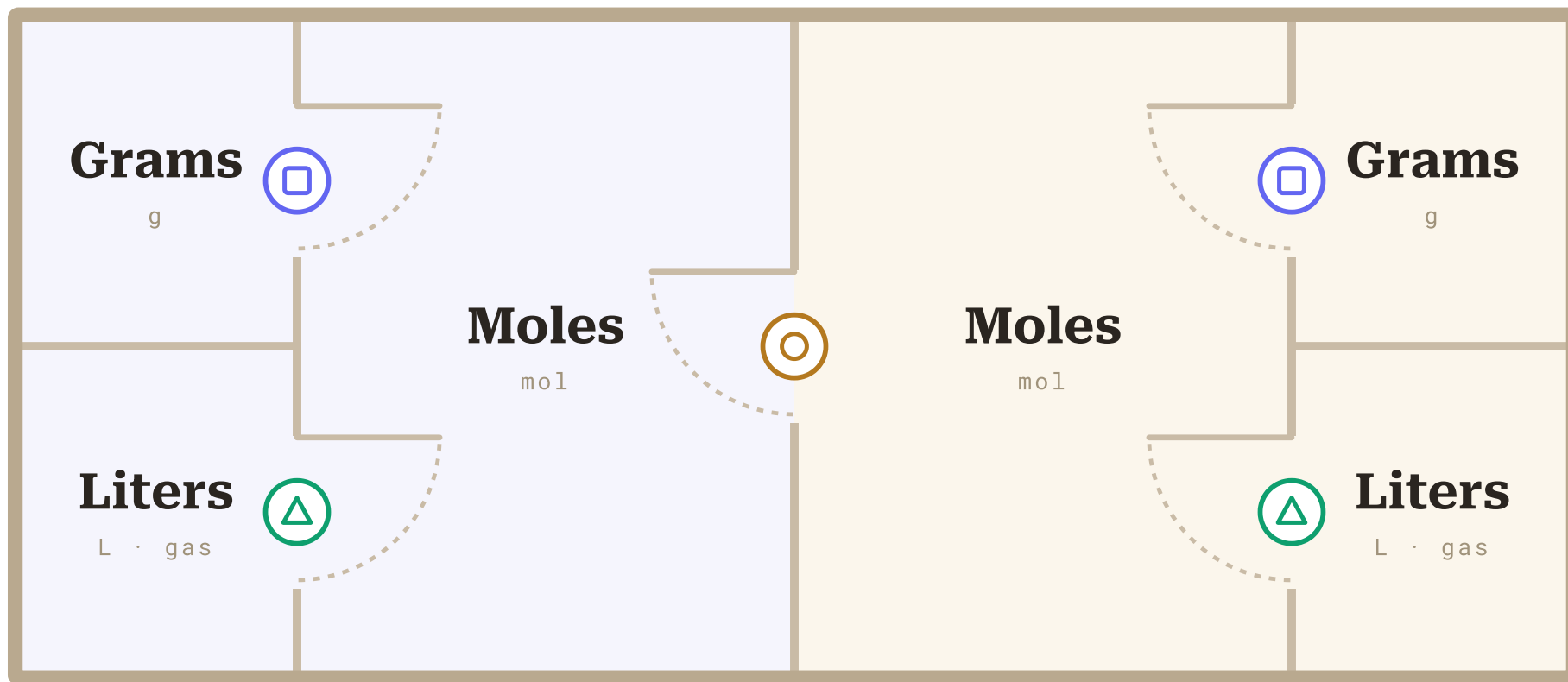


The Stoichiometry House

Start in the room you have. Unlock each door with its key.
Finish in the room you want.

BALANCED EQUATION _____

A · WHAT YOU HAVE _____ B · WHAT YOU WANT _____



Molar mass key

GRAMS ↔ MOLES

Divide going into moles.
Multiply going out.



Mole ratio key

MOLES A ↔ MOLES B

Multiply by coefficient
wanted over coefficient
given.



Gas key

MOLES ↔ LITERS

At STP, use 22.4 L/mol.
Otherwise, use $PV = nRT$.

How to play

2 to 4 players. The house sheet is the board. Each player needs a token: a coin, a cap, an eraser.

Setup

Shuffle the Problem cards and the Key cards. Deal 3 Key cards to each player. Leave room for a face-up Key discard pile.

Your turn

1. **Read.** Flip a Problem card and read it out loud. Put your token in the start room: the room that matches the number you are given. Point to the finish room: the room the question asks for.
2. **Unlock.** For each door on your route, play the matching Key card, discard it face up, and move through. No matching key? Your token waits at that door and your turn ends.
3. **Score.** Reach the finish room and keep the Problem card. It is worth 1 point per door you passed through.
4. **Refill** your hand to 3 Key cards. If the draw pile is empty, shuffle the Key discards.

Also

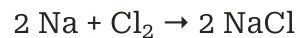
- Waiting at a door? On your next turn, keep going with the same problem instead of flipping a new one.
- Once per turn you may ask one player for a key by name. If they have it, they hand it over and draw a replacement.
- A Master key opens any door. Say which key it is standing in for.
- Anyone can turn the Problem card upside down to check the route. Wrong room or wrong key: take the key back and your turn ends.
- First to 7 points wins. If the Problem cards run out, most points wins.

Levels

- **Level 1 • Rooms.** Name the rooms and the keys. No numbers yet.
- **Level 2 • Moves.** As you play a key, say what it does with the numbers. "Molar mass key: 46.0 g divided by 22.99 g/mol ."
- **Level 3 • Solve.** Between turns, solve the problem in your notebook. Match the answer on the card for 1 bonus point.



1 DOOR

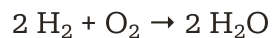


How many moles are in 46.0 g of Na?

START Grams A · FINISH Moles A
Molar mass 2.00 mol



1 DOOR

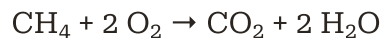


What is the mass of 3.00 mol of H₂O?

START Moles A · FINISH Grams A
Molar mass 54.1 g



1 DOOR

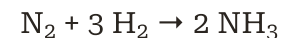


What volume does 2.50 mol of CO₂ take up at STP?

START Moles A · FINISH Liters A
Gas 56.0 L



1 DOOR

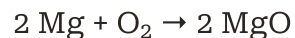


How many moles are in 89.6 L of NH₃ at STP?

START Liters A · FINISH Moles A
Gas 4.00 mol



1 DOOR

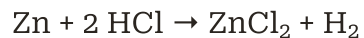


How many grams are in 0.500 mol of MgO?

START Moles A · FINISH Grams A
Molar mass 20.2 g



1 DOOR



How many moles are in 130.8 g of Zn?

START Grams A · FINISH Moles A
Molar mass 2.00 mol



1 DOOR

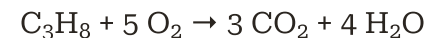


How many moles of O₂ form from 4.00 mol of KClO₃?

START Moles A · FINISH Moles B
Mole ratio 6.00 mol



1 DOOR

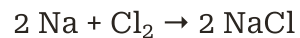


How many moles of O₂ are needed to burn 2.00 mol of C₃H₈?

START Moles A · FINISH Moles B
Mole ratio 10.0 mol



2 DOORS

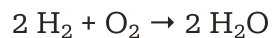


How many grams of NaCl form from 3.00 mol of Na?

START Moles A · FINISH Grams B
Mole ratio, Molar mass
175 g



2 DOORS

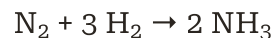


How many moles of H₂O form from 8.00 g of H₂?

START Grams A · FINISH Moles B
Molar mass, Mole ratio
3.96 mol



2 DOORS



How many liters of NH₃ at STP form from 1.50 mol of N₂?

START Moles A · FINISH Liters B
Mole ratio, Gas
67.2 L



2 DOORS

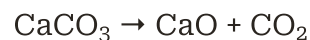


How many moles of O₂ react with 12.2 g of Mg?

START Grams A · FINISH Moles B
Molar mass, Mole ratio
0.251 mol



2 DOORS

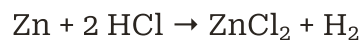


How many liters of CO₂ at STP form from 0.750 mol of CaCO₃?

START Moles A · FINISH Liters B
Mole ratio, Gas
16.8 L



2 DOORS

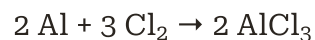


How many moles of HCl react with 32.7 g of Zn?

START Grams A · FINISH Moles B
Molar mass, Mole ratio
1.00 mol



2 DOORS

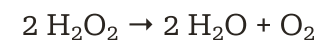


How many grams of AlCl₃ form from 1.20 mol of Cl₂?

START Moles A · FINISH Grams B
Mole ratio, Molar mass
107 g



2 DOORS

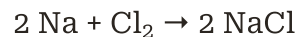


How many moles of H₂O₂ are needed to make 11.2 L of O₂ at STP?

START Liters A · FINISH Moles B
Gas, Mole ratio
1.00 mol



3 DOORS

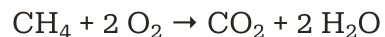


How many grams of NaCl form from 46.0 g of Na?

START Grams A · FINISH Grams B
Molar mass, Mole ratio, Molar mass
117 g



3 DOORS

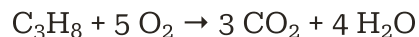


How many grams of O₂ are needed to burn 32.1 g of CH₄?

START Grams A · FINISH Grams B
Molar mass, Mole ratio, Molar mass
128 g



3 DOORS

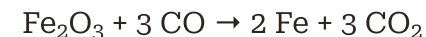


How many liters of CO₂ at STP form from 22.0 g of C₃H₈?

START Grams A · FINISH Liters B
Molar mass, Mole ratio, Gas
33.5 L



3 DOORS

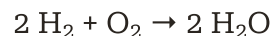


How many grams of Fe form from 33.6 L of CO at STP?

START Liters A · FINISH Grams B
Gas, Mole ratio, Molar mass
55.9 g



3 DOORS



How many liters of O₂ react with 44.8 L of H₂, both at STP?

START Liters A · FINISH Liters B
Gas, Mole ratio, Gas
22.4 L



3 DOORS

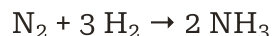


How many grams of KClO₃ are needed to make 10.0 L of O₂ at STP?

START Liters A · FINISH Grams B
Gas, Mole ratio, Molar mass
36.5 g



3 DOORS



How many liters of NH₃ form from 14.0 g of N₂ at 2.00 atm and 350 K?

START Grams A · FINISH Liters B
Molar mass, Mole ratio, Gas
14.4 L



3 DOORS



How many grams of MgO form from 5.00 L of O₂ at 1.00 atm and 298 K?

START Liters A · FINISH Grams B
Gas, Mole ratio, Molar mass
16.5 g



Molar mass

GRAMS ↔ MOLES

Divide going into moles. Multiply going out.



Molar mass

GRAMS ↔ MOLES

Divide going into moles. Multiply going out.



Molar mass

GRAMS ↔ MOLES

Divide going into moles. Multiply going out.



Molar mass

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Molar mass

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Molar mass

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Molar mass

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Molar mass

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Molar mass

GRAMS ↔ MOLES

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Molar mass

GRAMS ↔ MOLES

Divide going into moles. Multiply going out.



Molar mass

GRAMS ↔ MOLES

Divide going into moles. Multiply going out.



Molar mass

GRAMS ↔ MOLES

Divide going into moles. Multiply going out.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted
over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted
over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted
over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted
over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted
over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted
over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted
over coefficient given.



Mole ratio

MOLES A ↔ MOLES B

Multiply by coefficient wanted
over coefficient given.



Gas

MOLES ↔ LITERS

At STP, use 22.4 L/mol.
Otherwise, use $PV = nRT$.



Gas

MOLES ↔ LITERS

At STP, use 22.4 L/mol.
Otherwise, use $PV = nRT$.



Gas

MOLES ↔ LITERS

At STP, use 22.4 L/mol.
Otherwise, use $PV = nRT$.



Gas

MOLES ↔ LITERS

At STP, use 22.4 L/mol.
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At STP, use 22.4 L/mol.
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Gas

MOLES ↔ LITERS

At STP, use 22.4 L/mol.
Otherwise, use $PV = nRT$.



Master key

ANY DOOR

Say what the real key would have
done.



Master key

ANY DOOR

Say what the real key would have
done.



Master key

ANY DOOR

Say what the real key would have
done.