

Chemical Bingo

Instructions for Teachers

1. Introduction:

Chemical Bingo is a game for helping students to memorise the internationally recognised Symbols for the one hundred or so Chemical Elements that comprise material substances. But, in the hands of a skilled teacher, Chemical Bingo can be much more than a simple memory aid. The following instructions used with the accompanying files (downloadable from *Chemical Bingo* – http://blueplanetnsw.edu.au.ozstaging.com/templates/blue_content.aspx?pageID=551) can be used to provide valuable learning opportunities for Stage 4 and 5 students following the NSW Science curriculum.

1. Structure:

1.1. The Bingo Cards:

The bingo cards are modelled on a cut-down version of Mendeleev's Periodic Table.

Game 1

1	2						13	14	15	16	17	18
												He
	Be						B			O		
							Al		P			Ar
K								Ge	As	Se	Br	
					Ag	Cd					I	
					Au							

Game 2

1	2							13	14	15	16	17	18
							H						
	Be									N			Ne
Na								Al		P		Cl	
						Fe						Se	Kr
	Sr						Ag			Sn			
Cs													

These cards can be used in Stage 4 even before students have been introduced to the Periodic Table; the unusual structure of the cards is no barrier to students understanding and enjoying the game even before they comprehend the full implications of the structure.

The cards only cover the first 6 Periods of the Periodic Table and only Groups 1, 2, 13, 14, 15, 16, 17, 18 and three Groups of the Transition Metals (namely Groups 8, 11 and 12; which, however, are not numbered on the cards). This cut-down structure is to allow for a compact, simple card, easily understood at the Stage 4 and 5 levels.

On each bingo card there are the symbols for 15 randomly chosen Chemical Elements each located in its correct Period and Group.

1.2. Total List of Elements

Only 40 elements are included in the total list included in this game (see Appendix 1). This is to enable a single game of Chemical Bingo to be concluded in a 15 to 20 minute chunk within any usual classroom lesson sequence.



The list of Elements has been purposefully chosen with three criteria in mind:

- The elements are those commonly dealt with in Stage 4 of the NSW Science Syllabus.
- All the elements with Atomic Number between 1 and 20 are included, while the other twenty are chosen to cover the diversity in physical and chemical properties of those elements that have relatively stable isotopes.
- The elements are chosen to demonstrate the general structure of Mendeleev's Periodic Table (Groups; Periods; Transition Elements etc) and its evidential basis.

2. Preparation for Chemical Bingo in a Lesson:

2.1. The Bingo Cards:

There are six sheets (6 files **Chemical Bingo1** ... through to ... **Chemical Bingo6**) each with 4 rows of two bingo cards (48 different cards in total). Prior to the lesson, these files need to be downloaded and printed out on A4 paper and then cut up into individual cards (if only one game is to be played in the lesson) or individual rows of two cards (if two games are to be played in the lesson). These cards will be distributed to students at the beginning of the lesson.

2.2. List of Elements to be called:

There are five versions of the list (each in a separate file and each with a different purpose):

CHEMICAL ELEMENTS – 1. Symbols and Names

CHEMICAL ELEMENTS – 2. Names only

CHEMICAL ELEMENTS – 3. Symbols only

CHEMICAL ELEMENTS – 4. Symbols and Properties

CHEMICAL ELEMENTS – 5. Symbols and Atomic Models

Prior to the class, *at least* two of these ('CHEMICAL ELEMENTS – 2. Names only' and 'CHEMICAL ELEMENTS – 3. Symbols only') must be downloaded and printed on to A4 paper. Then, using a photocopier, these lists are copied to Overhead Transparencies (plastic sheets).

The Overhead Transparency titled '**CHEMICAL ELEMENTS – 3. Symbols only**' will be used as the *game template* for the "caller" to use and keep track of the called Elements during the conduct of the Bingo game.

The other Overhead Transparency ('CHEMICAL ELEMENTS – 2. Names only') should be cut up into 40 individual Chemical Element Transparency strips. These 40 transparency strips are then placed randomly in an opaque envelope. During the Bingo game, the "caller" will withdraw strips, one at a time at random; will call the Element's name (or, alternatively, describe its properties or some aspect of its atomic structure); and then will place the transparency strip on the '**CHEMICAL ELEMENTS – 3. Symbols only**' *game template*.



2.3. Incentives and Extras:

Prizes (usually 'chocolate frogs' or something similar) should be readied before the class.

An Overhead Projector should be available and possibly also a Periodic Table chart (alternatively, the teacher may wish to distribute A4 versions of the complete Periodic Table to each student).

3. Procedure for Chemical Bingo during a Lesson:

3.1. Basic Game:

1. Explanation should be given of the *purpose* of the game within the context of the wider scope and sequence of the lesson.
2. The Bingo Cards are distributed and the rules for the game outlined. Students must have pen or pencil to strike out the **Symbols** on their Bingo card as the Elements happen to be chosen and called during the game.
3. A "caller" (at first, the teacher) is chosen.
4. The **CHEMICAL ELEMENTS – 3. Symbols only** *game template* is displayed on the overhead projector screen.
5. The caller plucks the **Element Name** slips one-at-a-time from the envelope; calls them out; waits; and after a suitable interval, places the **Name** against the correct **Symbol** on the *game template*. Students will mark off the element **Symbol** if it happens to be on their cards.
6. One at a time the **Element Names** are chosen randomly, called, and placed on the *template* until a point is reached where one student will finally have completely crossed out all **Symbols** on his/her card. The teacher will check to see that the card is in fact correctly marked, and if so declare the student the winner and award the prize.

3.2. Games based on Chemical Properties and/or Atomic Models:

Once students are familiar with the basic game, and depending upon the Stage they have reached in the Science Syllabus, teachers and students will find it more rewarding to play an advanced version of the game: as each transparency slip is withdrawn from the envelope, instead of calling out the **Element Name**, the "caller" provides a description of the properties of the Element or else some particular aspect of its atomic structure or position in the Periodic Table. This greatly increases the educational value of the game and also the interest for the student. To provide assistance for these more advanced versions of the game, teachers can download the two files "**CHEMICAL ELEMENTS – 4. Symbols and Properties**" "**CHEMICAL ELEMENTS – 5. Symbols and Atomic Models**" which give potted details for the forty Elements in the list.

Other variations upon the game are to call for students to replace the teacher as the "caller", and to remove any visual memory aids (e.g. the Overhead projector).



CHEMICAL ELEMENTS – 1. Symbols and Names

H	Hydrogen	Fe	Iron
He	Helium	Cu	Copper
Li	Lithium	Zn	Zinc
Be	Beryllium	Ge	Germanium
B	Boron	As	Arsenic
C	Carbon	Se	Selenium
N	Nitrogen	Br	Bromine
O	Oxygen	Kr	Krypton
F	Fluorine	Rb	Rubidium
Ne	Neon	Sr	Strontium
Na	Sodium	Ag	Silver
Mg	Magnesium	Cd	Cadmium
Al	Aluminium	Sn	Tin
Si	Silicon	I	Iodine
P	Phosphorus	Xe	Xenon
S	Sulphur	Cs	Cesium
Cl	Chlorine	Ba	Barium
Ar	Argon	Au	Gold
K	Potassium	Hg	Mercury
Ca	Calcium	Pb	Lead