

## Investigation 15.A: Preparing Esters Answer Key

### Answers to Analysis Questions

1. You should observe the physical property of odour.
2. The production of an odour that differs from the odours of the original reactants is a key sign that a chemical reaction has occurred to form a new substance.

### Answer to Conclusion Question

3. Your answers will vary depending on the alcohol and carboxylic acid used to produce the ester. The following table lists some of the possible products and their characteristic odours.

Carboxylic acid	Alcohol	Ester product	Ester odour
ethanoic acid	ethanol	ethyl ethanoate	peach
ethanoic acid	propan-1-ol	propyl ethanoate	pear
ethanoic acid	butan-1-ol	butyl ethanoate	banana
ethanoic acid	octan-1-ol	octyl ethanoate	orange
butanoic acid	methanol	methyl butanoate	apple
butanoic acid	ethanol	ethyl butanoate	pineapple/peach
butanoic acid	butan-1-ol	butyl butanoate	apricot

### Answer to Application Question

4. Some odours are associated with more than one ester. The table shown below provides some characteristic esters.

Name	Chemical structure	Odours
octyl ethanoate	$\text{CH}_3\text{COOCH}_2(\text{CH}_2)_6\text{CH}_3$	orange
ethyl butanoate	$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOCH}_2\text{CH}_3$	pineapple
propyl ethanoate	$\text{CH}_3\text{COOCH}_2\text{CH}_2\text{CH}_3$	pear
methyl salicylate	$\text{C}_6\text{H}_4(\text{OH})\text{COOCH}_3$	wintergreen
methyl butanoate	$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOCH}_3$	apple