Glow Out Lab

As we have discussed, the scientific method is a process that is pivotal to obtain results and draw conclusions. It is the universal language for scientists and has been used for many years. Today, we are going to work through an experiment. As you and your group complete this experiment, notice the steps involved, specificity, variables, data collections, as well as other aspects because you will create your own experiment in the very near future!

**Background information: What makes a glow stick work?**

Light is generated by a chemical reaction called “chemiluminescence”. Typical glow sticks use chemical reactions. A hydrogen peroxide solution is used as an activator, while a solution on phenyl oxalate ester and fluorescent dye is used to make the color. The activator is stored in a thin glass capsule. When the glass capsule is broken – by flexing the glow stick – the activator is released and mixing the components by shaking the glow stick initiates the reaction. Depending on the components used, the chemical reaction can allow the glow sticks to glow from a few minutes to many hours.

**Step 1: Problem**

*Does temperature affect the reaction of the glow stick?*

**Step 2: Hypothesis**

*Using observations, you have made with prior knowledge, create a hypothesis to answer the following question: Which glow stick will burn the brightest (hot water, room temperature water, cold water)?* ***Remember: Any hypothesis is written as an “if-then” statement***

Hypothesis:

**Step 3: Set-Up**

1. What is the independent variable?
2. What is the dependent variable?
3. What is the control group?
4. What are some variables you should keep constant?

**Step 4: Procedure**

1. Obtain 3 glow sticks.
2. Write 3 observations about the inactivated glow sticks in the data collection section (Step 5).
3. Make a data table to record your observations while the glow sticks are in the water in the data collection section (Step 5).
4. Obtain 3 beakers of water. One beaker must contain hot water, the second beaker contains room temperature water, the third beaker contains cold water.
5. Activate your glow sticks at the same time.
6. Write 3 observations about the activated glow sticks in the data collection section (Step 5).
7. At the same time, place one glow stick in eachbeaker.
8. Keep the glow sticks in the container for 10 minutes.
9. At the end of 10 minutes record the brightness in the data table you made for each of the glow sticks using the following measurements: ***Dull Glow, Just Lights Up, Super Bright Glow***.
10. Clean up your table
11. Organize your data and answer the following questions.

**Step 5: Data Collection**

*In order to draw conclusions, a scientist must record data. This data must be easy to understand for an outsider. Therefore, it must be clear, organized and fairly concise. Write down the following observations and create a final data table.*

**Initial Observations:**

1.
2.
3.

**Glow Stick Activation Observations:**

1.
2.
3.

**Data Table:**

**Step 6: Analysis**

*Discuss the data. Be sure to refer to the data table and observations you made previously.*

1. Did we collect qualitative or quantitative data?

How do you know we collected that kind of data?

1. Describe the difference between quantitative and qualitative data.

1. In the space below write an analysis of what happened in the lab based on the data ***your group*** recorded.

1. Please list two sources of possible human error
	1.
	2.
2. Why would retesting the experiment be valuable?

**Step 8: Conclusion**

*Accept or reject your hypothesis based on the analysis. This conclusion should restate the hypothesis as well as use data as support.*

***\*\*You will be writing a claim-evidence-reasoning using your data plus the other classes data – please record your final data in the google form using one phone in your group\*\****