DCSD Instructional Planning Instrument
Focus on Teaching and Learning

Lakeside High School

Weekly Components			
Teacher: **Co-Teacher/Para:**	Pastirik	**Date – Week of:**	Monday 9/18/17 – Friday 9/22/17
Course:	Biology I	**Unit Name:**	Biology, Unit 1 From Molecules to Organisms: Structure and Processes

Priority Standards: (content specific)	Standards and Guiding Practices: Priority Standards SB1. OBTAIN, EVALUATE, and COMMUNICATE information to analyze the nature of the relationships between structures and functions in living cells. SB1c. CONSTRUCT arguments supported by evidence to RELATE the structure of macromolecules (carbohydrates, proteins, lipids, and nucleic acids) to their interactions in carrying out cellular processes. (Clarification statement: The function of proteins as enzymes is limited to a conceptual understanding.) SB1e. ASK questions to INVESTIGATE and PROVIDE explanations about the roles of photosynthesis and respiration in the cycling of matter and flow of energy within the cell (e.g., single-celled alga). (Clarification statement: Instruction should focus on understanding the inputs, outputs, and functions of photosynthesis and respiration and the functions of the major subprocesses of each including glycolysis, Krebs cycle, electron transport chain, light reactions, and Calvin cycle.)
Supporting Standards: (content specific)	*Standards and Guiding Practices: Supporting Standards* *SB1a.* *Construct an explanation of how cell structures and organelles (including nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, Golgi, endoplasmic reticulum, vacuoles, ribosomes, and mitochondria) interact as a system to maintain homeostasis.* *SB1b.* *Develop and use models to explain the role of cellular reproduction (including binary fission, mitosis, and meiosis) in maintaining genetic continuity.* *SB1d.* *Plan and carry out investigations to determine the role of cellular transport (e.g., active, passive, and osmosis) in maintaining homeostasis.* *Crosscutting Concepts & Science and Engineering Practices* *Crosscutting Concepts (All Daily)* *Patterns, Similarity, & Diversity* *Cause & Effect* *Scale, Proportion, & Quantity* *Systems & System Models* *Energy & Matter* *Structure & Function* *Stability & Change* *Science & Engineering Practices: #1, 2, & 6 (Daily)*

DCSD Instructional Planning Instrument
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	Asking Questions (Science) and Defining Problems (Engineering) *Developing & Using Models* *Planning and Carrying Out Investigations* *Analyzing & Interpreting Data* *Using Mathematics & Computational Thinking* *Constructing Explanations (Science) & Designing Solutions (Engineering)* *Engaging in Argument from Evidence* *Obtaining, Evaluating, & Communicating Information*
Non-Content Standards: (WIDA; interdisciplinary standards, literacy, etc.)	Students will as necessity: Read, write, interpret graphs, and present material. Students will work cooperatively.
Learning Targets: (what learners will be able to do at the end of the learning activity)	Students will learn the anatomy of cells and the processes associated with cell processes.
Essential Question(s): (address philosophical foundations; contain multiple answers; provoke inquiry)	1. How can we explain how cell structures and organelles interact as a system to maintain homeostasis? 2. What arguments supported by evidence can be used to relate the structure of macromolecules to their interactions in carrying out cellular processes? 3. What are the roles of photosynthesis and cellular respiration in the cycling of matter and flow of energy within the cell?
Big Ideas(s): (address philosophical foundations; contain multiple answers; provoke inquiry)	1. Each cell structure plays a particular role in the maintenance of the internal conditions through the use of feedback mechanisms even when external conditions change. 2. The process of photosynthesis converts light energy, carbon dioxide and water into glucose and oxygen that is then converted in cellular respiration to provide the chemical and thermal energy needed to support maintenance of the cells.
Academic Vocabulary:	Create Generalize Justify Assess Select Conclude Apply Explain Describe Explain Analyze Extend Classify Arrange Construct Substrate Lock-and-key mechanism Activation energy Carbohydrates Lipids Proteins Nucleic Acids ATP

	Photosynthesis Light reaction Calvin Cycle Cell Respiration Glycolysis Kreb cycle Electron Transport Chain Selective permeable Homeostasis Diffusion Osmosis Facilitated Diffusion Active Transport Endocytosis Exocytosis
STEM/STEAM/ Interdisciplinary Integration:	We will do our best to include a physical project during this unit
Engaging Performance Scenario:	During the course of the unit, three – four of the following four Engaging Performance Scenarios will be the lesson of the day (or days) during the first unit Engaging Performance Scenario: Task 1 Engaging Scenario Directions: Incorporate the five elements of effective scenarios: current situation; student challenge; student role; intended audience; product, or performance. Suggested Phenomena: Chemicals can influence cell function Science and Engineering Practices: Asking Questions, Planning and Carrying Out Investigations, Constructing Explanations, Engaging in Argument from Evidence, Obtaining, Evaluating and Communicating Information Imagine that you are a doctor for a hospital in the Philippines. Parents are carrying in their sick and dying children. By the end of the night over 100 children were sick and 27 children had died. All of the children attended the San Jose School in Bohol Island's Mabini Town. After interviewing patients and their parents it was discovered that all patients became ill after snack time. One child told her parents she was given some deep-fried caramelized cassava by a classmate who bought it from a vendor outside the school. The patients suffered severe stomach pain, vomiting and diarrhea. Some patients were still vomiting nearly 12 hours after eating the snack. During this unit you will be tasked with asking questions, planning experiments, and engaging in arguments from evidence to help you solve this mystery. You will be given clues along the way to find out what caused the children's deaths. Performance Task Synopses

Directions:

Brainstorm three or four possible Performance Tasks.
Write a brief synopsis (1–2 sentences) for each selected task and list the tasks in a "learning progressions" sequence.
Include the standards code for each task.
Task 1: Using a real-world cyanide poisoning case study, the students will work collaboratively to engage in arguments based on evidence to construct an explanation of what caused the illness that has resulted in the death of several school children.

Task 2: SB1c. Using oil (lipid) and water, yeast and various sugars (carbohydrates), and potato catalase (enzyme), students will develop an argument and individually construct a written explanation for how macromolecules function in terms of matter and energy.

Task 3: SB1a. Using a real world analogous system, students will construct an explanation of how the parts of the system compare to how cell structures and organelles interact as a system to maintain homeostasis.

Task 4: SB1d. Using solutes and solvents, students will explain the role of cellular transport in maintaining homeostasis.

Task 5: SB1e. Using an aquatic plant and selected materials, students will plan and design an experiment to investigate the relationship between photosynthesis and cellular respiration.

Performance Task 1 In Detail

Directions: Describe the task in full detail making the connection to the overall engaging scenario. Check that the task directly reflects the level of rigor for each targeted skill and related concept(s).

Suggested Phenomena: Chemicals can influence the functioning of cellular processes

Associated Standards:
SB1. Obtain, evaluate, and communicate information to analyze the nature of the relationships between structures and functions in living cells.

SB1a. Construct an explanation of how cell structures and organelles interact as a system to maintain genetic continuity.

SB1c. Construct arguments supported by evidence to relate the structure of macromolecules to their interactions in carrying out cellular processes. SB1e. Ask questions to investigate and provide explanations about the role of photosynthesis and respiration in the cycling of matter and flow of energy within the cell.

Task 1 Student Directions:

Engage:
Part1: The Symptoms
Imagine that you are a doctor for a hospital in the Philippines. Parents are carrying in their sick and dying children. By the end of the night over 100 children were sick and 27 children had died. All of the children attended the San Jose School in Bohol Island's Mabini Town. After interviewing patients and their parents it was discovered that all patients became ill after snack time. One child told her parents she was given some deep-fried caramelized cassava by a classmate who bought it from a vendor outside the school. The patients suffered severe stomach pain, vomiting and diarrhea. Some patients were still vomiting nearly 12 hours after eating the snack. During this unit you will be tasked with solving this mystery. You will be given clues along the way to find out what caused the children's deaths.

Teacher Notes:
The above scenario will be introduced at the beginning of the unit. After introducing the scenario allow students to spend 5-10 minutes in small groups discussing if all of the cases are linked. As a whole group discuss the following questions with the class. Are there any similarities or connections between the 27 children? What questions would you want to ask the families to answer the questions? In your opinion are the 27 deaths related? Why or why not?

Student Directions:
Explore
Part II: Autopsy Report (Give students this information after completing Performance Tasks 2 and 3.)

Immediate cause of death was hypoxia (suffocation or lack of oxygen).
Tissue sections from heart, lung, kidney, and liver all show massive cell death.
Staining with specific dyes showed major mitochondrial damage within the affected tissues.
Oxygen levels in the patients' blood were approximately 110 mm Hg (normal range is 75 – 100 mm Hg).
Teacher Notes:
Allow students to spend 5-10 minutes in small groups discussing the questions listed below. Afterwards, discuss questions as a whole group.

Recalling your knowledge of the function of organelles, what function of the cells was interrupted in these patients? Could this loss of function lead to the death of these individuals? Why or why not?
Given the data in the autopsy, were there any reports that seemed inconsistent with the immediate cause of death?
Student Directions:
Explain
Part III: Subcellular Metabolite Analysis (Give students this information after completing Task 4 and 5) Detailed analysis of the damaged cells showed that ATP levels in the mitochondria were very low. Levels of pyruvate and acetyl coenzyme A (CoA) were normal. You begin to suspect a malfunction of a specific cellular metabolic pathway and so you request a more detailed analysis of the sub-cellular

components of the affected cells from the autopsy. The levels of key metabolites are reported below:

Average Metabolite Levels

Metabolite	Average Patient Levels	Normal Levels
Glucose	99 µM	100 µM
Pyruvate	27 µM	25 µM
NAD+	10 µM	75 µM
NADH	400 µM	50 µM

Teacher Notes:

Allow students to spend 5-10 minutes in small groups discussing the questions listed below. Then discuss questions as a whole group.

Using the table above, describe the role of each metabolite in cellular respiration.
Are the metabolites substrates or products? What are their main functions?
Are there any abnormalities in the levels of these metabolites in the victims?
Develop a hypothesis about which pathway may be affected based on these abnormalities.
Explain your reasoning for your hypothesis.
Student Directions:
Extend
Part IV – Role of Cyanide (Give students this information at the end of the Unit)
You are now convinced that you know the cause of death for these victims and quickly report it back to the police as this is a very dangerous situation. After realizing that the electron transport chain was no longer functioning, you started to suspect poisoning and ran a blood test for various poisons that you knew affected electron transport. The test for all twenty-seven patients came back positive for cyanide. Cyanide irreversibly binds to a specific enzyme of the electron transport chain and prevents the transfer of electrons to oxygen, the final electron acceptor.

Teacher Notes: Allow students to spend 10-15 minutes in small groups discussing the questions listed below. Afterwards, discuss questions as a whole group. Share the article after whole group discussion for students to read about the actual event. The article explains how the children were poisoned with cyanide.

http://www.chinadaily.com.cn/english/doc/2005-03/10/content_423641.htm

Evaluate

What affect would cyanide have on the electron transport chain and the production of ATP? Explain your answer.
Given what you now know about the action of cyanide on cellular respiration, explain why the patients died of lack of oxygen while their blood oxygen levels were normal?
Would artificial respiration or oxygenation have saved these people? Why or why not?

Looking back at the information you have about the people before they got sick, can you suggest a possible source of the cyanide poisoning? How should public health officials and police respond to this tragedy?
This scenario was adapted/modified from the The Mystery of the Seven Deaths: A Case Study in Cellular Respiration by Michaela A. Gazdik Biology Department Ferrum College, Ferrum VA, and the National Center for Case Study Teaching in Science, University at Buffalo, State University of New York.

Crosscutting Concepts: Cause and Effect, Scale, Proportion and Quantity, Energy and Matter, Structure and Function, Stability and Change

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Engaging Performance Scenario: Task 2
Engaging Scenario

Directions: Incorporate the five elements of effective scenarios: current situation; student challenge; student role; intended audience; product, or performance.

Suggested Phenomena: Chemicals can influence cell function

Science and Engineering Practices: Asking Questions, Planning and Carrying Out Investigations, Constructing Explanations, Engaging in Argument from Evidence, Obtaining, Evaluating and Communicating Information

Imagine that you are a doctor for a hospital in the Philippines. Parents are carrying in their sick and dying children. By the end of the night over 100 children were sick and 27 children had died. All of the children attended the San Jose School in Bohol Island's Mabini Town. After interviewing patients and their parents it was discovered that all patients became ill after snack time. One child told her parents she was given some deep-fried caramelized cassava by a classmate who bought it from a vendor outside the school. The patients suffered severe stomach pain, vomiting and diarrhea. Some patients were still vomiting nearly 12 hours after eating the snack. During this unit you will be tasked with asking questions, planning experiments, and engaging in arguments from evidence to help you solve this mystery. You will be given clues along the way to find out what caused the children's deaths.

Performance Task Synopses

Directions:

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Task 1: Using a real-world cyanide poisoning case study, the students will work collaboratively to engage in arguments based on evidence to construct an

	explanation of what caused the illness that has resulted in the death of several school children. Task 2: SB1c. Using oil (lipid) and water, yeast and various sugars (carbohydrates), and potato catalase (enzyme), students will develop an argument and individually construct a written explanation for how macromolecules function in terms of matter and energy. Task 3: SB1a. Using a real world analogous system, students will construct an explanation of how the parts of the system compare to how cell structures and organelles interact as a system to maintain homeostasis. Task 4: SB1d. Using solutes and solvents, students will explain the role of cellular transport in maintaining homeostasis. Task 5: SB1e. Using an aquatic plant and selected materials, students will plan and design an experiment to investigate the relationship between photosynthesis and cellular respiration. Performance Task 2 In Detail Directions: Describe the task in full detail making the connection to the overall engaging scenario. Check that the task directly reflects the level of rigor for each targeted skill and related concept(s). Task 2 Standards: SB1c. Construct arguments supported by evidence to relate the structure of macromolecules to their interactions in carrying out cellular processes Suggested Phenomena: Chemicals can influence the functioning of cellular processes Task 2 Student Directions: Engage: Students gather information about how water and oil behave in a mixture by mixing 5 ml of oil to 20 ml of water to a beaker or flask. Cover then shake for 2 seconds. Wait 5 minutes. Record observation. Explore: Students plan and carry out investigations to obtain evidence and answer questions about how phospholipids are involved in cell formation by adding an egg yolk droplet to the oil/water mixture. Add a small drop of egg yolk to the oil water mixture. The principal component of egg yolks is phospholipids, which are amphiphilic, or are composed of polar and non-polar ends. Observe and record observations Draw and label a phospholipid. How does a phospholipids rearrange itself on the surface of the water? Sketch your result below. Label the hydrophobic and hydrophilic parts of the phospholipids. Shake for 2 seconds. Record observations.

Explain:

Students gather information (through a provided reading or online resource) on how the structure of the phospholipid relates to the function of the cell membrane.
Elaborate:

Students develop a model to visualize and describe how a system's function depends on shapes, composition and relationships among its parts.
Evaluate:

Students individually use their models to describe how phospholipid structure relates to its function in the cell.
Teacher Notes:
While students are waiting for the oil to return to the top, crack open an egg in a small bowl. Students predict what will happen when egg yolk is added to a water-oil mixture. The principal component of egg yolks is phospholipids, which are amphiphilic, or are composed of polar and nonpolar ends. These molecules have a water-liking end and the water-disliking end to represent the polar and nonpolar ends, respectively. Students will be introduced to the idea that egg yolk contains molecules that have a polar end and a nonpolar end. They will predict what happens if egg yolk is added to an oil/water mixture and explain the observed behavior. Prior to introduction of egg yolk to the mixture, students observe that the water-oil mixture separates into two layers. Oil, which is water-disliking, does not mix with water. Since oil is less dense than water, oil forms the upper layer. They should come to the conclusion that in water layer, an inverse micelle will be formed, and in the oil layer a micelle will be formed. This experiment allows students to visually see self-assembly and to predict the forces responsible for the event. Students should use an eyedropper, plunge the eyedropper about halfway into the egg yolk like a syringe. Remove a sample, then add one drop to the oil and water mixture. Adding too much can cause the oil to form such small droplets it becomes a colloid, like milk. The mixture will form small phospholipid bilayer vesicles.

Task 1 Student Directions:
Suggested Phenomena: Monosaccharides are used as immediate source of chemical energy by the cell.

Engage

Students obtain information about how simple carbohydrates are used as energy by the cell by observing a demonstration of a closed jar with yeast and sucrose solution.
Explore

Students plan and carry out investigations to answer questions about how simple sugars are used as immediate energy for cells.
Add a small amount of yeast to 10 ml of sucrose solution, starch solution, oil, and egg white in four flask. Record observation. .
Explain

Students construct explanations of the results of their experiment.
Teacher Notes:
Students construct an explanation for the use of simple sugars for the source of immediate energy for the cell. Students use evidence to support the argument that sugar structure relates to its function in the cell. Use baking yeast for this experiment as the only use simple sugars for cellular respiration. Create a 50% glucose solution and add .5 grams of yeast. After several minutes the students should see a reaction occurring in the test tube with the glucose solution and not in the other tubes.

Task 1 Student Directions:
Suggested Phenomena: Enzyme active sites bind with a specific substrate

Engage
Students gather information about how enzymes react with a substrate by observing a small potato cube and 3% hydrogen peroxide in a beaker provided by the teacher.

Explore
Students plan and carry out investigations to answer questions about how enzyme active sites bind with a specific substrate by using 3 potato cubes, 3% hydrogen peroxide, 3% sodium chloride solution and tap water.

Explain
Students construct an explanation for the use of enzymes in catalyzing reactions in the cell using evidence from their experiment.

Elaborate
Students use evidence to support the argument that enzyme structure relates to its function in the cell.

Evaluate
Student groups share evidence that supports that enzyme structure relates to its function in the cell.

Teacher Notes:
How do living cells interact with the environment around them? All living things possess catalysts, or substances within them that speed up chemical reactions and processes. Enzymes are molecules that enable the chemical reactions that occur in all living things on earth. In this catalase and hydrogen peroxide experiment, we will discover how enzymes act as catalysts by causing chemical reactions to occur more quickly within living things. Using a potato and hydrogen peroxide, we can observe how enzymes like catalase work to perform decomposition, or the breaking down, of other substances. Catalase works to speed up the decomposition of hydrogen peroxide into oxygen and water. We will also test how this process is affected by changes in the temperature of the potato.

Crosscutting Concepts: Cause and Effect, Scale, Proportion and Quantity, Structure and Function

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Engaging Performance Scenario: Task 3
Engaging Scenario

Directions: Incorporate the five elements of effective scenarios: current situation; student challenge; student role; intended audience; product, or performance.

Suggested Phenomena: Chemicals can influence cell function

Science and Engineering Practices: Asking Questions, Planning and Carrying Out Investigations, Constructing Explanations, Engaging in Argument from Evidence, Obtaining, Evaluating and Communicating Information

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Task 5: SB1e. Using an aquatic plant and selected materials, students will plan and design an experiment to investigate the relationship between photosynthesis and cellular respiration.

Performance Task 3 In Detail

Directions: Describe the task in full detail making the connection to the overall engaging scenario. Check that the task directly reflects the level of rigor for each targeted skill and related concept(s).

Task 3 Standards:
SB1a. Construct an explanation of how cell structures and organelles interact as a system to maintain homeostasis.

Suggested Phenomena: Organelles perform functions in the cell as to other systems in nature

Task 3 Student Directions:
Engage:
You work for a technology app company. Your team specializes in developing apps to help students extend science learning outside of the classroom. You have been given an assignment to design a biology educational app that uses analogies to help students learn how cell organelles work together in a system to maintain homeostasis. The content part of the app must be submitted for approval before the technology part of the app is created.

Explore:
Your assignment is to choose a real world system and relate it to how cell structures and organelles of a eukaryotic cell interact as a system. Choose a real world working system and decide how each organelle of the eukaryotic cell can be compared to the components and functions of the real world system.

Explain:

Design and draw a pictorial display of your analogy.
Label the parts of the real world system and put the cell organelles that are represented in parenthesis.
The following organelles must be in your display; nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, Golgi, endoplasmic reticulum, vacuoles, ribosomes, mitochondria.
Elaborate:

Create a chart that includes the cell organelle, real world analogous structure and a statement that justifies the analogy.
Give a creative title to your design that will encourage a student to choose your app from the education category of the App Store.

Evaluate:
Summary: As a summary to this assignment respond to the following questions by writing a short response:

In regards to a eukaryotic cell system:

What is the output of the eukaryotic cell system?
What input would this system have to receive for it to work? Where ultimately does the energy come from?
What would happen if there is a malfunction in the tiny capsule-shaped mitochondrial structure?
Describe how the functioning of this system would change if one of the parts wears out.
Why do we think of the cell as a system?
Teacher Notes:
Use this as a formative assessment to facilitate students in their understanding of how cell structures and organelles interact as a system to maintain homeostasis. Based on time constraints students can design a pictorial display rather than actually draw their designs. Note that the scoring guide should emphasize student understanding of how the cell organelles work together as a process. It is important for students to be able to answer the summary questions effectively. See highlights on the scoring guide.

Short Response Answer Key:

What is the output of the eukaryotic cell system?
Answer: It produces proteins that aid the cell in functioning pro.
What input would this system have to receive for it to work? Where ultimately does the energy come from?
Answer: Energy, Sun
What would happen if there is a malfunction in the tiny capsule-shaped mitochondrial structure?
Answer: Cells that have no mitochondria or malfunctioning mitochondria are unable to convert oxygen into energy, which is found in the form of adenosine triphosphate (ATP). Therefore disease could result in the cell/organism
Describe how the functioning of this system would change if one of the parts wears out.
Answer: If one of the organelles in a eukaryotic cell wears out, specific functions of the cell such as energy production, building of membranes, photosynthesis, and respiration would be affected. Because most of the organelles are sites of biochemical reactions, worn out or malfunctioning organelles could lead to disease. A worn out nucleus could lead to cell death because it is the location of the cell's DNA. Chloroplasts and mitochondria play an important role in the conversion of energy.
Why do we think of the cell as a system?
Answer: Cell organelles work together in a system to maintain homeostasis in the cell. Each organelle has a role (function) in the process.
Optional Extension: Students can use their designs to create their own apps. Direct them to code.org and appinventor.mit.edu.

Crosscutting Concepts: Structure and Function, Systems and System Models, Scale, Proportion, and Quantity

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Engaging Performance Scenario: Task 4
Engaging Scenario

Directions: Incorporate the five elements of effective scenarios: current situation; student challenge; student role; intended audience; product, or performance.

Suggested Phenomena: Chemicals can influence cell function

Science and Engineering Practices: Asking Questions, Planning and Carrying Out Investigations, Constructing Explanations, Engaging in Argument from Evidence, Obtaining, Evaluating and Communicating Information

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Task 5: SB1e. Using an aquatic plant and selected materials, students will plan and design an experiment to investigate the relationship between photosynthesis and cellular respiration.

Performance Task 4 In Detail

Standards:
SB1d. Plan and carry out investigations to determine the role of cellular transport (e.g., active, passive, and osmosis) in maintaining homeostasis.

Suggested Phenomena: Solvents (water) move through a membrane from a low concentration of solute to an area of high concentration, in an effort to reach equilibrium.

Task 4 Student Directions:
Engage:
Students gather information about how solvents move through a membrane by observing a demonstration of a zip lock bag containing starch solution is place in a beaker with iodine provided by the teacher.

Explore:
Students gather information (through a provided reading or online resource) on how osmosis affects cells in various solutions. Students plan and carry out investigations to answer questions about how solute concentration affects cells using 3 grapes, 20% NaCl solution, water, beakers, labels and a scale.

Explain:
Students construct an explanation for the changes in the mass of the grapes.

Elaborate:
Students gather information (through a provided reading or online resource) on how cellular transport assists cells in maintaining homeostasis.

Evaluate:
Students provide explanations to determine the role of cellular transport in maintaining homeostasis.

Extend:
Students provide explanations of how salt water fish are able to withstand living in a hypertonic ecosystem.

Teacher Notes:

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	In this activity, students will demonstrate osmosis with grapes, salt and water. For teacher demonstration, at the beginning of class, fill a plastic baggie with a teaspoon of corn starch and a half a cup of water tie bag. Fill a beaker halfway with water and add ten drops of iodine. Place the baggie in the cup so that the cornstarch mixture is submerged in the iodine water mixture. Students will notice the color change after the iodine has moved into the bag it will turn blue. This will open up a discussion about diffusion and osmosis. The students should then gather information about osmosis, including hypertonic, isotonic and hypotonic concentrations, in order to make predictions about what will occur in the experiment that they design. Sample experiments include finding the initial mass of the three grapes, placing them in at least 100ml of each solution in beakers. The students will return during the next class period to collect the final mass by using a towel and gently rolling the grapes to ensure the grape is dry but all liquid inside the grape is maintained. Students should find that the mass of the grapes placed in a hypotonic solution or hypertonic solution will change. The students must demonstrate their understanding that the water is moving to the area of the most concentration of solutes in their explanations. A possible extension to this activity would be to allow students to redesign their investigation to further examine a variable of their choice using household items. Crosscutting Concepts: Cause and Effect, Structure and Function

In the areas below, place an "X" in the box(es) to indicate the selected strategies and resources.

Research-Based Instructional Strategies: (weekly strategies chosen to guide teaching and learning)	**OPENING: Engaging Instructional Activity**	Activate Prior Knowledge Prefix/suffix of the day Questions from yesterday		Questioning (Raises questions)		Clarify Previous Lesson		Phenomenon	
		Provide Feedback		Scaffold Instruction		Create Interest		Other:	
	WORK PERIOD: Exploring, Explaining, Extending, and Elaborating	Facilitate Learning Engaging questionss		Academic Discussions		Cooperative Learning		Other:	
		Demonstrate/ Model		Generating and Testing Hypotheses		Independent Learning		Other:	
		Explain/Apply/Extend concepts and skills		High-Level Questioning		Interdisciplinary Writing		Other:	
	CLOSING: Evaluating	Summarize Lesson		Provide Alternate Explanations		Respond to EQs		Other:	
		Allow students to assess their own learning		Quick Write		3-2-1/K-W-L		Other:	

21st Century Learning Skills: (weekly strategies chosen to guide student engagement)	Teamwork and Collaboration	x	Innovation and Creativity	x	Accessing and Analyzing Information	x
	Initiative and Leadership	x	Critical Thinking and Problem Solving	x	Effective oral and Written Communication	x
	Curiosity and Imagination	x	Flexibility and Adaptability	x	Other:	x

Intervention Strategies

	Intervention Strategies (Tiers 1, 2, 3) Additional Support in Classroom		Specially Designed Instruction for Exceptional Education Students		Strategies for English Language Learners
x	Re-Voicing	x	Conferencing	x	Visuals/Realia
x	Explaining	x	Additional time	x	Front-loading
x	Prompting for Participation	x	Small group collaboration	x	Echoing/Choral response
x	Challenging or countering	x	Modify quantity of work	x	Color-coding
x	Asking "Why?" "How"	x	Take student's dictation	x	Multiple exposures in different media
x	Reread	x	Scaffold information	x	Pair-share
x	Practice new academic vocabulary	x	Differentiated content/process/product	x	Modeling

Components of this lesson plan may change according to the needs of the students.

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x	Assistive technology	x	Consistent reward system	x	Language scaffolds: e.g., sentence frames
x	Pre-teach & re-teach in a different way	x	Refer to students' IEP or 504 plan	x	Deconstruct complex sentences
x	Use of manipulatives	x	Assistive technology	x	Increase student-to-student talk
x	Collaborative work			x	Strategies vocabulary instruction
x	Create differentiated text sets			x	Additional think time

Gifted – Extensions for Learning

Tier 1

x	Flexible-Learning Groups		Varied Pacing with Anchor Options	x	Varied Supplemental Materials
	Choice of Books	x	Work Alone or Together		Computer Mentors
	Homework Options	x	Flexible Seating	x	Think-Pair-Share
x	Use of Reading Buddies	x	Varied Scaffolding	x	Open-ended Activities
	Various Journal Prompts		Varied Computer Programs		Explorations by Interest
x	Student/Teacher Goal Setting		Design-A-DAY	x	Options for Competition

Tier 2

	Gifted Edu. Cluster Classes	x	Alternative Assessments		Community Mentorships
	Gifted Edu. Collaboration Classes		Subject Advancement within class		Stations
	Tiered Activities and Products		Curriculum Compacting		Group Investigations
	Use of Literature Clubs		Tiered Centers	x	Assess Students in Multiple Ways
	Multiple Testing Options		Spelling by Readiness	x	Student choice
	Multiple Texts		Varying Organizers	x	Simulations

Tier 3		**Tier 4**	
	Advanced Content (all core content)		Above grade level accelerated (all core content)
	Resource Classes		Advanced Placement Classes
	Independent/Directed Study		International Baccalaureate Classes
x	Socratic Seminars		Internship/Mentorships

Differentiated Instruction (content, process, product)	**Assessment Evidence** (formative, summative)
In this section, the teacher will provide a description of the way in which they differentiated their lesson for their students – content, process, or product. The description does not need to be student specific. Also, teachers who have co-teachers can summarize their lesson contributions here.	*In this section, the teacher will identify any planned assessments and explain the assessments that were used during the week.* *Common Assessments* *Unit Assessments* *Summative/Formative Assessments* *Illuminate* *Paper/Pencil*

Resources: (weekly materials chosen to support teaching and learning)							
	Textbooks	x	Lab Materials	x	Other: (List the other resources below.)		
	Audio/Visual Aids	x	Course Syllabi	x			
	Handouts	x	Dictionaries	x			
	White Boards	x	Video Clips	x			
	Electronic Devices	x	Promethean Board	x			
	Supplemental Texts	x	Manipulatives	x			
	Calculators	x	Internet (tech)	x			

Daily Lesson Plan for Monday

Pre-Instructional Activity: (sponge; bell-ringer; journal; allows attendance to be taken)	September 15, 2017; Friday WOD: gyne/o, hal(o) check on mealworm metamorphosis Finish BBC: Human Planet: Cities 40 index cards for Moday 9/18/17 ********** September 18, 2017; Monday

40 index cards for Monday 9/15/17 - today - working on chapter 6 flashcards

WOD: hapl(o), hemi

Check on Coloring assignment

Work on completing the remainder of the Chapter 6 Flashcards (21 + 18 = 39 total; p. 174)

chapter 6 flashcard quiz on __September 22nd_____

****

September 19, 2017; Tuesday

WOD: hem(o), herb/a(i)

1/2 period given to work on the remainder of chapter 6 vocabulary words - the remainder are to be completed for homework - checked tomorrow

Started Lab Gummy Bears (Isotonic, Hypertonic, Hypotonic solutions, semi-permeable/selectively permeable membranes, solutes, osmosis and diffusion

Notes on chapter 6 started; some questions from the textbook

chapter 6 flashcard quiz on __September 22nd_____

****

September 20, 2017; Wednesday

WOD: heter/o hom(e)/o

Notes on chapter 6 continued; some questions from the textbook

chapter 6 flashcard quiz on __September 22nd_____

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	********** September 21, 2017; Thursday WOD: hom, hydr/o Check on Lab: Mealworm Metamorphosis chapter 6 flashcard quiz on __September 22nd PPT covering Chemistry in Biology - questions included.- time permittng! ********** September 22, 2017; Friday WOD: inter, intra, is/o, jug; WOD sheet distributed. check on Lab: Mealworm Metamorphosis chapter 6 flashcard quiz on __September 22nd - today
Opening (ENGAGE): (introduces the lesson; summarizes previous lesson; clarifies misconceptions)	***Opening Details:*** **TW**…in order to… **SW**…in order to…
Work Period (EXPLORE/EXPLAIN/ EXTEND/ELABORATE): (contains the mini lesson; allows students to practice concept; assess student learning)	***Work Period Details:*** **TW**…in order to… **SW**…in order to…
Closing (EVALUATE): (summarizes lesson; ensures understanding; clarifies misconceptions)	***Closing Details:*** **TW**…in order to… **SW**…in order to…
Daily Lesson Plan for Tuesday	
Pre-Instructional Activity:	
Opening (ENGAGE):	***Opening Details:*** **TW**…in order to… **SW**…in order to…
Work Period (EXPLORE/EXPLAIN/ EXTEND/ELABORATE):	***Work Period Details:*** **TW**…in order to… **SW**…in order to…

Closing (EVALUATE):	***Closing Details:*** **TW**…in order to… **SW**…in order to…
Daily Lesson Plan for Wednesday	
Pre-Instructional Activity:	
Opening (ENGAGE):	***Opening Details:*** **TW**…in order to… **SW**…in order to…
Work Period (EXPLORE/EXPLAIN/ EXTEND/ELABORATE):	***Work Period Details:*** **TW**…in order to… **SW**…in order to…
Closing (EVALUATE):	***Closing Details:*** **TW**…in order to… **SW**…in order to…
Daily Lesson Plan for Thursday	
Pre-Instructional Activity:	
Opening (ENGAGE):	***Opening Details:*** **TW**…in order to… **SW**…in order to…
Work Period (EXPLORE/EXPLAIN/ EXTEND/ELABORATE):	***Work Period Details:*** **TW**…in order to… **SW**…in order to…
Closing (EVALUATE):	***Closing Details:*** **TW**…in order to… **SW**…in order to…
Daily Lesson Plan for Friday	
Pre-Instructional Activity:	
Opening (ENGAGE):	***Opening Details:*** **TW**…in order to… **SW**…in order to…
Work Period (EXPLORE/EXPLAIN/ EXTEND/ELABORATE):	***Work Period Details:*** **TW**…in order to… **SW**…in order to…
Closing (EVALUATE):	***Closing Details:*** **TW**…in order to… **SW**…in order to…