Escape the classroom

Education in Chemistry
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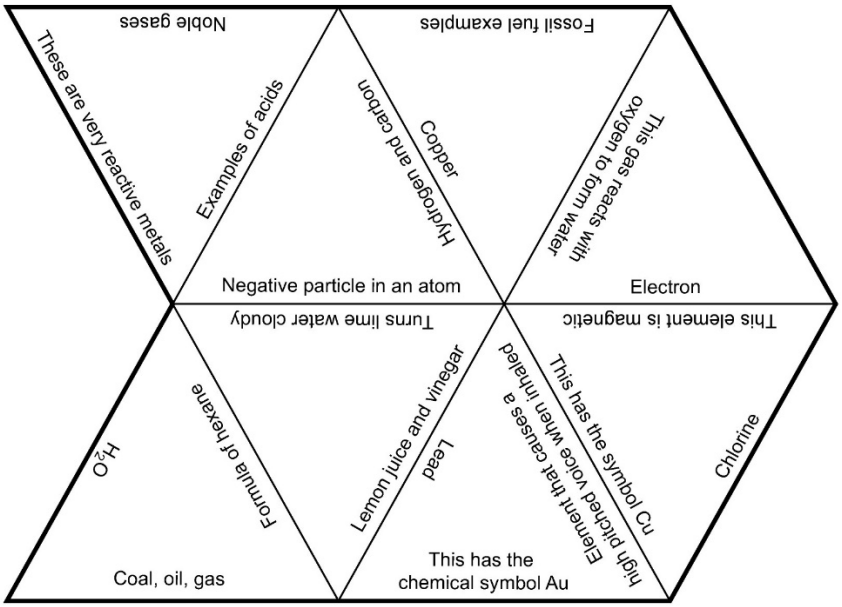
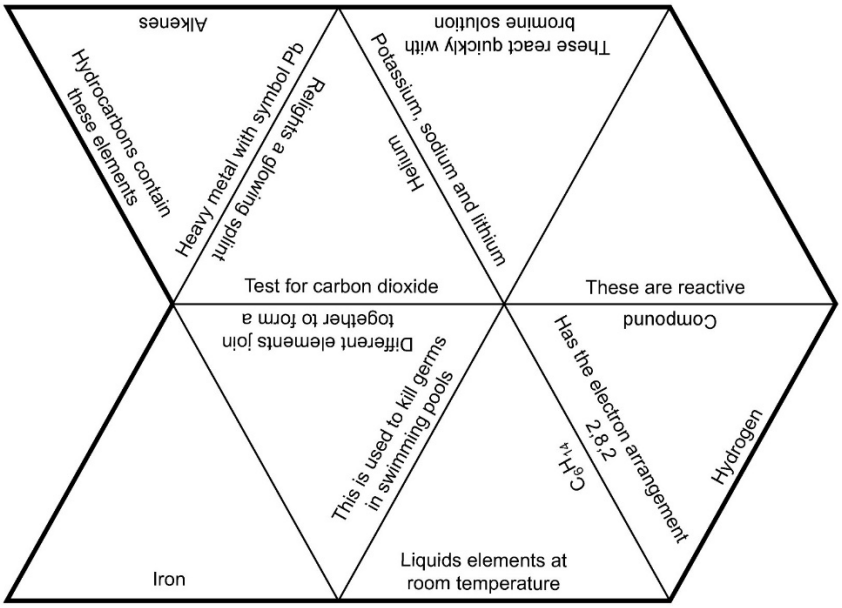
rsc.li/2DUcogN

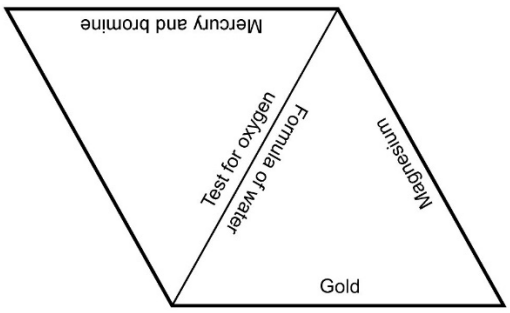
For this version of an Escape room, challenge students as a group to solve chemistry-based puzzles to open a locked box containing a reward, allowing them to develop problem-solving, knowledge and practical skills in a novel way.

On the following pages are teacher instructions, an example jigsaw and student worksheets.

Jigsaw


Noble gases
These are very reactive metals
Examples of acids
Fossil fuel examples
Copper
Hydrogen and carbon
This gas reacts with oxygen to form water
Negative particle in an atom
Electron
Turns lime water cloudy
This element is magnetic
H_2O
Formula of hexane
Lemon juice and vinegar
Lead
Element that causes a high pitched voice when inhaled
This has the symbol Cu
Chlorine
Coal, oil, gas
This has the chemical symbol Au


Alkenes
Hydrocarbons contain these elements
Heavy metal with symbol Pb
Relights a glowing splint
These react quickly with bromine solution
Potassium, sodium and lithium
Helium
Test for carbon dioxide
These are reactive
Different elements join together to form a
Compound
This is used to kill germs in swimming pools
C_6H_{14}
Has the electron arrangement 2,8,2
Hydrogen
Iron
Liquids elements at room temperature


Mercury and bromine
Test for oxygen
Formula of water
Magnesium
Gold

Periodic table guess who

Preparation
Label the guess who doors with: sulfur, sodium, germanium, oxygen, uranium, argon, francium, gold, carbon, copper, krypton, neon, silver, indium, chlorine, iodine, magnesium, hydrogen, nickel, europium, mercury, xenon, neptunium and aluminium

Clues
Close the door of …

… all elements named after planets.

… all elements named after countries.

… all elements that have full energy levels.

… all elements that are worn as jewellery.

… all elements that are used in coins.

… an element named after a continent.

… the element with an electron arrangement 2,8,3.

… the element required for combustion.

… the element which is a yellow solid at room temperature, found in matches.

… the element that burns with a bright white flame.

… the element used to kill germs in swimming pools.

Microscale chemical changes

Materials

- Dropper bottles with various chemicals
- Universal indicator
- Hydrochloric acid (0.1 M)
- Sodium hydroxide (0.1 M)
- Lead nitrate (0.01 M)
- Potassium iodide (0.0 1M)
- Phenolphthalein solution
- Copper sulphate (0.5 M)
- Ammonia (1 M)
- Laminated instruction sheet

Activity

Pupils should add a drop of each the chemicals to each other using the instructions and note the colour. The colour will correspond to a number. This will give the code required to unlock the box. This can be used to introduce pH, precipitation and complexes.

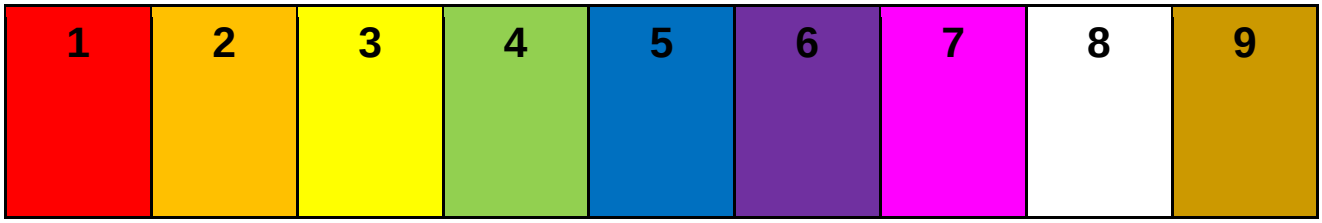
Microscale chemical changes worksheet

1) Add 1 drop of lead nitrate to 1 drop of potassium iodide in the circle.

2) Add 1 drop of universal indicator to 1 drop of hydrochloric acid in the circle.

3) Add 1 drop of copper sulfate to 1 drop or ammonia in the circle.

4) Add 1 drop of phenolphthalein to 1 drop of sodium hydroxide in the circle.



Conductivity code

Materials

- Carbon fibre
- Copper
- Electrolycra
- Perspex (cover slip)
- Rock
- Rubber band
- Sandpaper
- Wooden splint
- Zinc
- Microscale conductivity meter (see SSERC or CLEAPSS website for construction) or any set-up that can test for electrical conductivity.

Conductivity code worksheet

Rubber	Wood	Electrolycra	Rock	Perspex	Copper	Zinc	Sand	Carbon fibre
1	2	3	4	5	6	7	8	9

Which conducts electricity? Test to see. The conductors will reveal the key.