STUDENT GUIDE
Lesson 4: Assessment

Part 1: Revisiting the Phenomenon

After observing the phenomenon cards, write your reasoning below for the unique organization of your cards.

From the phenomenon cards we observed we realized there are connections from whey protein to exercise. We know that whey protein comes from dairy. The milk that comes from cows has many different elements including whey protein. Proteins are made from amino acids. Protein is an essential nutrient for humans to consume and can be found in things like granola bars. When humans exercise they need energy and whey protein is a healthy source of this for the body. When working out the body changes. It gets hot and your temperature rises. Homeostatic mechanisms in the body help return body temperature to its acceptable range. The more protein that an athlete consumes, the more quickly and effectively the body can recover. Improved recovery leads to the athlete gaining more muscle over time.

Part 2: Creating an Explanation of Whey Protein

Create an initial explanation to answer the Driving Question: ***Why might someone who exercises consume whey protein?*** In your explanation, be sure to address the following Look Fors:

- Describe the pattern in the energy flow between homeostatic changes in the body.
- Link patterns bodily changes (heart rate, temperature, body pressure, etc.) and as matter and energy flow through different organizational levels of living systems.
- Clearly depict how and where growth of muscles occurs and provide explanations for the underlying reasons.
- Use evidence from multiple sources in your explanation and explicitly reference the resources or data incorporated into your revisions.

Whey protein is important for muscle growth and recovery because it provides the body with amino acids that help repair and build muscle tissue after exercise. When you exercise, your body experiences changes in things like heart rate and increased body temperature to meet the energy demands. Afterward, consuming whey protein helps the body recover by aiding in processes where cells use amino acids to repair and grow. This is how the muscles get stronger over time.

On a smaller scale, whey protein supports the growth of muscle cells by providing essential nutrients that the body uses to repair itself. During exercise, muscle cells are broken down, and the amino acids from whey protein help rebuild these cells through processes like mitosis, where one cell divides to make more cells. This contributes to the body's ability to maintain homeostasis after physical activity.

Patterns in how the body uses energy during exercise appear at different levels. For example, your muscles and circulatory system work together to increase energy use and oxygen delivery during exercise. Afterward, whey protein helps restore energy by providing the necessary nutrients for muscle recovery. Using resources from the unit, like the case studies, models, and diagrams from the Homeostasis Lab or data from the Nutrient Detective lab on how protein affects cells, we can see how these small-scale processes lead to overall muscle growth and energy balance in the body.



Part 4: Creating a Protein Product Presentation

Create a final presentation with your group that communicates the answer to our Driving Question, ***Why might someone who exercises consume whey protein?*** to an audience of your choosing. Here, you should revise the content from all of your handouts based on the feedback you have been provided throughout the unit on your explanations.

Presentation Format Requirements:

- Videos cannot exceed 3 minutes.
- Written reports cannot exceed five paragraphs.
- Presentation is designed for the same chosen audience.
- Prepare a script of your presentation before adding multiple media formats.

Protein Product Requirements

- Must Include a name, label, ingredients, etc. Develop a description to include on a website or on a shelf sign in a store.
- Must include marketing statements that explain why the ingredients would be optimal for the audience of your choosing.

Choose the presentation format you will use and the audience you will design the presentation for. Circle them in the spaces below.

What presentation format will you choose? Circle one or create your own.	Social media post with narration and images PowerPoint/Slide deck presentation with embedded videos and/or images Written report with videos and/or images Video presentation with narration and/or graphics and images. Other: _____
Who is your targeted audience? Circle one or create your own.	Friends my age who exercise Student-athletes at school Adults who exercise Younger children who play and exercise Other: Endurance athletes

Be sure to use the Look Fors to guide your presentation. Check them off in the column at the left as you identify them in your work.

Included?	Look Fors
✓	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). • You can use the class consensus explanations, data sets, and/or models, and any other resources from the unit to support your presentation.
✓	Clearly communicate scientific information in a way that is appropriate for your chosen audience.
✓	Describe the different sources of protein and how they can provide different results for athletes vs. average individuals.
✓	Describe how amino acids and other carbon-based molecules can be assembled into larger molecules, such as proteins, to form new compounds.
✓	Describe the different cause and effect relationships that can be observed at various scales of the body systems.



Part 5: Creating a Protein Product

If you are doing this part of the assessment, use the directions in your Lesson 4 Planning Document handout. Put all of your work for this section there.



Part 6: Reflections

Fill out the box below with your reflections from the lessons you engaged in. Use these prompts to help guide your reflections:

- How have ideas about consuming whey protein changed since the start of your learning?
- How does your learning in this unit make you think differently about macromolecules and exercise?
- How does what you learned in this unit make you think differently about how your body functions to maintain homeostasis?
- How do you think you can use the science practices (eg, analyzing scientific literature, creating an explanation using scientific evidence) you engaged in this unit in other ways in your learning?

Student responses will vary.