A Race Around the School

Supporting Active Muscle Cells Cluster (Lessons 1,8–10, and 12)

Amelia and Jacob ran a race around the school. While running, Jacob noticed his heart was beating really fast and he was breathing very hard. After the race, he asked Amelia if she knew why his body was doing these things.

"Your muscle cells have to work harder when you exercise," Amelia explained. "Your heart beats faster and you breathe deeper to help your muscles do the extra work."

Explain how deep breathing and a faster heartbeat help muscles work harder.

TEACHER NOTE:

Use this assessment after teaching Lesson 9.

EVALUATION GUIDELINES:

When evaluating student answers, consider whether they include the following elements in their written explanations:

- When muscles are active, they use more oxygen, nutrients and water. These materials produce the energy needed to move.
- The heart beats faster to pump more blood during exercise. The blood delivers more oxygen and nutrients to the muscle cells so they can continue to function properly.
- Although not the focus of the lesson, students might describe how blood delivers water to the muscle cells.
- Students might also describe how muscles produce more waste (carbon dioxide) when active.
- In addition, they might explain how blood removes waste and how exhaling removes waste (carbon dioxide).

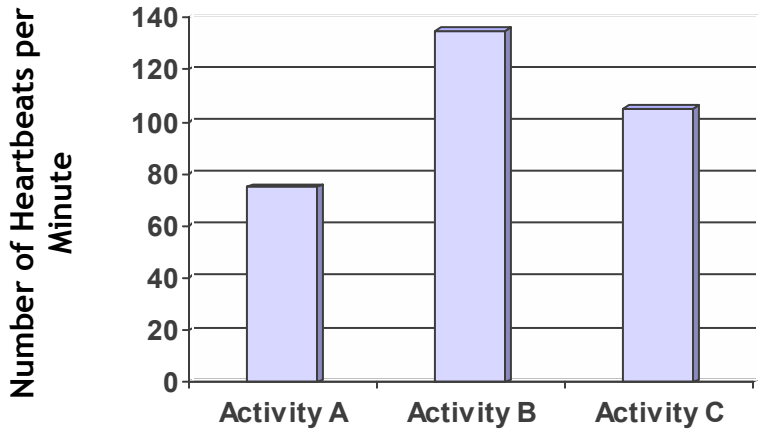
Supporting Active Muscle Cells Cluster

Quick Check Items

TEACHER NOTE: The following questions relate to the Supporting Active Muscle Cells cluster. Use them after teaching the entire cluster, or select the applicable questions immediately following each lesson. You can also compile Quick Check items into an end-of-unit assessment.

1. (Lesson 8) Blood carries _____, _____, and _____ to muscle cells so they can make energy. *oxygen, water, and nutrients*

Use the following graph to answer question 2:



2. (Lesson 8) A woman recorded her heart rate while she did three different things. Based on her results, write down the letter of the activity you think matches her heart rate.

Taking a slow walk	____	*C*
Sitting down	____	*A*
Sprinting	____	*B*

3. (Lesson 8) True or False? If false, rewrite the statement to make it true.

When you exercise, your heart beats faster. _____ *true*

4. (Lesson 8) You checked your pulse for 15 seconds and counted 20 throbs. How fast is your heart beating per minute (heart rate)?

   TEACHER NOTE: Students will use this space to work out their calculations.
   There are 60 seconds in a minute (4 groups of 15 seconds).
   20 x 4 = 80

   ____ *80* beats per minute

5. (Lesson 9) Which gas enters your body when you inhale? _____ *oxygen*

6. (Lesson 9) Which gas exits your body when you exhale? _____ *carbon dioxide*

7. (Lesson 9) The main organs of the respiratory system are:

   a. nostrils

   b. kidneys

   c. *lungs*

   d. intestines

8. (Lesson 10) What does the digestive system do for the body?

   a. sends and receives signals along nerve pathways

   b. takes in oxygen and rids the body of carbon dioxide

   c. circulates blood

   d. *breaks down food into nutrients the body can use*