



CURIOSITYQUEST

At-Home Experiment Lab Book

Ten kitchen-table experiments where YOU are the scientist

CuriosityQuest — At-Home Experiment Lab Book

Ten kitchen-table experiments where YOU are the scientist

How this lab works

Welcome to your lab. Everything you need is already in your kitchen, and every experiment hides a little TRAP — a place where the obvious answer is wrong. That is the fun part. Before you touch anything, do what **Inkling** does: guess out loud. Even a wrong guess is worth points here, because a guess you can be wrong about is how you find the trap. There is no answer key on the main pages on purpose — the experiment IS the answer key. When something flops, you did NOT fail; a flop is data. Turn to the grown-up pages at the back only AFTER you have tried.

1. Do the **Predict** line out loud FIRST — write your because, even if you are not sure.
2. Check off each material as you gather it.
3. Do the steps. WATCH like Notice — say what you see before you say why.
4. Fill the data table the moment it happens (that is Jot's rule).
5. Read **Science AFTER** only once you have watched it happen — it names the TRAP you may have fallen into.
6. Earn your three stars: ★ you TRIED · ★ you RECORDED · ★ you EXPLAINED it to someone. Stars are for the loop, never for being right.

Meet your lab partners

Partner	Their move	What they remind you
Notice	Slow-look FIRST	Name what you SEE before you say why. Most wonder lives in the noticing.
Inkling	Predict	Your first guess is INFORMATION, not a final answer. Say it out loud before you start.
Compare	The fair test	Change ONE thing, keep the rest the same — that is what makes it a real test.
Measure	Turn it into a number	A fuzzy word like 'fast' becomes a number anyone can check.
Jot	Write it down NOW	Record it the second it happens — a day-old fact is a lost fact.
Ditto	Do it again	Once could be luck. Twice starts to be true.
Ponder	Why did THAT happen?	'What does that even mean?' is the best question in the lab, never the failure.
Linger	Stay with the puzzle	Some good questions take days. The bouncy-egg one takes two.
Revise	Change your mind	Being wrong is how knowledge MOVES. A changed mind is the proudest move in science.
Lumen	Your lab helper	The mentor who frames each experiment — and the voice in the grown-up pages.

How this lab works

Experiment 1 — The Sinking Grape and the Floating Grape

Experiment 2 — Which Can Does the Magnet Grab?

Experiment 3 — The Colour Race: Warm Water vs Cold Water

Experiment 4 — Ice on Metal, Ice on Wood

Experiment 5 — The Balloon That Grabs Things

Experiment 6 — The Fizz That Blows Up a Balloon

Experiment 7 — Walking Water That Climbs UP

Experiment 8 — The Naked (Bouncy) Egg

Experiment 9 — Big Shadow, Small Shadow

Experiment 10 — The Foil That Sinks and the Foil That Floats

For the grown-up — read AFTER

Your certificate

Experiment 1 — The Sinking Grape and the Floating Grape



Inkling leads · you are exploring: *Density (how heavy for its size), not size*

 **Time**

15 min



Mess

Low



Grown-up

Not needed



Safety first

Just water and salt — safe to do on your own. Do not drink the salty water.

Gather your kit

- ☐ A tall clear glass of water
- ☐ 2–3 grapes
- ☐ Salt (about 6 big spoonfuls)
- ☐ A spoon



Predict first (Inkling's rule)

I predict a grape will ____ (sink / float) in plain water because ____.

Write your prediction here:

Do it — and watch like Notice

1. Drop a grape into plain water. Watch. Does it sink or float?
2. Now take the grape out. Stir in salt, one spoonful at a time, until no more will dissolve.
3. Drop the grape back into the salty water. Watch again.

Write it down the second it happens (Jot's rule)

Water	Predict	What I saw



Science AFTER



Read this only AFTER you have watched it happen.

The trap: *The 'heavy things sink' trap.*

The grape did not change — the WATER did. A grape sinks in plain water and floats in salty water because salty water is DENSER (heavier for its size). Floating is a race between how dense the object is and how dense the liquid is — not about how big or heavy the object *feels* in your hand. This is exactly why you float more easily in the ocean than in a pool.



Level up!

Try to find the EXACT amount of salt where the grape hangs in the middle — not sinking, not floating. Scientists call that neutral buoyancy.

☐ I did Experiment 1 · Date: _____ · My stars: ☆ tried ☆ recorded ☆ explained

Experiment 2 — Which Can Does the Magnet Grab?



Compare leads · you are exploring: *Not all metals are magnetic (the fair test)*

 **Time**
10 min

 **Mess**
None

 **Grown-up**
Not needed



Safety first

Watch the cut edge of any opened can — hold the smooth outside.

Gather your kit

- ☐ A fridge magnet
- ☐ A steel food can (soup / beans)
- ☐ A piece of aluminum foil or a soda can
- ☐ A paperclip



Predict first (Inkling's rule)

I predict the magnet WILL / WON'T stick to each metal because ____.

Write your prediction here:

Do it — and watch like Notice

1. Touch the magnet to the steel can. Note if it sticks.
2. Touch the magnet to the aluminum foil / soda can. Note if it sticks.
3. Touch the magnet to the paperclip.
4. KEEP EVERYTHING ELSE THE SAME — same magnet, same gentle touch — so it is a fair test.

Write it down the second it happens (Jot's rule)

Metal	Predict	Stuck? (Y/N)



Science AFTER



Read this only AFTER you have watched it happen.

The trap: *The 'all metal is magnetic' trap.*

Magnets only grab metals that contain IRON (steel is mostly iron). Aluminum is a metal too, but it has no iron, so the magnet ignores it. 'Metal' and 'magnetic' are not the same word. Compare's rule made this a fair test: you changed only the METAL and kept the magnet and the touch the same.



Level up!

Hunt your home for 5 metal objects and predict each before you test it. Keep score of your predictions.



I did Experiment 2 · Date: _____ · My stars: ☆ tried ☆ recorded ☆ explained

Experiment 3 — The Colour Race: Warm Water vs Cold Water



Measure leads · you are exploring: *Molecules move faster when warmer (diffusion)*

 **Time**

10 min



Mess

Low



Grown-up

For the hot water



Safety first

Ask an adult to fill the warm glass — warm from the tap is plenty, no boiling needed.

Gather your kit

- ☐ 2 identical clear glasses
- ☐ Warm water (not boiling)
- ☐ Cold water
- ☐ Food colouring
- ☐ A clock or phone timer



Predict first (Inkling's rule)

I predict the colour spreads faster in the ____ glass because ____.

Write your prediction here:

Do it — and watch like Notice

1. Fill one glass with warm water, one with cold — same amount, same glass, do not stir either.
2. At the SAME moment, drop ONE drop of colour into each.
3. Start the timer. Watch the colour spread WITHOUT stirring.

4. Measure: how many seconds until each glass is fully coloured?

Write it down the second it happens (Jot's rule)

Glass	Predict spread	Seconds to full colour



Science AFTER



Read this only AFTER you have watched it happen.

The trap: *The 'still water means nothing moves' trap.*

Even in perfectly still water the tiny water particles are always jiggling — and warmer water jiggles FASTER, so it swirls the colour through in a fraction of the time. Nothing pushed the colour; the invisible motion did. Measure turned 'faster' into a number of seconds you can actually compare.



Level up!

Add a third glass at room temperature. Does its time land neatly between the warm and cold ones?

☐ I did Experiment 3 · Date: _____ · My stars: ☆ tried ☆ recorded ☆ explained

Experiment 4 — Ice on Metal, Ice on Wood



Ponder leads · you are exploring: *Metal conducts room heat INTO the ice (conduction)*

 **Time**

20 min



Mess

Low (melts to water)



Grown-up

Not needed



Safety first

Just melting ice — dry the floor if it drips.

Gather your kit

- ☐ 2 ice cubes the same size
- ☐ A metal spoon or metal tray
- ☐ A wooden cutting board or a book
- ☐ A timer



Predict first (Inkling's rule)

I predict the ice on the ____ melts faster because ____.

Write your prediction here:

Do it — and watch like Notice

1. Put one ice cube on the metal and one on the wood, at the same time.
2. Touch the metal and the wood with your hand first — which FEELS colder?
3. Watch and time which cube melts first.

Write it down the second it happens (Jot's rule)

Surface	Feels colder?	Which melted first?



Science AFTER



Read this only AFTER you have watched it happen.

The trap: *The 'the colder-feeling surface melts ice slower' trap.*

The metal FEELS colder — so most people predict it keeps the ice frozen longer. The opposite happens: metal is a great heat CONDUCTOR, so it pulls the room's warmth straight into the ice and melts it FASTER. The metal felt cold to your hand for the very same reason — it was pulling heat out of YOU. Ponder's question 'why did the cold-feeling one melt first?' is the whole experiment.



Level up!

Test a plastic lid and a ceramic plate too. Rank all four from fastest-melt to slowest.



I did Experiment 4 · Date: _____ · My stars: ☆ tried ☆ recorded ☆ explained

Experiment 5 — The Balloon That Grabs Things



Notice leads · you are exploring: *Static electric charge*

 **Time**
10 min

 **Mess**
None

 **Grown-up**
Not needed



Safety first

Safe on your own. Works best on a dry day.

Gather your kit

- ☐ A blown-up balloon
- ☐ Your hair (dry) or a wool jumper
- ☐ Tiny bits of torn paper
- ☐ A thin stream of water from a tap



Predict first (Inkling's rule)

I predict the plain balloon can / can't pick up paper, and the RUBBED balloon can / can't, because ____.

Write your prediction here:

Do it — and watch like Notice

1. Hold the plain balloon near the paper bits. Notice: anything?
2. Rub the balloon fast on your hair or a wool jumper for 10 seconds.
3. Now hold it near the paper bits, then near a thin trickle of tap water.
Notice what each does.

Write it down the second it happens (Jot's rule)

Balloon	Paper bits	Water stream



Science AFTER



Read this only AFTER you have watched it happen.

The trap: *The 'an empty balloon can't do anything' trap.*

Rubbing moves invisible electric charge onto the balloon. That charge pulls light things toward it — paper bits jump up, and a thin stream of water BENDS toward the balloon without touching it. The balloon looked empty and boring, but Notice's slow-look caught the real change: it was the rubbing, not the balloon, that did the work.



Level up!

How long does the 'grab' last? Time how many seconds after rubbing the balloon still bends the water.



I did Experiment 5 · Date: _____ · My stars: ☆ tried ☆ recorded ☆ explained

Experiment 6 — The Fizz That Blows Up a Balloon



Jot leads · you are exploring: *A chemical reaction makes a GAS (mass doesn't vanish)*

 **Time**

15 min



Mess

Medium



Grown-up

Helpful



Safety first

Do it over the sink. Vinegar smell is strong — no tasting.

Gather your kit

- ☐ A small empty bottle
- ☐ Baking soda
- ☐ Vinegar (or lemon juice)
- ☐ A balloon
- ☐ A spoon and a small funnel or paper cone



Predict first (Inkling's rule)

I predict when the two mix, the balloon will ____ because ____.

Write your prediction here:

Do it — and watch like Notice

1. Pour a few spoonfuls of vinegar into the bottle.
2. Use the funnel to put 2 spoonfuls of baking soda INTO the balloon.
3. Stretch the balloon's neck over the bottle top WITHOUT letting the soda fall in yet.

4. Lift the balloon so the soda drops into the vinegar. Watch and Jot what happens the SECOND it happens.

Write it down the second it happens (Jot's rule)

Time	What I saw	Balloon size

 Science AFTER

 *Read this only AFTER you have watched it happen.*

The trap: *The 'mixing two things makes MORE stuff you can see' trap.*

The fizzing bubbles are a brand-new GAS (carbon dioxide) made by the reaction — and it inflates the balloon. It can look like stuff appeared from nowhere, but nothing was created or destroyed: the atoms in the soda and vinegar rearranged into new things, one of which is an invisible gas. Jot's rule mattered — the fizz peaks and fades fast, so writing 'balloon biggest at ~20 seconds' catches what memory would lose.

 Level up!

Try double the baking soda. Does the balloon get twice as big, or does it stop growing? (Hint: you can run out of vinegar to react with.)

☐ I did Experiment 6 · Date: _____ · My stars: ☆ tried ☆
recorded ☆ explained

Experiment 7 — Walking Water That Climbs UP



Linger leads · you are exploring: *Capillary action (water climbs against gravity)*



Time

5 min to set up · 30–60 min to watch



Mess

Low



Grown-up

Not needed



Safety first

Safe on your own.

Gather your kit

- ☐ 2 clear cups
- ☐ A paper towel (folded into a long thin strip)
- ☐ Water
- ☐ Food colouring



Predict first (Inkling's rule)

I predict the water will / won't travel from the full cup to the empty cup because ____.

Write your prediction here:

Do it — and watch like Notice

1. Fill one cup with coloured water. Leave the other EMPTY. Stand them side by side.
2. Drape the paper-towel strip so one end sits in the full cup and the other end hangs into the empty cup.

- Now Linger — walk away and check every 10 minutes. Do not stir or squeeze.
- Watch the colour climb UP the towel and start dripping into the empty cup.

Write it down the second it happens (Jot's rule)

Minutes	How high the colour climbed	Empty cup yet?



Science AFTER



Read this only AFTER you have watched it happen.

The trap: *The 'water only goes DOWN' trap.*

Water climbs UP the tiny gaps in the paper towel — that is capillary action, the same trick a real plant uses to lift water from its roots to its top leaves. Gravity says 'down', but the pull of water sticking to the paper fibres wins going up until it can spill over. Linger's patience is the whole experiment: nothing looks like it is happening for the first few minutes, and then it is.



Level up!

Set up THREE cups in a row — full, empty, full — with towels bridging each gap. Where does the water end up?

☐ I did Experiment 7 · Date: _____ · My stars: ☆ tried ☆ recorded ☆ explained

Experiment 8 — The Naked (Bouncy) Egg



Revise leads · you are exploring: *Acid dissolves the calcium-carbonate shell*



Time
2 days of waiting



Mess
Low



Grown-up
Helpful



Safety first

Raw egg — wash hands after touching. The 'bouncy' egg can still break and get messy; bounce it low over a plate.

Gather your kit

- ☐ A raw egg (in the shell)
- ☐ A jar or glass
- ☐ Enough vinegar to cover the egg
- ☐ Patience



Predict first (Inkling's rule)

I predict after 2 days in vinegar the shell will ____ because ____.

Write your prediction here:

Do it — and watch like Notice

1. Put the egg in the jar and cover it completely with vinegar. Notice the tiny bubbles forming on the shell right away.
2. Leave it 2 full days (change the vinegar after day 1 if you like).
3. Gently take the egg out and rinse it. The hard shell is GONE — a rubbery skin is left.
4. Bounce it VERY gently from a low height over a plate.

Write it down the second it happens (Jot's rule)

Day	What the shell looks like	Bubbles?



Science AFTER



Read this only AFTER you have watched it happen.

The trap: *The 'a hard shell is solid and safe from liquid' trap.*

The shell is made of calcium carbonate — the same stuff as chalk and seashells — and vinegar is an acid that slowly eats it away, releasing those bubbles of gas. What's left is the thin membrane that was always UNDER the shell, now holding the egg like a water balloon. If your first guess was 'the vinegar can't get through a solid shell,' this is Revise's moment: change your mind — being wrong is how you just learned what a shell really is.



Level up!

Leave the naked egg in plain water with a bit of colour overnight. Does it swell? (Water crosses the membrane — osmosis.)

☐ I did Experiment 8 · Date: _____ · My stars: ☆ tried ☆
recorded ☆ explained

Experiment 9 — Big Shadow, Small Shadow



Sort leads · you are exploring: *Shadow size depends on LIGHT distance, not object size*

 **Time**
10 min

 **Mess**
None

 **Grown-up**
Not needed



Safety first

Do not shine the light in anyone's eyes.

Gather your kit

- ☐ A flashlight or phone torch
- ☐ A small solid toy
- ☐ A blank wall in a dark-ish room
- ☐ A ruler (optional)



Predict first (Inkling's rule)

I predict moving the LIGHT closer to the toy makes the shadow ____ because ____.

Write your prediction here:

Do it — and watch like Notice

1. Stand the toy near the wall. Shine the torch at it to cast a shadow.
2. Keep the toy STILL. Move only the torch far away — look at the shadow size.
3. Now move only the torch close to the toy — look again.
4. Sort your results: near-light shadow vs far-light shadow.

Write it down the second it happens (Jot's rule)

Torch position	Shadow size	Shadow edge sharp/fuzzy?

 Science AFTER

 *Read this only AFTER you have watched it happen.*

The trap: *The 'a bigger shadow means a bigger object' trap.*

The toy never changed size — yet its shadow grew huge when you moved the LIGHT close, and shrank when the light was far. Shadow size is about how the light spreads past the object, not the object itself. That is why your own shadow at sunset (low, far sunlight) can be enormous. Sort's job — grouping 'near light' vs 'far light' — made the pattern pop out.

 Level up!

Can you make the shadow have a fuzzy edge AND a sharp edge? Move the light closer and farther and watch the edge change.

☐ I did Experiment 9 · Date: _____ · My stars: ☆ tried ☆ recorded ☆ explained

Experiment 10 — The Foil That Sinks and the Foil That Floats

 **Ditto** leads · you are exploring: *Shape and displacement, not the material, decide floating*

 **Time**
15 min

 **Mess**
Low

 **Grown-up**
Not needed

Safety first

Safe on your own. Dry the coins after.

Gather your kit

- ☐ Aluminum foil (two equal squares)
- ☐ A bowl or sink of water
- ☐ Small coins or beads (a cargo)

Predict first (Inkling's rule)

I predict a foil BALL and a foil BOAT (same foil) will ____ because ____.

Write your prediction here:

Do it — and watch like Notice

1. Scrunch one foil square into a tight ball. Drop it in the water — sink or float?
2. Shape the OTHER equal square into a little open boat. Float it.
3. Add coins to the boat one at a time. How many before it sinks?
4. Ditto it: rebuild the boat and do the coin test again. Same number, or different?

Write it down the second it happens (Jot's rule)

Foil shape	Float?	Coins held



Science AFTER



Read this only AFTER you have watched it happen.

The trap: *The 'metal always sinks' trap.*

The exact same foil sinks as a ball and floats as a boat. Floating is not about the material — it is about how much WATER the shape pushes out of the way (displacement). A wide boat shape pushes aside a lot of water, so the water pushes back up enough to hold it — which is how a steel ship the size of a town floats. Ditto's rule proved it was not a fluke: doing the coin test twice showed the boat holds about the same load each time.



Level up!

Design the boat that holds the MOST coins. What shape wins — wide and flat, or tall and narrow?



I did Experiment 10 · Date: _____ · My stars: ☆ tried ☆ recorded ☆ explained

For the grown-up — read AFTER

These pages are for you, the grown-up — read them AFTER your scientist has tried, never before. Each experiment lists what usually happens, a FLOP-RECOVERY move for when it doesn't, and a watch-list of the exact wrong things kids tend to say. A flop is not a failure: it is data. The best thing you can say is Lumen's line — 'A flop is still information. Let's change ONE thing and run it again.' Never hand over the answer; ask 'what did you NOTICE?' and 'what could we change?' Your scientist earns three stars for trying, recording, and explaining — not for being right.

Experiment 1 — The Sinking Grape and the Floating Grape

Usually happens: Grape sinks in fresh water, floats in saturated salt water. The turning point is roughly 6–8 tablespoons of salt per cup, depending on the grape.

If it flops (a flop is data): Grape won't float even in very salty water? The water isn't saturated yet — keep adding salt until crystals stop dissolving and sit on the bottom. A flop here is just 'not enough salt yet' — change one thing (more salt) and try again.

Watch for these (gently ask “what did you notice?”):

- 'It floats because grapes are light.'
- 'The salt made the grape lighter.'

Experiment 2 — Which Can Does the Magnet Grab?

Usually happens: Steel can + paperclip: sticks. Aluminum: does not. (Some 'tin' cans are steel with a thin tin coat — still magnetic.)

If it flops (a flop is data): Magnet won't grab the steel can? Try a stronger magnet, or find the seam — paint/coating can weaken the grab a little. Still counts: 'weak grab' is real data.

Watch for these (gently ask “what did you notice?”):

- 'Aluminum isn't a real metal.'
- 'The magnet is broken.'

Experiment 3 — The Colour Race: Warm Water vs Cold Water

Usually happens: Warm water fully colours in a small number of seconds; cold can take minutes. The gap is the whole point.

If it flops (a flop is data): Both look the same speed? One glass got bumped/stirred, or the temperature gap was too small — use colder cold water and warmer (not hot) warm water, and don't touch the table.

Watch for these (gently ask “what did you notice?”):

- 'The warm water is thinner.'
- 'Something must have stirred it.'

Experiment 4 — Ice on Metal, Ice on Wood

Usually happens: Ice on metal melts noticeably faster than ice on wood. Metal feels colder to the touch AND melts ice faster — both because it conducts heat well.

If it flops (a flop is data): Barely a difference? The metal was cold from the freezer, or the cubes were different sizes. Use room-temperature metal and equal cubes; change one thing.

Watch for these (gently ask “what did you notice?”):

- 'The metal is colder so it keeps the ice frozen.'
- 'Wood is warmer so it melts it.'

Experiment 5 — The Balloon That Grabs Things

Usually happens: Plain balloon: nothing. Rubbed balloon: lifts paper bits and visibly bends a thin water stream.

If it flops (a flop is data): Nothing happens? Humid air drains the charge — try a drier room, rub longer, and use a very thin water trickle.

Watch for these (gently ask “what did you notice?”):

- 'The balloon is magnetic.'
- 'The water is sticky.'

Experiment 6 — The Fizz That Blows Up a Balloon

Usually happens: Rapid fizzing; the balloon inflates within seconds and holds. Roughly 2 tbsp soda + $\sim 1/3$ cup vinegar gives a firm balloon.

If it flops (a flop is data): Balloon barely moves? Too little of one ingredient, or the balloon neck leaked — reseal, add a bit more vinegar. A slow fizz is still the reaction; note it.

Watch for these (gently ask “what did you notice?”):

- 'The bubbles are air.'
- 'The soda disappeared.'

Experiment 7 — Walking Water That Climbs UP

Usually happens: Colour visibly climbs within 10–20 minutes and begins transferring to the empty cup; near-equal levels in an hour or two.

If it flops (a flop is data): Nothing climbing? The towel end isn't deep enough in the water, or the strip is too wide/thick — use a thinner strip and push the end well under the surface.

Watch for these (gently ask “what did you notice?”):

- 'Someone poured it over.'
- 'Water can't go up.'

Experiment 8 — The Naked (Bouncy) Egg

Usually happens: Bubbles immediately; by day 2 the shell is fully dissolved and the egg is translucent and bouncy (from a very low height).

If it flops (a flop is data): Shell still partly there? Give it another day or fresh vinegar. Egg cracked? That is normal for a first try — start another; 'it broke' is data about how thin the membrane is.

Watch for these (gently ask “what did you notice?”):

- 'The vinegar bleached the shell white.'
- 'The egg is cooked now.'

Experiment 9 — Big Shadow, Small Shadow

Usually happens: Light close = large, fuzzy-edged shadow; light far = small, sharper shadow. The object is identical throughout.

If it flops (a flop is data): Shadow won't change? The room is too bright, or the toy moved — darken the room and pin the toy in place; move only the torch.

Watch for these (gently ask “what did you notice?”):

- 'The toy got bigger.'
- 'Shadows are always the same size as the thing.'

Experiment 10 — The Foil That Sinks and the Foil That Floats

Usually happens: Foil ball sinks; foil boat floats and holds a surprising number of coins (often 10–30) before water spills in and it sinks.

If it flops (a flop is data): Boat sinks straight away? Water got in over the sides — make the walls higher and even, and add coins gently and spread out.

Watch for these (gently ask “what did you notice?”):

- 'The boat is lighter than the ball.'
- 'Metal can't ever float.'

Your certificate



Home Lab Scientist

This certifies that

completed the CuriosityQuest At-Home Experiment Lab Book —
tried, recorded, and explained real science.

— *Lumen & the CuriosityQuest cast*

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