

**Richmond Public Schools**  
**Department of Curriculum and Instruction**  
**Curriculum Pacing And Resource Guide – Unit Plan**



**Course Title/ Course #: Life Science**

**Unit Title/ Marking Period # (MP): LS.2 Cells: Plant & Animal Theory & Structure; MP1**

**Start day: \*See RPS Pacing Guide**

**Meetings (Length of Unit): 2.5 Weeks**

***Desired Results ~ What will students be learning?***

**Standards of Learning/ Standards**

LS. 2 - The student will investigate and understand that all living things are composed of cells. Key concepts include:

- a) cell structure and organelles
- b) similarities and differences between plant and animal cells
- c) development of cell theory
- d) cell division

**Essential Understandings/ Big Ideas**

The concepts developed in this standard include the following:

- The structure of a cell organelle is suited to the function carried out by that organelle. Division of labor within a cell is essential to the overall successful function of the cell.
- Similarities and differences in plants and animals are evident at the cellular level. Plant and animal cells contain some of the same organelles and some that differ.

- Cell theory includes the following components: all living things are composed of cells; cells are the smallest unit (structure) of living things that can perform the processes (functions) necessary for life; and living cells come only from other living cells.
- The development of cell theory can be attributed to the major discoveries of many notable scientists. The development of cell theory has been dependent upon improvements in the microscope technologies and microscopic techniques throughout the last four centuries.
- Continuing advances in microscopes and instrumentation have increased the understanding of cell organelles and their functions. Many of these organelles can now be observed with a microscope.
- Cells go through a life cycle known as the cell cycle. The phases of the cell cycle are interphase, mitosis, and cytokinesis. (Although it is appropriate for students at this level to learn to recognize the stages of the cell cycle and mitosis, an exploration of the individual stages of meiosis may be reserved for high school Biology.)
- The purpose of mitosis is to produce new cells for growth and repair that are identical to the parent cell. The purpose of meiosis is to produce reproductive (sex) cells that carry half the genetic material of the parent.

### **Key Essential Skills and Knowledge**

In order to meet this standard, it is expected that students will

- distinguish among the following: cell membrane, cytoplasm, nucleus, cell wall, vacuole, mitochondrion, endoplasmic reticulum, and chloroplast.
- correlate the structures of cell organelles with their functions.
- compare and contrast examples of plant and animal cells, using the light microscope and images obtained from other microscopes.

- describe and sequence the major points in the development of the cell theory.
- identify the three components of the cell theory.
- sequence the steps in the cell cycle, including the phases of mitosis.
- differentiate between the purpose of mitosis and meiosis.
- design an investigation from a testable question related to animal and plant cells. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis. An example of such a question is: “Do onion cells vary in shape or structure depending on where they are found in the plant?”

### **Vocabulary**

1. Active transport
2. Bacteria
3. Biological evolution
4. Cell function
5. Cell membrane
6. Cell nucleus
7. Cell organelle
8. Cell wall
9. Cellular differentiation
10. Chloroplast
11. Chromosome

12. Cytoplasm
13. Diffusion
14. DNA
15. Eukaryote
16. Golgi apparatus
17. Mitochondrion
18. Osmosis
19. Photosynthesizing organism
20. Prokaryote
21. Protein
22. Ribosome
23. Solute
24. Solution
25. Concentration Gradient
26. Equilibrium
27. Hypertonic
28. Hypotonic
29. Isotonic
30. Cell Theory
31. Endoplasmic Reticulum (Smooth & Rough)

- 32. Nucleolus
- 33. Nuclear Envelope
- 34. Nucleus
- 36. Centrioles
- 37. Lysosomes
- 38. Peroxisomes
- 39. Cytoskeleton
- 40. Unicellular
- 41. Multicellular

***Assessment Evidence ~ What is evidence of mastery? What did the students master & what are they missing?***

**Assessment/ Evidence**

TSWBAT: (Choose **ONE** or more to collect evidence of mastery)

1. Demonstrate proficiency on a teacher-generated assessment created on Interactive Achievement
2. Complete GIZMO Assessment with passing score
3. Prepare a wet mount of both plant and animal cells and identify structure and function of visible organelles
4. Create a labeled model of a prokaryotic or prokaryotic cell (plant or animal) and include functions
5. Cell Structure and Function Quiz with a passing rate of 80% or above.

***Learning Plan ~ What are the strategies and activities you plan to use***

**Learning Experiences/ Best Practice**

- Students are able to identify the essential parts of the microscope.
- Students will create a journal entry that compares and contrasts the differences between plant (cell wall and chloroplasts) and animal cells.

- Appropriately create and label a 3D model of a cell.
- Create a cartoon or a series of cartoons/sketches that illustrate the basic characteristics of life.
- Create a Venn diagram that compares prokaryotic and eukaryotic cells. Categories for comparison may include size, DNA structure, types of organisms, and organelles.
- Place students in groups of 3 or 4 students. Have them create a cell analogy. Depending on your students, you may have them come up with their own categories or you can provide guidance by giving them a specific category. For example, they can compare the cell to a school, a sports team, a prison, a factory, or a car.

### **Technology Integrations**

Brain Pop:

Username: rpschools Password: 4me2use

[Cells](#)

[Stem Cells](#)

[Mitosis](#)

[Cell Specialization](#)

[Microscopes](#)

Gizmos:

[Cell Structure:](#)

[Cell Division:](#)

Videos:

United Streaming/Discovery Education

- Video Title: [Assignment Discovery: Cells](#)

- Video Title: [Cell Division](#)

- Video Title: [Cell Theory](#)

Video Title: [Biologix: Comparison of Mitosis and Meiosis](#)

## **Resources**

Lessons and Worksheets:

- [Cell Structure and Function](#)
- [Cell Theory and Cells](#)
- [Cell Cycle](#)
- [Twizzler Mitosis](#)
- [Microscope: Parts and Function](#)
- [Cell's Organelles Powerpoint](#)
- [Prokaryotes vs. Eukaryotes](#)
- [Osmosis](#)
- [Diffusion and Osmosis](#)

## **Cross Curricular Connection**

Algebra I – Generating graph demonstrating the time a cell spends in the different phases of mitosis. Reflection in interactive notebook or journal – reflect upon any similarities/differences you observed between your initial description of what a cell looks like and your direct observations with the microscope.

English – Reflection in interactive notebook or journal – reflect upon any similarities/differences you observed between your initial description of what a cell looks like and your direct observations with the microscope.

History – Create a timeline that highlights historical events which led to the creation of the cell theory and the scientists who made contributions to its development.

Art – Students will illustrate the stages of the cell cycle using construction paper, glue and multi-colored pipe cleaners.