

# Year 12 Chemistry - Activity Sheet 2

## Paired Problem Solving: Short Syntheses

Organic Chemistry

Module 7 - Lesson 2

### Aim

To practice planning and representing short (2-3 step) organic synthesis pathways using your knowledge of reactions and the visualisation tool.

### Instructions

Work with your partner. For each problem below:

1. Identify the starting material and the target product.
2. Use the Chord Diagram Visualisation tool to help you brainstorm possible reaction sequences. Identify necessary intermediates.
3. On your mini-whiteboard or paper (or Worksheet 2), write out the step-by-step reaction pathway.
4. For each step, clearly show the structure (or IUPAC name) of the reactant and product.
5. Above/below the reaction arrow for each step, write the necessary reagent(s) and conditions.
6. Be prepared to explain your chosen pathway.

### Synthesis Problems

**Problem Set A:** Propose a 2-step synthesis pathway for the conversion of **ethene** to **ethanoic acid**.

---

**Problem Set B:** Propose a synthesis pathway for the conversion of **propane** to **propanone**. (Hint: This might take more than 2 steps).

---

**Problem Set C:** Propose a synthesis pathway for the conversion of **1-bromobutane** to **butanoic acid**.

---

**Problem Set D (Ester Challenge):** Propose a synthesis pathway for the conversion of **propene** to **propyl ethanoate**. (Hint: You'll need to synthesise both the alcohol and the acid parts, potentially from the propene starting material if possible, or assume ethanoic acid is available).

---

**Metacognitive Prompts (Consider while working):**

- What functional group change is needed?
- What reaction(s) can achieve this change? (Check the visualizer!)
- What reagents/conditions are specific to that reaction?
- Is there another way to make this connection?