

Lesson Title: Biomolecules		
Standards to be Addressed:		
<p><i>Readiness Standards:</i></p> <ul style="list-style-type: none"> 9.A: compare the structures and functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids. 	<p><i>Supporting Standards:</i></p> <ul style="list-style-type: none"> 9.C: identify and investigate the role of enzymes. 	
Acquisition		
<p><i>Students will know:</i></p> <p>9.A</p> <ul style="list-style-type: none"> Though there are thousands of different molecules in a cell, there are only a few basic types of biomolecules. Many biomolecules, including carbohydrates, proteins and nucleic acids, are made up of repeating components known as monomers. These basic biomolecules are crucial to the structure and function of all cells. <p>9.C</p> <ul style="list-style-type: none"> All cells use proteins, called enzymes, to speed up reactions in the cell. Most biological reactions are catalyzed by proteins, though RNAs can catalyze some reactions. Most biochemical reactions are very slow and could take years to occur if not catalyzed by enzymes. 	<p><i>Students will be able to:</i></p> <p>9.A</p> <ul style="list-style-type: none"> Compare, among different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids, -- <ul style="list-style-type: none"> ○ structure. ○ function. <p>9.C</p> <ul style="list-style-type: none"> Identify and investigate the role of enzymes. 	
Student Expectations		
<p><i>The students will know:</i></p> <ul style="list-style-type: none"> Biomolecules: they need to know the structure and function of each one <ul style="list-style-type: none"> ○ Carbs: monosaccharaides (simple sugars) are the building blocks for carbs ○ Proteins: amino acids/enzymes ○ Nucleic Acids: nucleotides ○ Lipids: hydrocarbons (there are no monomers) Monomer/subunit/building block are synonymous Polymer/biomolecule/macromolecule Enzyme: increase/accelerate/speed up rate of reaction → biological catalyst 	<p><i>The students will be able to:</i></p> <ul style="list-style-type: none"> Identify the structure of the biomolecules and recall the functions Be able to list the similarities and differences between the biomolecules Identify the role of enzymes by analyzing data (graph) 	
Objective		
<p><u>Day 1:</u></p> <ul style="list-style-type: none"> Students will 	<p><u>Day 2:</u></p> <ul style="list-style-type: none"> Students will 	<p><u>Day 3:</u></p> <ul style="list-style-type: none"> Students will
Agenda		
<p><u>Day 1:</u></p> <ol style="list-style-type: none"> Warm-up Gatorade G Fit Series Recognizing biomolecules in food Biomolecules Video Notes Biomolecules Card Sort Iodine Secret Message Biomolecules Exit Ticket 	<p><u>Day 2:</u></p> <ol style="list-style-type: none"> Warm-up: Enzyme Background Reading Liver Lab Enzymes Video Notes Enzyme Card Sort Exit Ticket <p>Homework:</p> <ul style="list-style-type: none"> Study for the Assessment 	<p><u>Day 3:</u></p> <ol style="list-style-type: none"> Warm-up Biomolecules Compare/Contrast Bubble Map Cougar Races Assessment <p>Homework:</p> <ul style="list-style-type: none"> Introduction to Cell Membrane
Purpose		
<p>The purpose of this lesson is for the students to experience how biomolecules and enzymes are involved in the students day to day lives.</p>		
Materials		

<p><i>For the students:</i></p> <ul style="list-style-type: none"> • Pen or pencil • Interactive Notebook (paper to write on) 	<p><i>For the teacher:</i></p> <ul style="list-style-type: none"> • 3 PowerPoint Presentations • Biomolecules Video Notes Handout (copies) • Biomolecules Card Sort (class set) • Iodine • Medicine cups (transparent) • Bread • Sterile Q-tips • Paper • Biomolecules Exit Ticket (copies) • Enzyme Background Reading w/ questions (copies) • Liver Lab Handout (copies) • Liver • Bunsen burner • Acid • Hydrogen Peroxide • Biomolecules Compare/Contrast Bubble Map (copies) • Cougar Races (class set) • Assessment (copies) • Introduction to Cell Membrane Handout (copies)
Day 1	
Warm-up	<p><i>Introduction to Biomolecules:</i></p> <ul style="list-style-type: none"> • The students will think about the following questions, and answer them in their interactive notebooks. (These questions build upon the homework that was assigned in the previous class.) <ol style="list-style-type: none"> 1. What are biomolecules? 2. Why are biomolecules so important? 3. Are all four of the major biomolecules composed of monomers? • The students will share ideas with their should partner, and make any necessary revisions.
Transition 1	<ul style="list-style-type: none"> • The teacher will explain that it is important to know the functions of the biomolecules in order to determine when they are most effective.
Engage	<p><i>Gatorade G Fit Series</i></p> <ul style="list-style-type: none"> • The students will watch the Gatorade G Fit Series commercial. • As the students watch the commercial, they will think about the following questions. <ol style="list-style-type: none"> 1. What is this advertisement saying? 2. Why does it matter what you eat and when you eat it? • After they watch the video, the students will write the answers to the questions in their interactive notebook. • The students will share their answers with their shoulder partner.
Transition 2	<ul style="list-style-type: none"> • The teacher will explain to the students that it is important to identify what foods these biomolecules are found in so that we can incorporate them into our diets during the right times.
Application	<p><i>Recognizing biomolecules in food:</i></p> <ul style="list-style-type: none"> • The teacher will show 4 slides, each with several pictures of one of the four biomolecules. • The students will analyze each slide, and right down the answer in their Interactive Notebooks.
Transition 3	<ul style="list-style-type: none"> • The teacher will explain to the students that we are about to watch a video that will review each of the biomolecules, and the functions, monomers, and elements that compose each of them.
Explain 1	<p><i>Biomolecules Band Video Notes:</i></p> <ul style="list-style-type: none"> • The students will watch the video. • As the students watch the video, they will fill out the Biomolecule Video Notes handout.
Transition 4	<ul style="list-style-type: none"> • The teacher will explain to the students that they will now have an opportunity to practice comparing the different biomolecules.
Guided Practice	<p><i>Biomolecules Card Sort:</i></p> <ul style="list-style-type: none"> • The students will try to complete the card sort without using their notes. • Once the students complete the card sort, they will check their answer using their homework, notes, or the textbook. • Students who finish before others will assist other students who may be struggling.
Transition 5	<ul style="list-style-type: none"> • The teacher will explain to the students that they will observe how some of these biomolecules

	work.
Explore 1	<p><i>Iodine:</i></p> <ul style="list-style-type: none"> The teacher will pass out the material of the next activity – Secret Message. While the materials are being passed out, the students will observe what happens when iodine is applied to water and bread. The students will discuss the following questions with their shoulder partner and develop answers to them. <ol style="list-style-type: none"> What is iodine? Have you ever heard of iodine before? Decide what you think the iodine is doing. Develop a “rule” about iodine.
Transition 6	<ul style="list-style-type: none"> The teacher will explain to the students that they will now have to opportunity to apply their knowledge of biomolecules to a chemical process that occurs in their bodies every day.
Explore 2	<p><i>Secret Message:</i></p> <ul style="list-style-type: none"> The students will write a secret message using a Q-tip and their saliva. The students will follow the directions outlined below. <ol style="list-style-type: none"> Put the Q-tip in your mouth, get as much saliva on it as possible. Then, write a secrete message on the slip of paper provided by your teacher. Let it dry for a minute or two. Quickly submerge the paper into the iodine bath, remove and lay flat on a paper towel. As it dries, you should begin to see your message appear. The students will consider the following and write their hypotheses in their Interactive Notebooks. <ol style="list-style-type: none"> Write sentence or two describing what you think happened. Write a sentence explaining why you think this happened. How does the secret message activity relate to biomolecules? Can you relate this activity to a process that occurs in your body? The students will share their answers with their shoulder partner.
Transition 8	The teacher will explain to the students that they are about to take an exit ticket so that the teacher can assess their understanding of biomolecules structure and function.
Formative Evaluation: Exit Ticket	<p><i>Biomolecules Exit Ticket:</i></p> <ul style="list-style-type: none"> The students will complete the Biomolecules Exit Ticket, which will have the following questions. <ol style="list-style-type: none"> What are biomolecules? List the four main biomolecules that make up all living organisms. What two biomolecules are shown to the right? How did you know? Which biomolecule (to the right) is a polymer? Explain. List two new things you learned today. List one thing you are still unsure about.
Day 2	
Warm-up: Explain 1	<p><i>Enzyme Background Reading:</i></p> <ul style="list-style-type: none"> The students will read the Enzymes Background Reading one section at a time. The students will annotate as they read each section. The students will write a one-sentence description summarizing each section. The students will answer the guided reading questions on the back of their handout. <ol style="list-style-type: none"> What are enzymes? Why are enzymes so important? What is the relationship between the following? <ul style="list-style-type: none"> Enzyme and substrate Enzyme and catalyst Denaturation and enzyme function The students will share ideas with their should partner, and make any necessary revisions.
Transition 1	<ul style="list-style-type: none"> The teacher will explain to the student that they are about to complete a lab in which they will observe enzymes in action.
Explore	<p><i>Liver Lab:</i></p> <ul style="list-style-type: none"> Lab Instructions The students will answer the following questions independently: <ol style="list-style-type: none"> What did this lab have to do with biomolecules?

Explore	<p><i>Liver Lab:</i></p> <ul style="list-style-type: none"> • Lab Instructions • The students will answer the following questions independently: <ol style="list-style-type: none"> 1. What did this lab have to do with biomolecules? 2. When we say that enzymes catalyze reactions, what is meant by this? 3. What was the control group in the lab? Why do you need a control group? What were the independent and dependent variables in the lab? 4. When hydrogen peroxide was poured on the raw liver, bubbles were seen. Describe what was happening when the bubbles were present and what two products were given off? 5. Why is catalase important for living organisms? • The students will share ideas with their should partner, and many any necessary revisions.
Transition 2	<ul style="list-style-type: none"> • The teacher will explain to the students that they will have an opportunity to take some notes over enzymes while watching a video.
Explain 2	<p><i>Enzyme Video Notes:</i></p> <ul style="list-style-type: none"> • The students will watch the video. • As the students watch the video, they will fill out the Enzyme Video Notes handout.
Transition 3	<ul style="list-style-type: none"> • The teacher will
Guided Practice	<p><i>Enzyme Card Sort:</i></p> <ul style="list-style-type: none"> • The students will try to complete the card sort without using their notes. • Once the students complete the card sort, they will check their answer using their homework, notes, or the textbook. • Students who finish before others will assist other students who may be struggling.
Transition 4	<ul style="list-style-type: none"> • The teacher will explain to the students that they are about to take an exit ticket so that the teacher can assess their understanding of enzymes structure and function.
Formative Evaluation: Exit Ticket	<p><i>Enzymes Exit Ticket:</i></p> <ul style="list-style-type: none"> • The students will complete the Biomolecules Exit Ticket, which will have the following questions. <ol style="list-style-type: none"> 1. What is an enzyme and how does it function? What type of biomolecule is an enzyme? 2. What conditions cause an enzyme to denature? 3. How does denaturation affect the function of an enzyme?
Day 3	
Warm-up	<p><i>Review Exit Tickets:</i></p> <ul style="list-style-type: none"> • The teacher will distribute the students' exit tickets over biomolecules and enzymes. • The students will review the teacher's feedback. • If the students are still uncertain about the feedback, they will ask three of their classmates before asking the teacher. • The teacher will review any remaining uncertainties or misunderstandings with the class.
Transition 1	<ul style="list-style-type: none"> • The teacher will explain that the students will now have an opportunity to test their understanding of biomolecules before taking the assessment.
Guided Practice 1	<p><i>Biomolecules Compare/Contrast Bubble Map:</i></p> <ol style="list-style-type: none"> 6. The students will complete Biomolecules Compare/Contrast Bubble Map <ul style="list-style-type: none"> • The students try to complete the bubble map without using their notes. • Once the students complete the bubble map, they will check their answer using their homework, notes, or the textbook. <ol style="list-style-type: none"> 7. Students who finish before others will assist other students who may be struggling.
Transition 2	<ul style="list-style-type: none"> • The teacher will explain that we are about to do a review game to give the students some more practice before they take the test.
Guided Practice 2	<p><i>Cougar Races:</i></p> <ul style="list-style-type: none"> • The teacher will explain the objective and guidelines of Cougar Races to the students. • The students will work with their group to answer the questions/scenarios as a team. • The students will write the answer on their group's dry-erase board • The students will elect one group representative to bring the question/scenario and answer to the teacher to determine if their answer was correct. • If the answer is correct, the teacher will move the group's cougar over one space.

Summative Evaluation: Assessment	<p><i>Summative Assessment:</i></p> <ul style="list-style-type: none"> • The teacher will give the students post-assessment directions. <ul style="list-style-type: none"> ○ The students will turn in the assessment to “The Box.” ○ The students will pick up a copy of the homework. ○ The students will silently work to complete the homework assignment. • The teacher will review the assessment expectations. • The teacher will distribute the assessments. • The teacher will monitor the students while they complete the assessment.
Independent Practice	<p><i>Introduction to Cell Membranes:</i></p> <ul style="list-style-type: none"> • The students will complete the homework assignment.
Literacy Components	
Reading	<ul style="list-style-type: none"> • The students will read the enzyme background reading.
Writing	<ul style="list-style-type: none"> • The students will answer thought-provoking questions. • The students will annotate as they read.
Speaking	<ul style="list-style-type: none"> • The students will share their ideas with their shoulder partner.
Listening	<ul style="list-style-type: none"> • The students will listen to their shoulder partner’s insight. • The students will watch several video clips while listening for key information.
Opportunities to Check for Understanding	
Day 1: Warm-up	<ul style="list-style-type: none"> • The teacher will walk around the room to monitor the students’ understanding.
Day 1: Engage 1	<ul style="list-style-type: none"> • The teacher will monitor the students’ answers to check for understanding.
Day 1: Application	<ul style="list-style-type: none"> • The teacher will monitor the students’ answers to check for understanding.
Day 1: Guided Practice	<ul style="list-style-type: none"> • The teacher will walk around the room to monitor the students’ understanding.
Day 1: Explore 2	<ul style="list-style-type: none"> • The teacher will walk around the room to monitor the students’ understanding.
Day 1: Exit Ticket	<ul style="list-style-type: none"> • The teacher will review each student’s exit ticket and provide him or her with feedback.
Day 2: Warm-up	<ul style="list-style-type: none"> • The teacher will walk around the room to monitor the students’ understanding.
Day 2: Explore	<ul style="list-style-type: none"> • The teacher will walk around the room to monitor the students’ understanding.
Day 2: Guided Practice	<ul style="list-style-type: none"> • The teacher will walk around the room to monitor the students’ understanding.
Day 2: Exit Ticket	<ul style="list-style-type: none"> • The teacher will review each student’s exit ticket and provide him or her with feedback.
Day 3: Warm-up	<ul style="list-style-type: none"> • The teacher will walk around the room to monitor the students’ understanding.
Day 3: Guided Practice 1	<ul style="list-style-type: none"> • The teacher will walk around the room to monitor the students’ understanding.
Day 3: Guided Practice 2	<ul style="list-style-type: none"> • The teacher will monitor the students’ answers to check for understanding and to see if there are any misconceptions that span across multiple groups.
Planned Differentiation	
<ul style="list-style-type: none"> • Students who have an above-average understanding of this topic should finish their card sorts first. I will then have them circulate and help other students that are struggling. 	
Resources	
<ul style="list-style-type: none"> • Mrs. Miller and Ms. Paris: Gatorade G Fit, Biomolecule Card Sort, Secret Message, Iodine, Liver Lab, Cougar Races 	
Post-Lesson Reflection	