

FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Biology

Unit Name: **Cell-ebrate: The Functions of Cellular Structures**

Quality Core Objectives:

Unit8Cell-ebrate:The Functions ofCellular Structures	
B.1. Cells	a. Analyze the similarities and differences among (a)plant versus animal cells and (b) eukaryotic
	b. Describe the functions of all major cell organelles, includingnucleus, ER, RER, Golgi apparatus,
	c. Illustrate howall cell organelleswork together bydescribingthe step-by-step process of the translation of an mRNA strand into aprotein and its subsequent processing byorganelles sothat
	d. Contrast the structure and function of subcellular components of motility(e.g., cilia, flagella, pseudopodia)
	e. Explain howthe cell membrane controls movement of substances both into and out of the cell andwithin the cell
	f. Explain how the cell membrane maintains homeostasis
	g. Describe and contrast these types of cell transport: osmosis, diffusion, facilitated diffusion, and active transport
j. Describe the basic process of mitosis	

Purpose of the Unit:

To describe the structure and function of different kinds of cells, how substances move in and out of cells, and cell reproduction. This will allow students to understand the most basic unit of life (the cell) and make generalizations about life forms based on the cell type of the organism. It will further allow students to have a rudimentary understanding of diseases caused by prokaryotic & eukaryotic microorganisms, cancer, and treatments for those illnesses.

The following is a general objective list for the unit. It is tied back to each of the major content standards for the unit. Objectives are listed in the pacing guide/daily plan section. When additional standards are covered on a day, which are outside the scope of the objective, those standards are listed.

Objective	Objective Description	Target Standard	Objective	Objective Description	Target Standard
1	I can identify a plant cell based on its general appearance and the organelles present.	B.1.a	14	I can describe the process of active transport	B.1.g; B.1.e
2	I can identify an animal cell based on its general appearance and the organelles present.	B.1.a	15	I can describe the structure and function of a flagella	B.1.d
3	I can identify a bacterial/archae cell based on its general appearance and the organelles present	B.1.a	16	I can describe the structure and function of a cilia	B.1.d
4	I can list and describe the differences between an animal and a plant cell	B.1.a	17	I can describe the structure and function of a pseudopodia	B.1.d
5	I can list and describe the differences between a generalized prokaryotic cell and a generalized eukaryotic cell	B.1.a	18	I can describe the structure of DNA	C.1.a
6	I can list and describe the similarities between an animal and a plant cell	B.1.a	19	I can describe how DNA is packaged in different types of cells	B.1.j; B.1.b; C.1.a;
7	I can name all 14 major cellular organelles and tell the major function of each	B.1.b	20	I can describe the process of cell division (mitosis) and list its steps.	B.1.j; B.1.b; C.1.a;
8	I can describe the general structure of a cellular membrane	B.1.f			
9	I can describe the way in which a cell membrane would react to changes in its environment	B.1.f			
10	I can list and describe the various types of proteins found in cell membranes	B.1.f; B.1.e			
11	I can describe the process of diffusion	B.1.g; B.1.e			
12	I can describe the process of osmosis	B.1.g; B.1.e			
13	I can describe the process of facilitated diffusion	B.1.g; B.1.e			

Prerequisites:

The basic principles of biology (from earlier chapters) and biochemistry are required to understand this material.

Daily Lesson Guide

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1	<p>Introduction to Cells and Organelles – Part 1.</p> <p>Objectives: 1,3,5</p> <p>I – Bell ringer II – Pretest</p>	<p>What do we know about cells and cell biology?</p>	<p>Adaptation of think, pair, share for the bell ringer.</p>	<p>Bell Ringer: Ask students to write a short paragraph or two about a time that they were really sick. (Personal response)</p> <p>Pair up and share. Let students whose partner thinks that their paragraph is good read them out loud. After a few kids read theirs out loud, lead a short discussion on what sickness it. Show a video of eukaryotic cells doing battle with prokaryotic cells. (http://www.youtube.com/watch?v=JnlULOjUhsQ)</p>	<p>Pre-assessment: ACT quality core questions for this unit. (formative)</p>
2	<p>Introduction to Cells and Organelles – Part 2.</p> <p>Objectives: 1,2,3,4,5</p> <p>Non-target Standards: A.3.a, A.3.b, A.3.f</p>	<p>What are the major events in the history of cell biology?</p>	<p>In Class: Time Line of cell biology. (Partial non-linguistic representation)</p> <p>H.W.: Essay from an “involved party’s” point of view upon a major event in cell biology.</p>	<p>Bell Ringer: Pick your favorite part of the cell that you remember from Middle School or the reading. Draw a picture of it and tell all the things you can remember it doing. (choice of topic, personal)</p>	<p>Bell Ringer Review by teacher (formative)</p>

	<p>I – Bell ringer II – Lecture III – Time line (group work)</p>				
3	<p>Cell Types: Prokaryote & Eukaryote</p> <p>Objectives: 1,2,3,5</p> <p>Non-target Standards: A.1.f</p> <p>I – Bell ringer II – Lab III – Lecture</p>	<p>What are the main differences between prokaryotic cells and eukaryotic cells?</p>	<p>Observe 4 cells, and infer which is eukaryotic and which is prokaryotic.</p> <p>Venn diagram prokaryotic and eukaryotic cellular structure.</p>	<p>Bell ringer: “Who do you think was the most important scientist or what was the most important discovery, in the history of cell biology. Why do you say that?”</p> <p>Students work in lab groups and have a group picture quiz at the end. (Working with others)</p>	<p>Lab sheet/questions; Group Picture Quiz</p>
4	<p>Organelles: The little organs</p> <p>Objectives: 7</p> <p>I – Bell ringer II – Lecture III – In Class Essay</p>	<p>What are the functions of the various eukaryotic cell organelles?</p>	<p>In class essay: Imagine a eukaryotic cell that suddenly lost one of its organelles (you chose which one). Explain problems that cell might have, and whether or not you think the cell could still survive. Be sure to justify all your thinking.</p> <p>H.W. – Draw and label a</p>	<p>Bell ringer: “Show or tell me the somehow the ‘most important’ 3 differences between a prokaryotic cell and a eukaryotic cell.”</p> <ul style="list-style-type: none"> - Students will do this part by themselves. Then partner and be told to discuss the 3 differences that they picked and narrow it down to 2. - Partners then go into groups of 4. They narrow it down to 1. - As a class we will list all the differences and decide if any are really ‘the most important’ 	<p>Oral questions during lecture.</p> <p>Essay.</p>

			typical eukaryotic cell and a typical prokaryotic cell	difference. (Working with others)	
5	<p>Cell Types: Animals & Plants</p> <p>Objectives: 1,2,3,4,6</p> <p>Non-target Standards: A.1.f</p> <p>I – Bell ringer II – Lab III - Lecture</p>	What are the differences between plant and animal cells?	<p>H.W.:</p> <p>Read an article about the Irish potato famine, describe the types of organisms involved, and explain how it could have been prevented.</p>	<p>Observation lab: A plant cell and an animal cell using a light microscope. When done, as a group, list the differences between the cell types. (working with others)</p>	Lab sheet/questions.
6	<p>Review of cell types and parts</p> <p>Objectives: 1-7</p> <p>I – Bell ringer II – Model Building</p>	How can we model what cells look like?	<p>Bell Ringer: Write two paragraphs. The first should summarize all the differences between a eukaryotic cell and a prokaryotic cell. The second should summarize the differences between an animal cell and a plant cell.</p>	<p>Students will build giant cookie models of cells in groups. They may choose which type of cell they model. (Choice, working with others, Novelty/Variety)</p>	<p>Models will be evaluated by the other groups, and evaluations turned in.</p> <p>Bell ringers will be read by teacher.</p>
7	<p>Chapter Test Review Day</p> <p>Objectives: 1-7</p> <p>I – Bell ringer II – Practice test in group</p>	What do we know about cells and cell biology?	<p>Bell ringer: “Answer focus question. Trade with a partner of your choice. Add everything that your partner left out. Correct mistakes your partner made.”</p>	<p>Bell ringer (working with others)</p> <p>Students will take practice test. Instead of giving answers students will partner up and discuss whether or not they got the same answer and discuss why answers are right or wrong. Students will switch partners twice.</p>	Practice test.

8	End of Chapter Test, Cells and Organelles	N/A	N/A	N/A	Summative Assessment: End of Chapter Test - Cells and Organelles
9	Membranes: Structure and function. Objectives:8,9, 10, 11,12 I – Bell ringer II – Demo III - Lecture	What are the components of biological membranes?	H.W.: Draw a picture of a typical eukaryotic cell membrane. Include and label all key features. Write a sentence to go with each labeled feature, explaining what it does in the membrane	Bell Ringer: Graph the grade distributions of the test from your class. Do you see any patterns? How do you feel about where you fall on your graph? (Personal response) Demo of diffusion with shell-less eggs. (Novelty/Variety)	Questions During Lecture H.W. Assignment
10	Membranes: Diffusion and Osmosis - part 1 Standards: 11 I – Bell Ringer II – Lab III – Lecture IV – H.O.T. (home work if not finished)	How do solutes move through membranes?	H.O.T.: Do you think that Ions like Na ⁺ , K ⁺ , and Cl ⁻ move through cell membranes like the iodine in the lab? Why or why not?	Starch-Iodide diffusion lab and discussion (Working with others)	Lab questions/sheet Answer to H.O.T. question at end.
11	Membranes: Diffusion and Osmosis – Part 2 I – Bell ringer	How are large molecules (like proteins) and polar things (like	In class essay: Support of refute the following statement – “Active transport is the most important method of	Bell ringer: “Dialysis is a process for removing waste and excess water from the blood. Why would the cells in a body need to have excess waste and water removed from the blood? Have you ever known	Q&A during lecture

	<p>II – Lecture III – In class essay</p>	<p>ions) moved across membranes?</p>	<p>moving substances in and out of membranes”</p>	<p>anyone who has had to have dialysis? How does what we have been studying relate to dialysis?” (Personal response)</p>	
12	<p>Membranes: Diffusion and Osmosis - part 3</p> <p>Objectives: 12</p> <p>I – Bell ringer II – Lab III – H.O.T. question (H.W. if not finished)</p>	<p>How does water diffuse across a cell membrane?</p>	<p>H.O.T question: Why is it not a good idea to drink sea water when you are thirsty?</p>	<p>Bell ringer: Placed a line from ‘The rime of the ancient mariner’ on the board and asked students to explain biologically what the poet meant.</p> <p>Osmosis lab: predict what will happen to potatoes (The potato & the sea lab) in different solutions.</p> <p>H.O.T. (Personal Response)</p>	<p>Lab sheet/questions. Answer to H.O.T. question at end.</p>
13	<p>Mitosis & Cell division – part 1</p> <p>Objectives: 20</p> <p>I – Bell ringer II – read article on cancer III – work on questions that go with article IV – start cell cycle graphic organizer</p>	<p>What is the cell cycle & how does it relate to our lives?</p>	<p>Creating a complex graphic organizer. Reading for content.</p>	<p>Bell ringer: “Have you ever known anyone with cancer? How did it affect their life or your life?” (Personal Response)</p>	<p>Cancer article question, in class questioning.</p>

14	<p>Mitosis & cell division – part II</p> <p>Objectives: 19 & 20</p> <p>I – Bell ringer II – chromosome reading II – Write summary of chromosome paper III – Mitosis picture puzzle lab (no labels)</p>	<p>What do the stages of cell division look like and how do they relate to each other in time?</p>	<p>Organizing events in time and explaining your logic.</p> <p>Summarizing</p>	<p>Mitosis Lab (personal response – originally students organize pictures as THEY see fit and explain their reasoning.) (Working with others – students group and</p>	<p>Lab sheets</p>
15	<p>Mitosis and cell division – part III</p> <p>Objectives: 19 & 20</p> <p>I – Bell ringer II - Short YouTube video on mitosis III – mitosis Picture puzzle lab with labels IV –continue cell cycle organizer</p>	<p>What do the stages of cell division look like and how do they relate to each other in time?</p>	<p>Organizing events in time and explaining your logic.</p>	<p>Mitosis Lab (personal response – originally students organize pictures as THEY see fit and explain their reasoning.) (Working with others – students group and</p>	<p>Lab sheets</p>

16	<p>Mitosis and cell division – part IV</p> <p>Objectives: 19 & 20</p> <p>I – Bell ringer II – apoptosis video III – Continue cell cycle organizer IV – give out review and vocabulary packets</p>	<p>What do the stages of cell division look like and how do they relate to each other in time?</p>	<p>Creating complex graphic organizers</p> <p>Critical thinking review questions</p>		
17	<p>Mid Unit Test Review Day</p> <p>I – Bell ringer II - Practice Test</p>				Practice test
18	<p>Mid Unit Test</p> <p>I – test II – DNA reading and summary for H.W. or when finished.</p>				Summative assessment: Chapter 5 & 8(pt 1)

