Scaffolding cards

Nudges, not answers.

Naming

- The number goes immediately before the ending: pent-**2**-ene, not 2-pentene.
- Count from the end of the chain that gives the functional group the LOWER number.
- Two double bonds → '-diene', and the 'a' comes back: buta-1,3-diene.
- E/Z: look at EACH carbon of the C=C on its own. Does that carbon carry two different groups? If either carbon carries two the same, there is no E/Z.

Naming the seven families

- Endings: -ane · -ene · -ol · -al · -one · -oic acid. Haloalkanes use a prefix: chloro-, bromo-, iodo-.
- Longest chain first, every time.
- Two prefixes → alphabetical order (bromo before chloro before methyl).
- -al and -oic acid are always on carbon 1, so they never need a number.

Reactions of alkenes

- The five reagents are: H_2 · Br_2 · HBr · steam · propene itself. You supply the catalyst, the temperature and the pressure.
- Two of the five need a catalyst you must name. One needs a high pressure as well.
- 'Room temperature' is a real condition — write it.
- For the major product, think about which carbocation forms more easily.

The mechanism

- THREE curly arrows. One starts on the π bond. One starts on a bond that is breaking. One starts on a lone pair.
- No arrow ever starts on an atom, and no arrow ever starts on a + charge.
- Every arrowhead must touch the atom or the bond that receives the electrons.
- The + goes on the carbon that did NOT get the bromine.
- Words: localised · high electron density · repels · induced dipole · δ+ · electrophile.

π bonding in ethene

- Each carbon has FOUR outer electrons. How many ordinary single bonds does each carbon make? That accounts for three of them.
- Where does the last electron live, and which way does that orbital point?
- The two orbitals do not point at each other — they lie side by side. What is the word for that overlap?
- 'Above and below' is worth saying.

π bonding in benzene

- The same four sentences as ethene, but each carbon is joined to two carbons and one hydrogen — and the sideways overlap does not stop after one neighbour.
- Six p-orbitals, six electrons, one ring.

Kekulé and delocalised

- One model has two different bond lengths. The other has one.
- The systematic name is built from: ring (cyclo-) + six carbons + three double bonds + where they are.

Evidence 1 — resists reaction

- Compare the electron density BETWEEN TWO CARBONS in each molecule.
- Something has to be made before anything can happen to the bromine. What?
- Kekulé's structure contains three of something. What should those three do to bromine water?

Evidence 2 — bond lengths

- Three numbers, all in nm, all beginning 0.1.
- The benzene value is not the average of the other two by accident — where does it sit?

Evidence 3 — enthalpy

- 'Displayed' means every bond drawn as a line, including all four on every carbon and the H–H bond.
- The Kekulé structure has three C=C bonds. One C=C releases 120 kJ mol^{-1}.
- Less energy released than predicted means the starting material was already lower in energy than expected.

Words the examiner is looking for

localised · delocalised · electron density · polarise · induced dipole · electrophile · π bond · σ bond · p-orbital · sideways overlap · carbocation · heterolytic fission · electrophilic addition · delocalisation energy · planar · bond angle · displayed formula · locant · stability