

Activity: Fluid Balance

Introduction: Every individual has a unique sweat rate, determined by factors such as genetics and training status. Sweat rate will also vary based on the intensity of a particular exercise, the environment and type of clothing or gear worn. Conducting a fluid balance test will help an individual determine their unique sweat rate in the environment they are tested.

A fluid balance test is conducted by measuring changes in body weight and actively monitoring all fluids consumed and urine output during the testing time. The most accurate results are obtained by obtaining a nude body weight. Since this is rarely practical, individuals are asked to wear minimal clothing, preferably compression shorts and a sports bra for women. The results of this lab exercise will provide fluid needs for the specific environmental and exercise conditions.

In this virtual lab experiment, you will determine your own sweat rate from a fluid balance test. It is ideal to weigh all beverages consumed and urine output; however, since you may not have a beverage scale at home, we will estimate with ounces of fluid.

Supplemental reading: [SSE #161: Sweat Testing Methodology in the Field: Challenges and Best Practices](#) [Baker, L. 2016].

Materials

Body weight scale
Beverages of choice
Bike, treadmill, or other mode of exercise
Towel
Disposable container for urine collection (if needed)
Smartphone app for temperature and humidity

Pre-Test Preparation

- Decide on an exercise mode. Choose an exercise that can be sustained for at least 30 minutes.
- Record the number of ounces of full containers for all beverages you expect to consume during the test, if any. Record on the data sheet
- Use the restroom before beginning
- Obtain a pre-exercise body weight wearing minimal clothing, ideally compression clothing. Remove all jewelry. Record on the data sheet.
- Record the temperature and humidity from your app on the data sheet

Only exercise if you are good physical condition and not under doctor's orders to avoid physical activity. If you are not able to exercise, consider conducting this activity using an appropriate individual as the exerciser.

- Record the time and begin exercise
- If you need to urinate during the test, collect the urine and measure the amount in ounces the best you can
- At the end of exercise, record the time on the data sheet
- Dry off as much as possible and obtain a post-exercise body weight, in the exact same clothing as worn for the pre-weight. Record on the data sheet.
- Record the remaining ounces of fluid and record on the data sheet.
- Use the [fluid loss calculator](http://www.GSSIweb.org) at www.GSSIweb.org to calculate sweat rate

Data Collection

Type of Exercise: _____

Temperature: _____ Humidity: _____

Exercise Start Time: _____ Stop Time: _____

Pre-Exercise Body Weight: _____ (kg or lbs)

Post-Exercise Body Weight: _____ (kg or lbs)

Fluid

Bottle #	Pre-Exercise [oz]	Post-Exercise [oz]	Difference [oz consumed]

Urine produced _____ oz

Data Analysis

What is your sweat rate?

How much did your weight change? Convert pounds to percent body weight.

Write 1-2 paragraphs analyzing your results. Items to consider:

- How much fluid did you consume compared to your sweat rate?
- Did you gain weight? What does that mean?
- If you lost weight, what was your percentage weight loss? Was it less than 2%?
- Based on your results, how would you change the amount of fluid you consume?
- Describe your environment? How would you expect your results to change if it was hotter or colder?