High School Science Lesson Plan 2023-2024

Teacher(s): Graham-Jones, Nash, Loving, Johnson	Subject: Biology I Unit/Lesson: Cells as a System

MS-CCR Standard(s):

BIO.1C.2 Investigate to compare and contrast prokaryotic cells and eukaryotic cells, and plant, animal, and fungal cell

BIO.1D.1 Plan and conduct the investigations to prove that the cell membrane is semi-permeable, allowing it to maintain homeostasis with its environment through active and passive transport processes.

BIO.1D.2 Develop and use models to explain how the cell deals with imbalances of solute concentration across the cell membrane (i.e., hypertonic, hypotonic, and isotonic conditions, sodium/potassium pump).

BIO.1B.1 Develop and use models to compare and contrast the structure and function of carbohydrates, lipids, proteins, and nucleic acids (DNA and RNA) in organisms.

BIO.1B.2 Design and conduct an experiment to determine how enzymes react given various environmental conditions (i.e., pH, temperature, and concentration). Analyze, interpret, graph, and present

Essential Question(s):

How does passive transport work?

How does active transport work?

How does the cell deal with imbalances of solute concentration?

Explain hypertonic, hypotonic, and isotonic conditions.

Explain the sodium/potassium pump.

What happens to chemical bonds during chemical reactions?

How do energy Changes affect when a chemical reaction will occur?

data to explain how those changing conditions affect the enzyme activity and the rate of the reactions that take place in biological organisms.

Academic Vocabulary:
Diffusion, Facilitated Diffusion, Aquaporin, Osmosis, Isotonic, Hypertonic, Hypotonic, Osmotic Pressure, Chemical Reaction, Reactant, Product, Activation Energy, Catalyst, Enzyme, Substrate

Vocabulary Instruction Strategies (*How will you teach vocabulary?*):

High School Science Lesson Plan 2023-2024

Vocabulary will be taught throughout the lesson. Scholars will learn how to pronounce and define terms. Scholars will be given crossword puzzles, jeopardy, and charades as a fun way to learn vocabulary terms.

Materials/Resources (*List all online, digital, and physical materials and/or resources you will need for the week*): Canvas
Pens
Planners/ Planner Sheets
District Issued Laptop
Binder w/ tabs
Biology (Study Guide)

Scaffolding Strategies (*How will you scaffold the content for students? Ex. Visual Aids, Making Real-World Connections, and Show and Tell*):

Think-Pair-Share
Turn and Talk
Anchor Charts
PowerPoints
Labs

Sentence Stems (***How will you engage students in peer-peer and peer-teacher discussions throughout the week?***)**:** Scholars will be placed into groups during labs and individual work to aid in peer-peer interactions. The time for teacher-peer interaction will be guided practice.

High School Science Lesson Plan 2023-2024

Lesson Structure – Instructional Day 1- Date: Collaborative rotations	**X**	**A Day**
	X	**B-Day**
MS-CCR Standard(s): BIO.1C.2 Investigate to compare and contrast prokaryotic cells and eukaryotic cells, and plant, animal, and fungal cell		
Learning Target(s): Compare and Contrast Prokaryotic/Eukaryotic cells		
Lesson Component Duration Activities and Strategies		

Do Now

10 min Preview Standard: Bio.1C.2

(Review/Preview Protocol)

Answer: B
Review Standards: Bio.1A.4

Answer: D

Prokaryotic and Eukaryotic Cells | 58 plays | Quizizz (Prokaryotic/Eukaryotic Cells)

Engage

5 min https://www.youtube.com/watch?v=Pxujitlv8wc

(Hook/Anticipatory Set)

Goals:

- Connect student's experiences
- Create interest
- Get students thinking

Students can use a video note-taking handout to summarize main points from this video for homework. Main points can be shared by students and used to facilitate a discussion.

- Dr. Cork

High School Science Lesson Plan 2023-2024

● Understand the objectives of the unit	
Explore (Quick Lab/Mini Lab/Simulation/Virtual Field Trip) **Goals:** ● Students receive real experience with the topic ● Students use and develop creative thinking skills ● Students make observations, record results, and make connections	14 min **Activity** **Interactive Cell Models (cellsalive.com)** **TSW will be placed into groups of three and they will be tasked to explore a Prokaryotic Cell and a Eukaryotic Cell. As they explore, they will be tasked to create a** **T chart and write down the parts of each.** **Strategy 1: A Cell Model Foldable (Foldable will resemble a T chart. One side will** **Have Pro(Prokaryotes) and Eu(Eukaryotes).** **Strategy 2: Create an edible cell in the class: Give scholars an option to pull materials** **out of a bag and they have to look at the model and tell you which organelle it will be.** **Strategy 3: Venn Diagram** **Check for Understanding (Embedded)** (Questions/Informal Check) **Where is the nucleus in a prokaryotic cell? Explain** **TTW cold call at least three students to give a brief explanation of the question provided above.**

Explain (I Do)

15 min **Activity**

Model/Input
(Slide deck/Direct instruction)

Goals:

- Students develop an understanding of the content
- Observations and experiences are discussed and critiqued
- Students develop vocabulary

[Prokaryotic Vs Eukaryotic Cells - Google Slides]

TTW explain through a brief PowerPoint presentation the differences between prokaryotic and eukaryotic cells.

Check for Understanding (Embedded)

(Questions/Informal Check)

Explain the differences between a Prokaryotic cell Vs a Eukaryotic cell.

High School Science Lesson Plan 2023-2024

- Students are able to connect the content presented to previous experiences

TTW cold call at least three students to give a brief explanation of the question provided above.

Elaborate (We Do)

(Extend the learning)

Goal:

- Students use their newly obtained knowledge to propose solutions and extend their learning to new situations

20 min **Activity**

BIO.1C.2 GN ProvEu .docx - Google Docs

TTW assists scholars with filling in the blanks for the guided notes geared towards the Powerpoint Presentation.

Suggestion: To elaborate, allow students to compare all types of cells, fungi included, per the standard.
https://serpmedia.org/scigen/assets/l7.2-cellcomparechart.pdf

Check for Understanding (Embedded)
(Questions/Informal Check)

Closure

(Question/Clarify Misconceptions/Revisit Essential Questions)

5 min TTW draw a T chart on the board and scholars will compare and contrast Eukaryotic vs Prokaryotic cell.

Project: The scholar will create a poster comparing and contrasting Eukaryotic cells.
Materials:
1. PosterBoard
2. Scholars must draw a Prokaryotic and a Eukaryotic cell labeling and give the functions of all their parts.

Evaluate (You Do)

Independent Practice

20 min Prokaryotes vs Eukaryotes - Student Copy (sciencenotes.org)

Scholars will read statements and specify if the statements are Prokaryotic/Eukaryotic or both.

Common assessment(SMWYK): TSW be given an exam to pinpoint where their mastery lies

between the last few standards. 15 questions
Exit Ticket 5 min Preview Standard: Bio.1C.2

High School Science Lesson Plan 2023-2024

(Questions/Recap/Review/Preview Protocol) Answer: B Review Standards: Bio.1A.4 Answer: D TTW goes over answers to present preview questions given to students as Bellringer.

Lesson Structure – Instructional Day 2- Date: Collaborative Rotation Focus Day 2 Should Include all standards in BIO 1. For reteaching.	**X**	**A-Day**
	X	**B-Day**
MS-CCR Standard(s): BIO.1D.1 Plan and conduct the investigations to prove that the cell membrane is semi-permeable, allowing it to maintain homeostasis with its environment through active and passive transport processes.		

Learning Target(s): **Explain how the structure of the cell membrane relates to its function.** **Understand the role of the cell membrane in cell survival.** **Compare diffusion and facilitated diffusion.** **Understand the basic mechanisms by which biological molecules and water are transported within a living organism.**	
Lesson Component Duration	**Activities and Strategies**
Do Now 10 min	Preview Standard: Bio.1D.1

High School Science Lesson Plan 2023-2024

(Review/Preview Protocol)	Answer: B Review Standard: Bio.1C.2 Answer: B

Engage 5 min (Hook/Anticipatory Set) **Goals:** ● Connect student's experiences ● Create interest ● Get students thinking ● Understand the objectives of the unit	Cell Transport - YouTube TSW watch this video to get a brief snapshot of what's to come in the lesson.
Explore 14 min (Quick Lab/Mini Lab/Simulation/Virtual Field Trip) **Goals:** ● Students receive real experience with the topic ● Students use and develop creative thinking skills	**Activity:** **Cell Membrane bubble lab** **Lab 2 Bubble_Lab.pdf (commackschools.org)** **TSW be tasked with completing the lab with their groups to explore how cell are selectively permeable** **Check for Understanding (Embedded)**

High School Science Lesson Plan 2023-2024

● Students make observations, record results, and make connections	(Questions/Informal Check) **What is Osmosis?** **TTW use the cold call method to ask a scholar the question listed above**

Explain (I Do) 15 min **Model/Input** (Slide deck/Direct instruction) **Goals:** ● Students develop an understanding of the content ● Observations and experiences are discussed and critiqued ● Students develop vocabulary ● Students are able to connect the content presented to previous experiences	**Activity** **Bio.1D.1 - Google Slides** TTW explain through a brief PowerPoint presentation what Active and Passive transport is. **Check for Understanding (Embedded)** (Questions/Informal Check) What is Exocytosis and Endocytosis?
Elaborate (We Do) 20 min (Extend the learning) **Goal:** ● Students use their newly obtained knowledge to propose solutions and extend their learning to new situations	**Activity** Reinforcement_ Cell Transport.pdf - Google Drive TT and scholars work together to answer questions provided in the worksheet given. **Check for Understanding (Embedded)** (Questions/Informal Check)
Closure 5 min (Question/Clarify Misconceptions/Revisit Essential Questions)	Review the terms areas of high concentration and areas of low concentration as it relates to diffusion and facilitated diffusion. **Define Vocabulary** **Homeostasis** **Diffusion**

	Facilitated Diffusion **Aquaporin** **Osmosis** **Isotonic** **Hypertonic** **Hypotonic** **Osmotic Pressure**
Evaluate (You Do) 20 min **Independent Practice**	**Yellow Bee Book (Think-Pair-Share) page 264** **Scholars will form partners for the Think-Pair-Share Activity. Individuals will consider their own answers to each question, and then compare answers with their partners and others from the class.** **1. What prevents the materials from crossing the membrane in Figure 8-21 unassisted?** **2. What does the cell need to transport these materials across the membrane? Students will locate each component they list to answer questions in Figure 8-21. (Even though, ATP is not pictured with endocytosis and exocytosis, both processes require ATP.)** **3. How does the cell benefit from active transport?**
Exit Ticket 5 min (Questions/Recap/Review/Preview Protocol)	Preview Standard: Bio.1D.1 Answer: B Review Standard: Bio.1C.2

High School Science Lesson Plan 2023-2024

	Answer: B TTW go over answers to present preview questions given to students as Bellringer.

Lesson Structure – Instructional Day 3- Date: Collaborative Rotation Focus Day 3 Should Include all standards in BIO 1. For reteaching.	**X**	**A Day**
	X	**B-Day**
MS-CCR Standard(s): BIO.1D.1 Plan and conduct the investigations to prove that the cell membrane is semi-permeable, allowing it to maintain homeostasis with its environment through active and passive transport processes.		
Learning Target(s): **Explain how the structure of the cell membrane relates to its function.** **Understand the role of the cell membrane in cell survival.** **Compare diffusion and facilitated diffusion.** **Understand the basic mechanisms by which biological molecules and water are transported within a living organism.**		

Lesson Component Duration	**Activities and Strategies**
Do Now 10 min (Review/Preview Protocol)	Review: 1D.1

High School Science Lesson Plan 2023-2024

	Answer: B Answer: A
Engage 5 min (Hook/Anticipatory Set) **Goals:** ● Connect student's experiences ● Create interest ● Get students thinking ● Understand the objectives of the unit	Cell Transport Graphic (biologycorner.com) Scholars will be placed into groups and they must figure out the questions before the timer runs out using prior knowledge from the previous day's lesson.
Explore 14 min (Quick Lab/Mini	**Activity** **Transport Challenge HIGH - Google Docs**

Lab/Simulation/Virtual Field Trip)	

High School Science Lesson Plan 2023-2024

Goals: ● Students receive real experience with the topic ● Students use and develop creative thinking skills ● Students make observations, record results, and make connections	Scholars will remain in their groups and rotate through the stations. They must understand the images and explain how they are displaying cellular transport. **Transport Challenge High Answer Key** **Check for Understanding (Embedded)** (Questions/Informal Check)
Explain (I Do) 15 min **Model/Input** (Slide deck/Direct instruction) **Goals:** ● Students develop an understanding of the content ● Observations and experiences are discussed and critiqued ● Students develop vocabulary ● Students are able to connect the content presented to previous experiences	**Activity** **Cell Transport | 1.8K plays | Quizizz** TTW facilitate a quizziz game lesson in order to add a challenge and fun to the lesson. **Check for Understanding (Embedded)** (Questions/Informal Check)

Elaborate (We Do) 20 min (Extend the learning) **Goal:** ● Students use their newly obtained knowledge to propose solutions and extend their learning to new situations	**Activity** Homeostasis, Transport, and Bioenergetics (ringgold.org) **Gallary Walk** Scholars will walk around the science hall and answer standard gear questions for understanding. **Check for Understanding (Embedded)** (Questions/Informal Check) Movement of molecules from an area of high concentration to an area of low concentration is answer choices A.diffusion B.passive transport C.osmosis D.all of the above

High School Science Lesson Plan 2023-2024

Closure 5 min (Question/Clarify Misconceptions/Revisit Essential Questions)	Scholars will write down all the things they learned about Cellular Transport and then will do a turn and talk with their peers.
Evaluate (You Do) 20 min **Independent Practice**	Transport Challenge LOW - Google Docs Scholars will remain in their groups and rotate through the stations. They must understand the images and explain how they are displaying cellular transport. Transport Challenge Low Answer Key

Exit Ticket 5 min (Questions/Recap/Review/Preview Protocol)	Review: 1D.1 Answer: B

High School Science Lesson Plan 2023-2024

	Answer: A TTW go over answers to present preview questions given to students as Bellringer.

High School Science Lesson Plan 2023-2024

Lesson Structure – Instructional Day 4- Date: Collaborative Rotation Focus Day 4 Should Include all standards in BIO 1. For reteaching.	**X**	**A Day**
	X	**B-Day**

MS-CCR Standard(s): BIO.1D.2 Develop and use models to explain how the cell deals with imbalances of solute concentration across the cell membrane (i.e., hypertonic, hypotonic, and isotonic conditions, sodium/potassium pump)

Learning Target(s):

Understand osmosis, how it works, and why it is important to our cells!

Lesson Component Duration	Activities and Strategies
Do Now 10 min (Review/Preview Protocol)	Preview Standard: Bio.1D.2 Answer: D Review Standards: Bio.1C.3 Answer: D
Engage 5 min (Hook/Anticipatory Set) **Goals:** ● Connect student's experiences	**"DEATH BY WATER?"** **Michelle was a healthy 25-year-old running in her first marathon. The hot and humid weather had made all the runners sweat profusely, so Michelle made sure she drank water at every opportunity. Gradually, she began to feel weak and confused. At the end of the marathon, Michelle staggered into a medical tent. Complaining of headache and nausea, she**

● Create interest	**collapsed onto on the floor. Volunteers quickly gave Michelle water for dehydration. Soon, her condition**

High School Science Lesson Plan 2023-2024

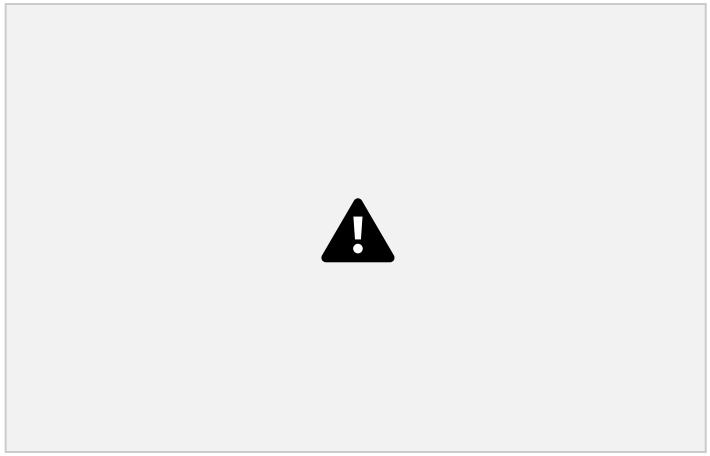
● Get student thinking ● Understand the objectives of the unit	**worsened, and Michelle was rushed to the hospital, where she was gripped by a seizure and went into a coma.** **Why did treating Michelle with water make her condition worse?** **Clue #1: At the hospital, a sample of Michelle's blood was drawn and examined. The red blood cells appeared swollen. At this point, what do you think has happened to Michelle's cells? What cell organelle is most responsible for what occurred in Michelle's body?**
Explore 14 min (Quick Lab/Mini Lab/Simulation/Virtual Field Trip) **Goals:** ● Students receive real experience with the topic ● Students use and develop creative thinking skills ● Students make observations, record results, and make connections	**Activity** **LAB:** TTW introduce scholars to the standard through a hands-on lesson called the Naked Eggs Lab. Microsoft Word - The Naked Egg Lab (schoolwires.net) **Check for Understanding (Embedded)** (Questions/Informal Check)

Explain (I Do) 15 min **Model/Input** (Slide deck/Direct instruction) **Goals:** ● Students develop understanding of the content ● Observations and experiences are discussed and critiqued ● Students develop vocabulary ● Students are able to connect the content presented to previous experiences	**Activity** Input: ● Introduce Osmosis as a type of facilitated diffusion. Explain that cells contain proteins called aquaporins that allow water molecules to pass. ● Explain how osmosis works using the experimental image below. Key points: The barrier is permeable to water but not sugar. The concentration of solutes is different on both sides of the barrier. Water will make net movement toward the concentrated sugar solution.

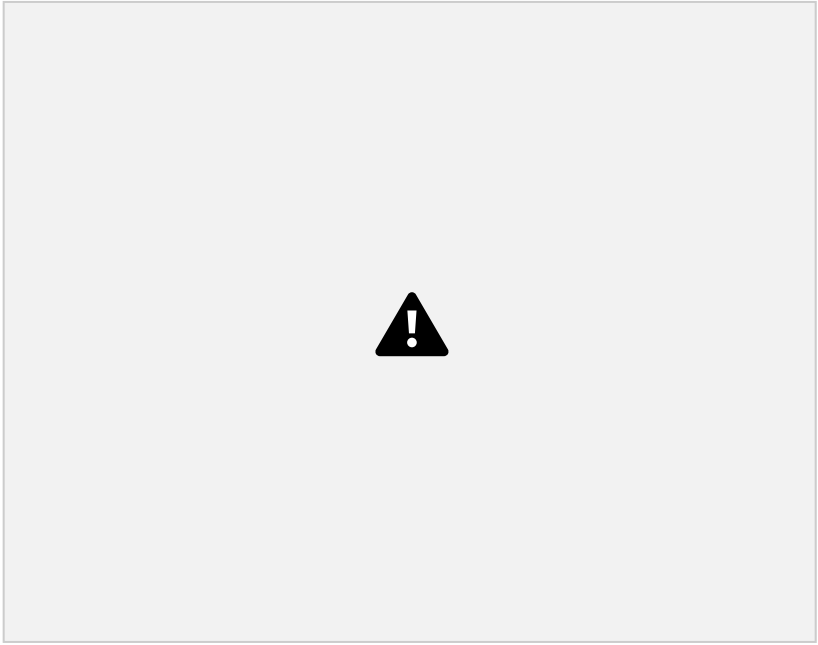
High School Science Lesson Plan 2023-2024

	 ● Introduce osmotic pressure. Explain how osmotic pressure causes cells to shrink or swell. Use Figure 8-20 to explain the effects of osmosis on animal cells and how it differs from the effects on plant cells. Students should understand that cells swell in hypotonic solutions, cells shrivel in hypertonic solutions and remain the same in isotonic solutions. Create an anchor chart (see example in Resource Guide). **Check for Understanding (Embedded)** (Questions/Informal Check) CHECK FOR UNDERSTANDING: If an orange dye capable of passing through the membrane was added to the left side of the tube shown in the lesson, how would it be distributed at the end of the experiment?
Elaborate (We Do) 20 min (Extend the learning) **Goal:** ● Students use their newly obtained knowledge to propose solutions and extend their learning to new situations	**Activity** Microsoft Word - Transport in Cells B1Y vM2.doc (dvusd.org) **TTW complete handout with scholars to build their knowledge on hypertonic, hypotonic, and isotonic conditions.** **Check for Understanding (Embedded)** (Questions/Informal Check)
Closure 5 min	60-second check-in using white boards

High School Science Lesson Plan 2023-2024

(Question/Clarify Misconceptions/Revisit Essential Questions)	 TSW demonstrates understanding by drawing diagrams to find the correct answer. The correct answer is D.

Evaluate (You Do) 20 min **Independent Practice**	**TSW work in grouped stations to complete questions provided.** Questions could also be grouped (1-3, 4-6, 7-10) and used as stations. The teacher will guide the students to draw diagrams to determine answers for each question. 1. Relate Cause and Effect: When a person sweats, water and essential solutes called electrolytes are lost from the body. Michelle drank lots of water but did not replace lost electrolytes. What effect did this have on her cells? 2. Infer: Imagine that Michelle drank both water and sports drinks containing the electrolytes she lost. Would her condition be the same? Explain. 3. Infer: Do you think that hyponatremia happens because of osmosis or active transport? Explain your reasoning. 4. Ms. Palmeri traveled to Italy this summer and went swimming in the Mediterranean Sea. Her skin felt very dry after a long day of swimming. Explain what cellular process(s) have taken place and be sure to include evidence with appropriate vocabulary to support your claim.

	5. Draw/make a model of a cell that is in an isotonic solution. Label the amount of solute in the cell and in the solution. 6. Draw/make a model of a cell that is in a hypertonic solution. Label the amount of solute in the cell and in the solution. 7. Draw/make a model of a cell that is in a hypotonic solution. Label the amount of solute in the cell and in the solution. 8-10 TTW will choose assessment questions (from 1D.2 Encase document) to practice. See the example below. TSW practices the skill learned during Input. 
Exit Ticket 5 min (Questions/Recap/Review/Preview Protocol)	Preview Standard: Bio.1D.2 Answer: D

High School Science Lesson Plan 2023-2024

	Review Standards: Bio.1C.3 Answer: D TTW go over answers to present preview questions given to students as Bellringer.

High School Science Lesson Plan 2023-2024

Lesson Structure – Instructional Day 5- Date: Collaborative Rotation Focus Day 5 Should Include all standards in BIO 1. For reteaching.		**A Day**
		B Day
MS-CCR Standard(s): BIO.1D.2 Develop and use models to explain how the cell deals with imbalances of solute concentration across the cell membrane (i.e., hypertonic, hypotonic, and isotonic conditions, sodium/potassium pump)		
Learning Target(s): Understand osmosis, how it works, and why it is important to our cells!		
Lesson Component Duration	**Activities and Strategies**	

Do Now 10 min (Review/Preview Protocol)	Review Standards: Bio.1D.2 Answer: C Answer: B Hypertonic, Hypotonic and Isotonic Solutions! - YouTube TSW watch this mini educational video on how Hypotonic, Isotonic, and Hypertonic solutions work.
Engage 5 min (Hook/Anticipatory Set) **Goals:** ● Connect student's experiences ● Create interest ● Get students thinking ● Understand the objectives of the unit	

High School Science Lesson Plan 2023-2024

Explore 14 min (Quick Lab/Mini Lab/Simulation/Virtual Field Trip) **Goals:** ● Students receive real experience with the topic ● Students use and develop creative thinking skills ● Students make observations, record results, and make connections	**Activity** **Cell Homeostasis Virtual Lab - Activity (esc4.net)** TSW utilize their school issues laptops to go through this Virtual lab exploring osmosis and diffusion. **Check for Understanding (Embedded)** (Questions/Informal Check) **There will be a peer-to-teacher discussion in the lab and the discussion will entail the contents of the lab to see if scholars understand osmosis.**
Explain (I Do) 15 min **Model/Input** (Slide deck/Direct instruction) **Goals:** ● Students develop an understanding of the content ● Observations and experiences are discussed and critiqued ● Students develop vocabulary ● Students are able to connect the content presented to previous experiences	**Activity** **Osmosis 1D.2 - Google Slides** **TTW utilize visual aids to explain in depth osmosis and solution conscious to scholars.** **Check for Understanding (Embedded)** (Questions/Informal Check)
Elaborate (We Do) 20 min (Extend the learning) **Goal:** ● Students use their newly obtained knowledge to propose solutions and extend their learning to new situations	**Activity** Osmosis U Tube Worksheet.docx - Google Docs TSW work in f=groups to complete U Tube diagrams for the understanding of osmosis and Hypertonic, Isotonic and Hypotonic solutions **Check for Understanding (Embedded)** (Questions/Informal Check)
Closure 5 min	**1. During diffusion, how do molecules move?**

High School Science Lesson Plan 2023-2024

(Question/Clarify Misconceptions/Revisit Essential Questions)	**a) From an area of higher concentration to an area of lower concentration b) From an area of lower concentration to an area of higher concentration c) Across a cell membrane using cellular energy d) Against a concentration gradient** **TSW be provided the following and they must explain their answers to the teacher in order to show mastery of the standard.**
Evaluate (You Do) 20 min **Independent Practice**	**TSW utilize their own sheet of paper and work in groups of 2 to answer the following questions provided.** Answer the following questions with hypertonic, hypotonic, or isotonic. 1. A turgid plant was placed in a solution with an unknown concentration of solutes. The plant began to wilt. What kind of solution was this? 2. Yvon placed wilted lettuce in a sink of pure water. The lettuce becomes crisp and firm again. What is the pure water considered here? 3. What kind of solution would make a plant turgid? 4. What kind of solution would make an animal cell shrivel? 5. If a plant cell loses water at the same rate that it takes in water, what kind of solution is it in?
Exit Ticket 5 min (Questions/Recap/Review/Preview Protocol)	Review Standards: Bio.1D.2 Answer: C

High School Science Lesson Plan 2023-2024

	Answer: B TTW go over answers to present preview questions given to students as Bellringer.

Lesson Structure – Instructional Day 1- Date: Sept 11/12	**X**	**A Day**
	X	**B-Day**
MS-CCR Standard(s): BIO.1B.1 Develop and use models to compare and contrast the structure and function of carbohydrates, lipids, proteins, and nucleic acids (DNA and RNA) in organisms.		
Learning Target(s): Macromolecules **Lesson Component Duration Activities and Strategies**		

Do Now
(Review/Preview Protocol)
10 min Preview Standard: Bio1B.1

Review Standard: Bio.1A.1

Answer:D

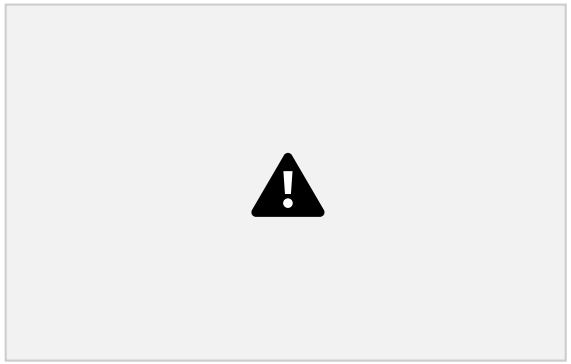
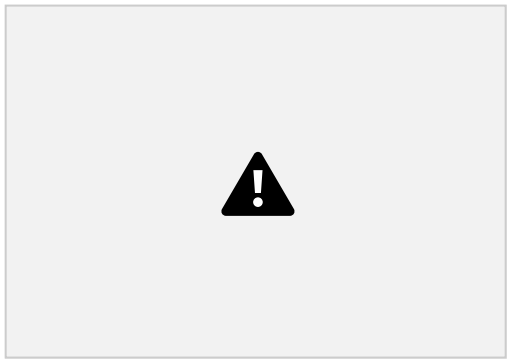
High School Science Lesson Plan 2023-2024

	Answer: C
Engage 5 min (Hook/Anticipatory Set) **Goals:** ● Connect student's experiences ● Create interest ● Get students thinking ● Understand the objectives of the unit	Why Can't Mrs. M eat Ice Cream? Milk and dairy products are composed of a sugar called lactose. To break down that sugar, cells must be able to produce the enzyme: lactase. Without lactase, the milk sugar is not broken down and can cause symptoms like stomach aches, gas, and vomiting. What do you think the treatment is for someone who is "lactose intolerant?"

Explore 14 min (Quick Lab/Mini Lab/Simulation/Virtual Field Trip) **Goals:** ● Students receive real experience with the topic ● Students use and develop creative thinking skills ● Students make observations, record results, and make connections	**Activity** Sci 251 - Lab Simulation - Biological Macromolecules - WilmUTube (kaltura.com) **This lab simulation video goes through the process of testing for three of the four macromolecules: carbohydrates, proteins, and lipids.** **Check for Understanding (Embedded)** (Questions/Informal Check)
Explain (I Do) 15 min **Model/Input** (Slide deck/Direct instruction) **Goals:** ● Students develop an understanding of the content	**Activity** Macromolecules - Google Slides **TTW utilize visual aids to explain organic compounds to scholars** **Check for Understanding (Embedded)**

High School Science Lesson Plan 2023-2024

● Observations and experiences are discussed and critiqued ● Students develop vocabulary ● Students can connect the content presented to previous experiences	(Questions/Informal Check)

Elaborate (We Do) 20 min (Extend the learning) **Goal:** ● Students use their newly obtained knowledge to propose solutions and extend their learning to new situations	**Activity** **Activity** TTW draw macromolecules and their monomers/formulas on board for scholars and explain each. 1. Carbohydrates 2. Lipids 3. Proteins 4. Nucleic acids (DNA/RNA)   **Check for Understanding (Embedded)** (Questions/Informal Check)
Closure 5 min (Question/Clarify Misconceptions/Revisit Essential Questions)	**TTW reiterate how much biomolecules make an impact on life.**

High School Science Lesson Plan 2023-2024

	Biomolecules are important for life because they help organisms grow, stay alive, and have more offspring. By interacting with each other, they help build organisms from single cells to complex living things like people.
Evaluate (You Do) 20 min **Independent Practice**	Reinforcement: Biomolecules (biologycorner.com) TSW works in groups of two, reading scenarios and labeling which macromolecule level they are.
Exit Ticket 5 min (Questions/Recap/Review/Preview Protocol)	Preview Standard: Bio1B.1 Answer:D Review Standard: Bio.1A.1 Answer: C TTW goes over answers to present preview questions given to students as Bellringer.

Lesson Structure – Instructional Day 1- Date: Collaborative Rotation Focus Day 6 Should Include all standards in BIO 1. For reteaching.	**X**	**A Day**
	X	**B-Day**

High School Science Lesson Plan 2023-2024

MS-CCR Standard(s): BIO.1B.2 Design and conduct an experiment to determine how enzymes react given various environmental conditions (i.e., pH, temperature, and concentration). Analyze, interpret, graph, and present data to explain how those changing conditions affect the enzyme activity and the rate of the reactions that take place in biological organisms.	
Learning Target(s): Enzymes, pH, temperature and concentration	
Lesson Component Duration	**Activities and Strategies**
Do Now 10 min (Review/Preview Protocol)	Preview Standard: Bio.1B.2 Answer: C Preview Standards: Bio.1A.2 Answer: C

Engage 5 min (Hook/Anticipatory Set) **Goals:** ● Connect student's experiences ● Create interest ● Get students thinking ● Understand the objectives of the unit	Enzymes (Updated) - YouTube Students can use a video note-taking handout to summarize main points from this video for homework. Main points can be shared by students and used to facilitate a discussion. - Dr. Cork
Explore 14 min	**Activity**

High School Science Lesson Plan 2023-2024

(Quick Lab/Mini Lab/Simulation/Virtual Field Trip) **Goals:** ● Students receive real experience with the topic ● Students use and develop creative thinking skills ● Students make observations, record results, and make connections	Investigation "How do enzymes affect Gelatin" Students will be placed in groups of 4 to 5 while the teacher talks them through their lab. **Check for Understanding (Embedded)** (Questions/Informal Check)

Explain (I Do) 15 min **Model/Input** (Slide deck/Direct instruction) **Goals:** ● Students develop understanding of the content ● Observations and experiences are discussed and critiqued ● Students develop vocabulary ● Students are able to connect the content presented to previous experiences	**Activity** **Enzymes - Google Slides** **TTW break down the standard more to explain the processes of enzymes and how they work using visual aids.** **Check for Understanding (Embedded)** (Questions/Informal Check)
Elaborate (We Do) 20 min (Extend the learning) **Goal:** ● Students use their newly obtained knowledge to propose solutions and extend their learning to new situations	**Activity** Investigation: Pineapple Enzyme Lab - Google Docs **As students go through lab and gain an understanding through the Enzyme breakdown of the lesson (Explain) They will be able to further complete the lab questions presented from the explore portion of the lab.** **Check for Understanding (Embedded)** (Questions/Informal Check)
Closure 5 min	TTW opens the floor for scholars to express any misconceptions they may have with an open discussion segment.

High School Science Lesson Plan 2023-2024

(Question/Clarify Misconceptions/Revisit Essential Questions)	**HW** **Define Vocabulary** **Chemical Reaction** **Reactant** **Product** **Activation Energy** **Catalyst** **Enzyme** **Substrate**
Evaluate (You Do) 20 min **Independent Practice**	Enzyme_WS_With_Modeling1_(Pamela_Mercier's_conflicted_copy_2014-10-15) (spps.org) Scholars will be given this worksheet to test their knowledge of the lesson taught. In this worksheet, scholars analyze and interpret data with graphs.
Exit Ticket 5 min (Questions/Recap/Review/Preview Protocol)	Preview Standard: Bio.1B.2 Answer: C Preview Standards: Bio.1A.2 Answer: C

BIOLOGY BOOTCAMP Agenda and Rotations: Cells as a System (Wednesday and Thursday)

Collaborative Groups

Bell Ringer/Do Now: (6 standards)
Vocabulary Group lesson Strategy #3
6 Station rotation pet class.
Check for understanding
Complete KWL chart for accountability
Exit ticket/Closure
Collect Data and Regroup for Next Day Instruction

Rotation Schedule

Graham-Jones	5th Block	2nd and 6th Block	3rd	4th and 8th Block
Johnson	XX		XX	
Loving	1st and 5th Block	6th Block		4th and 8th Block
Nash	1st and 5th Block	2nd and 6th Block	XX	4th and 8th Block