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| **Bremer_FinalSelection_Color[1]** | **Bremer State High School** | |
| Student Name: | Teacher Name: |
| Teacher Email: | |
|  | FINAL: |

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| **Subject** | Chemistry | **Task no.** | FIA 3 |
| **Technique** | Research Investigation | | |
| **Unit** | 2 | | |
| **Conditions** | | | |
| **Duration** | 10 hours class time | | |
| **Mode** | Written Report | **Length** | 1500 – 2000 words |
| **Individual/ group** | Individual | **Other** | Individual student work |
| **Resources available** | School library (online: internet and school intranet, databases, journals) | | |
| **Context** | | | |
| Investigate one of the following claims:   * Hydrogen bonding gives water unique properties. * Life would not exist if O-H bonds were replaced with S-H bonds. * The most efficient way to speed up a chemical process is to increase the temperature.   You may identify an alternative claim in consultation with your teacher. This claim must be related to Unit 2 subject matter. | | | |
| **Task** | | | |
| Gather secondary evidence related to a research question in order to evaluate the claim. Develop your research question based on a number of possible claims provided by your teacher.  Obtain evidence by researching scientifically credible sources, such as scientific journals, books by well- credentialed scientists, and websites of governments, universities, independent research bodies or science and technology manufacturers. You must adhere to research conventions. | | | |
| **To complete this task, you must:** | | | |
| * select a claim to be evaluated, from a list provided by the teacher\* * identify the relevant scientific concepts associated with the claim\* * conduct research to gather evidence from scientifically credible sources to evaluate the claim\* * pose a research question that addresses an aspect of the claim * identify relevant evidence to answer the research question * identify the trends, patterns or relationships in the evidence * analyse the evidence to identify limitations * interpret the evidence to construct scientific arguments * interpret the evidence to form a conclusion to the research question * discuss the quality of the evidence * evaluate the claim by applying the findings of the research to the claim * suggest improvements and/or extensions to the investigation * communicate findings in an appropriate scientific genre, e.g. report, journal article, essay, conference presentation.   \*These aspects of the task can be completed as a group. | | | |
| **Checkpoints** | | | |
| * Term 2, Week 10: Identify sources and develop a research question. | | | |
| * Term 3, Week 1: Conduct research and write a rationale. | | | |
| * Term 3, Week 2: Analyse and evaluate evidence. | | | |
| * Term 3, Week 3: Submit a full draft (**Due Thursday 31 July by 9:00am)**. | | | |
| * Term 3, Week 5: Submit final response **(Due Wednesday 13 August by 9:00am)**. | | | |
| **Assessment objective/s** | | | |
| 1. Describe ideas and findings about intermolecular forces and gases, aqueous solutions and acidity, and rates of chemical reactions. | | | |
| 1. Apply understanding of intermolecular forces and gases, aqueous solutions and acidity, and rates of chemical reactions. | | | |
| 1. Analyse research data about intermolecular forces and gases, aqueous solutions and acidity, and rates of chemical reactions. | | | |
| 1. Interpret research evidence about intermolecular forces and gases, aqueous solutions and acidity, and rates of chemical reactions. | | | |
| 1. Evaluate research processes, claims and conclusions about intermolecular forces and gases, aqueous solutions and acidity, and rates of chemical reactions. | | | |
| 1. Investigate phenomena associated with intermolecular forces and gases, aqueous solutions and acidity, and rates of chemical reactions. | | | |
| **Feedback** | | | |
| **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. | | | |
| **Scaffolding** | | | |
| The response must be presented using an appropriate scientific genre (i.e. report) and contain:   * a claim * a research question * a rationale for the investigation * justified scientific arguments using evidence * a conclusion to the research question based on the interpretation of the evidence * evaluation of the claim and suggestions of improvements and extensions to the investigation * a reference list. | | | |
| **An example of how one of the claims could be developed into a research question**  **Claim:** Plastics are bad for the environment.  **Research question:** What effect do catalysts have on the chemical recycling of polyethylene terephthalate (PET) by glycolysis?  **Developing the research question:**   1. Identify the key (important) terms in the claim.    1. ‘plastics’, ‘bad’, ‘environment’ 2. Propose refining questions that need to be addressed to refine key terms and narrow the focus of the claim.    1. Which plastic will I investigate?    2. Why did I choose this plastic?    3. What do I mean by ‘bad’ for the environment in chemical terms? 3. Provide an example of how one of the claims could be developed into a research question. Conduct research to gather information to address the refining questions.    1. The plastic that will be investigated is PET.    2. PET’s structural and chemical properties make it a high-demand plastic that is not biodegradable. Therefore, it is an environment problem if not recycled.    3. PET can be recycled by a chemical process called glycolysis, which requires a catalyst.    4. Products from chemically recycling PET can be used as feedstock (raw materials) for other products. 4. Draft the research question to address the claim.    1. How does chemically recycling PET help the environment? 5. Refine and focus the research question.    1. How does chemically recycling PET by glycolysis help the environment?    2. What factors affect the chemical recycling of PET by glycolysis?   Present the research question to the teacher for approval.  What effect do catalysts have on the chemical recycling of polyethylene terephthalate (PET) by glycolysis?  **Note:** You cannot use this sample research question for your investigation. | | | |

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







