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 cm3) 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 cm3)** |
| Apricot | 30 |
| Avocado | 150 |
| Rhubarb | 0.25 |
| Banana | 3.2 |
| Pineapple | 1.2 × 10–3 |
| Passion fruit | 235 |
| Pear | 85 |

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

Answer: 0.0012.

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

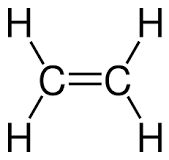
Answer: Pineapple, rhubarb, banana, apricot, pear, avocado, passion fruit.

1. Calculate the volume of ethene produced by the following masses of fruit.

Remember to give units in your answers.

1. 2 kg of bananas in 1 hour  
   Answer: 6.4 cm3.
2. 200 g of apricots in 1 hour  
   Answer: 6 cm3.
3. 4 kg of pears in 2 hours  
   Answer: 680 cm3.
4. Ethene has the molecular formula C2H4.

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



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

|  |  |
| --- | --- |
| **Unsaturated** | Answer: A molecule containing one or more carbon single bonds. |
| **Hydrocarbon** | Answer: A substance containing hydrogen and carbon only. |

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

Answer: Bromine water.

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

Answer: Bromine water goes from orange to colourless.

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

|  |  |  |
| --- | --- | --- |
|  | **C:\Users\Owner\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\6D48BFDD.tmp**  **Molecule 1** | **C:\Users\Owner\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\1D6B7AF3.tmp**  **Molecule 2** |
| Homologous series | Answer: Alkanes. | Answer: Alkenes. |
| General formula of homologous series | Answer: CnH(2n+2) | Answer: CnH2n |
| Name of substance | Answer: Propane. | Answer: Propene. |
| Molecular formula | Answer: C3H8 | Answer: C3H6 |
| Burns with smoky flame (Y/N) | Answer: No. | **Answer:** Yes. |

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

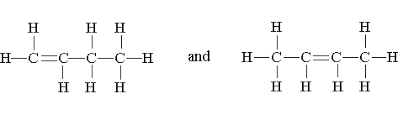
Answer: Hydrogen.

1. Which of the molecules is the more reactive?

Give a reason.

Answer: Molecule 2.

It contains a carbon double bond.



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

1. What is the name of this molecule?

Answer: Butene or but-1-ene.

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

Give a reason for your answer.

Answer: Molecule 2.

Molecule 2 and but-1-ene both have carbon double bonds, or contain the same functional group.