b. **Step 2 - State the Question**: You come up with a question based on your observations. Scientific questions are questions about the natural world. Only those questions that can be answered by observing, measuring, or investigating are considered scientific questions.

Write a scientific question that could be answered in an experiment for each topic listed below:

Laundry detergent – Ex – Which brand of laundry detergent removes grass stains the most effectively?

Free throw percentage in basketball – Ex – Does a person's height impact their ability to accurately make a free throw?

Candy – Ex – Which candy bar will melt the fastest when left in the sun?

c. **Step 3 - Form a Hypothesis**:

This is a possible explanation for a set of observations or answers to a scientific question. They must be testable.

How to write:
Can be a statement written in the form of IF….. THEN

Ex: If I water my plants more, then they will grow taller.

FYI: In higher level science classes you may be required to write a I think or I believe hypothesis statement. `

You try one on your question for candy:

If I put candy bars out in the sun, then Hershey bar will melt the fastest.

d. Step 4 - Experiment:

This is a plan that states HOW you will test your hypothesis. It is a logical outline that guides the gathering of information. It must be repeatable and should be repeated as many

times as possible. Experiments should avoid bias (personal opinion) as well.

Terminology:

Variables(3 types)

1. Independent Variable: (manipulated)

The variable that is purposely changed. It is what you are testing in your experiment. Only ONE at a time per experiment.

2. Dependent Variable: (responding)

The factor that might change as a result of the independent variable. This is the result or effect of changing the independent variable. It's what you expect to happen. For example, if you add fertilizer to plants, you expect them to grow taller.

3. Controlled Variables:

The variables that are the same in BOTH the experimental and control groups. They don't change.

Groups (2 types)

1.Experimental Group(s): Receives the independent variable being tested AND all the other controlled variables.

2.Control group: Receives the same variables as the experimental group, EXCEPT it does NOT receive the independent variable. Most experiments have a control group so that you know if your independent variable is actually causing the result you observe.

Read the following description of an experiment and identify the terms:

- Darryl's thought that listening to music would make taking tests easier. His parents thought it was a terrible idea, but he convinced his teacher to let him try out his hypothesis. Darryl decided to test this idea with an experiment on his class. Each Friday his language arts class took a vocabulary quiz on 25 words. With his teacher's permission, Darryl played music in the classroom while the class took the test

on the first Friday. On the following Friday, the class took the test in the normal quiet music-free classroom. Both tests were conducted in the same room and at the same time of day. All students sat in their assigned seat for each quiz. Both quizzes were the same format. Darryl calculated the average score on the two vocabulary quizzes. The music group had an average score of 93. The non-music group had an average score of 89.

Independent Variable: Music played during the quiz
Dependent Variable: Average on the quiz (increase)
Experimental Group:First group with music
Control Group: Second group without music
Controlled Variables: same room, same seat, same class, same subject, same teacher, same quiz type, same students

- Kay wanted to see if fertilizer helped her Venus fly trap grow taller. She set up the following experiment: She put 2 plants on a window sill and made sure they had the same

type of pot and soil. She gave each plant 5 ml of water each day and kept them in the sun for 9 hours. She gave 5 grams of fertilizer to only one of the plants each week and recorded the growth for 3 weeks.

Independent Variable: fertilizer
Dependent Variable: Growth of plants
Experimental Group:The plant that got the fertilizer
Control Group: The plant that did not get fertilizer
Controlled Variables: type of plant, type of pot and soil, same amount of water and sunlight, same location

Identify the independent and dependent variable for the following:

1. If acid rain is in the water, then the amphibian population will decrease.

   Independent Variable:Acid rain
   Dependent Variable: amphibian population

2. If plants are watered daily, then the plant's rate of growth will increase.

   Independent Variable: Watering daily
   DependentVariable: Rate of growth

3. What effect does high temperature have on seed germination?

   Independent Variable: High temp
   Dependent Variable: seed germination

4. What effect does food color have on the amount of food fish eat?

   Independent Variable: Food color
   Dependent Variable: amt of food fish eat

5. The amount of clothing I wear depends on the temperature.

   Independent Variable: Temp
   Dependent Variable: Amt of clothing