

30: Puzzles and Games

A: Chemical Alphabet

Can you think of a chemical word for each letter of the alphabet? You could do research using the Internet or Encarta for a wide range of words. To show what you might do, some examples are shown below.

Word	Clue
A	is for finding out which chemicals are present
B	is for one of two liquid elements
C	is for bangs, whizzes, colours and pops
D	is for evaporation then condensation
E	is for a state change
F	is for separating a precipitate from a solution
G	is for energetic particles far apart
H	is for the lightest element
I	is for a purple element
J	is for a unit of energy
M	is for 6.02×10^{23} particles
N	is in the nucleus of an atom
O	is for Mr Lavoisier and Mr Priestley
P	is for cleaning dirty water

Answers

analysis, bromine, chemistry, distillation, evaporation, filtering, gas, hydrogen, iodine, joule, mole, neutron, oxygen, purification

B: Chemical Bingo

Making a set of the bingo cards will take some time. An alternative is for the pupils to make the cards.

For each bingo card a 3 x 3 grid is required. The grid is then filled with a random selection of words or symbols (see ideas below). Laminating the cards (or covering in plastic) would produce a durable resource.

It is essential that if pupils are making their own cards they complete the cards in pen before you start the bingo game. This is to avoid a pupil adding the names as you call them out!

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You can use counters or pieces of paper to cover the names as they are called out. Alternatively, if you laminate or cover the cards with plastic, pupils can cross out the symbols with a washable pen.

The holder of a winning card could be given a small prize such as a sweet. The greater the variety of symbols used, the longer it will take to get a full house.

Ideas for bingo cards

Element symbols – you read out the name and pupils match the name to a symbol on the card.

Compound symbols – you read out the name and pupils match the name to the symbols on the card.

Famous chemists – you read out what they did.

Laboratory equipment – you read out what it is used for.

Chemical techniques such as distillation, evaporation etc. – you read out a description of the method.

C: Close-up Quiz

This is a simple quiz based on images of equipment found in the science laboratory. This activity could be used as one round in a quiz.

Use either a good digital camera (it is often difficult to get a very close-up focused image with a digital camera) or a macro lens on an ordinary camera to take close-up and unusual angle pictures of ordinary equipment around the laboratory.

Collate all the pictures on to an A3 sheet of paper. If possible, colour photocopy the sheet so you have enough copies for your pupil groups.

To make the quiz more interactive, arrange the equipment that has been photographed on the laboratory benches and get the pupils to move around with the images trying to match them up. The photos would have to be spread over more sheets to be used in this way.

D: Who wants to be a millionaire?

You can base a chemistry quiz on the popular television show 'Who wants to be a millionaire'.

The aim of the game is to collect moles. What do moles mean? Moles mean prizes. You can set your own sweet currency for moles.

The values are: 100, 200, 500, 1000, 4000, 16 000, 32 000, 125 000, 500 000, 1 000 000. This relates to 10 questions.

The questions are graduated and get harder as the stakes get higher. If you are playing for sweets then you can make 1000 and 32 000 benchmarks. At each of these values the player can be guaranteed prizes.

If the player gets a 100, 200 or 500 question wrong they leave with nothing.

If the candidate gets the 4000 or 16 000 question wrong they drop to 1000.

If the player gets the 125 000 or 500 000 question wrong they drop to 32 000.

The player can stop after hearing the question and claim the prize won so far.

30: Puzzles and Games (contd)

The class can participate in three ways:

- a** as an audience member - they are each given 4 cards with A, B, C or D on so they can vote
- b** fastest finger first in the initial 8
- c** phone a friend.

Each question has a choice of four answers and as the stakes get harder so do the questions. The ability and age of pupils can determine the difficulty of the questions.

Hard questions need not necessarily be a difficult concept or higher level chemistry. If you make the choices very similar and plausible then the question will also be difficult.

Rules

- 1 To choose the candidate who will take part have a selection of pupils (eight candidates is suggested) who will compete to take the seat. They have to put a list of something in order, for example
 - order of elements (give them a periodic table)
 - order of number of electrons on the outer shell
 - order of size of atom.
- 2 Each person has someone standing behind him or her with a stop clock. The candidates write down what they think is the correct order as fast as they can. The time taken is written on the sheet. The player with the fastest time and the correct answers plays.
- 3 The player has three lives.
 - Ask the audience** – the audience hands in a card with A, B, C or D on if asked.
 - 50:50** – the teacher can eliminate two wrong answers.
 - Phone a friend** – the friend can be someone in the class who can give their best guess of the correct answer. This is done against the clock – they have 20 seconds to offer an answer.

What you need

OHP
acetate sheets
stop clocks for each of the initial contestants
pen and paper for each of the initial contestants
a set of A, B, C and D cards for each audience member

30: Puzzles and Games (contd)**What you do**

This set of quiz questions is suitable for high ability year 10 pupils.

Copy the series of questions below on to acetate and cut up so each question can be used one at a time on the OHP.

Select a contestant using the following question. The fastest correct solution goes forward for the Mollinaire questions.

Put the following elements in alphabetical order.

cobalt calcium copper chromium

100 mole question

The separation of a solid from a liquid is described as

a filtering **b** flitting **c** flapping **d** failing

200 mole question

Which of the following substances is acidic?

a water **b** lemon juice **c** wood **d** ammonia

500 mole question

Acids can be neutralised by

a salt **b** alkali **c** water **d** acids

1000 mole question

Charged particles are called

a irons **b** eons **c** neuons **d** ions

2000 mole question

Which of the following particles is/are responsible for all the mass in the nucleus of an atom?

a protons and neutrons **b** neutrons and electrons
c neutrons **d** electrons

16 000 mole question

Covalent bonding can be described as

a transfer of electrons **b** increase in protons
c change in neutrons **d** sharing electrons

32 000 mole question

Which of the following substances is the most ionic?

a NaCl **b** HCl **c** PCl₃ **d** CCl₄

64 000 mole question

Which of the following metals is the most reactive?

a Na **b** K **c** Fr **d** Sc

125 000 mole question

The element used in tear gas, photographic films and as a disinfectant. What is the element?

a chlorine **b** bromine **c** fluorine **d** iodine

500 000 question

This person discovered oxygen jointly with Lavoisier.

a Harry Kroto **b** Fritz Haber
c Dmitri Mendeleev **d** Joseph Priestley

1 000 000 mole question

When did J.J. Thompson discover the electron?

a 1847 **b** 1897 **c** 1927 **d** 1957