**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pop Your Top**

****Background Information: When Alka-Seltzer is placed in the same container as water it bubbles and reacts. The container you will be given is an old film canister. When the two react with the top on, the bubbles will build up pressure and force the top to pop off.

Guiding Question: What factors will increase the rate of reaction?

Pre-Lab:

1. *Define the following:*

Rate of reaction- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Collision theory- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Concentration- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Brainstorm: What factors may change the rate of reaction?
2. If a reaction takes longer to complete, does that mean the rate increased or decreased?
3. A student says, “The top will pop off fastest if the water used is hot, the tablet is crushed and the concentration is high.” Write a claim to either support or disprove the student’s statement and defend your prediction.

**Prediction**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Reasoning**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Procedure: You need to time the reaction and then create trials to discover and prove how factors can affect the rate of reaction.

*Our classes’ control trial:*

*Our teams’ variable:*

*Our team’s procedure:*

Materials Needed:

Our Team’s Data: (clearly label)

Class Data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Constants**  **(check all that apply)** | | | | **Results** |
| High temp | Volume | Tablet size | temperature | solvent |  |
| Low temp |  |  |  |  |  |
| Increased surface area |  |  |  |  |  |
| High concentration |  |  |  |  |  |
| Low concentration (change water) |  |  |  |  |  |
| Low concentration (change tablet) |  |  |  |  |  |
| vinegar |  |  |  |  |  |

Questions:

1. Explain how a change in temperature will affect the kinetic energy of the particles in a reaction.
2. Using collision theory, explain how changes in temperature affect the rate of reaction.
3. Using collision theory, explain how changes in concentration affect the rate of reaction.
4. Construct a **claim** that supports or contradicts the prediction made in the pre-lab questions.
5. Provide **evidence** that supports your claim. Use your **reasoning** skills to explain why your evidence is relevant.
6. **Justify** the steps you took to obtain the evidence you obtained.