# **STUDENT GUIDE** ENGAGE LESSON 15



### Part 1: Our Motivation

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

# Part 2: Experiencing and Recording the Changes in Our Bodies Between Rest and High-Intensity Exercise

Choose one of the following high-intensity workout options to conduct an experiment:

- Choose a combination of bodyweight exercises (for example, five burpees, five pushups, five squats, and five squat jumps) and do them consecutively, as fast as possible, with no stopping. Repeat if necessary to fill the 45 seconds.
- Sprint approximately ½ to 1 lap around a track or about 200 400 m
- Do a shuttle run in the gym where you run from the baseline to the free throw line and back, baseline to the half line and back, and baseline to the other baseline and back, or as far as you get in 45 seconds.
- Jump rope as fast as you can for 45 seconds.
- Go all out on an exercise bike, rower, or other stationary fitness equipment for 45 seconds
- Sprint up a flight of stairs, do five bodyweight exercises, jog back down the stairs, and repeat.

Before completing the workout, record your resting heart rate and breathing rate in the "Resting/Before Workout" column in the data table below. Use the graphics below to calculate your rates.

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### Directions:

- 1. Complete the high-intensity workout you chose. Exert yourself for 45 seconds at your maximum effort.
- 2. Immediately after the workout, record your heart rate and breathing rate, as well as any other changes you notice in your body during this time.

# MeasurementResting/Before WorkoutAfter WorkoutHeart rate<br/>(beats/min)Breathing rate<br/>(breaths/min)Other Observations

### **High-Intensity Workout**

### Part 3: Identifying Patterns in Data and Observations

Use the space below to capture the class consensus on the near universal changes noticed during/after high intensity workout.

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### Part 4: Interpreting and Analyzing Data

Using the Lesson 15 Data Set handout, review the workout data and summarize the investigation plan that researchers used to gather the data.

After reviewing the data, summarize the general findings below.

### Part 5: Constructing Initial Explanations

Use prior experiences (including your existing science knowledge or related experiences), data collected during your workout, and evidence from the recovery data set we looked at to construct an initial scientific explanation that answers our Module Questions: *Why are there so many changes to my body during exercise? How does milk help with recovery?* In your explanations, be sure to describe:

- Why do you think breathing rate and heart rate increase during exercise?
- Why do you think muscles fatigue and burn during exercise?
- Where does the body get energy to move the muscles during exercise?
- How does drinking milk help recovery of the body's energy for performance in a second workout?

Compare your explanation to that of your classmates, and record areas of agreement and disagreement.

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Parts of the Explanation We Agree On	Parts of the Explanation We Disagree On

### Part 7: Asking New Questions

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Record any new questions that you have that might help you:

- Find additional information about why the changes occur in our body during exercise.
- "Fill in a gap" in your explanation or our class explanation.
- Settle an area of disagreement that we've identified in our explanations.