Incoming Freshman Science Summer Assignment

Investigation Design and Implementation

Purpose and Rationale:

The beginning of the school year is a busy time of adjustment, especially for new students. As La Salle science teachers, we are convinced that you will find science class at the high school level to be more active and involved than what you experienced in your middle school years. To help make this a smooth start for you, we have created a summer assignment that will stir your interest, is self-directed, and introduces you to a number of important concepts associated with the process of scientific inquiry – this being the cornerstone of all scientific exploration. This open-ended summer assignment is intended to provide you with a flexible learning experience that begins to stress the ownership of your work/research. Science Summer Assignment details are provided within this outline; please read it carefully. The Science Summer Assignment will be due at the end of the summer, during the first week of school. Expect your teacher to provide details associated with submitting the assignment into the drop box within the school's student portal; again, this will be collected during the upcoming start of classes. Assignments will be reviewed and graded by the appropriate subject area team. The score you earn will be your first significant grade in Science as a freshman.

Materials:

- Access to a computer with an internet connection and "word" processing software
- Access to a digital camera
- Length measuring instrument (tape measure, ruler, yard stick, or meter stick)
- At least one other measuring instrument (timer, thermometer, balance, *etc*.)

Project Directions:

1. Each student will begin the Science Summer Project by reading and reviewing this resource in its entirety.

2. Each student will create a digital journal/lab notebook using a "word" processing program. This completed journal will be the culminating product of your summer assignment. It will include written as well as photographic entries. Expect it to start off as a narrative that resembles entries of a diary. Over time, it will include notes and more formal pieces of objective information (aka data). Each journal entry should be dated and at least a paragraph in length. Make a serious attempt to keep your thinking organized while using correct spelling and proper grammar. A journal submission should be entered each time you work on your project. The document should be saved and named using the following naming template: LSSCIENCESUMMERSCIENCEPROJECT**LASTNAMEFIRSTINITIAL** Please use all caps and no spaces. An example for a student named John Smith would be LSSCIENCESUMMERPROJECTSMITHJ

3. Once a general understanding of the project is developed, you will need to watch 3 public domain videos before proceeding to the creation and implementation of the actual investigation. These resources will provide context for the ideas and terminology associated with the project. It is suggested that you take notes on these audio-visual resources – include them in your journal. They include:

The Role of Science https://www.youtube.com/watch?v=mVffDBjmdXE

The Scientific Method https://www.youtube.com/watch?v=SMGRe824kak

Making Observations https://www.youtube.com/watch?v=3MRHcYtZjFY

4. Creating Your Investigation:

Each student will design and conduct a simple outdoor investigation. The focus will be on making and documenting observations. One primary goal will be to interpret the data collected into a meaningful written conclusion.

Each student's investigation will involve selecting 2 areas measured 1 meter by 1 meter (1 m x 1 m = 1 m^2). These spaces are recommended to be in your yard or driveway. If you do not have a traditional yard or driveway, consider using some other available open and unobtrusive public space (like a park). Keeping them close or next to each other is convenient, but not necessary. These standard size areas will become your project's laboratory.

Each investigation will need specific required components. As you might expect, it will include a hypothesis, collected observations (data), and some formal conclusion. Your investigation will take shape once you determine what it is that **you** want to investigate, measure, compare and determine. This open-ended component offers obvious flexibility, but can also pose the greatest challenge to developing students of science. A good place to start is to determine your 1m^2 areas and observe the space(s) for at least 10-minutes. Record your initial observations in your time/dated journal. Think carefully about what you observed; do not rush into a commitment here. Determine what you want to investigate in the days ahead. Example ideas are included below – try to come up with one of your own.

Develop your hypothesis (a proposed explanation; what you think will happen) based on what you what you have decided to observe – this is important since it will define your investigation moving forward. Identify the 2 variables you have selected, independent and dependent – these are the physical quantities you plan to compare. The independent variable is what is being controlled by the investigator. The dependent variable is what is compared to what the investigator is controlling. In most cases the physical quantity of time is the independent variable. Secure measuring tools so you can complete your measurements throughout the duration of the investigation.

<u>Example Combinations of Variables:</u>

Number of bugs (ants) counted at different times of the day for 5 straight days.

Temperature of the driveway's (asphalt) surface at the same time every day for a week.

Height of the plant (grass) growth over a period of 10 days.

Number of budding flowers (roses) each day over the course of 1 week.

5. Once you determine what you are measuring, measure it for the first time in your designated areas. Consider taking a digital picture of your spaces.

6. Log a journal entry describing what you did. Include the conditions surrounding what was performed. Include all observations and measurements associated with your work on your investigation. Consider including a digital picture as part of each entry – this is not required for each day, but recommended; use discretion here. Repeat this pattern every time you revisit your areas of investigation. The ideal duration of your actual investigation is 7-10 days; it could be shorter or longer. One popular model here includes revisiting your spaces around the same time every day for 10 days. Another model would be to visit the spaces 3x's a day for 5-days. Other frequency combinations are acceptable. Prioritize your time/day consistency as much as possible – your measurements and their interpretation will likely be more reliable and accurate.

7. Once you make your last visit and complete your final journal entry, finish your Summer Science Project by writing a conclusion. The conclusion should be the last formal entry in your digital journal. It should be a few paragraphs in length. Your official hypothesis, specifically noting your variables, should be clearly identified within your first paragraph. Focus your conclusion on interpreting what you think your collected data (observations and measurements) means.

8. Finally, following your conclusion, create a list of 20 vocabulary words that will serve as an unofficial glossary of terms associated with your investigation. You determine these words based on your interpretation of their importance/significance. Define each term in your digital journal.

In Summary:

*Each student will design and conduct a simple outdoor investigation comparing 2 separate areas of $1m^{2.}$

*Each student will determine 2 variables to investigate and measure over an extended period of time.

*Each student will log entries, including data (measurements, descriptions, pictures), into their digital Science Summer Project journal.

*Each student will write a formal multi-paragraph conclusion identifying their hypothesis and interpreting and relationship that may exist.

*Each student will identify and define 20 vocabulary words that are relevant to their investigation.

Estimated time to complete the Science Summer Assignment: approximately 30 minutes per day over a span of approximately 10 days; totaling approximately 7 hours of work.