The order on the periodic table

Atomic structure and properties | constructed element comparison

Instructional alignment HS-PS1-1

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Use a model to predict chemical behavior
Crosscutting concept Patterns

1. X tends to lose one electron, forming +1; Y gains one, forming -1.

2. One electron transfers from X to Y, supporting a 1:1 ratio for this charge model.

3. The valence pattern supports charge reasoning. It omits orbital detail and the full energetics of actual substances.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Thinking a neutral atom changes its element when it forms an ion. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Replace Y with a model atom having six valence electrons and revise the ratio.

Related public evidence

CHEM_NEW_2026_08_39 | public question

Official mapping for that example

CHEM_NEW_2026_08_15 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

What the boiling evidence can show

Interparticle forces | constructed property investigation

Instructional alignment HS-PS1-3

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Interpret an investigation and construct an explanation
Crosscutting concept Structure and function

1. The 95°C liquid is consistent with stronger attractions under the supplied conditions.

2. Energy helps separate molecules against attractions. Boiling does not ordinarily break the covalent bonds within each molecule.

3. Use equal pressure and purity, repeat measurements and compare additional structure or property evidence.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Explaining boiling by breaking all bonds inside molecules. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Change external pressure and explain why the original temperatures require a controlled comparison.

Related public evidence

CHEM_NEW_2026_08_36 | public question

Official mapping for that example

CHEM_NEW_2026_08_35 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

Conservation on both sides

Reaction models | atom-count model

Instructional alignment HS-PS1-7

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Use mathematics and a model to support conservation
Crosscutting concept Energy and matter

1. $2H_2 + O_2 \rightarrow 2H_2O$.

2. Both sides contain 4 H atoms and 2 O atoms.

3. Atoms are conserved and rearranged. Three reactant molecules become two product molecules, so molecule counts can differ.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Changing a subscript to make the atom counts match. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Use a particle diagram with four H_2 and one O_2. Identify the excess substance after reaction.

Related public evidence

CHEM_NEW_2026_08_31 | public question

Official mapping for that example

CHEM_NEW_2026_08_29 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

A system that warms its surroundings

Chemical energy | constructed thermal evidence

Instructional alignment HS-PS1-4

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Develop an energy model
Crosscutting concept Energy and matter

1. Energy transfers from the reaction system to the surroundings, consistent with an exothermic reaction.

2. Products have lower chemical potential energy than reactants in this model; the difference is released.

3. Activation energy concerns the barrier along a reaction path. Net temperature change does not specify that barrier.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Treating energy released overall as evidence that no activation barrier exists. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Add a catalyst and revise the path while keeping the net energy difference.

Related public evidence

CHEM_NEW_2026_08_32 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

Which evidence measures rate?

Reaction rate | constructed reaction data

Instructional alignment HS-PS1-5

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Analyze data and construct an explanation
Crosscutting concept Cause and effect

1. A produces 20 mL in 10 s, averaging 2 mL/s. B produces 35 mL, averaging 3.5 mL/s.

2. At the higher-temperature condition B, particles can collide more frequently or with greater energy, increasing effective collisions.

3. Final volume describes total gas yield here. The time taken to reach that yield can differ.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Using final product amount as the sole measure of reaction speed. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Change surface area while holding temperature fixed and design a fair comparison.

Related public evidence

CHEM_NEW_2026_08_48 | public question

Official mapping for that example

CHEM_NEW_2026_08_37 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

A concentration threshold

Solutions | constructed solution data

Instructional alignment HS-PS1-10

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Use proportional reasoning with evidence
Crosscutting concept Scale and proportion

1. A is 6 g/100 mL and exceeds the target. B is 3 g/100 mL and meets it.

2. 12/5*100=240 mL final solution.

3. Dissolving and mixing can change the resulting volume. The target is defined per volume of solution, so prepare to a final volume.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Comparing masses directly while ignoring different solution volumes. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Provide a solution with a different total mass but the same concentration and compare the decisions.

Related public evidence

CHEM_NEW_2026_08_38 | public question

Official mapping for that example

CHEM_NEW_2026_08_34 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed