

**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**

**Essential Question(s):**

**How does passive transport work?**

**How does active transport work?**

**How does the**



**Sentence Stems (**

**);**

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.



## Do Now

(Review/Preview Protocol)

10 min **Preview Standard: Bio.1C.2**

Answer: B

**Review Standards: Bio.1A.4**

Answer: D

[Prokaryotic and Eukaryotic Cells | 58 plays | Quizizz](#) (Prokaryotic/Eukaryotic Cells)

## Engage

(Hook/Anticipatory Set)

### Goals:

Connect student's experiences

Create interest

Get students thinking

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

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



Understand the objectives of  
the unit



## 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/17.2-cellcomparechart.pdf>

### Check for Understanding (Embedded)

(Questions/Informal Check)

## Closure

(Question/Clarify

Misconceptions/Revisit Essential  
P

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

between the last few standards. 15 questions

Exit Ticket 5 min **Preview Standard: Bio.1C.2**



(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**



(Review/Preview Protocol)

Answer: B

**Review Standard: Bio.1C.2**

Answer: B

Hook/Assignment Set

**Goals:**

- Connect student's existing knowledge
- Create interest
- Get students thinking
- Understand the objectives of the unit

**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**  
**3**

<p><b>Explain (I Do)</b></p> <p>15 min</p> <p><b>Model/Input</b> (Slide deck/Direct instruction)</p> <p><b>Goals:</b> 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</p>	<p><b>Activity</b> <a href="#">Bio.1D.1 - Google Slides</a> TTW explain through a brief PowerPoint presentation what Active and Passive transport is.</p> <p><b>Check for Understanding (Embedded)</b> (Questions/Informal Check)</p> <p>What is Exocytosis and Endocytosis?</p>
<p><b>Elaborate (We Do)</b></p> <p>20 min</p> <p>(Extend the learning)</p> <p><b>Goal:</b> Students use their newly obtained knowledge to propose solutions and extend their learning to new situations</p>	<p><b>Activity</b> <a href="#">Reinforcement Cell Transport.pdf - Google Drive</a> TT and scholars work together to answer questions provided in the worksheet given.</p> <p><b>Check for Understanding (Embedded)</b> (Questions/Informal Check)</p>
<p><b>Closure</b></p> <p>5 min</p> <p>(Question/Clarify Misconceptions/Revisit Essential Questions)</p>	<p>Review the terms areas of high concentration and areas of low concentration as it relates to diffusion and facilitated diffusion.</p> <p><b>Define Vocabulary</b> <b>Homeostasis</b> <b>Diffusion</b></p>

**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?**

**E B<sup>U</sup> Students will locate each component they list to answer questions in Figure 8-21. (Even though, ATP is**



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**

Review: 1D.1

10 min

(Review/Preview Protocol)

E E 1000 B.C.E  
Answer:

E 1000 B.C.E

2000 B.C.E

2000 B.C.E



<p><b>Elaborate (We Do)</b></p> <p>(Extend the learning)</p> <p><b>Goal:</b></p> <p>Students use their newly obtained knowledge to propose solutions and extend their learning to new situations</p>	<p>20 min</p> <p><b>Activity</b></p> <p><a href="http://ringgold.org">Homeostasis, Transport, and Bioenergetics (ringgold.org)</a></p> <p><b>Gallery Walk</b></p> <p>Scholars will walk around the science hall and answer standard gear questions for understanding.</p> <p><b>Check for Understanding (Embedded)</b> (Questions/Informal Check)</p> <p>Movement of molecules from an area of high concentration to an area of low concentration is answer choices</p> <p>A.diffusion B.passive transport C.osmosis D.all of the above</p>
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<p><b>Closure</b></p> <p>(Question/Clarify Misconceptions/Revisit Essential Questions)</p>	<p>5 min</p> <p>Scholars will write down all the things they learned about Cellular Transport and then will do a turn and talk with their peers.</p>
<p><b>Evaluate (You Do)</b></p> <p><b>Independent Practice</b></p>	<p>20 min</p> <p><a href="#">Transport Challenge LOW - Google Docs</a></p> <p>Scholars will remain in their groups and rotate through the stations. They must understand the images and explain how they are displaying cellular transport.</p> <p><a href="#">Transport Challenge Low Answer Key</a></p>







Create interest

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

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**

**Explain (I Do)**

15 min

**Model/Input**

(Slide deck/Direct instruction)

**Goals:**

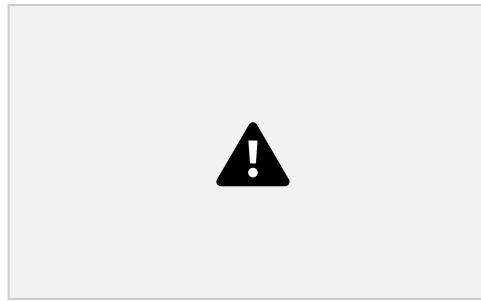
Students develop understanding of the content  
Observations and experiences are discussed and critiqued  
Students develop vocabulary  
Students are able to connect the content presented to previous experiences

**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.





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



(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

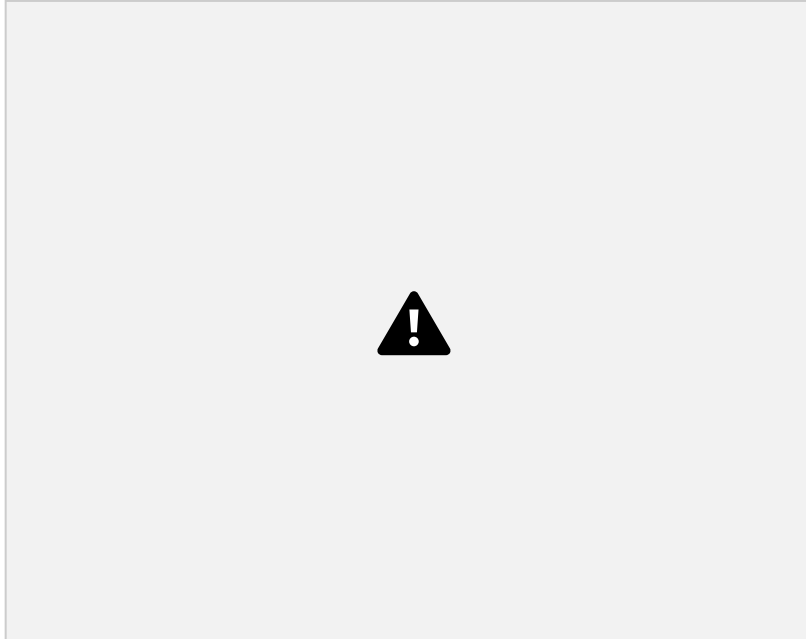
**TSW work in grouped stations to complete questions provided.**

**Independent Practice**

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

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**

(Questions/Recap/Review/Preview Protocol)

5 min

**Preview Standard: Bio.1D.2**

Answer: D



**Review Standards: Bio.1C.3**

Answer: D

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

**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**

**Activ 1 howD**

**Do Now**

10 min

## **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



<p>(Question/Clarify Misconceptions/Revisit Essential Questions)</p>	<p><b>a) From an area of higher concentration to an area of lower concentration</b> <b>b) From an area of lower concentration to an area of higher concentration</b> <b>c) Across a cell membrane using cellular energy</b> <b>d) Against a concentration gradient</b></p> <p><b>TSW be provided the following and they must explain their answers to the teacher in order to show mastery of the standard.</b></p>
<p><b>Evaluate (You Do)</b></p> <p>20 min</p> <p><b>Independent Practice</b></p>	<p><b>TSW utilize their own sheet of paper and work in groups of 2 to answer the following questions provided.</b></p> <p>Answer the following questions with hypertonic, hypotonic, or isotonic.</p> <ol style="list-style-type: none"><li>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?</li><li>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?</li><li>3. What kind of solution would make a plant turgid?</li><li>4. What kind of solution would make an animal cell shrivel?</li><li>5. If a plant cell loses water at the same rate that it takes in water, what kind of solution is it in?</li></ol>
<p><b>Exit Ticket</b></p> <p>5 min</p> <p>(Questions/Recap/Review/Preview Protocol)</p>	<p>Review Standards: Bio.1D.2</p> <p>Answer: C</p>

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**

Answer:D



Answer: C

**Engage**

(Hook/Anticipatory Set)

**Goals:**

- Connect student's experiences
- Create interest
- Get students thinking
- Understand the objectives of the unit

5 min

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 Z

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



<p>Observations and experiences are discussed and critiqued  Students develop vocabulary  Students can connect the content presented to previous experiences</p>	<p>(Questions/Informal Check)</p>
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		<b>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.</b>
<b>Evaluate (You Do)</b>	20 min	<a href="http://biologycorner.com">Reinforcement: Biomolecules (biologycorner.com)</a>
<b>Independent Practice</b>		TSW works in groups of two, reading scenarios and labeling which macromolecule level they are.
<b>Exit Ticket</b>	5 min	<b>Preview Standard: Bio1B.1</b>
(Questions/Recap/Review/Preview Protocol)		Answer:D
		<b>Review Standard: Bio.1A.1</b>
		Answer: C
		TTW goes over answers to present preview questions given to students as Bellringer.

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



**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**

<b>Lesson Component Duration</b>	<b>Activities and Strategies</b>
<p><b>Do Now</b></p> <p>(Review/Preview Protocol)</p> <p>10 min</p>	<p>Preview Standard: Bio.1B.2</p> <p>Answer: C</p> <p>Preview Standards: Bio.1A.2</p> <p>Answer: C</p>

<p><b>Engage</b></p> <p>(Hook/Anticipatory Set)</p> <p><b>Goals:</b></p> <ul style="list-style-type: none"> <li>Connect student's experiences</li> <li>Create interest</li> <li>Get students thinking</li> <li>Understand the objectives of the unit</li> </ul>	<p>5 min</p> <p><a href="#">Enzymes (Updated) - YouTube</a></p> <p>Students can use a <a href="#">video note-taking handout</a> to summarize main points from this video for homework. Main points can be shared by students and used to facilitate a discussion.</p> <p>- Dr. Cork</p>
<p><b>Explore</b> 14 min</p>	<p><b>Activity</b></p>



<p>(Quick Lab/Mini Lab/Simulation/Virtual Field Trip)</p> <p><b>Goals:</b></p> <ul style="list-style-type: none"> <li>Students receive real experience with the topic</li> <li>Students use and develop creative thinking skills</li> <li>Students make observations, record results, and make connections</li> </ul>	<p><a href="#">Investigation "How do enzymes affect Gelatin"</a></p> <p>Students will be placed in groups of 4 to 5 while the teacher talks them through their lab.</p> <p><b>Check for Understanding (Embedded)</b> (Questions/Informal Check)</p>
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<p>(Question/Clarify Misconceptions/Revisit Essential Questions)</p>	<p><b>HW</b></p> <p><b>Define Vocabulary</b></p> <p><b>Chemical Reaction</b></p> <p><b>Reactant</b></p> <p><b>Product</b></p> <p><b>Activation Energy</b></p> <p><b>Catalyst</b></p> <p><b>Enzyme</b></p> <p><b>Substrate</b></p>
<p><b>Evaluate (You Do)</b></p> <p>20 min</p> <p><b>Independent Practice</b></p>	<p><a href="#">Enzyme WS With Modeling1 (Pamela Mercier's conflicted copy 2014-10-15) (spps.org)</a> Scholars will be given this worksheet to test their knowledge of the lesson taught. In this worksheet, scholars analyze and interpret data with graphs.</p>
<p><b>Exit Ticket</b></p> <p>5 min</p> <p>(Questions/Recap/Review/Preview Protocol)</p>	<p><b>Preview Standard: Bio.1B.2</b></p> <p>Answer: C</p> <p><b>Preview Standards: Bio.1A.2</b></p> <p>Answer: C</p>

