

HOW TO ESCAPE

5 doors, each a puzzle in its own right – several have more than one part.

1. Work every part of a door on this pack and build its code.
2. Type the code into the terminal to open the door.
3. Write down the key digit it gives you.
4. Combine all 5 key digits into the master override and escape.

TEAM NAME

TERMINAL

🔒 DOOR 1 PERIODIC TABLE

GROUPS 1 & 7

Part 1. Halogens (IDs only) were added to solutions of the others' salts. ✓ = displacement, ✗ = none, · = not tested.

added ↓	2	6	9
2	—	✗	✓
6	✓	—	✓
9	✗	✗	—

Put the IDs in order most → least reactive.

Part 2. (increases = 1 · decreases = 2) going **down** Group 1, reactivity and going **down** Group 7, reactivity .

Door code = the reactivity IDs, then the trend digits.

DOOR
CODE

KEY
DIGIT

Three gases were tested. Identify each and read its code digit.

hydrogen = 3 · oxygen = 7 · carbon dioxide = 1 · chlorine = 9 · ammonia = 5

GAS 1

It relights a glowing splint.

code

GAS 2

It bleaches damp litmus paper.

code

GAS 3

A lit splint gives a squeaky pop.

code

Door code = the gas digits, in order.

DOOR
CODE

KEY
DIGIT

For each salt, choose the correct **preparation method** and write its number. Use the solubility rules.

Methods: 1 = excess solid (metal / insoluble base / carbonate) + acid, then filter · 2 = titration (soluble alkali + acid) · 3 = precipitation (mix two solutions, filter)

Barium sulfate

Potassium nitrate

Copper(II) sulfate

Reactive-metal soluble salt → titration; other soluble salt → excess; insoluble → precipitation. Door code = the method numbers, in order.

DOOR
CODE

KEY
DIGIT

Work out each answer and write it in the box.

$A_r: \text{Mg} = 24 \cdot \text{O} = 16$

1 Work out the M_r of magnesium oxide, MgO.

2 Work out the % by mass of oxygen in MgO.

Door code = the answers in order (numbers only, no units).

DOOR
CODE

KEY
DIGIT

Part 1. Classify each molecule as an alkane or an alkene from its formula. alkane = 1 · alkene = 2

C_2H_4

C_3H_8

C_4H_8

Part 2. How many carbon atoms are in a molecule of C_2H_4 ?

Alkanes fit C_nH_{2n+2} ; alkenes fit C_nH_{2n} . Door code = the classifications, then the Part 2 answer.

DOOR
CODE

KEY
DIGIT

Each clue gives only a **type** of element. Exactly one element of that type is hidden in the grid – **find it**, then write the **first letter** of each element. Enter them in order 1-4 for the code.

L	Y	U	X	M	D	L	R	G	A	K	P	L
A	R	J	C	P	E	J	G	F	P	H	M	M
D	F	P	O	K	K	C	F	H	X	X	W	U
E	X	I	C	X	P	E	N	M	O	F	M	I
C	P	I	C	T	F	B	B	G	P	X	G	S
H	N	G	F	A	A	Q	N	Y	F	F	A	S
E	V	C	Q	K	L	O	C	K	Y	U	B	A
N	W	M	R	R	T	C	P	Z	T	Z	U	T
I	V	N	M	H	F	G	I	R	W	P	V	O
M	W	Q	T	P	H	X	J	U	D	Y	K	P
O	R	N	P	F	Q	W	Y	F	M	Z	J	X
R	Z	O	T	K	P	G	D	E	A	P	L	V
B	R	Q	K	N	W	M	Z	Q	H	L	W	I

1. A Group 1 metal
2. A Group 2 metal
3. A transition metal
4. A Group 7 element (a halogen)

CODE

The clue only tells you the group – the grid tells you which element it is.

MASTER OVERRIDE

Every door green? Write your key digits in order, then enter the master code to escape.

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DOOR 1 DOOR 2 DOOR 3 DOOR 4 DOOR 5

Enter codes at: _____