Aspirin Tablets: Are They All the Same?

Background
The primary ingredient in aspirin is *acetylsalicylic acid*, which is usually combined with a nontoxic binder (which may be insoluble). Many people have found that aspirin can cause stomach irritation, so drug companies and manufacturers have developed a variety of coatings or additives that make the aspirin easier on your stomach. "Buffered" aspirin includes an ingredient to lessen the effect of the acid in the aspirin, while safety coated aspirin, also called *enteric*, prevents dissolving in certain conditions. Your task is to test three (3) types of aspirin in different conditions to see how they respond, and then do a little bit of research about why they respond the way that they do.

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.

Materials
- 3 tablets each of: regular, buffered, and enteric aspirin
- Water
- White vinegar
- Baking soda
- Measuring Cup
- Teaspoon measure
- 3 clear colorless glasses (plastic will work as long as clear and colorless)

Exploration
1. You need to perform an experiment using the materials supplied, to explore how the different types of aspirin tablets behave in different types of liquids. The three liquids are: water, white vinegar, and a solution of baking soda (1 tsp per ½ cup water).

2. The data you collect should be both qualitative and quantitative, with a component that can be graphed. Qualitative data can include both anecdotal evidence and pictures.

3. To ensure some consistency, let’s assume that most people take aspirin with at least ½ cup of water. This means that the amount of liquid used for each tablet in your experiment design should be at least ½ cup and should be held to a constant amount. Also, remember that aspirin takes about 20-30 minutes to take effect, part of which time is spent dissolving; therefore your observations should take at least 5-10 minutes per set, to ensure sufficient time for observing any differences in behavior.
Data
Use the following data table as a guide.

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Vinegar</th>
<th>Baking Soda Solution</th>
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</thead>
<tbody>
<tr>
<td><strong>Regular Aspirin</strong></td>
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<tr>
<td><strong>Buffered Aspirin</strong></td>
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<tr>
<td><strong>Enteric Aspirin</strong></td>
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Research questions
1. Write both the chemical and structural formula for aspirin (acetylsalicylic acid).

2. These questions are about the vinegar observations:
   a. Aside from water, what is the other major ingredient in vinegar (please give a name and formula) and what does it have in common, chemically, with your stomach?
   b. Was there evidence of a chemical reaction for any of the aspirin tablets in the vinegar? What obvious type of product appeared?
   c. What is a buffer?

3. These questions are about the baking soda solution observations:
   a. What is the chemical makeup of baking soda?
   b. Is a solution of baking soda acidic, basic, or neutral?
   c. Is the pH of a baking soda solution more aligned with the pH of your stomach or your small intestine?
**Conclusion**
Write a paragraph conclusion that restates your purpose, what you observed, and your conclusion about how your observations are connected to the purpose of the experiment.

Parent Signature _________________________   Date _____________