

Stage 4 Science

First Hand Investigation 2023

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| **TOPIC**: CW2 Chemical Changes: First Hand Investigation | **MARKS:** / **30** |
| **SUBMISSION REQUIREMENTS:**  Students will undergo a First-Hand investigation during  ***Term 2 Weeks 7-8***  ***Final submission Due 16 June 2023***  **Depending on availability of laboratories.** |
| **Outcomes to be assessed:**  **SC4 - 4WS Identifies** questions and problems that can be tested or researched and makes predictions based on scientific knowledge.  **SC4 – 5WS** Collaboratively and individually produces a plan to **investigate** questions and problems. **SC4 – 6WS** Follows a sequence of instructions to safely undertake a range of **investigation** types, collaboratively and individually.  **SC4 – 7WS** Processes and **analyses** data from a first-hand investigation and secondary sources to identify trends, patterns and relationships and draw conclusions.  **SC4 – 8WS** Selects and uses appropriate strategies, understanding and skills to **produce** creative and plausible solutions to identified problems.  **SC4 – 17CW Explains** how scientific understanding of, and discoveries about the properties of elements, compounds and mixtures relate to their uses in everyday life. | |
| **DIRECTIONAL VERBS:**  **Analyse** Identify components and the relationship between them; draw out and relate implications  **Explain** Relate cause and effect; make the relationships between things evident; provide why and/or how.  **Identify** Recognise and name  **Investigate** Plan, inquire into and draw conclusions about  **Produce** Make or manufacture | |
| **TASK DESCRIPTION:** Students are required (individually or collaboratively) to complete a first-hand investigations on physical and chemical changes. Students are to follow the directions given to them on the day of the task and answer questions about physical and chemical changes. **Duration: 5 hour (up to 5 periods)**  Extensive feedback will be provided to students upon the return of the completed assessment. | |

**ASSESSMENT CRITERIA**

You will need to apply your knowledge of chemical and physical reactions in a laboratory setting by reading a method and performing chemical testing on various substances safely.

You will need to be able to decide if a change you see is a chemical change or a physical change by applying the signs of physical and chemical changes accurately.

You should learn the signs of a chemical reaction and understand how to tell whether a chemical change or a physical change is taking place.

You should also ensure you understand all the laboratory safety rules and can conduct testing by yourself safely.

Stage 4: FHI Assessment Marking Criteria

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|  | Q | total | Outcome | Marking Criteria | Example Answer |
| I | 1 | / 1 | SC4-4WS | Correct Colour | Blue |
| 2 | / 1 | SC4-4WS | Correct Colour | White |
| 3 | / 1 | SC4-4WS | Correct description | Changed back to Blue |
| 4 | / 1 | SC4-7WS | Correct change | Physical |
| 5 | / 3 | SC4-5WS   SC4-8WS | Relevant equipment  Labelled equipment  Used ruler |  |
| ii | 1 | / 1 | SC4-4WS | Correct Colour | Green |
| 2 | / 1 | SC4-4WS | Correct Colour | Black |
| 3 | / 1 | SC4-4WS | Correct description | Remains black |
| 4 | / 1 | SC4-7WS | Correct change | Chemical |
| III | 1 | / 2 | SC4-6WS | Makes two correct observations | Bubbles / gas produced  Disappearance of the solid etc |
| 2 | / 1 | SC4-7WS | Correct change | Chemical |
| IV | 1 | / 2 | SC4-7WS | - Mentions particles moving faster when heated  - Mentions solid’s particles being rigid, or liquid particle rolling over each other. | When ice melts, the particles move faster when heated. This makes them unlock from their solid structure and rolling over each other |
| 2 | / 1 | SC4-7WS | Correct change | Physical |
| V | 1a | / 5 | SC4-7WS | - Correctly labelled axis  - Labels include units  - Line graph  - axis to scale  - correct plot | A picture containing line, diagram, plot, text  Description automatically generated |
| 1b | / 3 | SC4-7WS | -Correct change    -Mentions relevant sign of chemical change    -Relates the change back to the question | It is a chemical change.  When the reactants are mixed, there is a large increase in temperature.  A large increase in temperature is considered a sign of chemical change. |
| 2a | / 2 | SC4-17CW | -Describes the incorrect addition of acid to water.  -States why not to do this. | He poured the water into the acid. This can increase the heat and is dangerous |
| 2b | / 3 | SC4-8WS | -Correct change  - identifies two signs of chemical change  Or  - Correct change  - identifies one sign of chemical change  - state a new substance forms | The reaction is a chemical change. The burnt hair will be a new substance. One sign is that the hair changes colour when burnt. Another sign is that burnt hair produces an odour. |

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

**Year 8 Science: First Hand Investigation**

**Complete the following experiments and answer in the spaces provided.**

**Section I:**

In front of you is a test tube (A) containing copper sulfate

Q1. What colour is the copper sulfate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

**Follow the following First Hand Investigation**.

1. Safely light the Bunsen burner.
2. Using the heating flame wave the test tube containing copper sulfate through the

flame.

1. Continue moving the test tube through the flame for a minute.

Q2. What colour is the substance in the test tube now? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

1. Place the heated sample onto the Petri dish supplied and add two drops of water

using the pipette in the beaker.

Q3. What happened to the colour of the substance? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

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Q4. Is this a physical or a chemical change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

Q5. Draw and label a scientific diagram of the set up for this experiment 3

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**Section II:**

In front of you is a test tube (B) containing copper carbonate

Q1. What colour is copper carbonate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

1. Safely light the Bunsen burner.

2. Wave the test tube containing copper carbonate through the heating flame.

3. Continue this for one minute.

Q2. What colour is the substance in the test tube? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

4. Place the heated sample onto the Petri dish supplied and add two drops of water

using the pipette in the beaker.

Q3. What happened to the colour of the substance? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

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Q4. Is this a physical or a chemical change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

**Section III:**

In front of you is a dropper bottle containing hydrochloric acid and a small test tube (C) containing calcium carbonate (white powder).

1. Add 5 drops of hydrochloric acid into test tube (C).

Q1. Record two observations that have occurred. 2

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Q2. Is this a physical or a chemical change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

**AT THE COMPLETION OF YOUR EXPERIMENTAL SECTION PLEASE PLACE ALL PETRIE DISHES INTO THE BIN AND TEST TUBES INTO THE WASH UP TRAY PROVIDED.**

**THIS SECTION IS TO BE COMPLETED WITHIN THE CLASSROOM.**

**Section IV:**

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Q1. Explain what would be happening to the particles in the ice cube. Include a description of the way the particle’s arrangement changes.

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Q2. Is this a physical or a chemical change? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1

**Section V:**

A large change in temperature is considered an example of a chemical change.

Q1. Bill and Ben conducted an experiment on what would happen when Magnesium is added to Hydrochloric Acid. Their results were recorded in the table below.

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| --- | --- |
| Time (mins) | Temperature of the water (oC) |
| 0 | 20 |
| 1 | 30 |
| 2 | 40 |
| 5 | 55 |

a) Draw a graph of Bill and Ben’s experimental results below using the grid supplied.

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b) Is the reaction conducted by Bill and Ben a physical or chemical change?

**Explain** your answer 3

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Q 2 **Read the following safety tip for mixing acid and water.**

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| If you add **water** to a concentrated **acid** the heat released can cause an explosion, spreading **acid** throughout a room. One way to remember this is that you should “add **acid to water** as you ought-er.” **Adding** the **acid** or base to the larger volume of **water** allows the heat to dissipate safely. |

Below are the steps that Jim the mad scientist used for creating a mixture of concentrated acid and water:A picture containing drawing, sketch, illustration, art

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1. Obtain two 250 mL beakers
2. Label the beakers A and beaker B.
3. Fill beaker A with 150 mL water
4. Fill beaker B with 15 mL of concentrated acid
5. Beaker A is poured into Beaker B.

a) Describe the problem with the method that Jim the mad scientist used. 2

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b) The next day, Jim did some different experiments and burnt the top of his hair. Identify if burning hair would be a physical or chemical reaction?

Explain **TWO (2)** reasons as to support your decision. 3

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