New curriculum practical sample numbers 2024

NUMBER ONE

Scenario

A pharmaceutical company got an order from UNHCR to supply over 2000 doses of sulphur ointment to treat a skin disease outbreak in a refugee camp.
An important step in the production of the ointment involves obtaining sulphur which is made by reacting dilute hydrochloric acid and sodium thiosulphate solution at **room temperature**.

Sodium thiosulphate reacts with hydrochloric acid according to the following equation:

$$Na_2S_2O_3(aq) + 2HCl(aq) \longrightarrow 2NaCl(aq) + SO_2(g) + H_2O(l) + S(s)$$

The formation of sulphur with time is noted by the disappearance of a cross marked (**X**) or a dot marked (■) on a white tile/paper placed under the reaction flask/container.

Due to rapid spread of the infections, the company managers have been requested to ensure **timely** supply of the ointment.
The company's chemist has advised the managers that timely delivery can be made if sodium thiosulphate solution of **higher concentration** is used. The company managers have, however, not yet accepted the chemist's advice.

The hydrochloric acid is provided as **BA1** and sodium thiosulphate as **BA2.**

Task

(a) As Chemistry learner;

(i) design an experiment the company's chemist would use to convince the company's managers.

(ii) carry out the experiment and record your findings.

(iii) treat your results appropriately.

(b) What can the company's managers deduce from your findings?

NUMBER TWO

SCENARIO

Thelma whose home is located along a gentle slope 1 Km away from a rocky area collected water from two different sources and stored them in two separate drums to be used for washing clothes and other house hold items.

She started washing using water from the first drum but soon noticed that the process wasn't smooth and lather wasn't easily formed.

This made Thelma to change and instead used water from the second drum. To her surprise, lather was easily formed. She was happy but couldn't explain the differences between the two water samples.

The laboratory technician at your school collected water samples from each of the two drums and randomly labelled them as A and B.

Also provided is soap solution R.

TASKS.

As a chemistry learner,

a) i) Design an experiment you will use to explain the observed differences in the water samples A and B.
   ii) Carry out an experiment an experiment and record your findings.
   iii) Explain your findings in a) ii) above.
b) What conclusions can Thelma derive from your findings?
c) How can Thelma make water sample from the first drum to easily form lather like that from the second drum?

NUMBER THREE

Scenario

Thelma's home is located along a gentle slope in a rocky area. She uses water from two different sources. The table below shows the report on the analysis done on the two samples of the water by some nearby scientist.

Water sample	Volume of water sample used, cm^3	Volume of soap solution used to form permanent lather, cm^3	No. of drops of soap solution used to form permanent lather
A	15	10	100
B	15	2	15

She prefers to use water from source A for washing clothes since it's much nearer her home than source B. She is now wondering how she can make water from source A behave in a similar way like that from source B.

The scientist advised her that she can use solid R and boiling process to find out if it's possible. You have been given the opportunity to help her.

TASKS.

As a chemistry learner;

i) Design an experiment you would use to make the two water samples behave in a similar way for smooth washing.

ii) Carry out the experiment and record your results.

iii) What conclusions can Thelma derive from your results in (ii) above?

NUMBER FOUR

Scenario

A local recycling company is experimenting the removal of magnesium metal residues found in a certain waste material using hydrochloric acid before it is discarded off.

The quantity (amount) of magnesium in this waste material is the same since the amount of waste produced at a given time is constant.

The company aims to determine the rate and concentration of the acid which can best remove the metal from the waste at room temperature.

Magnesium reacts with hydrochloric acid according to the following equation

$$Mg_{(s)} + 2HCl_{(aq)} \longrightarrow MgCl_{2(aq)} + H_{2(g)}$$

To achieve their aim, the company intends to investigate how the speed of this reaction changes with varying concentrations of the acid at room temperature, but lacks knowledge to do so and have come to you for help.

You are provided with the acid labelled as BA1 and magnesium ribbon.

TASKS.

As a chemistry learner;

i) Design an experiment you will carry out to address the company's challenges

ii) Carry out the experiment and record your results.

iii) Analyze your data (results) and give its interpretation

iv) What conclusions can the company draw from your findings