**Science 10 Chemistry Day 9,10 Changing Chemical Reaction Rate**

***Outcome: Design, carry out and control variables, to illustrate how factors such as heat, concentration and surface area can affect chemical reactions.***

Design an investigation to study the effect of certain factors on how fast a chemical reaction takes place. The reaction we will investigate is the reaction between **Alka-seltzer tablets and**

**water.**

Choose **one** (1) of the following questions to investigate:



* **How does the temperature of the water affect the reaction rate?**

**OR**

* **How does surface area (contact area between the tablet and water) of the Alka-seltzer tablet affect the reaction rate?**

**Possible Materials:**

Alka-seltzer tablets 250 mL beakers Water 100 mL graduated cylinders

Mortar & pestle Thermometer Stopwatch Ice

Kettle

**To Do**

**Day 1:**

1. **Choose** one of the questions above.
2. In a group, develop a **prediction** of what you think will occur as you change either the water temperature or tablet surface area. **Explain** your reasoning.
3. Develop a **procedure** to test your chosen question. See above list of possible materials.
4. Create a **table** to collect data.
5. Have your **teacher approve** your procedure.

**Day 2:**

1. **Conduct** your investigation following lab safety protocol.
2. **Collect data** (reaction time = time from when bubbles start to when bubbles stop) and present in a table.
3. **Answer** analysis questions.

**To Submit (one per person)**

Write-up including:

* 1. Your question
  2. Your prediction & reasoning
  3. Your completed data table
  4. Answers to Analysis questions (below).

**Analysis**

1. What happened to the rate of reaction as you changed either the water temperature or tablet surface area?
2. Talk to a group that investigated the other question. What did they discover?
3. Name one change you would make to improve your procedure.
4. What do you think would happen if you changed either the number of tablets ***or*** the amount of water? Explain.

**Changing Chemical Reaction Rate Evaluation Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **0** | **1** | **2** |
| **Prediction** | *Not done* | *Prediction made but not explained* | *Prediction made with an adequate explanation* |
| **Experimental Design** | *Experimental design is not relevant to the question being investigated.* | *Experimental design is adequate to test the question being investigated, but leaves some unanswered questions.* | *Experimental design is a well-constructed test of the stated question.* |
| **Table** | *Not done* | *Table is present but does not relate to the question being investigated/ does not contain necessary information* | *Table clearly demonstrates relationship between question being investigated and reaction rate and contains titles and units where applicable* |
| **Analysis** | *Answers demonstrate insufficient knowledge of the effect of temperature and surface area on reaction rate.* | *Answers demonstrate adequate knowledge of the effect of temperature and surface area on reaction rate.* | *Answers demonstrate in-depth knowledge of the effect of temperature and surface area on reaction rate.* |

**Total /6**

**Changing Chemical Reaction Rate Evaluation Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **0** | **1** | **2** |
| **Prediction** | *Not done* | *Prediction made but not explained* | *Prediction made with an adequate explanation* |
| **Experimental Design** | *Experimental design is not relevant to the question being investigated.* | *Experimental design is adequate to test the question being investigated, but leaves some unanswered questions.* | *Experimental design is a well-constructed test of the stated question.* |
| **Table** | *Not done* | *Table is present but does not relate to the question being investigated/ does not contain necessary information* | *Table clearly demonstrates relationship between question being investigated and reaction rate and contains titles and units where applicable* |
| **Analysis** | *Answers demonstrate insufficient knowledge of the effect of temperature and surface area on reaction rate.* | *Answers demonstrate adequate knowledge of the effect of temperature and surface area on reaction rate.* | *Answers demonstrate in-depth knowledge of the effect of temperature and surface area on reaction rate.* |

**Total /6**