

# Chem!stry

Name: ..... ( )

Class: .....

Date: ..... / ..... / .....

## Chemistry SPA Skill 3 – Planning an Experiment

### To Investigate the Effect of Temperature on the Concentration of Vitamin C in Orange Juice

#### Aim:

In this question you will be assessed on your ability to plan a procedure to carry out an experiment.

#### Description:

Vitamin C reacts with iodine according to the following balanced chemical equation:



This reaction allows the amount of iodine in orange juice to be determined by titration, using starch as an indicator. When the iodine reacts with the vitamin C, the reaction remains pale orange (the colour of the orange juice). As soon as there is one drop of excess iodine in the reaction, the iodine will react with the starch indicator to form a blue/black complex.

A manufacturer of orange juice is concerned that the temperature the orange juice is stored at affects the amount of vitamin C in the orange juice.

Design an experiment to investigate the effect of temperature on the concentration of vitamin C in orange juice.

#### Apparatus and Chemicals:

You are provided with the following apparatus and reagents

50 cm <sup>3</sup> Burette	25 cm <sup>3</sup> Pipette with pipette filler	Aqueous iodine solution of concentration 0.0100 mol/dm <sup>3</sup>
Orange juice	Distilled water	250 cm <sup>3</sup> Beaker
Starch indicator	50 cm <sup>3</sup> Measuring cylinder	100 cm <sup>3</sup> Measuring cylinder
250 cm <sup>3</sup> Conical flask	Tripod	Spatula
Glass rod	-10 to +110 °C Thermometer	Weighing machine
Stopwatch	Test tubes and test tube rack	Wire gauze
Bunsen burner	White tile	Delivery tube with stopper
Boiling tubes	Retort stand and clamp	Filter funnel and filter paper

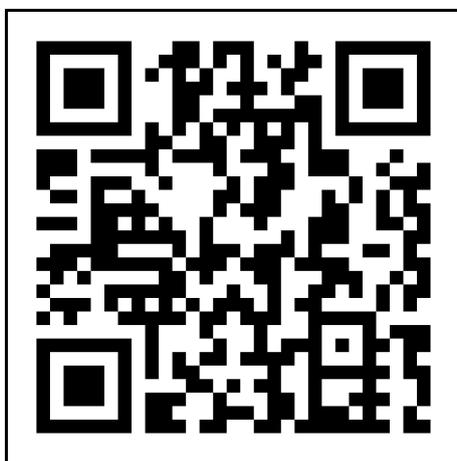
In addition to this, you may also use any other apparatus that is commonly available in the laboratory.

**Plan:**

In your plan you should

- a) Give a hypothesis or problem statement for the experiment.
- b) Identify the important variables and state which one(s) will be changed and which ones will be kept constant.
- c) Give a brief outline as to how you will conduct the experiment.
- d) List the apparatus and reagents that you will need in order to perform the experiment.
- e) Draw a labelled diagram to show how the apparatus will be setup.
- f) Write out your suggested method as a series of step-by-step instructions.
- g) Describe how the experimental results should be processed in order to complete the experiment.  
You are expected to include a results table, but are not required to include any data.
- h) Identify a key source of error and state how it will affect your results.

- Scan the QR code given below for the answer to this assignment:



[http://www.chemist.sg/purification/vitamin\\_c\\_ans.pdf](http://www.chemist.sg/purification/vitamin_c_ans.pdf)