SCOPE AND SEQUENCE UNIT 1

Matter and Energy in Organisms and Ecosystems

OVERVIEW					
Lesson	Topic	PE's and DCI's	Chapter (Biology Text Nowicki)	Suggested Pacing Year	Suggested Pacing Semester
1	Introduction	HS-LS1-2	1	2	2
2	Unifying Themes in Biology	HS-LS1-2	1	2	2
3	Chemistry of life and Macromolecules	HS-LS1-6	2	4	4
4	Cells – Introduction	HS-LS1-2	3	3	3
5	Active and Passive transport	HS-LS1-6	3	2	2
6	Chemical Energy and ATP	HS-LS1-6	4	2	2
7	Overview of Photosynthesis	HS-LS1-5	4	2	2
8	Overview of Cellular Respiration	HS-LS1-7	4	2	2
9	Energy in Ecosystems Food Chains and Food Webs	HS-LS1-2-3	13	2	2
10	Cycling of matter	HS-LS2-3,45	13	2	2

# Blocks	STUDENT LEARNING OBJECTIVES	CORRESPONDING DCIs	CURRICULAR & SUPPLEMENTAL RESOURCES	Sample Activity	ASSESSMENT
8	**HS-LS1-6** Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to	**HS-LS1-2** **HS-LS1-6** LS1.C As matter and energy flow though different organizational levels of living systems, Chemical Elements are recombined in different ways to form different products.	**Chapter 1: Biology in the 21st Century** • Unifying themes in Biology • Introduction to Lab • Microscopes **Chapter 2: Chemistry of Life** **Atoms Ions and molecules** **Carbon Based Molecules** **Chemical Reactions and Enzymes**	**Activity 1**: HASPI with sample lab Scientific Measurements & Equipment. This is a station activity that will allow students to become more familiar with common measurements and equipment used in the biology labs for this course. Stations include ratios & percentages, measuring mass & volume, graphing, measuring length, making observations, measuring time, research and	**Activity 1:** Labs **Activity 2:** Discovery generated quiz **Activity 3:** Discovery District Concept based unit assessment (DE created)

	form amino acids and/or other large carbon-based molecules. • Identify Elements common to living things • Compare Ionic and Covalent bonding • Identify the properties of water • Describe the bonding properties of carbon atoms • Compare carbohydrates, lipids, proteins and nucleic acids. • Explain the effect of a catalyst on activation energy. • Describe how Enzyme			references, and measuring temperature. http://tinyurl.com/haspi-Scientific-processes **Acitivty2**: GIZMO: http://tinyurl.com/gizmo-Scientific-processes **Activity3:** Discovery Education http://tinyurl.com/DE-Chemistry-of-Life Assignment: Scientific Explanation: Atoms, Elements, Compounds, and Chemical Bonds.	

	s regulate Chemical Reactions.				

# Blocks	STUDENT LEARNING OBJECTIVES	CORRESPONDING PE's and DCIs	CURRICULAR & SUPPLEMENTAL RESOURCES	Sample Activity	ASSESSMENT
5	**HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. 1. Differentiate between diffusion and osmosis in relation to intracellular and extracellular solutes. 2. Describe the effects of hypotonic, isotonic, and hypertonic solutions on red blood cells. 3. Explain the relationship between the rate of osmosis and the time for hemolysis. 4. Describe the importance of maintaining a homeostatic body pH. 5. Describe the Cell Theory 6. Differentiate between Eukaryotic	**HS-LS2-3** **LS1.C:** Organization for Matter and Energy Flow in Organisms As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products.	**Chapter 3 Cell Structure and Function** • **Cell Theory** • **Cell Organelles** • **Cell Membrane** • **Diffusion and Osmosis** • **Active Transport, Endocytosis and Exocytosis**	**Activity 1:** Discovery Education Cell Structure and function. http://tinyurl.com/DE-Cells • Creating and modeling scientific models of the cell. • Comparing plant and animal cells. **Acitivty2:** GIZMO: http://tinyurl.com/gizmo-cell-energy-cycle	**Activity 1:** Constructed response **Activity 2**: Quiz **Activity 3:** Concept based Unit Assessment (DE and textbook created)

	and Prokaryotic cells. 7. Describe the internal Structure of Eukaryotic cells. 8. Describe the Function of organelles in Plant and Animal cells. 9. Describe the structure of the cell membrane 10. Summarize how signals are transmitted across the cell membrane.				

# Blocks	STUDENT LEARNING OBJECTIVES	CORRESPONDING Pes and DCIs	CURRICULAR & SUPPLEMENTAL RESOURCES	Sample Activity	ASSESSMENT
6	**Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. (HS-LS1-5)** **Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. (HS-LS2-3)** • Recognize the importance of ATP as an energy carrying molecule • Identify energy	**HS-LS1-7** **HS-LS1-5** **HS-LS2-3**	Text: **Chapter 4: Cells and Energy** • **Chemical Energy and ATP** • **Overview of Photosynthesis** • **Overview of Cellular respiration**	**Activity 1:** Discovery Education Energy of Life http://tinyurl.com/Biology-DE-Energy-of-life ***Hands on activities*** *1.Energy in Ecosystems* *2.Energy in Foods* http://tinyurl.com/DE-Ecology 5 E's and hands on resources **Activity2: HASPI with labs** Respiration http://tinyurl.com/Haspi-Respiration	**Activity 1**: Constructed response **Activity 2:** Quiz **Activity 3:** Concept based Unit Assessment (DE and textbook created)

	resources used by Organisms • Relate Producers to photosynthesis • Describe the Process of photosynthesis • Describe the process of cellular respiration • Compare Cellular Respiration to photosynthesis.				
4	**Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. (HS-LS2-4)** **Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. (HS-LS2-5)** • Identify	**HS-LS2-4** **HS-LS2-5**	**Chapter 13: Principles of Ecology** • **Biotic and Abiotic Factors** • **Energy in Ecosystems** • **Food chains and food webs**	**Acitivty3: GIZMO:** Food Chain http://tinyurl.com/Biology-Food-chains	

	Biotic and Abiotic factors in an ecosystem • Describe how a change in one ecosystem can affect others. • Describe the Role of Producers and Consumers in Ecosystems . • Compare photosynthesis and chemosynthesis • Describe the structure of a food chain • Explain how food chains and trophic levels are related. • Analyze feeding relationships in a food web. • Summarize Earth's Hydrologic and biogeochemical cycles • Relate cycling of matter to ecosystems				

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