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| Bremer_FinalSelection_Color[1] | *Bremer State High School* | |
| Student name: | Student number: |
| Teacher name: Mrs Shepherd | |
| Date handed out: 18 February 2025 | Date due: 30 April 2025 by 9:00am |

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| **Subject** | Chemistry | **Instrument no.** | FIA2 |
| **Technique** | Student Experiment | | |
| **Unit** | Unit 1: Chemical fundamentals – structure, properties and reactions | | |
| **Topic** | Topic 3: Chemical reactions – reactants, products and energy change | | |

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| **Conditions** | | | |
| **Duration** | 10 hours class time |  |  |
| **Mode** | Written response — Scientific Report | **Length** | 1500 – 2000 words |
| **Individual/ group** | Group work with individual report | **Other** | May work collaboratively to develop methodology and perform experiment. All other elements are individual work. |
| **Resources available** | School library (online: internet a | nd school intranet, | databases, journals) |
| **Context** | | | |
| You have completed the following experiment:   * Enthalpy of combustion for burning foods | | | |
| **Task** | | | |
| Modify (i.e. refine, extend or redirect) an experiment in order to address your own related hypothesis or question.  You may use a practical performed in class, a related simulation or another practical related to Unit 1 (as negotiated with your teacher) as the basis for your methodology and research question. | | | |

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| **To complete this task, you must:** | |
| * identify an experiment to modify\* * develop a research question to be investigated\* * research relevant background scientific information to inform the modification of the research question and methodology * conduct a risk assessment and account for risks in the methodology\* * conduct the experiment\* * collect relevant qualitative data and/or quantitative data to address the research question\* * process and present the data appropriately * analyse the evidence to identify trends, patterns or relationships * analyse the evidence to identify uncertainty and limitations * interpret the evidence to draw conclusion/s to the research question * evaluate the reliability and validity of the experimental process * suggest possible improvements and/or extensions to the experiment * communicate findings in an appropriate scientific genre, i.e. scientific report.   \*The steps indicated with an asterisk above may be completed in groups. All other elements must be completed individually. | |
| **Stimulus** | |
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| **Checkpoints** | |
| * Week 5 Lesson 1 – Research Question | |
| * Week 6 Lesson 1 – Rationale | |
| * Week 7 Lesson 1 – Analysis of Data | |
| * Week 9 Thursday – **Full draft due before 9:00am** | |
| **Assessment objective/s** | |
| 1. Describe ideas and findings about properties and structure of atoms and materials, and chemical reactions in terms of reactants, products and energy change. | |
| 1. Apply understanding of properties and structure of atoms and materials, and chemical reactions in terms of reactants, products and energy change. | |
| 1. Analyse data about properties and structure of atoms and materials, and chemical reactions in terms of reactants, products and energy change. | |
| 1. Interpret evidence about properties and structure of atoms and materials, and chemical reactions in terms of reactants, products and energy change. | |
| 1. Evaluate processes, claims and conclusions about properties and structure of atoms and materials, and chemical reactions in terms of reactants, products and energy change. | |
| 1. Investigate phenomena associated with properties and structure of atoms and materials, and chemical reactions in terms of reactants, products and energy change. | |
| **Feedback** | |

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| **Authentication strategies** |
| * The teacher will provide class time for task completion. |
| * Students will provide documentation of their progress at indicated checkpoints. |
| * The teacher will collect and annotate drafts. |
| * The teacher will conduct interviews or consultations with each student as they develop the response. |
| * Students will use plagiarism-detection software at submission of the response. |
| * Students must acknowledge all sources. |
| * The teacher will provide class time for task completion. |
| * Students will provide documentation of their progress at indicated checkpoints. |
| **Scaffolding** |
| The response must be presented using an appropriate scientific genre (i.e. scientific report) and contain:   * a research question * a rationale for the experiment * reference to the initial experiment and identification and justification of modifications to the methodology * raw and processed qualitative data and/or quantitative data * analysis of the evidence * conclusion/s based on the interpretation of the evidence * an evaluation of the methodology and suggestions of improvements and extensions to the experiment * a reference list. |
| **An example of how one of the practicals could be modified to develop a research question:**  **Practical that will be modified:** Electrolysis of water (simulation).  **Research question:** How does changing the concentration of the electrolyte (KOH) affect the time to produce 25 mL of hydrogen gas by electrolysis?  **Developing the research question:**   |  |  | | --- | --- | | **Steps** | **Details** | | Identify the independent variable to be investigated. | Concentration of KOH (electrolyte). | | Identify the dependent variable. | Time to produce 25 mL hydrogen gas. | | Identify the methodology to be used. | Electrolysis. | | Draft research questions. | How can the concentration change the amount of hydrogen gas produced?  How can the addition of an acid or base act as an electrolyte to make hydrogen? | | Refine and focus the research question. | Can a change in concentration of a basic electrolyte affect the time to make hydrogen gas? | | Present research question to teacher for approval. | How does changing the concentration of the electrolyte (KOH) affect the time to produce 25 mL of hydrogen gas by electrolysis? |   **Note:** You cannot use this sample research question for your experiment. |

**Instrument-specific marking guide (ISMG)**







