Calculating Rate of Reaction

A12.2.1 change in amount ÷ time

Name: _____ Date: _____

1. Recall

1.1 Write the average-rate relationship. What must you do if a reactant mass decreases?

1.2 Complete the units: g and s; cm^3 and s; mol and s; cm^3 and min. How many seconds in 1 min?

2. Product calculations

2.1 72 cm^3 in 24 s. 2.2 45 cm^3 in 15 s. 2.3 84 cm^3 in 28 s. Show working and units.

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3. Reactant used

3.1 8.40 g → 6.90 g in 50 s. 3.2 12.5 g → 10.1 g in 80 s. 3.3 7.20 g → 5.70 g in 50 s.

4. Time conversion

4.1 Convert 2.5 min to seconds. 4.2 120 cm^3 in 2.0 min as $cm^3\ min^{-1}$ and as $cm^3\ s^{-1}$.

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5. Table

Time / s	0	20	50	80
Gas volume / cm³	0	18	42	58

5.1 Rate from 20–50 s. 5.2 Rate from 50–80 s (2 s.f.). 5.3 Which interval is faster?

6. Graph chord

6.1 18 cm³ at 20 s and 42 cm³ at 50 s. 6.2 15 cm³ at 20 s and 39 cm³ at 60 s.

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7. Error detective

Correct: (i) 80 cm^3 in 20 s = '4 cm^3'. (ii) 9.0 → 7.5 g in 30 s, rate = 7.5 ÷ 30. (iii) 90 cm^3 in 1.5 min = 60 cm^3 s^{-1}.

8. Rate data challenge

A 150 cm^3 in 50 s. B 2.4 g used in 80 s. C 0.48 mol in 4.0 min (give mol min^{-1} and mol s^{-1}).

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9. Examination-style

(a) 96 cm^3 in 32 s. [2] (b) 6.80 → 5.30 g in 75 s. [3] (c) 15 cm^3 at 20 s, 39 cm^3 at 60 s. [3] (d) Why the unit is essential. [1]

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10. Method

List the five calculation steps used in the lesson.