NAME:_____

HPER 3970 SPORTS NUTRITION
LAB #2: FLUID BALANCE AND REPLACEMENT

Purpose

Today's demonstration laboratory is intended to provide examples of the thermoregulatory responses to exercise and, more importantly, the calculation of sweat rate based on acute body weight changes.

Two volunteers will exercise for 30 minutes. One volunteer will exercise in a hot/humid environment and will be allowed to ingest fluids ad-libitum. The other volunteer will exercise in a thermoneutral environment and will be restricted from fluid consumption.

We will measure internal (core) temperature, heart rate, and plasma volume changes. We will then compare the responses between the individuals.

Volunteer #1 (Thermoneutral Environment):

Name: _____ Temperature: _____
Relative Humidity: _____ Workload: _____
Exercise Time: _____

Pre-Exercise Body Weight: _____ Pre-Exercise Hematocrit: _____
Post-Exercise Body Weight: _____ Post-Exercise Hematocrit: _____
Δ Plasma Volume (%): _____

Heart Rate (BASE): _____ Heart Rate (20 min): _____
Heart Rate (10 min): _____ Heart Rate (30 min): _____

Core Temperature (BASE): _____ Core Temperature (20 min): _____
Core Temperature (10 min): _____ Core Temperature (30 min): _____

Volunteer #2 (Hot/Humid Environment):

Name: _____ Temperature: _____
Relative Humidity: _____ Workload: _____
Exercise Time: _____

Pre-Exercise Body Weight: _____ Pre-Exercise Hematocrit: _____
Post-Exercise Body Weight: _____ Post-Exercise Hematocrit: _____
Δ Plasma Volume (%): _____

Heart Rate (BASE): _____ Heart Rate (20 min): _____
Heart Rate (10 min): _____ Heart Rate (30 min): _____
Core Temperature (BASE): _____ Core Temperature (20 min): _____
Core Temperature (10 min): _____ Core Temperature (30 min): _____

Fluid Ingestion:

B#1 Pre-Ex. Weight: _____ B#1 Post-Ex. Weight: _____ B#1 Diff: _____
B#2 Pre-Ex. Weight: _____ B#2 Post-Ex. Weight: _____ B#2 Diff: _____
B#3 Pre-Ex Weight: _____ B#3 Post-Ex. Weight: _____ B#3 Diff: _____

Total Fluid Consumed: _____

Calculations/Questions

Volunteer #1 (Thermoneutral Environment):

Sweat Rate Calculation:

C	D	E	F	G	H	I	J
Body Weight (kg)		Δ BW (g) (C-D)	Drink Volume (mL)	Urine Volume (mL)	Sweat Loss (mL) (E+F-G)	Exercise Time (min)	Sweat Rate (mL/min) (H/I)
Pre-EX	Post-EX						
			N/A	*N/A*			

1. Based on the data collected, calculate the following:

   Δ BW (g) (Column E): _____

   Sweat Loss (mL) (Column H): _____

   Sweat Rate (mL/min) (Column J): _____

   Sweat Rate (mL/hour): _____

   Recommended Fluid Intake (mL/hour) to stay euhydrated (this exercise): _____

   How much fluid should this person drink over
   65 minutes of exercise to remain euhydrated: _____

2. Based on the data collected, calculate the following:

   % change in HR from **10-30 minutes**: _____

   % change in core temperature from **BASE to 30 min**: _____

   Hint: % change = ((Final Value – Initial Value) / Initial Value) × 100

Volunteer #2 (Hot/Humid Environment):

Sweat Rate Calculation:

C	D	E	F	G	H	I	J
Body Weight (kg)							
Pre-EX	Post-EX	Δ BW (g) (C-D)	Drink Volume (mL)	Urine Volume (mL)	Sweat Loss (mL) (E+F-G)	Exercise Time (min)	Sweat Rate (mL/min) (H/I)
			N/A	*N/A*			

1. Based on the data collected, calculate the following:

   Δ BW (g) (Column E): _____

   Sweat Loss (mL) (Column H): _____

   Sweat Rate (mL/min) (Column J): _____

   Sweat Rate (mL/hour): _____

   Recommended Fluid Intake (mL/hour) to stay euhydrated (this exercise): _____

   How much fluid should this person drink over 65 minutes of exercise to remain euhydrated: _____

2. Based on the data collected, calculate the following:

   % change in HR from **10-30 minutes**: _____

   % change in core temperature from **BASE to 30 min**: _____

   Hint: % change = ((Final Value – Initial Value) / Initial Value) × 100