

Subject: Chemistry

Level: S.4

Topic: Fractional distillation

Learning objectives:

1. Content

Students should be able to:

i. identify the characteristics of fractions produced by the fractional distillation of petroleum

2. Language

Students should be able to:

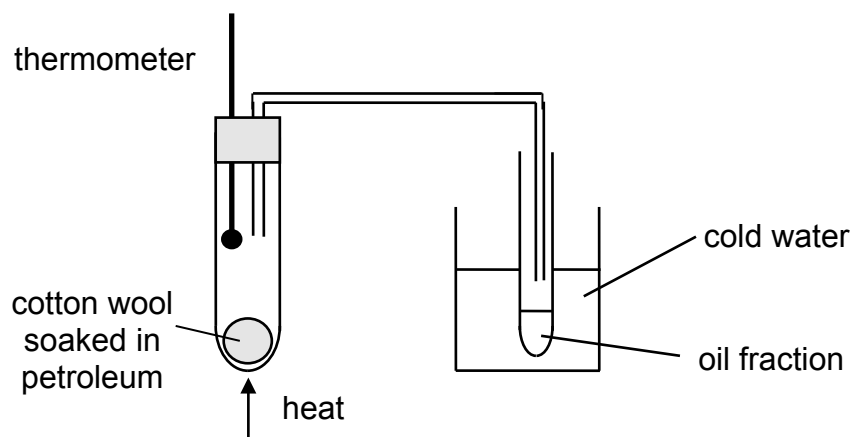
i. use “an increase” and “a decrease” with noun phrases to describe the characteristics of fractions

**S4 Chemistry
Fractional Distillation
Worksheet 1**

Name : _____ No.: _____ Class: _____ Date: _____

Experiment

- (a) Set up the apparatus as shown in the diagram. Use about 10 cm³ of petroleum.
(b) Heat the test tube gently.
(c) Collect any liquid that distils in the test tube up to 80°C. This liquid is called a **fraction**.



- Replace test tube 1 with test tube 2. Heat this test tube more strongly. Collect the fraction that distils between 81°C and 140°C.
- Collect more fractions with the boiling point ranges:
 - 141-200°C;
 - 201-250°C.
- Examine each fraction in the ways described below. Record your observations in the table.
 - Colour
 - Viscosity (i.e. how well the liquid flows)
Place about 4 drops of the fraction in an evaporating dish. Turn the evaporating dish and notice if the liquid flows slowly or quickly.
(A fraction that flows more quickly has a lower viscosity.)
 - Ease of evaporation
Place 3 drops of the fraction onto a watch glass. Note if it evaporates slowly or quickly.
 - Flammability (i.e. how well it burns)
Place about 6 drops of the fraction in an evaporating dish. Try to ignite the fraction by using a burning splint. Does the fraction burn easily? What colour is the flame? Is the flame clean or sooty?

5. Results

<i>Fraction</i>		<i>Room temperature -80°C</i>	<i>81-140°C</i>	<i>141-200°C</i>	<i>201-250°C</i>
(a)	<i>Colour intensity</i>				
(b)	<i>Viscosity</i>				
(c)	<i>Ease of evaporation</i>				
(d)	<i>Flammability</i>				
	<i>- ease of burning</i>				
	<i>- colour intensity of the flame</i>				
	<i>- amount of soot in the flame</i>				

6. Looking for patterns

As the boiling point range of the fractions increases, what happens to:

- (a) **the colour intensity** of the fractions? [increases / decreases]
- (b) **the viscosity** of the fractions? [increases / decreases]
- (c) **the ease of evaporation?** [increases / decreases]
- (d) (i) **the ease of burning?** [increases / decreases]
- (ii) **the colour intensity of flame?** [increases / decreases]
- (ii) **the amount of soot produced during burning?** [increases / decreases]

7.  Writing

Rewrite your conclusion with the following sentence pattern?

With increasing boiling point ranges, there is [an increase / a decrease] in [physical properties].

(a) With increasing boiling point ranges, there is [an increase / a decrease] in colour intensity.

(b) With increasing boiling point ranges, there is [an increase / a decrease] in

:

(c) With increasing boiling point ranges, there is

:

(d) (i) _____

(ii) _____

(iii) _____
