

ELEMENTAL Rule Book

Learning Objectives

Elemental is a serious educational board game designed to reinforce and deepen understanding of periodic trends and element classification at GCSE / early A-level chemistry. By playing Elemental, players will:

- **Recall** factual chemical knowledge (group numbers, metals vs non-metals, basic periodic structure).
- **Apply** knowledge of periodic trends (reactivity, atomic radius, ionisation energy) to solve problems.
- **Analyse** incomplete information through structured questioning and deduction.
- **Evaluate** when sufficient evidence has been gathered to justify a confident guess under time pressure.
- **Communicate** scientific reasoning clearly and collaboratively within a team-based problem-solving context.

The game is designed to promote active reasoning and discussion, rather than rote memorisation, aligning with principles of serious game design.

Preparing to play

Number of players: 4-8 players, split into equal teams

Game time: 20-35 minutes

Game components:

- Gameboard
- Trend reference Sheet
- Element cards, with varying difficulty
 - Level 1 (Easier)
 - Level 2 (Medium)
 - Level 3 (Harder)
- Trend tokens (each worth 1 point)
- Player pieces (one per team)
- 90 second timer



Figure 1. Players game pieces

Setup:

1. Unfold the gameboard and place in the centre of the table.
2. Players divide into 2 teams.
3. Each team places their playing piece on Start.
4. Shuffle the element cards by difficulty or as a combined deck (players choice).
5. Give the card holder access to the deck and trend tokens.
6. Place the optional Trends reference sheet within sight of all players.

How to play

Each turn, team members are nominated describer and guessers. All players must take their turn at being the describer.

Step 1: Describer draws an element card

- The timer starts.
- The describer keeps the element card hidden from the guessing players.
- The card shows the element and its difficulty level (1–3).

Step 2: Question Phase

- The guessers ask yes/no questions to determine the identity of as many element as they can in the time limit.
- Questions may relate to:
 - Group **or** period (cannot ask both of these on one element card)
 - Metal vs non-metal
 - Periodic trends (e.g. reactivity, atomic radius, ionisation energy)
- For every trend-based question asked, the team receives one Trend Token.
- When the 90 second times runs out, no more guessing!
- **Banned Questions:**
 - Descriptive language - "Is it very reactive?" "Is it small?"
 - Naming or guessing straight away - "Is it chlorine?"
 - Open or vague prompts - "Is it near oxygen?" "Is it like sodium?"

Step 3: Guess and Justification

- At any point before time runs out, the team may choose to guess.
- To score, the team must:
 - Point to the correct element on the periodic table.
 - Verbally justify their guess.

Step 4: Scoring

- If the guess is correct:
 - Score the card's point value.
 - Add +1 point for each Trend Token earned.
- If the guess is incorrect:
 - Score 0 points.
- Breaking the rules results in 0 points for that element.

Step 5: Movement

- At the end of the round, total the number of points earned.
- Move the team's playing piece forward one space per point.

The winning team is the one to cross the 32 spaces and reach finish first. Exact landing is not required.

Sample round

A Level 2 card is drawn: *Chlorine*

The team asks:

- “Is it a non-metal?” → Yes
- “Is it in Group 7?” → Yes
- “Is it more reactive than Br?” → Yes + Trend token awarded

The team guesses chlorine, points to it on the periodic table, and justifies:

- “Chlorine is in Group 7, is more reactive than Br as reactivity decreases down group 7.”
- Scoring:
 - Card value: 2 points
 - Trend Tokens: 1 point
 - Total: 3 points

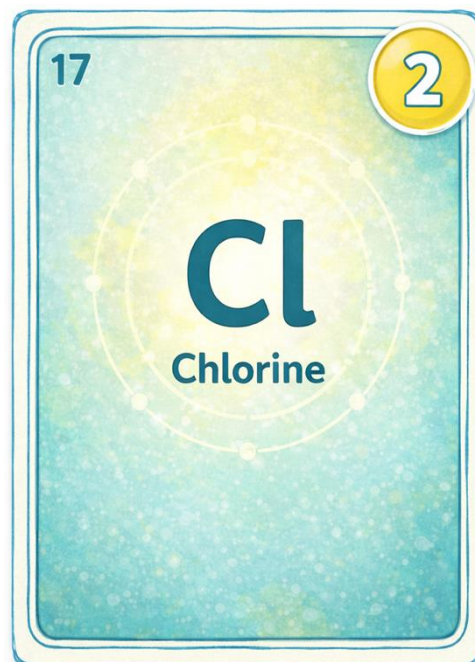


Figure 2. Front of the Chlorine element card showing the

The team continues this cycle until the timer runs out.

Optional Extension Activity (Creating)

After the main game, teams may use the element cards they correctly identified to:

- Combine 2–3 elements to form a **chemically valid compound**.
- Name the compound and explain why the elements bond.

This extension supports higher-order learning without altering core gameplay.

Teacher/ Facilitator Tips

- Adjust difficulty by limiting or encouraging use of the Trends reference sheet.
- Encourage verbal justification of each element to reinforce chemical language.
- Use the post-game extension as further discussion.

Elemental is designed to be flexible, supporting mixed-ability groups while preserving challenge and educational integrity.