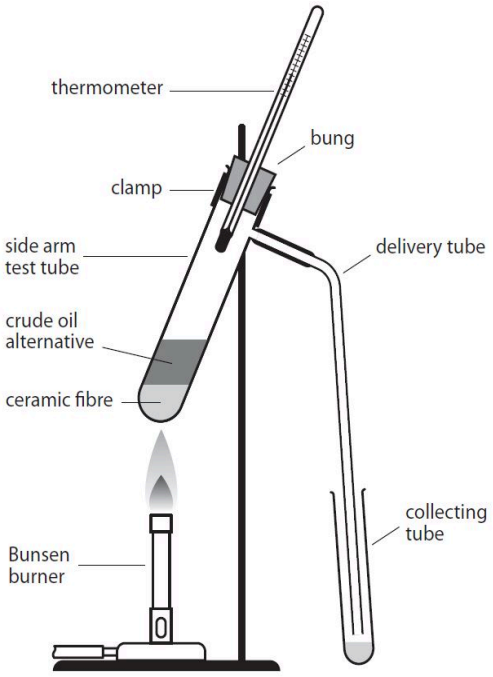
The fractional distillation of crude oil

a) Place about a 2 cm^3 depth of mineral wool in the bottom of a side-arm boiling-tube. Add about 6 cm^3 of crude oil alternative to this, using a teat-pipette.

b) Set up the apparatus as shown in the diagram, with one addition for the first fraction: ensure you place a beaker of cold water around the collecting tube. Heat the bottom of the side-arm boiling-tube gently, collecting the distillate in the first small test tube. Watch the thermometer.



When the temperature reaches 100°C, replace the collection tube with another empty one. The beaker of water is no longer necessary.
Collect three further fractions, to give the fractions as follows:

1 Room temperature to 100°C

2 100–150°C

3 150–200°C

4 200–250°C

c) A black residue remains in the side-arm boiling-tube. Test the four fractions for viscosity (how easily do they pour?), colour, smell and flammability.
To test the smell, *gently* waft the smell towards you with your hand.
To test for flammability, place a few drops on some mineral wool in a crucible. Light the fraction with a burning splint. Was the flame smoky?

The Fractional Distillation of Crude Oil

Crude oil alternative

Mineral wool

Side arm boiling tubes

0-260˚C thermometers inserted in bungs

Rubber tubing

4 small test tubes/ignition tubes per group

Test tube racks

100ml beakers

Retort stands

Bosses and clamps

Bunsen burners

Heat proof mats

Pipettes

Crucibles

Waste bucket

Experiment Hazard Assessment

Experiment: The Fractional Distillation of Crude Oil
Reference: GCSE-9-1

Chemical hazards			
Crude oil alternative 	DANGER Highly flammable liquid and vapour Toxic to aquatic life Causes skin irritation May cause drowsiness or dizziness	Wear eye protection. Avoid skin contact Ensure no naked flames when dispensing Dispense in the fume cupboard	CLEAPSS Hazcard 45A Recipe book 32

Hazards associated with carrying out the practical and suggested control measures

- Long hair should be tied back
- Wear safety glasses at all times
- Ensure room is well ventilated
- Dispense the crude oil alternative in the fume cupboard
- The apparatus will be hot after heating. Leave to cool down before dismantling.

Disposal

- Waste fractions should be collected in a waste bucket. Technicians should mix this with an equal volume of detergent and flush down a foul-water drain. The mineral wool can be placed in the normal waste.

References

- CLEAPSS L195 - Safer chemicals, safer reactions p42
- RSC https://edu.rsc.org/resources/the-fractional-distillation-of-crude-oil/754.article