In context

Subject area: Organic chemistry | **Level: 14–16 years (Foundation)**

Topic: Alkenes | **Source: rsc.li/3jI6P77**

1. Many fresh fruit and vegetables produce ethene.

This gas may then ripen other fruit which is unripe.

The table below shows how much ethene (in cm^3) is produced from 1 kg of fruit each hour.

Source: Envato Elements

Name of fruit or vegetable	Volume of ethene produced by 1 kg of fruit in 1 hour (in cm^3)
Apricot	30
Avocado	150
Rhubarb	0.25
Banana	3.2
Pineapple	1.2×10^{-3}
Passion fruit	235
Pear	85

a) Write the volume of ethene produced by 1 kg of pineapple per hour as a normal number (that is, one not in standard form).

b) Place the fruit in order of the volume of ethene they produce each hour, smallest first.

c) Calculate the volume of ethene produced by the following masses of fruit.

Remember to give units in your answers.

i) 2 kg of bananas in 1 hour

ii) 200 g of apricots in 1 hour

iii) 4 kg of pears in 2 hours

d) Ethene has the molecular formula C_2H_4.

Draw the structure of an ethene molecule showing the chemical bonds.

e) Ethene is described as an unsaturated hydrocarbon, define each term in the table below.

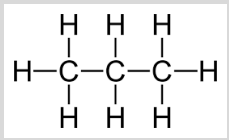
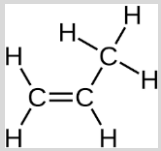
Unsaturated	
Hydrocarbon	

f) State the name of a chemical substance that could be used to show that ethene is unsaturated.

g) Give the result of the test when using the substance in part f).

2. This question is about the two molecules in the table below.

a) Complete the table.

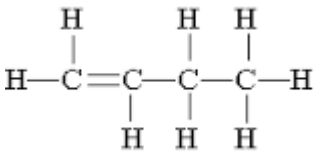
	 **Molecule 1**	 **Molecule 2**
Homologous series		
General formula of homologous series		
Name of substance		
Molecular formula		
Burns with smoky flame (Y/N)		

b) Give the name of a substance that would change molecule 2 into molecule 1.

c) Which of the molecules is the more reactive?

Give a reason.

Parts d) and e) are about the molecule shown.



d) What is the name of this molecule?

e) Which molecule in the table (molecule 1 or molecule 2) is this molecule most similar to?

Give a reason for your answer.