

RUBRIC

EVALUATE LESSON 14



Part 2 Task Rubric

INFO-H5: Communicate scientific and/or technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).

LS1.A-H1: Systems of specialized cells within organisms help them perform the essential functions of life.

LS1.A-H4: Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and function even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (through negative feedback) what is going on inside the living system.

SC-H3: Feedback (negative or positive) can stabilize or destabilize a system.

| | Emerging | Developing | Proficient |
|-------------------------|---|--|---|
| Sample Student Response | <p>Let's now look more closely at what's happening in the body during and after exercise. After a person works out, they typically get hot.</p> <p>The body gets hot due to exercise, and it has multiple ways in which it tries to cool down, like sweat or changing the blood vessels to make more heat go out of the body.</p> | <p>Let's now look more closely at what's happening in the body during and after exercise. After a person works out, they typically get hot.</p> <p>We looked at a study that was done to show how a person's internal body temperature changes during exercise. It shows that before exercise, the body temperature starts at a normal, stable state at about 36.5° C. When exercising, body temperature increases by about 0.5-1.0°C. Then, after exercise, body temperature returns to about 36.6°C.</p> | <p>Let's now look more closely at what's happening in the body during and after exercise. After a person works out, they typically get hot. Take a look at this study that was done to show how a person's internal body temperature changes during exercise.</p> |



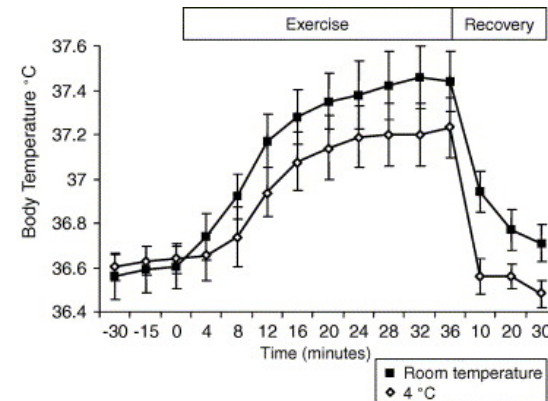
You get thirsty because you sweat and you pee out a lot of water.

But, the body has ways of preventing it from losing too much water. It tries to save water by not putting too much in the urine or by sweating less.

Milk can help your body recover from these effects because it has water in it, which replaces the water you lost.

The body gets hot due to exercise, and it has multiple ways in which it tries to cool down. First, thermoreceptors in the skin and muscles detect a change in temperature. They send a nerve signal to the hypothalamus in the brain, which then sends a signal via nerves to the sweat glands to produce sweat to cool the body. The hypothalamus also signals the vasodilation nerves to expand the blood vessels, allowing blood to bring heat from the body to the surroundings. This is one example of a feedback mechanism the body has to respond to the increase in temperature of the body to bring the temperature back to its stable state.

Next, let's talk about why you get thirsty and why your urine color might change with exercise. The loss of water in sweat occurs because water moves from the bloodstream to the skin in sweat. The body has ways of preventing it from losing too much water, which is what happens when your blood volume decreases. Osmoreceptors detect the decrease in water in the blood and send a signal to the brain. The hypothalamus in the brain receives the signal from the osmoreceptors. This results in the sensation of thirst and an increased production of ADH from the pituitary gland in the brain. The pituitary region of the brain sends ADH to the kidney via the bloodstream to absorb less water from the blood, leading to less water moving to the bladder, where it is stored as urine. The urine color becomes

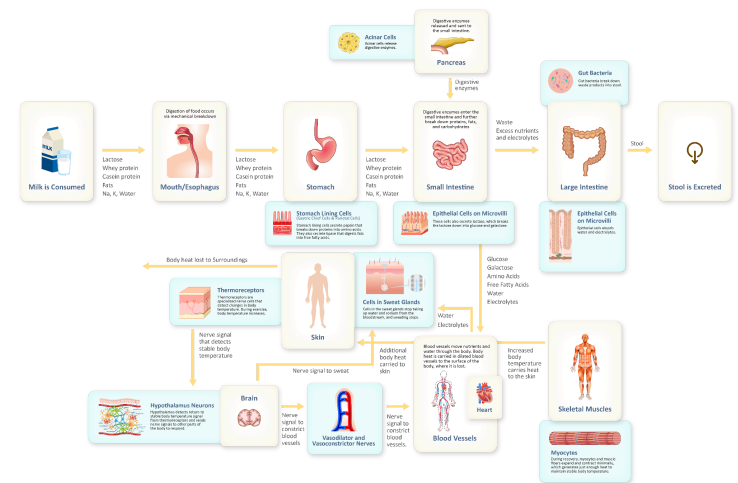


Before exercise, the body temperature starts at a normal, stable state at about 36.5°C. When exercising, body temperature increases by about 0.5-1.0°C. Then, after exercise, body temperature returns to about 36.6°C.

The body gets hot due to exercise, and it has multiple ways in which it tries to cool down. I'll show you them on this model.

darker. This process is also a negative feedback loop and is how the body prevents additional water loss.

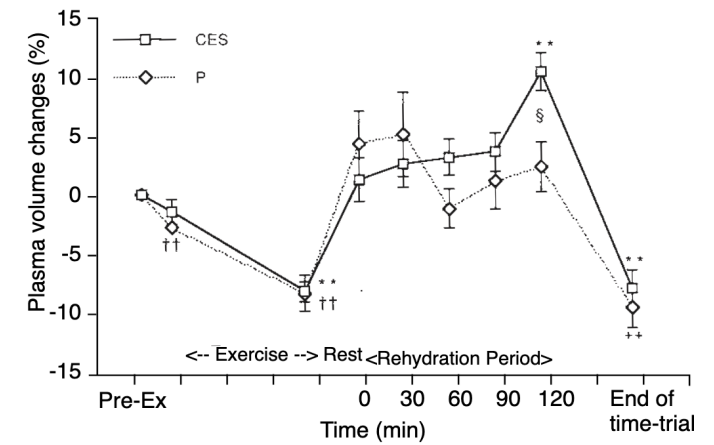
Now, these effects of exercise on the body might sound alarming, but they are all part of your body's natural response to try to maintain stable conditions. Milk can also help your body recover from these effects. In recovery, when someone stops exercising, they cool down. The temperature change is detected by thermoreceptors, which send a signal to the hypothalamus, which then signals the sweat glands to stop sweating. When someone drinks milk, the water in the milk moves through digestion into the bloodstream, which brings the amount of water in the blood back to its stable state. The osmoreceptors detect this change, cease the sensation of thirst, and send less ADH to the kidneys. The kidneys can now absorb more water from the bloodstream, passing it on to the bladder as urine. Urine is a lighter color as a result.



Effects of Exercise Model Lesson 10

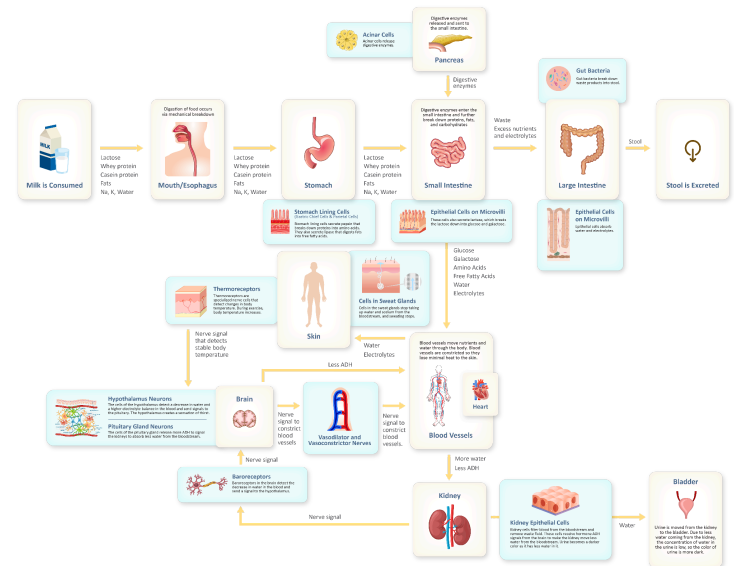
First, thermoreceptors in the skin and muscles detect a change in temperature. They send a nerve signal to the hypothalamus in the brain, which then sends a signal via nerves to the sweat glands to produce sweat to cool the body. The hypothalamus also signals the vasodilation nerves to expand the blood vessels, allowing blood to bring heat from the body to the surroundings. This is one example of a feedback mechanism the body has to respond to the increase in temperature of the body to bring the temperature back to its stable state.

Next, let's talk about why you get thirsty and why your urine color might change in exercise. The loss of water in sweat occurs because water moves from the bloodstream to the skin in sweat. Take a look at this graph of blood volume changes over time in exercise.



We can see that blood volume decreased during two instances of exercise. First, during the moderate effort exercise, it decreased by about 10%. Then, during the max effort exercise, it decreased by 10-20%.

The body has ways of preventing it from losing too much water, which is what happens when your blood volume decreases. Let's again look at this model to see how that happens.

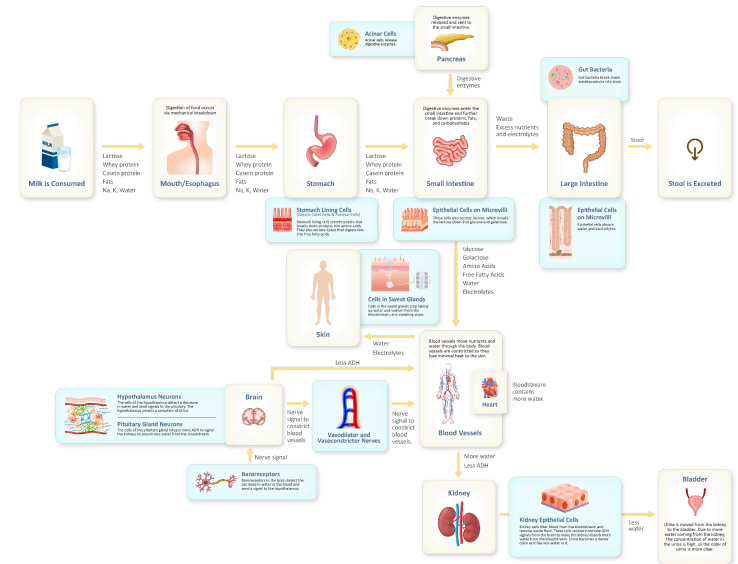


Exercise Effects Model from Lesson 12

Osmoreceptors detect the decrease in water in the blood and send a signal to the brain. The hypothalamus in the brain receives the signal from the osmoreceptors. This results in the sensation of thirst and an increased production of ADH from the pituitary gland in the brain. The pituitary region of the brain sends ADH to the kidney via the bloodstream to absorb less water from the blood, leading to less water moving to the bladder, where it is stored as urine. The urine color becomes darker. This process is also a negative feedback loop and is how the body prevents additional water loss.

Now, these effects of exercise on the body might sound alarming, but they are all part of your body's natural response to try to maintain stable conditions.

Milk can also help your body recover from these effects. Let me show you.



Recovery model from Lesson 12

In recovery, when someone stops exercising, they cool down. The temperature change is detected by thermoreceptors, which send a signal to the hypothalamus, which then signals the sweat glands to stop sweating. When someone drinks milk, the water in the milk moves through digestion into the bloodstream, which brings the amount of water in the blood back to its stable state. The osmoreceptors detect this change, cease the sensation of thirst, and send less ADH to the kidneys. The kidneys can now absorb more water from the bloodstream, passing it on to the bladder as urine. Urine is a lighter color as a result.

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| How to Achieve This Level | Student completes 0-1 out of 4 Look Fors | Student completes 2-3 out of 4 Look Fors | Student completes 4 out of 4 Look Fors |
|----------------------------------|--|--|--|

| Part 2 Look Fors | Prompts to Support Students in Improving on Look Fors |
|--|---|
| <p>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) (INFO-H5).</p> <ul style="list-style-type: none"> You can use the class consensus model, data sets, and/or models from any other resources from the module. | <p>Ask students to return to their resources from the unit and choose appropriate graphics, diagrams, data, or other visual resources.</p> |
| <p>Clearly communicate scientific information in a way that is appropriate for your chosen audience (INFO-H5).</p> | <p>Ask students to compare their presentation language to the scientific explanations they wrote in the module and reflect on how they modified the language to be appropriate to their chosen audience. What terms and ideas did they simplify? Which did they make more complex? What would their chosen audience prefer?</p> |
| <p>Describe how exercise can destabilize water balance in the body and how negative feedback mechanisms in the body and the consumption of milk can help the body return temperature and water balance to its stable state (LS1.A-H4, SC-H3).</p> | <p>How did you describe the feedback mechanisms associated with water levels? With temperature? How did you describe how water in milk can help the body during exercise recovery?</p> |
| <p>Describe how the functions of multiple kinds of specialized cells contribute to maintaining and adjusting water levels in the body in response to changes in the body's conditions (LS1.A-H1).</p> | <p>Identify at least three different kinds of specialized cells from the module resources and incorporate those into your presentation.</p> |

To Support Students in Revising Their Tasks Based on Peer or Teacher Feedback

- Prior to submitting their work, hold a peer-feedback session using a protocol such as [Tell-Ask-Give](#) or with norms such as [SPARK](#). Alternatively, students can utilize the Peer Feedback Form. Students can use this feedback to revise their presentations in this lesson, in upcoming modules, and/or in the final unit performance task.
- After submitting their work and receiving feedback and a grade, hold a session for students to norm on the features of high-quality work. Choose three samples of student work (one Emerging, one Developing, and one Proficient), anonymize them, and distribute them to students. Ask students to analyze the three samples of work and annotate what features of the work are high-quality examples of the Look Fors and what features are not. Share the features of high-quality work that students identified and ask them to point to specific examples in the work samples. Build a class list of features of high-quality work. Then, allow students time to revise their work based on the list they generated and resubmit it for a revised grade.