Cracking: shorter molecules and demand

Teacher / technician

YEAR 11 / LESSON 79 / CHEMISTRY + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. Written and model-based lesson; no laboratory procedure is implied.

Coverage and delivery

Shared core: 4.17–4.18. Catalytic cracking model using silica/alumina at the syllabus range 600–700 °C; no classroom heating procedure.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, working in 15 pairs

Item	Per pair / setup	Class total
Booklet / writing tools	1 per learner	30 sets
Model kit / periodic table	1 set per pair	15 sets

Immediate safety

Desk activity only; keep small model pieces away from mouths.

Preparation and delivery

Read alongside the student method

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1. Provide 30 booklets and 15 model kits or reusable atom counters; no chemicals are needed.

2. Use 10 minutes retrieval, 25 independent/pair tasks, 15 explanation and 10 corrections. Keep first attempts visible.

3. No liquid paraffin, catalyst heating or bromine is issued. The RSC practical is background for the phenomenon, not a pupil method in this lesson.

4. If a separate live demonstration is used, use the school-approved screened setup and outlet-first shutdown; this paper model does not replace that procedure.

5. Check all carbon valencies, formula subscripts and equation coefficients. Label any supplied numbers as practice data, not class observations.

Close of lesson

• Return shared equipment and retain corrected reasoning.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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- $C_{10}H_{22} \rightarrow C_8H_{18} + C_2H_4$.
- Ethene, with C=C.
- Silica or alumina, approximately 600–700 °C.
- It converts less-demanded heavy hydrocarbons into more useful smaller products, including fuels and alkene feedstocks.
- Cracking changes molecules by chemical reaction; distillation separates existing molecules by volatility.
- It supports unsaturation in the mixture under appropriate controls, but is not a complete composition analysis.

References and provenance

Pearson Chemistry specification

RSC catalytic cracking background

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.