

# Create a Smell Ester Synthesis

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

## Purpose

To create new smells by following a formal laboratory procedure.

## Materials

- 50 mL beaker
- hot plate
- 3 microscale test tubes
- boiling stones
- 3 plastic pipettes
- scissors to cut pipettes
- pencil or marker
- organic acids and alcohols (see below)

## Setup and Safety Instructions



Always wear safety goggles and dress appropriately for a chemistry lab.

There should be NO OPEN FLAMES. The organic chemicals are flammable.

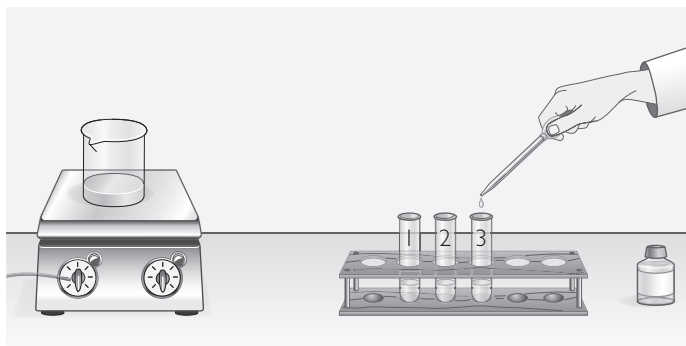
Extreme care should be taken when handling 18 M sulfuric acid. It burns the skin and creates holes in clothing.

During clean-up, place the final products in designated waste containers.

Recap bottles after use to reduce unwanted odors in the room.

## Procedure

1. Fill a 50 mL beaker with about 30 mL of water.
2. Drop in a boiling stone.
3. Place the beaker of water on a hot plate and bring the water to a *gentle* boil.
4. Label your test tubes 1, 2, and 3.
5. Carefully smell the acids by wafting, and record the smells in the data table. Add **five** drops of the appropriate carboxylic acid to each test tube according to the table.
6. Carefully smell the alcohols by wafting, and record the smells in the data table. Add **ten** drops of the appropriate alcohol to each tube according to the table.



Test tube	Carboxylic acid	Alcohol
1	acetic acid	isopentanol
2	acetic acid	butanol
3	butyric acid	ethanol

7. Add **one** drop of the concentrated sulfuric acid,  $\text{H}_2\text{SO}_4$ , to each test tube.
8. Drop a boiling stone into the mixture in each tube.
9. Carefully smell each mixture by wafting, and record the smells in the data table.

**Data Table**

Test tube	Smell of carboxylic acid	Smell of alcohol	Smell of mixture before heating	Smell of mixture after heating
1				
2				
3				

10. Cut a plastic pipette so that it is shorter than the length of the test tube. Put it in the test tube with the stem down, so that the bulb *loosely* seals off the tube.
11. Place the test tubes into the boiling water and heat for five minutes, or until the smell is no longer putrid.
12. After five minutes, remove the test tubes from the water. Turn off hot plate.
13. Remove the pipette from the test tube. It should not have any liquid in it, just vapors.
14. Carefully squeeze the pipette near your nose so that you can waft and smell the vapors. Record the smells in the data table.
15. Dispose of chemicals as directed by your teacher. Turn off hot plate.
16. **Making Sense** What functional group do you think is present in the final molecules? Explain.
17. What do you think happened to the molecules to change the smell?

