Chemical calculations: timed practice

Teacher / technician

YEAR 10 / LESSON 48 / CHEMISTRY + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. Original shared-core 24-mark practice set. Initial attempt and corrected work remain distinguishable; no official grade boundaries.

Coverage and delivery

Shared-core practice: 1.25–1.33 and 1.36. No Chemistry-only molar gas-volume or solution-concentration questions.

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
Calculator / periodic table / timer	1 calculator each; shared timer	30 calculators; 15 tables; 1 timer

Immediate safety

Desk activity only; no chemicals or heating.

Preparation and delivery

Read alongside the student method

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1. Give 30 learners the student sheet, a calculator and periodic-table access. Hold back the staff marking guidance. No chemical equipment.

2. Allow 30 minutes initial work, 15 marking/corrections, 10 retry and 5 exit. The six questions total 24; these are original classroom tasks, not official Pearson items.

3. Use the four explicit credit points per answer. Accept scientifically equivalent reasoning and consistent error-carried-forward methods; do not credit a contradictory statement.

4. Keep initial score and improvements separate. Do not derive an examination grade from this small topic set. Exit calculation checks transfer and is outside the 24 marks.

Close of lesson

• Keep your workings and corrections; return shared materials.

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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• Q1 (4): $N_2 + 3H_2 \rightarrow 2NH_3$ [1]; H_2:NH_3 = 3:2 [1]; $n(NH_3)=0.600\times2/3$ [1]; 0.400 mol [1].

• Q2 (4): 24+2(14+3×16) [1]; M_r=148 without unit [1]; M=148 g mol^{-1} [1]; mass=0.0500×148=7.40 g [1].

• Q3 (4): n(Mg)=0.72/24=0.030 mol [1]; n(O)=0.48/16=0.030 mol [1]; 1:1 [1]; MgO [1].

• Q4 (4): $n(CaCO_3)$=5.00/100=0.0500 mol [1]; 1:1 CaO ratio and M(CaO)=56 [1]; theoretical CaO=2.80 g [1]; 2.24/2.80×100=80.0% [1].

• Q5 (4): assume 100 g and divide by atomic masses: 3.333..., 6.7, 3.33125 mol [1]; approximately 1:2:1 [1]; CH_2O [1]; empirical mass 30 and multiplier 6 → $C_6H_{12}O_6$ [1]. Percentages are rounded; do not demand an exactly integral raw ratio.

• Q6 (4): lid reduces product loss [1]; brief opening admits oxygen [1]; cool for safe, stable weighing [1]; lost oxide makes final mass and inferred oxygen gain too low [1]. Exit: 0.0750×56 = 4.20 g CaO.

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.