

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# AQA A-LEVEL CHEMISTRY

## CIP Priority Rules: Identifying E/Z Isomers

### Learn Pack

*Guided notes, worked examples and practice questions to be completed alongside the lesson.*

**WATCH THE LESSON**

## E/Z Isomerism

Stereoisomers have the same molecular and \_\_\_\_\_ but a different arrangement of atoms in \_\_\_\_\_.

Geometric or E/Z isomerism is caused by restricted \_\_\_\_\_ about a carbon-carbon \_\_\_\_\_ bond. For E/Z isomerism to exist, each carbon atom in the \_\_\_\_\_ bond must be attached to two \_\_\_\_\_ groups.

### Lesson Objectives:

- Know what the Cahn-Ingold-Prelog (CIP) priority rules are.
- Be able to use the CIP priority rules to assign priority to groups and identify E and Z isomers of alkenes.

### E Isomers

Priority groups are on \_\_\_\_\_ sides of the double bond.

Example: E-but-2-ene

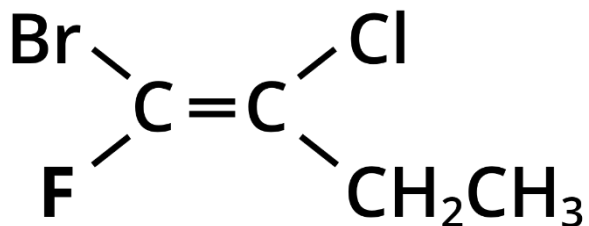
### Z Isomers

Priority groups are on the \_\_\_\_\_ side of the double bond.

Example: Z-but-2-ene

## Why do we need CIP Priority Rules?

Annotate the structural formula below to explain why CIP priority rules are needed:



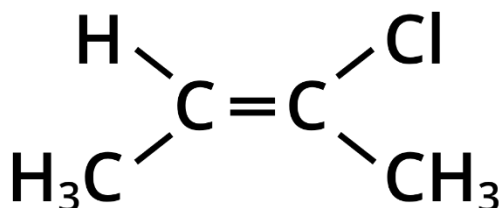
## CIP Priority Rules

1. Compare the \_\_\_\_\_ directly bonded to a carbon atom in the carbon-carbon double bond.
2. The group containing the atom with the higher \_\_\_\_\_ number is given priority.
3. If the atoms are the same, compare the atoms \_\_\_\_\_ bonded to them.
4. If those atoms are the same, continue comparing equivalent atoms until you reach the first point of \_\_\_\_\_ and assign priority.
5. Repeat the process with the other carbon atom in the \_\_\_\_\_ bond.
6. Compare the priority groups to determine whether the molecule is the \_\_\_\_ isomer or the \_\_\_\_ isomer.

## Applying the Rules

Circle the priority groups on each side of the double bond, explaining your reasoning. Then identify whether each molecule is the E or Z isomer:

Example 1:



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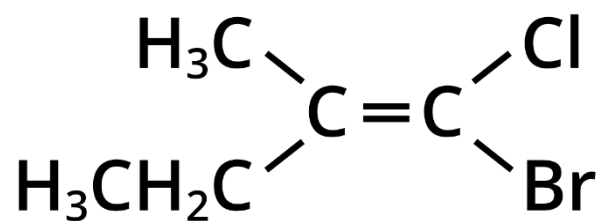
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E or Z Isomer: \_\_\_\_\_

## Example 2:



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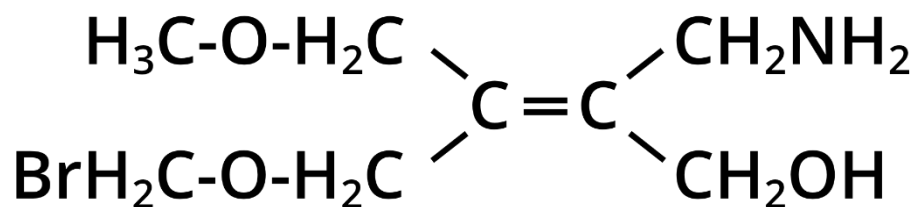
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E or Z Isomer: \_\_\_\_\_

## Example 3:



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E or Z Isomer: \_\_\_\_\_

## Practise Questions – Fact Recall

1. What is it about carbon-carbon double bonds that allows E/Z isomerism to occur?

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2. What condition is required for E/Z isomerism?

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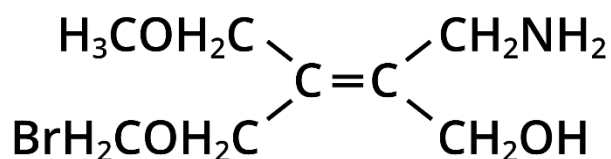
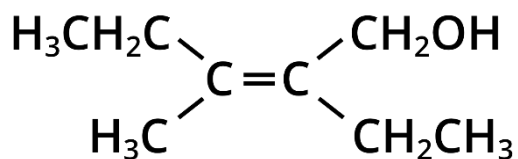
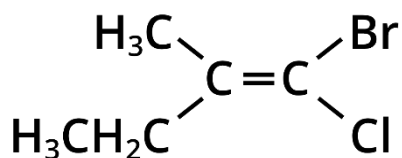
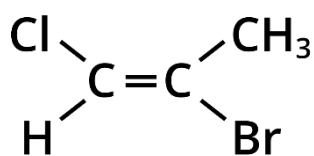
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3. When determining priority for E/Z isomers, groups containing atoms with the higher what are given priority?

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## Practise Questions – Application

1. For each of the following molecules, complete the table below:



| Molecule | Left-hand Priority Group | Right-hand Priority Group | E or Z isomer? |
|----------|--------------------------|---------------------------|----------------|
| 1        |                          |                           |                |
| 2        |                          |                           |                |
| 3        |                          |                           |                |
| 4        |                          |                           |                |