**Unit 2 Scales: Cell Biology**

**Scale for Cell Theory**

SC.912.N.1.3, SC.912.N.2.1, SC.912.N.3.1, SC.912.L.14.1, SC.912.N.3.4

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| **4** | Students will be able to: create a cell theory timeline showcasing the contributions individuals made to the Cell Theory. |
| **3** | Students will be able to:**Describe** the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.**Explain** that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena thus, a scientific theory represents the most powerful explanation scientists have to offer.**Recognize** that theories do not become laws, nor do laws become theories, theories are well supported explanations and laws are well supported descriptions. |
| **2** | Students will be able to:* **Recognize** how cell theory characterizes a scientific theory instead of a scientific law.
* **Explain how** cell theory challenged previous claims by using scientific standards and criteria.
* **Recognize** and **determine how** contributions of scientists aided in the development of cell theory.
* **Describe** the components of cell theory.
* **Explain** what characterizes a theory (well-tested hypotheses, derived from many scientific investigations, draws together all current evidence concerning a broad range of phenomena, most powerful explanations scientists have to offer).
* **Define** and **differentiate** between scientific theories and laws.
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| **1** | With assistance, the learner has partial success with 2.0/3.0 |

**Scale for Cell Structures**

SC.912.L.14.3, SC.912.L.14.2, SC.912.L.18.1, SC.912.L.18.11

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| **4** | Students will be able to:- actively participate in a “game” that allows them to identify the structures & functions of all of the macromolecules- complete a lab comparing plant & animal cells |
| **3** | Students will be able to:**Compare** and **contrast** the general structures of plant and animal cells. **Compare** and **contrast** the general structures of prokaryotic and eukaryotic cells. **Relate** structure to function for the components of plant and animal cells. **Identify** the structure and **describe** the function of the four macromolecules. **Explain** the role of enzymes as catalysts that lower the activation energy of biochemical reactions. **Identify** factors, such as pH and temperature, and their effect on enzyme activity. |
| **2** |  Students will be able to:* **Infer** how factors such as pH, temperature and concentration may ultimately impact organelle functioning by affecting enzyme activity.
* **Describe** how enzymes affect the functioning of organelles in a cell.
* **Identify** and **describe** basic molecular structures of each biological macromolecule category (lipid, protein, carbohydrate, nucleic acid).
* **Describe** the functions of various cellular nucleic acids.
* **Describe** the functions of various cellular carbohydrates.
* **Describe** the functions of various cellular proteins.
* **Describe** the functions of various cellular lipids.
* **Identify and** **describe** the macromolecules that can be found in a cell.
* **Describe** the functions of cell structures listed below.
* **Determine** which structures can be found in prokaryotic, eukaryotic, plant and/or animal cells:
	+ cell wall, cell membrane (plasma membrane), cytoplasm, ribosomes, flagella, nucleus, nuclear envelope, nucleolus, chromatin, endoplasmic reticulum, microtubules, microfilaments, vacuoles, mitochondria, Golgi apparatus, chloroplasts, lysosomes, cilia, and flagella
* **Differentiate** between animal and plant cells.
* **Differentiate** between prokaryotic and eukaryotic cells.
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| **1** | With assistance, the learner has partial success with 2.0/3.0 |

**Scale for Role of the Cell Membrane**

SC.912.L.14.2, SC.912.L.18.1

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| **4** | Students will complete a 5 day lab and associated lab report on the role of the cell membrane using an egg and various liquids. |
| **3** | Students will be able to:**Explain** the role of cell membranes as a highly selective barrier (passive and active transport). |
| **2** |  Students will be able to:* **Describe** the movement of molecules across the cell membrane when a cell is exposed to different solution concentrations (isotonic, hypotonic and hypertonic solutions).
* **Compare** and **contrast** passive and active transport.
* **Explain** the role of the cell membrane during active and passive transport.
* **Describe** how various macromolecules help the cell membrane regulate what enters and exits the cell.
* **Identify**the macromolecules present in the cell membrane.
* **Describe** the purpose of the cell membrane (plasma membrane).
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| **1** | With assistance, the learner has partial success with 2.0/3.0 |

**Scale for Cell Cycle**

SC.912.L.16.14, SC.912.L.16.8, SC.912.L.18.11, SC.912.L.16.16, SC.912.L.16.17

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| **4** | Students will be able to explain the steps of the cell cycle using a booklet that they create. They will also be able to identify examples they are given as either a reference to mitosis or meiosis.  |
| **3** | Students will be able to:**Describe** the cell cycle, including the process of mitosis. **Explain** the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction. **Describe** the process of meiosis, including independent assortment and crossing over. **Explain** how reduction division results in the formation of haploid gametes or spores.**Compare** and **contrast** mitosis and meiosis and relate to the process of sexual and asexual reproduction and their consequences for genetic variation. **Explain** the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer. |
| **2** |  Students will be able to:* **Describe** how the processes of sexual and asexual reproduction impact genetic variation.
* **Compare** and **contrast** mitosis and meiosis.
* **Summarize** the purpose and products of meiosis.
* **Describe** what happens in each of the phases of meiosis, including independent assortment and crossing over.
* **Summarize** the purpose and products of mitosis.
* **Describe** what happens in each of the phasesof mitosis.
* **Recognize** that some proteins function to regulate the cell cycle. ***Identify*** and ***describe*** the basic molecular structure of proteins.
* **Explain** how cancer may result from mutations that affect the proteins that regulate cell cycle.
* **Summarize** the purpose of the cell cycle.
* **Describe** what happens in each of the stagesof the cell cycle.
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| 1.0 | With assistance, the learner has partial success with 2.0/3.0 |