Dynamic equilibrium: moving counters, steady totals

Teacher / technician

YEAR 11 / LESSON 88 / CHEMISTRY ONLY

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

Coverage and delivery

Chemistry only: 3.19C–3.20C. A deliberately simplified discrete model, not measured reaction kinetics.

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
Counters / labelled areas	30 counters and 2 areas per pair	450 counters; 30 labelled areas

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. Supply 30 counters per pair (450 total), two labelled areas and a round log. No chemicals or glassware.

4. Check the simultaneous-update rule; sequential recalculation gives a different model. Emphasise rates versus amounts.

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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- A→B=6, B→A=0; final A=24, B=6.
- A→B=2 and B→A=2; amounts stay A=10 and B=20.
- No; both transfers continue even though there is no net amount change.
- No; rates are equal here while the amounts are 10 and 20.
- Loss would represent an open system and alter the total/material balance.
- Discrete rounds/rounding, arbitrary transfer fractions and counters do not represent molecular collisions or actual concentration-time behaviour exactly.

References and provenance

Pearson Chemistry specification

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.