

CONTINUOUS ASSESSMENT ITEMS

SCHOOL:

CLASS: SENIOR THREE

TERM: III

THEME: FUEL AND ENERGY

**TOPIC: CHEMICAL REACTION
RATES**

LEARNING OUTCOMES:

1. Understand and appreciate that chemical reactions take place at different rates.
2. Understand the effect of various factors on the rate of chemical reactions and recognize that many reactions are reversible.

SUBJECT COMPETENCY (SC):

- Carries out investigation on the effect of external conditions on rate of reactions.

GENERIC SKILL (GS):

- Critical thinking and problem-solving skills.

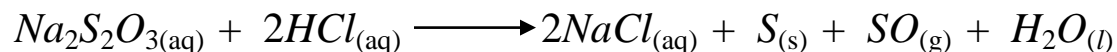
LEARNING DOMAIN: PSYCHOMOTOR

IMITATION

In photographic industry, sodium thiosulphate is used to improve the quality of photographic printing paper. One of the workers in the printing studio has advised that the temperature in the printing machine has to be adjusted as it affects the rate of reaction of sodium thiosulphate on printing paper so as not to delay their customers.

Other workers seemed not to understand his argument and they wanted to investigate the issue at hand.

Sodium thiosulphate reacts with hydrochloric acid in the same way it does with the printing paper as according to the following equation;



You are provided with the following;

- Dilute hydrochloric acid labeled **BA1**
- Sodium thiosulphate solution labeled **BA2**

Task:

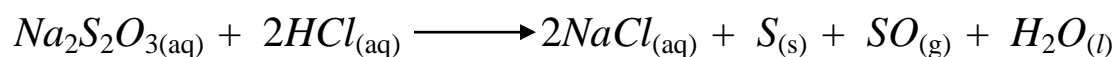
As a chemistry learner;

Replicate the steps as demonstrated by the teacher to design and carryout an investigation on the effect of temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.

MANIPULATION

A sulphur manufacturing company organized a workshop to train workers how to manufacture sulphur used to treat skin diseases. A male participant was told to add hydrochloric acid to sodium thiosulphate solution. The participant conducted the manufacturing process near a heat source and he noted that it took less time to produce sulphur than when he was far from the heat source. He became confused and he wondered why this had happened.

Sodium thiosulphate reacts with hydrochloric acid as according to the following equation;



You are provided with sodium thiosulphate solution labeled **BA2** and hydrochloric acid labeled **BA1**.

Task:

As a chemistry student;

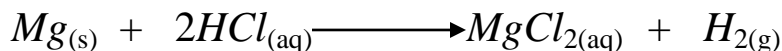
Follow the instructions below to carry out an investigation on the effect of temperature on rate of reaction between sodium thiosulphate and hydrochloric acid

INSTRUCTIONS:

- i. State and write the experiment's aim using keywords
- ii. Correctly identify the;
 - *Independent variable*
 - *Dependent variable*
 - *Controlled variable*
- iii. State and write the hypothesis using keyword
- iv. List all relevant apparatus and materials
- v. Coherently write the procedure of the experiment
- vi. Identify and write the risks and their mitigations
- vii. Carry out the experiment following your procedure
- viii. Accurately record your data in a logical format
- ix. Analyse your data using appropriate methods
- x. Interpret your data correctly and draw an appropriate conclusion basing on data interpretation.

PRECISION

Following a decrease in supply of helium (a gas used to fill tyres of aircrafts), the aircraft manufacturing company has opted to start using hydrogen gas which can be obtained by reacting magnesium with hydrochloric acid as according to the following equation;



The workers were at first using dilute hydrochloric acid but one of the workers suggested that they should start using a more concentrated acid as this could yield hydrogen gas faster.

However, his colleagues seemed not to understand his suggestion.

You are provided with the following;

Hydrochloric acid labeled **HA1**

Substance **Z** which is magnesium ribbon.

Task:

Use your chemistry knowledge to;

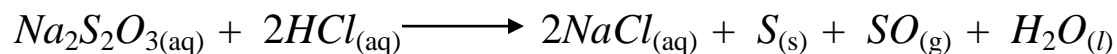
Independently design and carryout an investigation to help colleagues understand the worker's suggestion.

(Your investigation should have minimal errors).

ARTICULATION

John is a new worker in a company that manufactures sulphur that is used as a fungicide by farmers. Sulphur production involves mixing hydrochloric acid with sodium thiosulphate. Due to high demand for sulphur, John decided to dilute a concentrated solution of sodium thiosulphate by adding water to form a larger volume of solution expecting to obtain a larger quantity of sulphur.

However he noticed that the time taken to produce sulphur kept on increasing as he kept on diluting sodium thiosulphate, he was puzzled about this phenomenon. Sodium thiosulphate reacts with hydrochloric acid as according to the following equation;



You are provided with sodium thiosulphate labeled **FA1** and hydrochloric acid labeled **FA2**.

Task:

As a chemistry student;

Correctly and innovatively design an experiment you will use to help John understand the phenomenon he encountered.

NATURALISATION

A tile cleaning company uses a bleaching mixture containing hydrogen peroxide and liquid soap to clean tiles. The mixture works by producing a froth that is used to scrub tiles hence removing stains.

The general manager of the company has realized that under normal conditions, little froth is produced at a time and he thus decided to purchase two different *catalytic substances* so as to facilitate faster production of froth.

An efficient *catalytic substance* is one that facilitates froth production in a short time.

The workers want to select the more efficient *catalytic substance* from the two purchased by the general manager. However the workers are stuck of how to determine the more efficient one and have thus approached you for help.

You are provided with the following:-

Hydrogen peroxide labeled **GA1**

Liquid soap labeled **GA2**

Equal masses of solids **J** and **K**, which are *catalytic substances* purchased by the general manager.

Task:

Using your chemistry knowledge, use the materials availed to you to;
Design an experiment you can carryout to help the workers.