

Functional groups: classification of organic compounds ·  
supported focus

Supported focus · HL

## Supported scope

- Supported HL focus. First assessment 2025; current brief acquired; full Chemistry guide not acquired. Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

# Organic · 1.1

## Reasoning

Two compounds can have the same molecular formula but different structures. Their functional groups help predict which reactions they undergo. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

## Organic · 2.1

### Reasoning

A homologous series shares a functional group and general formula. Structural isomers share a molecular formula but differ in atom connections. Alkenes contain a carbon-carbon double bond. functional group: An atom group determining characteristic reactions; isomer: A compound sharing a formula but differing in structure.

## Organic · 3.1

### Reasoning

Distinguish addition, substitution, oxidation and polymerization by tracing bonds before and after reaction. Conditions and reagents belong to the reaction arrow; they are not interchangeable labels. Draw displayed or structural formulae with the correct number of bonds at each carbon. Use a carbon count to check a proposed synthesis. At advanced level, track reagents and conditions through multistep routes.

## Organic · 4.1

### Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: ethene adds bromine across its double bond. The two-carbon skeleton stays intact and each carbon gains one bromine atom, giving 1,2-dibromoethane. One mole of ethene reacts with one mole of bromine in this addition reaction.

## Organic · 4.2

### Reasoning

How many moles of bromine react completely with 0.15 mol ethene? Use the same sequence: known quantities  $\rightarrow$  model  $\rightarrow$  relation  $\rightarrow$  substitution  $\rightarrow$  unit and interpretation.

## Organic · 5.1

### Reasoning

Bromine decolourization provides evidence of unsaturation in an appropriate test. It is not proof that an unknown sample is specifically ethene. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

## Organic · 5.2

### Reasoning

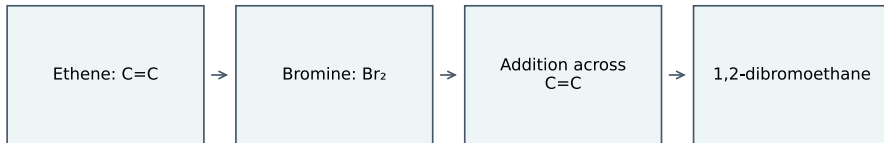
Compounds with the same molecular formula always have identical properties. This claim is false: Bromine decolourization provides evidence of unsaturation in an appropriate test. It is not proof that an unknown sample is specifically ethene.

## Organic · 5.3

### Reasoning

Organic structures and reaction pathways: Distinguish addition, substitution, oxidation and polymerization by tracing bonds before and after reaction. Conditions and reagents belong to the reaction arrow; they are not interchangeable labels.

# Organic · diagram



- Original teaching diagram: Organic structures and reaction pathways
- Use the labels and the stated model together.

## Organic · original transfer

### Your turn

For  $\text{CH}_2=\text{CH}_2 + \text{Br}_2 \rightarrow \text{CH}_2\text{BrCH}_2\text{Br}$ , 0.20 mol ethene meets 0.12 mol  $\text{Br}_2$ . Find product and excess reagent, and explain why this is addition rather than substitution.

## Organic · transfer reasoning

### Method and interpretation

Product 0.12 mol; ethene remaining 0.08 mol. Atoms add across  $C=C$  with no small molecule replaced in this stated reaction. This is a paper model, not an instruction to handle bromine.

## Check yourself

- Explain functional group using the stated model.
- Explain isomer using the stated model.
- Change one value in the original transfer; explain which assumption still matters.