

STUDENT GUIDE

ENGAGE LESSON 8



Part 1: Our Motivation

Record what we were trying to figure out that led to this investigation.

- Why does a body need to hydrate as part of exercise recovery?
- How does water in milk help with recovery?
- What happens in the body after it is hydrated?
- Does the amount we sweat impact the amount of fluids we need to replenish?
- Does drinking specific items, like milk, increase hydration only? Are there other effects?



Part 2: Observing the Module Phenomenon

Record what you observe about the effects of exercise on the athlete from the video in the table below.

Before	At End of Exercise	After Exercise Recovery with Milk	After Exercise Recovery without Milk
<ul style="list-style-type: none"> • Internal body temp 36.9°C • Skin temp 33°C • No sweat present = 0 • "Low" feeling of thirst • Urine color is light at 3 	<ul style="list-style-type: none"> • Internal body temp at 37.7°C • Skin temp 34°C • Entire body covered in a layer of sweat and still producing sweat = 5 • "High" feeling of thirst • Urine color is darker at 5 • Losing energy rapidly and increasing 	<ul style="list-style-type: none"> • Body temp at 37.1°C • Skin temp 33.5°C • No longer producing high amount of sweat = 2.5 • Still feeling some thirst, but minimized after drinking milk to "Low" • Urine returns to a light color at 3 • Feel less weakness and muscle soreness than 	<ul style="list-style-type: none"> • Body temp at 37.1°C • Skin temp 33.5°C • Still producing high amount of sweat = 4 • Still feeling thirsty, but somewhat minimized to "Medium" • Urine returns to a lighter color at 4 • Still feeling some weakness and muscle soreness but it is slightly less



	weakness, tiredness, and muscle soreness	immediately after exercise	as compared to immediately after exercise
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Part 3: Creating an Initial Explanation

With your group, use the graphic organizer below to develop an explanation that shows how you would currently answer our Module Questions, *Why do we get sweaty and thirsty after exercise? Why does the color of our urine change? How does milk help us recover from these effects?* In your explanation, be sure to:

- Describe why you think Kitana sweats during exercise and why she stops sweating after exercise.
- Describe why the person gets thirsty during exercise.
- Describe why the color of her urine changes after exercise.
- Describe how drinking milk after exercise can help reverse the effects of sweating, thirst, and urine color change.

Before	During	After
While you are at rest, your body is functioning normally, not getting hot or thirsty.	As you start a workout, your body is using energy, your blood is pumping faster, and you start to sweat to cool off. You get thirsty, and you are getting increasingly tired. The body doesn't have enough water, so the urine gets darker.	After working out, your body starts to cool off. You feel less tired, less thirsty, and are not making any more sweat because you are cooling off. Milk helps us recover from exercise because it is usually a cold drink, so it makes the body colder, too. Milk helps rehydrate your body because it has water in it.



Part 4: Sharing Initial Explanations

Share your explanation with the class as instructed by your teacher. In the space below, record parts of the explanation you agree on with your peers and parts you disagree on.

Agree	Disagree
<p>Milk helps to cool off the body.</p> <p>Sweat helps cool your body.</p> <p>Milk helps rehydrate your body.</p>	<p>Milk has something to do with the urine color change and sweat change.</p>

Be ready to share what you found with the class. Record our Class Consensus Explanation in the space below.

Normal body functions are present before a workout. As a person does a long, intense workout, the internal conditions of the body change, and they begin to experience increased heart rate, body temperature, and sweat production. Their urine becomes increasingly darker throughout the workout. Because your body is getting tired from the workout and running out of water, you become thirsty, and your urine gets darker. All these changes happen in the body throughout the duration of the workout and increase (or remain) until you are done. When you drink milk, the nutrients get broken down through digestion to help you cool off/recover, which helps your body go back to normal. As your body cools off, you become less thirsty and eventually feel satisfied, your heart rate decreases and eventually returns to normal. Once you drink milk, your urine returns to a lighter color.

What are the gaps in our class explanation that you want to figure out more about?

- We don't know why body temperature goes up during exercise.
- We aren't sure why body temperature goes back down after exercise.
- We don't understand how sweat helps the body cool down.
- We still aren't sure of how we get thirsty during exercise.
- We still don't know how milk can help an athlete recover from exercise.
- We are still unsure of why our urine changes from a lighter to a darker color during exercise.
- We don't know how/if all these changes have to do with changes to water in the body.

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Part 5: Asking New Questions

Record what new questions you have that might help you:

- Find additional information about why we sweat and get thirsty during exercise and how milk helps with exercise recovery.
- Fill in a “gap” in your explanation or our class explanation.
- Settle an area of disagreement that we’ve identified in our explanations.

Write six questions in the box below.

- Why do we sweat during exercise?
- How is milk connected to sweating or sweating less?
- Why do you feel thirsty while working out, and how does milk help relieve this?
- What causes you to "feel" thirst?
- Why do we get dehydrated when working out?
- How do the nutrients in milk help us recover from being sweaty, thirsty, or changing urine color?