Reactivity trend of Group 1 metals

Student activity • desk activity

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The question

How far can evidence support a prediction down Group 1?

Reuse the evidence from Lesson 18 to describe a trend and make a cautious prediction. Everyone completes the shared-core comparison. Chemistry-only extension 2.4C uses electron arrangements, distance and shielding to explain the trend; Double Award learners can omit that extension and Question 5.

Equipment

- Student booklet, Lesson 18 evidence table and periodic table
- Pencil and optional two-colour counters for the Chemistry-only extension
- No repeat demonstration or chemicals required

Desk activity only. No chemical samples or live reactions. Keep counters out of mouths and return loose pieces; use pencil symbols instead if preferred.

Course coverage: Shared core 2.2–2.3: describe the air/water trend and predict properties of other Group 1 metals. Chemistry-only extension 2.4C: explain the trend using electronic configurations.

Evidence → interpretation → prediction

Observe / retrieve	Explain the evidence	Predict with limits
What is actually shown?	What chemistry supports it?	What remains untested?

Chemistry-only extension: Question 5 and the electronic explanation (2.4C). Double Award completes the shared-core trend and prediction tasks.

Method and reasoning

Read the whole sequence before starting

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1. Retrieve the Li, Na and K observations from Lesson 18. Mark each statement as an observation, interpretation or prediction. If using supplied descriptions instead, identify their source.

2. Order the three metals by reactivity. Write one sentence linking the trend to observed evidence and one sentence describing a limitation of that evidence.

3. Predict rubidium's reaction with water compared with potassium. Say which group pattern supports the prediction; do not propose carrying it out.

4. Compare two claims: "reactivity increases down Group 1" and "each reaction is exactly twice as fast". Explain why only the first is supported by this qualitative comparison.

5. Complete the shared-core questions 1–4 and 6. Describe patterns without requiring an electronic explanation for Double Award.

6. Chemistry-only extension 2.4C: use Li 2,1; Na 2,8,1; K 2,8,8,1. Identify the shared outer-electron count and increasing occupied shells. Model greater distance and shielding down the group.

7. Chemistry-only extension: explain why attraction to the outer electron weakens overall despite increasing nuclear charge, so that electron is lost more readily. Answer Question 5.

Cleanup

• Keep evidence and corrections together. Return shared cards/counters and equipment; close the recording or reference pages. No chemical waste is generated.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Shared core: describe the qualitative trend and use it to predict behaviour, with limits. Extension 2.4C — Chemistry only: Li 2,1; Na 2,8,1; K 2,8,8,1. The model shows occupied shells and outer electrons; dots on circles are not literal paths. No numerical reaction-rate data are supplied.

Shared-core claim	Evidence / prediction	Limit or qualification
Li compared with Na		
Na compared with K		
Trend down Group 1		
Predict Rb with water		
Numerical speed claim		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. State the trend in reactivity down Group 1.

2. Use two viewing notes from Lesson 18 to support the trend, distinguishing evidence from inference.

3. Predict rubidium’s reaction with water relative to potassium, and qualify your prediction.

4. Why can you not conclude that each metal reacts exactly twice as fast as the one above it?

5. CHEMISTRY ONLY (2.4C): explain the trend using occupied shells, shielding and loss of the outer electron.

6. A student reports a flame that was not visible in the clip. How should the record be corrected?