Scientific Processes – Important Terms

**Observations** – data that are descriptions of qualities such as shape, color, etc.; these are acquired through use of one’s senses

a. **Objective observation** – an observation based on fact

   *Ex. I feel my heart beating faster after running in place.*

b. **Subjective observation** – an observation based on opinion

   *Ex. Jim looks more tired than Tina after running in place.*

**Inference** – an explanation that tries to make sense of your observations; these explanations may not be true and can be impacted by ones prior experience/knowledge

*Ex. Perhaps Jim looks more tired than Tina because his heart is beating faster than hers.*

**Hypothesis** – a working explanation or trial answer to a problem; an educated guess; can be written in the form of “if…then…because…” statement

*Ex. If an individual increase his/her activity level, then their heart rate will increase because the body’s muscles (cells) will require more oxygen to function at a higher level. A faster beating heart will increase blood flow; thus, allowing an increased concentration of oxygen to reach the cells in need.*

**Control group** – a group of subjects in an experiment who are not given any special treatment; something that is not manipulated

*Ex. The resting heart rate represented the baseline heart rate to which any increase in activity level was compared to.*
Constants – factors in an experiment that are kept the same and not allowed to change

_ex. One minute was consistently the amount of time allotted to perform the necessary activity (walking, running, etc.)._

Variables – things or factors that can be assigned or take on different values in an experiment

a. Independent variables - variables that are purposely changed or manipulated

_ex. The activity level (resting, walking, running) was purposely changed_

b. Dependent variables – variable that may change as a result of the independent variables

_ex. The person’s heart rate changed as the activity level changed_

Quantitative data – data consisting of numbers

_ex. The person’s heart rate (80 beats/minute)_

Qualitative data – data consisting of verbal descriptions or information gathered using scales without numbers

_ex. Describing a person’s heart rate with words (fast or slow)