

Assessment tasks

6.1 Formal assessment





Chemistry

Preparation of esters

Name: _____

Date: _____

Aim: To prepare different esters from an alcohol and carboxylic acid and to identify it through smell.

Investigative question:

Hypothesis:

Variables:

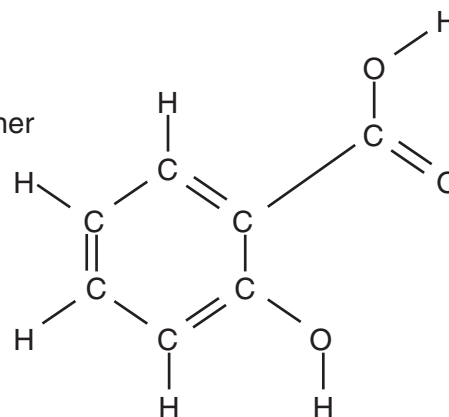
Independent variable (Which is changed.)	Dependent variable (Which is measured.)	Controlled variable(s) (Which remain(s) the same.)

Apparatus:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Six test tubes • Marking pen • Thermometer • 250 ml beaker • Safety goggles | <ul style="list-style-type: none"> • Test tube rack • Eye dropper • Hot plate/Bunsen burner • Measuring cylinder |
|---|--|

Chemicals:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Ethanoic acid • Methanol • Ethanol • Pentan-1-ol | <ul style="list-style-type: none"> • Salicylic acid • H₂SO₄(c) |
|---|--|



Safety measures:

- Ethanoic acid is flammable, corrosive and can cause burns. Do not inhale it.
- Salicylic acid is harmful when ingested.
- Salicylic acid irritates the respiratory system and skin.
- Salicylic acid can cause serious damage to the eyes.
- Pentan-1-ol and ethanol are flammable and poisonous.
- Methanol is highly flammable and extremely toxic if inhaled or ingested.
- H₂SO₄(c) is corrosive and can cause burns.



**Method:**

1. Number the test tubes from 1 – 6 and place it in the test tube rack.
2. Add the correct amount of the substances to the test tubes as indicated in the table.

Test tube	Carboxylic acid	Alcohol
1	1 cm ³ ethanoic acid	1 cm ³ methanol
2	1 cm ³ ethanoic acid	1 cm ³ ethanol
3	1 cm ³ ethanoic acid	1 cm ³ pentan-1-ol
4	one spatula salicylic acid	1 cm ³ methanol
5	one spatula salicylic acid	1 cm ³ ethanol
6	one spatula salicylic acid	1 cm ³ pentan-1-ol

3. Carefully add four drops of H₂SO₄(c) to each test tube.
4. Add approximately 150 ml tap water to the beaker.
Place the test tubes in the water and heat to 60°C.
Leave the test tubes in the water bath for approximately 15 minutes.
5. Cool the test tubes down in colder water.
6. Add 5 ml distilled water to each test tube.
7. Carefully note the odours. Hold the test tube approximately 30 cm from your nose and wave the fumes towards you with your hand.
8. Wash your hands thoroughly after the experiment.
9. Dilute the products with a large amount of water before pouring it down an outside drain.

Results:

Complete the table.

Test tube	Organic acid	Alcohol	Name of product	Observation (odour)
1	Ethanoic acid	Methanol		
2	Ethanoic acid	Ethanol		
3	Ethanoic acid	Pentan-1-ol		
4	Salicylic acid	Methanol		
5	Salicylic acid	Ethanol		
6	Salicylic acid	Pentan-1-ol		

1. Write down a common equation for the preparation of esters.
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2 Use structural formulae and write down an equation for the reactions that took place in:

2.1 test tube 1;

2.2 test tube 2;

2.3 test tube 3;

2.4 test tube 4;

2.5 test tube 5;





2.6 test tube 6.

3. What is the function of H_2SO_4 in these reactions?

Conclusions:
