Lesson Topic: Cells and Life

Objective:
Students will be able to:

1. Identify the difference between living and nonliving things
2. Identify cells as the smallest and basic unit of all living things
3. Create a timeline of cell discovery
4. Describe the three parts of the cell theory

Time Required: 90 minutes

Materials Needed:

- Teacher computer with internet access
- Projector/Smartboard
- 1 computer/laptop/iPad per student with internet access
- Outdoor space OR gather a variety of living and nonliving materials
- Cells and Life handout (1 per student)
- Website
    - https://bitesizebio.com/166/history-of-cell-biology/

Teacher Preparation:

- Assign a Legends of Learning Instructional Quick Play playlist for the day(s) you will be teaching the lesson.
    - Instructional - Middle School - Cells and Life
- Assign a Legends of Learning Content Review Quick Play playlist for the day(s) you will be teaching the lesson.
    - Content Review - Middle School - Cells and Life
- Make copies of Cells and Life Worksheet (1 per student)
- Suggestion: Have class outside if possible.

Engage (15 minutes):

1. Have students bring the Cells and Life handout and a pencil outside.
    a. If going outside is not possible, or the weather will not allow for it, gather a couple living and nonliving things to show to students (plants, classroom items, students etc).
2. Tell students “In your T chart, write down the items that you see that are living and also things that you see that are not living.”
3. Bring everyone together inside and make a class list of living and non-living things.
    a. Answers will vary based on classroom/outdoor setting
4. Ask students “All of the living things that you listed have something in common. Can you think of what it is?”
    a. Give students time to think and then share out their ideas.
5. Tell students “All living things have at least one cell. They are teeny tiny, and cannot be seen with the naked eye. Most of the items that you listed on the board have many cells, but we are going to talk all about living things and the basic unit of life; cells.

Explore (20 minutes):

1. Have your students sign in to Legends of Learning. Instruct students to complete the Instructional playlist.
2. As students complete the assigned game, students should write down any new observations on the Cells and Life Handout.
3. Assist students as needed during game play, pause playlist if you need to address content or questions to the entire class.

Explain (15 minutes):

1. Tell students "Let's talk about cells. Cells are the smallest and most basic unit of all living things. Some living things have many cells, like plants and animals - multicellular. Other organisms are made up of only one cell like bacteria and many protists- unicellular."
2. "Many people helped in discovering all that we know about cells. Because they cannot be seen with the naked eye, lack of technology was part of the issue of not knowing about cells. What invention has helped scientists discover and learn about cells?"
    a. Answer: microscope
3. "Using inventions like the microscope, a group of scientists discovered the cell theory, which is a set of rules that are true about cells (write the cell theory on the board and have students copy down in their Cells and Life handout).
    a. All living things are made up of cells.
    b. Cells are the basic unit of structure and function in all living things.
        i. Schleiden worked with plants
        ii. Schwann worked with animals
    c. Cells come from other cells.
        i. Virchow saw plants dividing under a microscope.

Elaborate (30 minutes):

1. Direct students to access this website.
2. Have students skim through the article. They are free to take notes if they wish.
3. Then, have students create their own timeline about the discovery of cells on the Cells and Life handout.
4. Have them choose at least 6 events to add on their timeline.
5. Their timeline should include:
    a. 6 events
    b. The dates of the events
    c. A drawing to go along with each event.
    d. Title for the timeline

Evaluate (10 minutes):

1. Have your students sign in to Legends of Learning. Instruct students to complete the Content Review playlist.
2. Analyze student results to determine what concepts need to be a focus for reteaching.

Additional Lesson Strategies:

- To use Legends for additional instruction, create a custom playlist with an instructional game and pre and post assessment.
- To use Legends for a quick formative assessment, create a 5-question assessment in a playlist.
- To use Legends for a student-directed experience, create a targeted freeplay playlist.
- Encourage students to play on their own at home in Legends of Learning: Awakening for a student-driven experience including avatars, battling, and quests all centered around topics they are covering in class.

Living Things	Nonliving Things

New Observations

Cell Theory

1.

2.

3.

History of Cell Discovery Timeline

Timeline KEY

***Student chosen events may vary. Events must include a drawing.**