Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Endothermic vs. Exothermic Investigation**

Our goal as a class is to identify the chemical combination that is the most endothermic. This endothermic combination will be used to design a device which can cool down something as efficiently as possible.

|  |
| --- |
| Question |
| Which combination of chemicals produces the most endothermic reaction? |
| Scientific Knowledge Probe Summary |
|  |
| Prediction |
| Hypothesis:  Reasoning: |
| Investigation Plan |

**Variables**

What are you changing?

What are you measuring?

**Procedure**

For this investigation, you will follow the instructions at each station. For each station, it is important that you take the initial temperature when instructed to, start the timer as indicated in the instructions and record the temperature in your quantitative data every 30 seconds. You should also record the qualitative data.

|  |
| --- |
| Observation |
| |  | | --- | | **Combination #1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | **Qualitative:** | | **Quantitative:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Initial Temp** | **:30** | **1:00** | **1:30** | **2:00** | **2:30** | **3:00** | |  |  |  |  |  |  |  | | |  | | **Combination #2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | **Qualitative:** | | **Quantitative:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Initial Temp** | **:30** | **1:00** | **1:30** | **2:00** | **2:30** | **3:00** | |  |  |  |  |  |  |  | | |  | | **Combination #3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | **Qualitative:** | | **Quantitative:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Initial Temp** | **:30** | **1:00** | **1:30** | **2:00** | **2:30** | **3:00** | |  |  |  |  |  |  |  | | |  | | **Combination #4: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | **Qualitative:** | | **Quantitative:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Initial Temp** | **:30** | **1:00** | **1:30** | **2:00** | **2:30** | **3:00** | |  |  |  |  |  |  |  | | |  | | **Combination #5: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | **Qualitative:** | | **Quantitative:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Initial Temp** | **:30** | **1:00** | **1:30** | **2:00** | **2:30** | **3:00** | |  |  |  |  |  |  |  | | |  | | **Combination #6: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | **Qualitative:** | | **Quantitative:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Initial Temp** | **:30** | **1:00** | **1:30** | **2:00** | **2:30** | **3:00** | |  |  |  |  |  |  |  | | |

For this section you will not only analyze your data but also the data collected by the rest of the class. This will give us more accurate results without having to do multiple trials within a group.

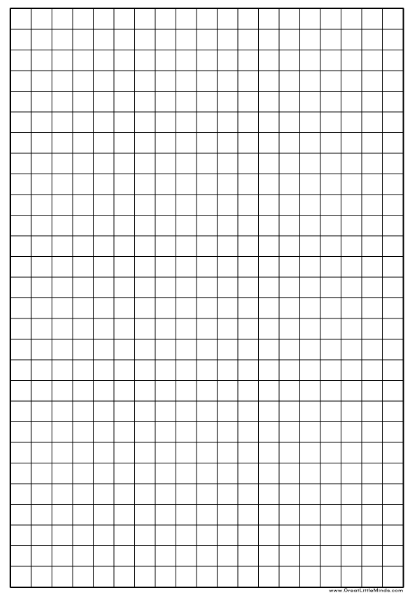
**Data Analysis**

**Your Group’s Data Analysis**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Combination** | **Initial Temp.** | **Highest or Lowest Temp. Recorded** | **Overall Temp. Change** | **Increase or Decrease in Temp??** | **Exothermic or Endothermic** |
| **1** |  |  |  |  |  |
| **2** |  |  |  |  |  |
| **3** |  |  |  |  |  |
| **4** |  |  |  |  |  |
| **5** |  |  |  |  |  |
| **6** |  |  |  |  |  |

**Class Data Averages per Combination**

|  |  |  |  |
| --- | --- | --- | --- |
| **Combination** | **Overall Temperature Change** | **Increase or Decrease in Temp??** | **Exothermic or Endothermic** |
| **1** |  |  |  |
| **2** |  |  |  |
| **3** |  |  |  |
| **4** |  |  |  |
| **5** |  |  |  |
| **6** |  |  |  |

**Graph:** Create a graph showing the class average overall temperature for each combination.

**Draw on Graph**

* **Draw (at least) two arrows showing what you see.**
* **Draw (at least) two arrows showing what you know.**

|  |
| --- |
| **Explanation** |

**Claim:**

**Evidence:**

|  |
| --- |
| **Evaluation** |

**What were 3 possible sources of error? Also explain how they could have affected your results.**

**How confident are you in your results? (Use the Confidence Chart)**

**What would you do differently next time?**