

## Activity: Assessment of Exercise Metabolism



### Introduction

To assess exercise metabolism in an exercise physiology lab, you would use a metabolic cart. The athlete runs on a treadmill or cycles, wearing a facemask or mouthpiece with nose clips, with tubes connecting them to the cart. The metabolic cart is calibrated with  $O_2$  and  $CO_2$  gasses, and will tell you the amount of  $O_2$  consumed and  $CO_2$  produced by the athlete. Since  $O_2$  is used for aerobic metabolism, and  $CO_2$  is the byproduct, measurement of these gasses is used to estimate the amount of carbohydrate and fat used for energy and various exercise intensities.

The **Respiratory Exchange Ratio (RER)** is the ratio of carbon dioxide produced to oxygen consumed. Based on their chemical structures, fat and carbohydrate differ in the amount of  $O_2$  used and  $CO_2$  produced during oxidation. Therefore, calculating RER from the metabolic cart data gives an indication of how much fat and carbohydrate is being used for energy at a given intensity.

Since you do not have a metabolic cart to conduct an experiment, in this activity you will estimate the changes you expect to see in RER at different intensities and with different pre-exercise feeding.

### Part 1: RER Values

Based on what you learned in lecture, fill in the following table:

R	% Fat	% CHO
0.70	<input type="text"/>	<input type="text"/>
0.85	<input type="text"/>	<input type="text"/>
1.0	<input type="text"/>	<input type="text"/>

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## Part 2: Estimate RER in Different Conditions

On the graph below, draw a line to show how you think RER will change with increasing exercise intensity in the following conditions. You will use different color lines, drawing all three on the same graph:

**RED:** the athlete begins the test in the morning after an overnight fast

**BLUE:** the athlete has eaten scrambled eggs and coffee for breakfast two hours before the test

**GREEN:** the athlete has eaten pancakes, strawberries and orange juice two hours before the test

NOTE: while you're being asked to draw changes in RER as intensity increases, this is a learning activity. When measuring RER in the lab, you would get the value from the metabolic cart at a steady state of exercise.

