**LAB skill workshop**

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| MATERIALS |
| **Materials:** Complete list of all the things you need  THINK: Ingredients for a recipe   * + List as bullet points   + Accurate and specific so that it can be replicated or done again by others   + Example:   + Don’t say: beaker   + Say: 200 ml beaker   **Example: Circle the parts that are specific.**   * 4 quarter pieces of Alka-Seltzer tablets * 2 half pieces of Alka-Seltzer tablets * 1 whole piece of Alka-Seltzer tablet * 100 mL of Water * 250 mL Beaker * Stop watch   **Exercise:** Point out what is wrong with this? How can we change it to make it better?   * Graduated cylinder * Water * Dropper pipette * Balance * beaker   **Corrections:** |
| PROCEDURE |
| **Procedure:** Describe step by step “what to do”  *Reason for specifics:* Experiment could be repeated using your report   * + Steps written in a paragraph with transition words   + Steps are written in past tense, passive voice   + Past tense = happened already (ends with –ed normally)   + Passive voice = **DO NOT** use I, we, you   **Example:**   * Don’t Say: We are taking the temperature every 2 minutes. * Say: The temperature was taken every 2 minutes.   **Things to include:**   * + Be very specific in amount of materials used   **Example:**   * Don’t Say: Samples of milk were placed on a wooden surface * Say: 3-mL samples of 2% milk were placed on a wooden surface.   + How many trials did you do?   **Example:**   * Don’t Say: Count the number of drops it takes for the water to overflow. Repeat. * Say: Count the number of drops it takes for the water to overflow. Repeat the trial 3 times.   + Include a drawing for any equipment |

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| NOTES |
| **Example:** Circle the transition words.  First, add 100 mL of water to the beaker. Next, drop in one quarter piece of Alka-Seltzer. Using the stop watch, observe the length of the reaction. Afterwards, record the length of the reaction in the correct place in the provided Data Table below. Repeat the experiment three more times: once with a half tablet, once with three quarter tablets and once with a whole tablet. Following this step, record your data on the class data table in the front of the room. Then copy the data obtained from the other lab groups. Average the length of reaction from all of the groups for each differing amount of Alka-Seltzer afterwards. Finally, plot the average lengths on a graph (See the Data Analysis section for further details)  **Rewrite this procedure so it is in the passive voice:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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| introduction |
| **INTRODUCTION:** A brief (five sentence) introduction to the experiment should be written at the top of the page. The introduction should state the goals and objectives of the laboratory and describe what data will be collected and how that data will be used to arrive at conclusions at the completion of the laboratory.  **T = Topic (state goals & objectives of lab)**  **I = Introduction of Evidence (what data will be collected)**  **E = Evidence (how it will be collected)**  **D = Development of Evidence (what data might you expect and what conclusion can you come to)**  **C= Conclusion**  ***Label each part of the introduction you see:***  In this experiment, we are looking to test the effect of surface area on the rate of dissolving. In order to do this, we will test the effect of three different surface areas of an Alka Seltzer Table (whole tablet, chunks, crushed) on the rate at which an Alka Seltzer dissolves. We will take data of the time it takes for a whole table, ¼ chunks and completely crushed Alka Seltzer to completely dissolve. If it takes longer to dissolve as you use smaller pieces, that means the surface area has a negative effect. If it takes shorter to dissolve as you use smaller pieces, that means the surface area has a positive effect.  ***What’s wrong with this introduction?***  The purpose of this laboratory investigation is to determine how the magnitude of vibrations affects the amplitude of a seismograph. A seismograph (or seismometer) is an instrument that is used to measure the strength of the seismic waves that occur during an earthquake. The “magnitude of the vibrations” is a term that describes their strength or intensity. The amplitude of a seismograph is the height of the waves traveling through the medium. |

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| conclusion |
| **A conclusion must contain the following:**  **Paragraph 1: Introduction**   * + - **Restate the lab’s problem**     - **State if your hypothesis was correct, incorrect, or inconclusive.**     - **Summarize your results—state any trends you saw and why**   **Paragraph 2: Body**   * + - **Sources of error**     - **Suggestions to improve experiment**   **Paragraph 3: Conclusion**   * + - **Explain how information gained in lab can be applied to real-life situations and how does it relate to major scientific principles, classnotes, or text**     - **State at least one question that you have remaining from the experiment**   ***Label each part of the conclusion you see:***  In my hypothesis, I stated if I increase the surface area of the Alka Seltzer, then the rate at which the tables dissolve increases because the Alka Seltzer has more contact points with water. In this experiment, my hypothesis was proved to be correct. This is evident through my data. For example, the mean rate of the whole tablet took 20 seconds slower than the mean rate of the chunked tablet. In addition, there is a 36 second difference between the whole tablet and crushed tablet.  Overall, the experiment was successful. However, there are some sources of error that probably affected the results of the experiment. One source of error could be how the tablet was broken into pieces. The chunks may not have all been the same size, which could have affected the rate. In the future, a knife could be used to break everything into equal size. Another source of error could be the timing of the test. There is a possibility that the timing could be off because the counting down may not have started immediately after the tablet hit the water. In the future, having one person drop the tablet while someone else starts the stopwatch could help with more accurate timing.  After having completed the experiment, some questions popped into mind. I wonder how would temperature have an impact on the dissolving rate. I also wonder if using a different type of tablet would have an impact.  ***What’s wrong with this discussion/conclusion?***  This lab investigated how the magnitude of vibrations affects the amplitude of a seismograph. In order to study the problem we created three magnitudes of movement and measured the amplitude of each with a seismograph. My results showed the trial with the greatest amplitude was trial three because the table was being hit with the most force, making the table and the pen move more than the other three trials. The trial with the least amplitude was trial two because the table was hit with the least amount of pressure. While observing the experiment, I noticed that the more vibrations or higher magnitude resulted in a higher amplitude on the seismograph. The harder the table was being hit, the higher the amplitude rose. This proves my hypothesis was correct.  I believe the results are accurate because while the experiment was in progress, the frame moved at the same rate as the table. It was proven in trials one through three that the increased magnitude of table movement caused the greatest amplitude differences on the seismograph. It is clear, therefore, that the movement of the frame also corresponds to the amplitude of the seismograph. The bar and marker shared the same relationship with the table and the frame. The more the frame moved, the greater the amplitude on the seismograph.  In order to further investigate this problem, next time I would try the experiment on a different surface and would add additional movements of varying forces for further readings on the seismograph. |

**Now you will try to rewrite your procedure, introduction, and conclusion using the density lab:**

PROCEDURE:

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INTRODUCTION:

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CONCLUSION:

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**Did the writer…**

**Materials:** PEER REVIEWER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Complete list of all the things you need
* List as bullet points
* Uses specific numbers so that it can be replicated or done again by others

**Procedure:**

* Describe step by step “what to do”
* Steps written in a paragraph with transition words
* Steps are written in past tense (ends with –ed normally)
* Steps are written in passive voice = **DO NOT** use I, we, you

**Introduction: :** PEER REVIEWER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* T = Topic (state goals & objectives of lab)
* I = Introduction of Evidence (what data will be collected)
* E = Evidence (how it will be collected)
* D = Development of Evidence (what data might you expect and what conclusion can you come to)
* C= Conclusion

**Conclusion: :** PEER REVIEWER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Paragraph 1: Introduction

* + - Restate the lab’s problem
    - State if your hypothesis was correct, incorrect, or inconclusive.
    - Summarize your results—state any trends you saw and why

Paragraph 2: Body

* + - Sources of error
    - Suggestions to improve experiment

Paragraph 3: Conclusion

* + - Explain how information gained in lab can be applied to real-life situations and how does it relate to major scientific principles, classnotes, or text
    - State at least one question that you have remaining from the experiment