

Grade 9 Chemistry Midyear Exam

Units 1–5: evidence, matter, atoms, periodicity, and chemical language

60 minutes. Calculator permitted. Show reasoning and units. All data cards are fictional. Total 24 points.

1. Which is an inference? [1 pts]
 - A. Scale reads 12.4 g
 - B. Bubbles appear
 - C. A gas formed
 - D. Liquid is blue
2. Convert 2.50 km to meters. [2 pts]

3. A sample has mass 18.0 g and volume 6.0 mL. Calculate density. [2 pts]

4. A particle model has tightly packed, ordered particles. Identify state and one model limitation. [2 pts]

5. For ${}^{23}_{11}\text{Na}^+$, state protons, neutrons, electrons. [3 pts]

6. A graph shows increasing atomic radius down a group. Draw a simple arrow/model sketch and explain one shielding-distance reason. [3 pts]

7. Write formula for magnesium chloride and explain charge balance. [2 pts]

8. Balance $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$. [2 pts]

9. A sealed vessel mass changes 12.50 g to 12.49 g on uncertainty ± 0.02 g. State supported claim and overclaim. [2 pts]

10. A student says one spectrum line proves a sample is safe. Identify two evidence problems. [2 pts]

11. Extended CER: A fictional material has higher density than another sample. Make a bounded claim, cite data, explain particle-model connection, and name a limitation. [3 pts]
