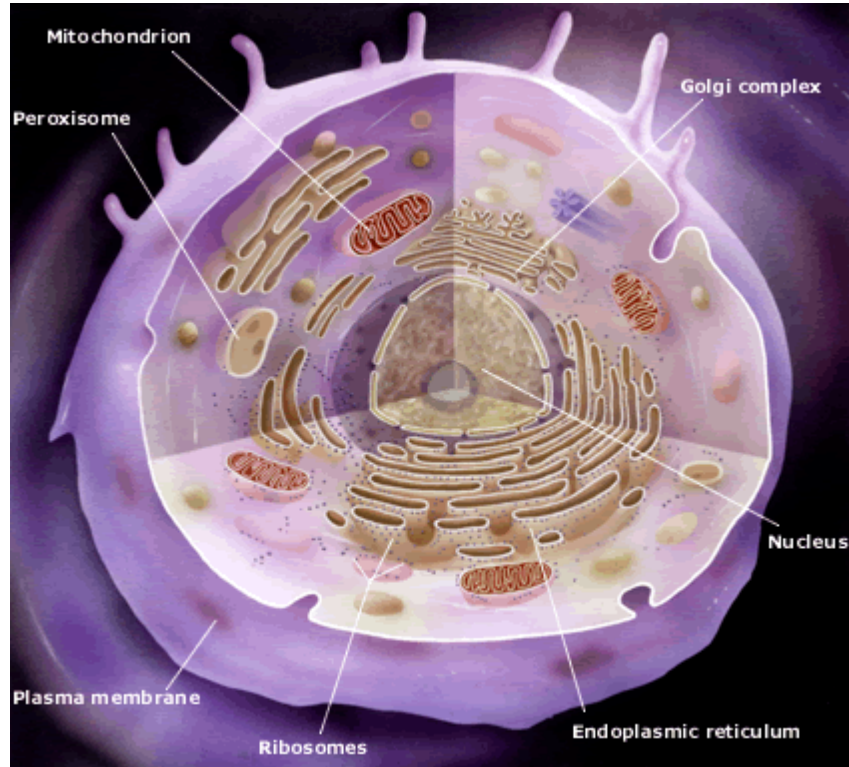
- multicellular, and some unicellular organisms with membrane-bound organelles, such as yeast, plants, and animals

### Organisms are made of cells working together





## The Main Parts of a Cell



### •Nucleus:

- the brain of the cell

### •Mitochondrion:

- the powerhouse of the cell

### •Plasma Membrane:

- controls what enters and exits the cell

### •Ribosomes:

- produce proteins

### •Nucleolus:

- Found inside the nucleus, it produces ribosomes



Name: \_\_\_\_\_

Date: \_\_\_\_\_

### The Onion Cell Lab

**Background:** Onion tissue provides excellent cells to study under the microscope. The main cell structures are easy to see when viewed with the microscope at medium power. For example, you will observe a large circular **nucleus** in each cell, which contains the genetic material for the cell. In each nucleus are round bodies called **nucleoli**. The nucleolus is an organelle, which synthesizes small bodies called **ribosomes**. Ribosomes are so small you cannot see them with the light microscope. Also present in the onion cell is a well-developed **cell wall** and a **cell membrane** just beneath it.

**Purpose:** To study the structure of the onion epidermal cell, with particular emphasis on the nucleus and nucleoli.

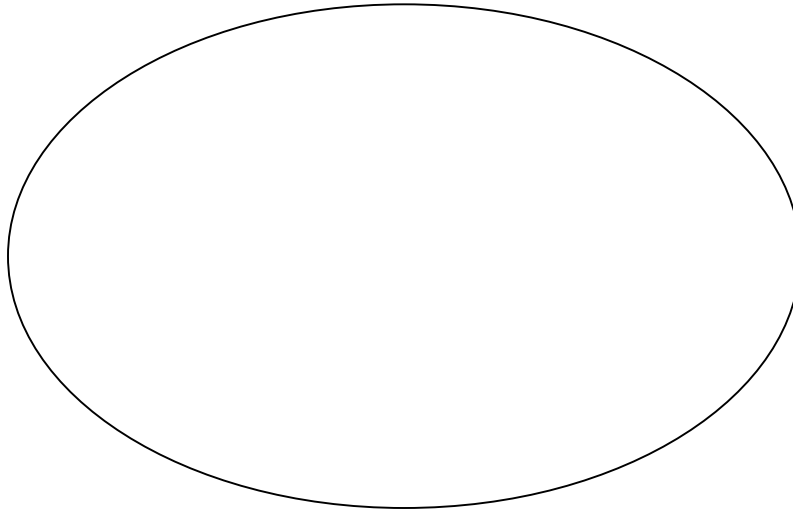
**Materials:** The following materials are required: onion, microscope, glass slide, cover slip, and iodine (**Note:** iodine is toxic and will stain – handle with care).

#### Procedure:

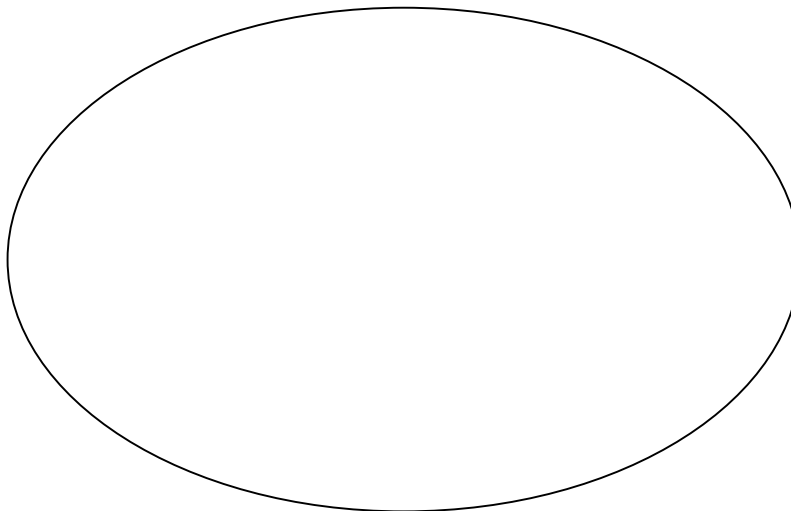
1. Get a glass slide and cover slip for yourself and make sure they are both thoroughly washed and dried.
2. Remove the single layer of epidermal cells from the inner (concave) side of the scale leaf (The thinner the better).
3. Place the single layer of onion cell epithelium on a glass slide. Make sure that you do not fold it over or wrinkle it.
4. Place a drop of iodine stain on your onion tissue.
5. Put the cover slip on the stained tissue and gently tap out any air bubbles.
6. Observe the cells under 4x, 10x, and 40x with the diaphragm wide open. Slowly reduce the light intensity by closing the diaphragm, and observe the image. **Which light intensity revealed the greatest cellular detail?**  
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7. In the space provide below, draw a group of 10 neighboring cells at 10x. In one cell, label all the parts you see.



8. Switch to high power at 40x. Can you see a whole cell? If you can, draw one cell and label it below. If no, go back to 10x and draw one cell and label it below.





**Questions:**

1. What is the function of the nucleus?
2. Where is the nucleolus found, and what does it produce?
3. Describe what ribosomes do in the cell.

**Questions:**

1. What is the function of the nucleus?

The nucleus is the control center of the cell. Its primary function is to control cell activities.

2. Where is the nucleolus found, and what does it produce?

The nucleolus is found inside the nucleus, and it produces ribosomes.

3. Describe what ribosomes do in the cell.

The job of ribosomes is to produce proteins.