**Research Methods 1 (Module)**

**Module: The Scientific Method**

**Subtopic: The Scientific Method  
-**first begin by studying the existing collection of information about the world (previous work published by other scientists, which helps them build…-**Step 1: Theory:** General set of ideas about the way the world works  
-**Step 2: Hypothesis:** Testable statement guided by theories that make specific predictions about the relationship between variables  
-**Step 3: Research Method:** The way in which the hypothesis will be tested  
-**Step 4: Collect Data:** Taking measurements of the outcome of the test  
-**Step 5: Analyze Data:** Understand the data and discover trends or relationships between the variables (accept or reject original hypothesis)  
-**Step 6: Report Findings:** Publish articles in scholarly journals (submission is reviewed by experts; ensures research is meaningful)  
**-Step 7: Revise Theories:** To include new information into our understanding of the world  
**-Paradigm Shift:** particularly dramatic change in our way of thinking  
\*The scientific method provides a standardized process for scientific research; minimizes biases, conflicts and other problems in order to promote accurate results and scientific discourse

**Module: Conducting an Experiment**

**Subtopic: Testing a Hypothesis**-**Anecdotal evidence:** evidence gathered from others or self-experience (to support or refute hypothesis)  
-**1.** Single experience might not be representative  
-**2**. Personal experience might not represent others  
-**3.** Cannot be sure that result is due to energy drinks alone

**Subtopic: Using an Experiment**-**Experiment:** scientific tool used to measure the effect of one variable on another  
-**Independent Variable:** variable manipulated by the scientist  
-**Dependent Variable:** variable being observed by the scientist

**Module: Control Groups**

**Subtopic: Using Control Groups  
-Experimental group:** receive the manipulation of the independent variable  
**-Control group:** will not receive manipulation of the independent variable  
-groups should only differ in independent variable (be as similar as possible); difference must be due to independent variable

**Subtopic: Within Subjects Design**-**Within Subjects Design:** manipulating the independent variable within each participant to minimize the effect of external variables on the dependent variable (using same subject repeatedly)  
-**Practice Effects:** improved performance over the course of an experiment due to becoming more experienced; can reduce control of experiment  
**-Between Subjects Design:** one group of subjects receive experimental manipulation; one group acts as the control group  
-**Confounding Variable:** a variable other than the independent variable that has an effect on the results

**Module: Sampling**

**Subtopic: Selecting Participants**-specific criteria may be hard to meet; limiting scope of conclusions  
-results from very specific groups of participants CANNOT be generalized to other groups  
**-Population:** general group of people we’re trying to learn about  
-**Sample:** selected members of population that we are actually collecting data from  
-**Random Sample:** choosing a sample at random from the entire population  
-**Random Assortment:** assigning subjects to either the experimental or control group at random to avoid any biases that may cause differences between the groups of the subjects

**Module: Conducting an Experiment:**

**Subtopic: Participant Biases  
-Placebo Effect:** effect that occurs when an individual exhibits a response to a treatment that has no related therapeutic effect  
-**Participant Bias:** when a participant’s actions in an experiment influence the results outside of the manipulations of the experimenter  
-**Blinding:** when participants do not know whether they belong to the experimental or control group, or which treatment they are receiving

**Subtopic: Experimenter Biases  
-Experimenter Bias:** actions made by the experimenter, unintentionally or deliberately, to promote the result they hope to achieve  
-**Double-Blind Studies:** experiments in which neither the experimenter nor the participants know which group each participant belongs to