Name: ______________________

**It’s Alive!**

**Background**
The fuzzy stuff that grows on bread is a living organism called *mold*. Mold is only one of the thousands of different types of *fungus* known to the world. Fungi, along with *bacteria* and *viruses* are all different types of *germs*. Like all living things, germs require energy to live and grow. Germs can be spread in a variety of different ways, however one of the most common ways is through touch.

**Prelab Questions**
1. How do people get sick?
2. How are germs spread?
3. How can we stop germs from spreading?
4. What do you think works best for cleaning our hands, using hand sanitizer or using hand soap? Explain why you think that.
5. List some advantages of hand soap.
6. List some advantages of hand sanitizer.
7. How do you know when a chemical change has occurred?

**Problem**
Which hand cleaner is more effective at eliminating germs, hand sanitizer or hand soap?

**Materials**
- White bread
- Ziploc bags
- Liquid hand soap
- Hand sanitizer
- Digital scale

**Safety**
- Always wear safety goggles when handling chemicals in the lab.
- Wash your hands thoroughly before leaving the lab.
- Follow the teacher’s instructions for cleanup of materials and disposal of chemicals.
- Do not consume lab solutions, even if they’re otherwise edible products.
Food in the lab should be considered a chemical not for consumption.

**Procedure**

1. View and discuss the *germs* videos with the class.
2. As a group, read and discuss the prelab questions. Develop and record your hypothesis in your observation log below.
3. In your assigned group, follow your teacher’s instructions to pass around a piece of white bread, making sure that everyone touches it and it is not dropped or set down. Place the piece of bread inside the Ziploc bag for your group labelled “dirty” and be sure to have your teacher spray it with water and seal the bag completely.
4. Following the instructions of your teacher, you and your group members will clean your hands with either hand sanitizer or liquid hand soap.
5. Once all of your group members have “clean” hands, repeat step #3, only this time place the bread into the bag marked “clean”.
6. Have one member of your group weigh each bag using a digital scale and record the information in your observation log.
7. Continue to observe and discuss your group’s samples as directed by your instructor, remembering to complete your logs each time. Be sure to draw and color what you see, as well as writing a few sentences to describe it.
8. Upon completion of the investigation, collaborate with your group members to complete the data analysis portion of the activity, including any necessary calculations (ex: changes in weight or changes in the mold spot size).
9. Compare your group’s data with the data of a different group who used the alternative hand cleaning method. Determine whether or not your hypothesis was correct.

**Hypothesis**

*Which hand cleaner is more effective at eliminating germs? Sanitizer or soap?*

- I think that _______________ will work better because:

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**Observations & Results**

<table>
<thead>
<tr>
<th>Day 1 Date: _______________</th>
<th>Dirty Sample</th>
<th>Clean Sample</th>
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<tbody>
<tr>
<td>Weight</td>
<td></td>
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<tr>
<td>Written observations</td>
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<td>Illustration</td>
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<td>Day _____ Date:______________</td>
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Calculations
Calculate the difference between your starting weights and ending weights for each sample. Create a graph of your data and explain your findings.

Analysis
1. Were any new substances formed? What is your evidence?

2. Was there a difference between your initial sample weights and your final sample weights? What, *if anything*, does this indicate?

3. Did you observe any chemical reactions? How do you know?

4. Based on your observations and data, which substance is best suited for eliminating germs? Why?

5. What are the strengths and weaknesses of the two cleaning methods tested?
6. Was your hypothesis supported? Why or why not?

7. What is the most important thing that you learned in this investigation?

**Conclusion**

Use this sentence starter to help write your conclusion:

"My hypothesis was ____________. I think that __________ worked better because:"