# **STUDENT GUIDE** EVALUATE LESSON 7



## Part 1: Our Motivation

Record what we were trying to explain about the Anchor Phenomenon.

We are going to revisit our Anchor presentation to determine what new scientific information we can communicate to the audience about how milk helps with recovery from exercise, including the new information that we have figured out about how milk nutrients are recombined during the process of digestion.

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# Part 2: Communicating Scientific Ideas

Create a presentation with your group that communicates the answer to our Driving Question, *How can milk help athletes recover from physical exercise?* to an audience of your choosing. Here, you can build upon your presentation from Lesson 1, revise and/or add to it, or start a new presentation entirely.

Presentation Format Requirements:

- Videos cannot exceed 2 minutes.
- Written reports cannot exceed 1 page.
- Presentation is designed for the same chosen audience and with the same format you selected in Lesson 1.
- Prepare a script of your presentation before adding multiple media formats.

Presentation Development Steps:

- Develop a script/outline.
- Have the teacher review your script/outline.
- Develop your presentation.
  - If doing a written presentation, create the formal writing product.
  - If doing a video presentation, rehearse and record the video product.
- Receive peer feedback on your presentation.
- (Optional can be done here or in the final Performance Task) Revise your presentation based on peer feedback.

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Be sure to use the Look Fors provided below to guide your presentation. Mark each Look For after you include it.

Included	Look Fors
	<ul> <li>Include multiple methods of communication, including models and evidence from the module (video plus graphics/diagrams, written report plus graphics/diagrams, or video with narration of a slideshow).</li> <li>You can use the class consensus model, data sets, and/or models from any other resources from the module.</li> </ul>
	Clearly communicate scientific information in a way that is appropriate for your chosen audience.
	Describe how the hierarchical organization and function of body systems, organs, and cells contributes to the digestion of milk.
	Describe the scale relationships between the models you are showing using orders of magnitude.
	Describe how the function of multiple kinds of specialized cells contributes to the digestion of milk.

You can use these tips to help you create an effective presentation.

Tips for a Successful Multimedia Presentation	How I Plan to Use These Tips
<ul> <li>Choose the Focus of This Module</li> <li>What do you think is the most important information from this module?</li> <li>Stay on point - clarify your objective, never lose sight of it, and shape all of your content around it.</li> </ul>	
<ul> <li>Engage Your Chosen Audience</li> <li>How can you tailor this information to be presented appropriately for the audience you chose?</li> <li>Research your audience - why are they here? What do they care about?</li> <li>Adapt your approach - keep questioning, "How can I connect to my audience?" and "How do I want them to react?"</li> </ul>	
<ul> <li>Choose Appropriate Media</li> <li>Use media that exemplifies your audience's needs and preferences.</li> <li>Use media that adds context to your presentation text rather than compete with it. <ul> <li>For example, a graphic should illustrate a science idea you are discussing. A graphic should not be an image that is not relevant to the content being discussed.</li> </ul> </li> <li>Use media from the module, such as: <ul> <li>the class consensus model.</li> <li>models from texts or science theater</li> <li>graphs of data</li> </ul> </li> </ul>	
<ul> <li>Narrate Effectively</li> <li>Facts and information should be the focus of your presentation, but the more you can connect them to real-life experiences, the more the audience will relate to your presentation.</li> <li>Rehearse your script so that you are confident in what you are saying and so that it doesn't seem like you are reading a script.</li> </ul>	

In the space below, prepare your presentation script or written report.

#### Written Report

Let's start from the beginning. The Chemistry of Milk illustration showed the nutrients that make up milk, such as fats, lactose, proteins, and electrolytes.



Milk Chemistry. Milk Chemistry - Cheese Science Toolkit. (n.d.). https://www.cheesescience.org/milk.html

When an athlete drinks milk after working out, milk goes into their digestive system, which is made of many different organs, which are each made of many different specialized cells. Each of these has a different job. As we look at our class model, we can see each organ and what is happening in these organs. Let's walk through what happens in each of the steps shown below.



Starting at the mouth, nutrients pass through the esophagus and move into the stomach. This is where the digestion of milk really begins. When nutrients reach the athlete's stomach, we start to see how specialized cells are working to digest milk.

The lining of the stomach, which is about 6mm in size, has specialized cells that start acting upon nutrients with enzymes. We can see from our size & orders of magnitude tool that the cells of the stomach are 1.0-1.6 um in size. Fats are broken down from big globs to smaller globules by gastric lipase. Proteins are broken down into amino acids by pepsin, which is an enzyme released from Chief cells in the stomach lining. The enzyme is much smaller than the cells at 5-10 nm in size. So, we can see that different structures of different sizes make up this complex system.



Then, nutrients from milk move into the athlete's small intestine. More chemical digestion happens as an enzyme called lactase breaks lactose down into glucose and galactose. Also, fats get broken down even more now into free fatty acids by the enzyme lipase. The broken-down nutrients in the small intestine then get absorbed into the bloodstream. The lining of the small intestine has epithelial cells that absorb these broken-down nutrients into the bloodstream. We can see from our size & orders of magnitude tool that glucose molecules are 800 pm, such a smaller size compared to the size of an epithelial cell ~20 um thick. This shows that glucose could easily travel into the epithelial cells.



# Part 3: Sharing Presentation Drafts and Receiving Feedback on Our Presentations

As part of the process of preparing your presentation, you will work with another group to rehearse your presentations, then get feedback from your peers and give them feedback.

Pair with another group, then decide which group will rehearse first. After each group finishes their presentation, have a discussion about your observations. Use reasoning and evidence to support your ideas.

### When the other group presents:

Respectfully provide feedback to your peers on their presentation. Use the "Peer Feedback Form" handout to document your feedback.

### When your group presents:

Listen to the other group's feedback on your presentation and thank them for their suggestions. Be open to receiving critiques on your presentation. Then, as a group:

- Consider each item of feedback from your peers.
- Discuss the suggestions you want to incorporate in your presentation and explain why/why not. Use reasoning and evidence as you talk through ideas.
- (Optional can be done here or in the final Performance Task) Make any revisions to your script or written report as agreed upon through group consensus.

Use the space below to record your group's discussion.

Reasoning for Incorporating/Not Incorporating