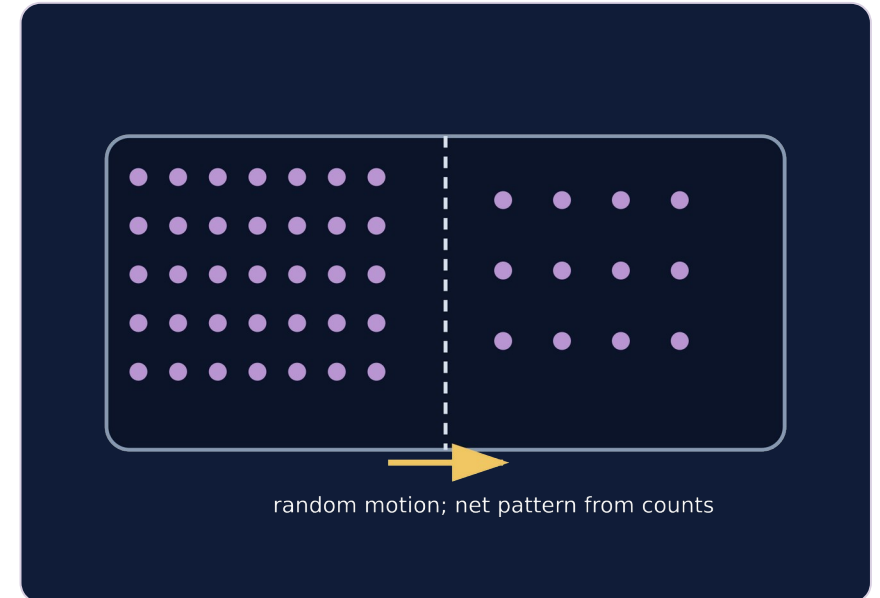


Diffusion

I can explain diffusion as net movement down a concentration gradient and use evidence to compare rates.

Notice. Recall. Be ready to explain.

- 1 What does concentration describe?
- 2 What is a gradient?



Retrieval answers

Make a prediction

Particles move randomly in both directions. Can there still be net movement from high to low concentration?

A No — random means no pattern

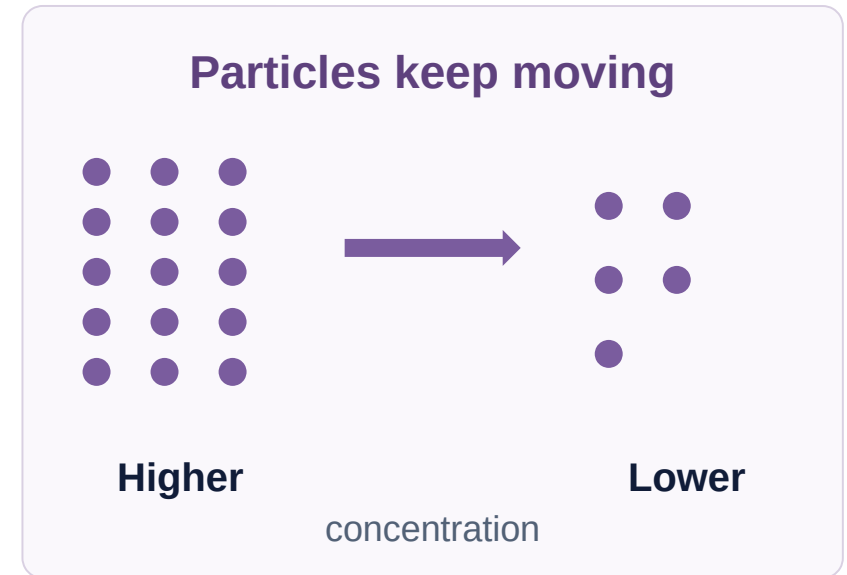
B Yes — more particles begin on the high side

C Only if every particle moves one way

Commit, then check

Watch the model

- 1 Individual particles move randomly in every direction.
- 2 More particles start in the high-concentration region, so more crossing events begin there.
- 3 Net movement is the overall difference between movements in opposite directions.



[View labelled diagram](#)

[Optional video](#)

Choose and justify

Which statement is scientifically accurate during diffusion?

A All particles move from high to low

B Particles stop when concentrations match

C Particles move randomly, with net movement down the gradient

D Low-concentration particles pull high-concentration particles

Give the deciding clue before checking.

Check the reasoning

Connect the science

- 1 A steeper concentration difference usually increases the net rate.
- 2 Higher temperature increases particle kinetic energy and movement rate.
- 3 A longer diffusion distance reduces the rate of exchange.

Illustrative crossings in equal volumes

Left → right: 8 Right → left: 2

Net left → right = $8 - 2 = 6$

At balance: $5 - 5 = 0$; motion continues.

Count both directions

Equal volumes: 12 particles on the left, 3 on the right. Predict the initial net direction.

Interval	Left → right	Right → left
Early	8	2
At balance	5	5

Find the net crossing count for each interval. What keeps happening at balance?

Reveal shared reasoning

Your independent evidence

Equal-volume chambers have the same temperature and diffusion distance. A starts with 80 particles left, 20 right; B has 60 left, 40 right. Which has faster initial net diffusion? Explain using random motion and the gradient.

Optional support

Net movement = crossings one way minus crossings the other way. Start: “More particles move from ____ to ____ because...”

Make one precise correction to the same work after feedback.

[Open worksheet pages](#)[Model after first attempt](#)

What changed in your thinking?

What continues at equilibrium even though net movement is zero?

- 1 Point to one improvement in your work.
- 2 Choose what you want to revisit.
- 3 Tell your teacher; agree the next step together.

Retrieval and prediction check

- 1 Amount of a substance per unit volume.
- 2 A difference/change in concentration across a distance.

Yes — more particles begin on the high side

[Return to Starter](#)

Check the deciding clue

Particles move randomly, with net movement down the gradient

Accurate. Use crossing counts to justify the net direction.

Compare your reason. Correct one step if needed.

[Return to We Do](#)

Our shared reasoning

Early: $8 - 2 = 6$ net left to right.

At balance: $5 - 5 = 0$ net.

Particles still move randomly and cross both ways. These are illustrative model counts.

[Return to shared task](#)

Compare after your first attempt

Chamber A has the faster initial net diffusion because its concentration difference is larger. Particles move randomly in both directions, but more particles begin on the left in A, so more left-to-right crossings occur at first. This produces a greater net movement down the concentration gradient.

Use the model to improve your explanation in your own words.

[Return to independent task](#)

Your lesson resources

Worksheet pages are stored inside this PowerPoint.

[Worksheet · page 1](#)[Worksheet · page 2](#)[Standard PDF](#)[Supported PDF](#)[Depth PDF](#)[Editable Word worksheet](#)[Open online lesson / model](#)

Named files are in this week's folder. Online lesson and video need internet.

[Optional concept video](#)

Worksheet · page 1

Use your printed copy.
Keep the first attempt.

MADE BY MATT / LAUNCH SCIENCE

W4L1 | Counter crossings

Monday | 09:30–10:10 | Introduce | Editable pupil sheet

Name: _____ Date: _____

Core first. Write, speak, point or dictate your own words. Keep the first attempt so you can improve it.

Optional support: Net movement = crossings one way minus crossings the other way. Start: "More particles move from ____ to ____ because..."

Work together

Draw two equal-volume regions: 12 particles left and 3 right. Predict the initial net direction.

Illustrative model/sample data; not measurements made by this class.

Model interval	Left → right	Right → left
Early	8	2
At balance	5	5

Your labelled sketch / arrows:

1. Use the early crossing counts to calculate net movement and direction.

2. At balance, how much net movement is there? What is still happening?

Return to task

Worksheet · page 2

Continuation is optional.
Improve the same work.

MADE BY MATT / LAUNCH SCIENCE

W4L1 | Continue and improve

Use after the core questions when directed

3. Explain one reason a higher temperature can increase diffusion rate.

Optional transfer

Why must the two starting regions have equal volumes if particle counts alone are used to compare concentration?

Depth: name an assumption or limit, then say what evidence would strengthen your answer.

Improve the same work

One correction I made, and why:

My request for next time: _____

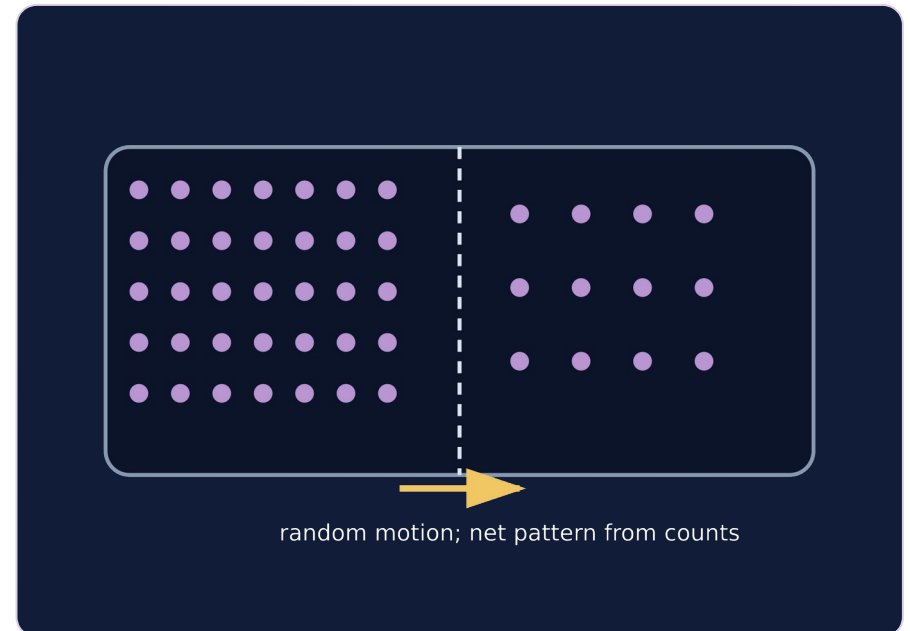
Return to task

Watch, pause and explain

Diffusion

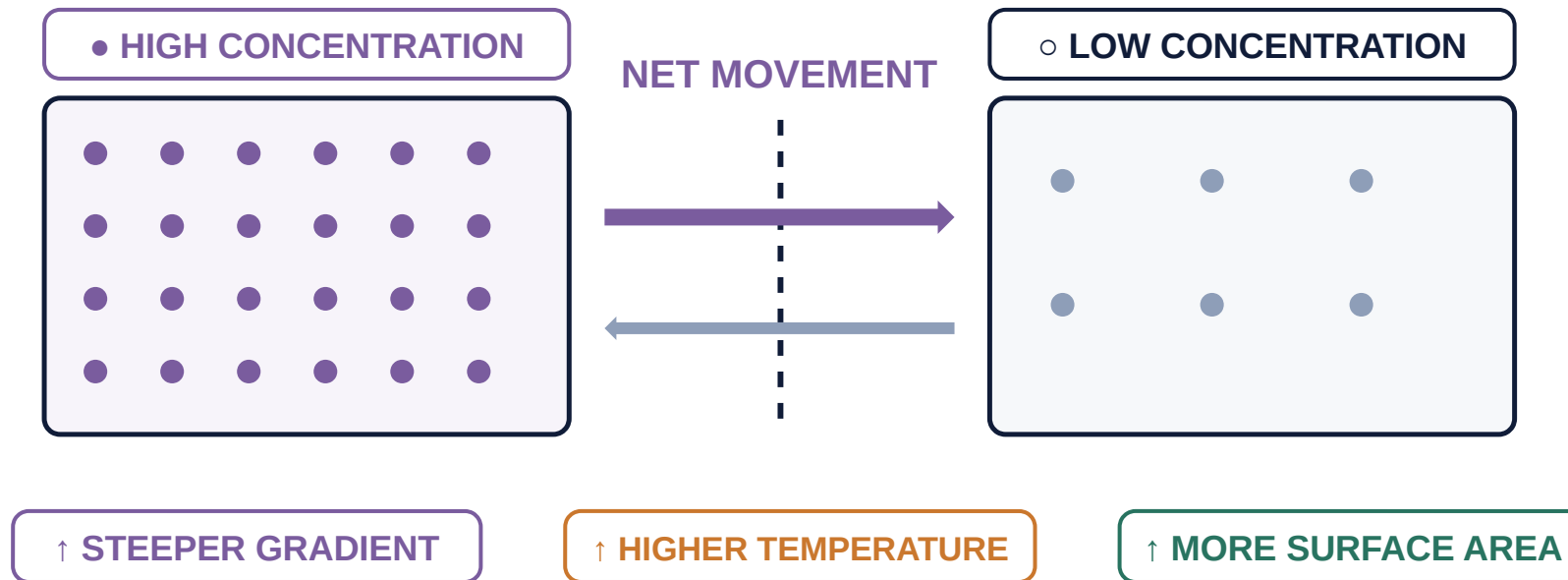
What keeps happening when there is no net movement?

[Play freesciencelessons video](#)



No connection? Use the still model and explain the same question.

Look closely at the model



A model illustration: use the stated data for calculations.

[Return to I Do](#)