



Melting Lab

Mission: The lab's ice samples are melting, and a student claims the lab is "losing matter." Use the hot plate, the lid, and the digital scale to find out what really happens to mass when ice melts, water freezes, and water evaporates.

Big question: Does matter disappear when it melts, freezes, or evaporates?

★ Warm-up: Would you rather bet?

Look at each pair. Which one has MORE mass, or are they the SAME? Write your choice and one reason.

A 1 kg bag of feathers or a 1 kg bag of rocks? ✓ **Same. Both are 1 kg; size is not mass.**

A frozen juice pop, or the same juice pop after it melts in a sealed bag? ✓ **Same. Melting only rearranges particles.**

Key vocabulary

Mass	How much matter is in an object, measured in grams (g).
Matter	Anything that has mass and takes up space.
Melting	A solid changing to a liquid when heated.
Evaporation	A liquid changing to a gas (vapor).
Sealed system	A closed container. No matter can get in or out.
Conservation of mass	Matter is not created or destroyed, so total mass stays the same.

1 Box 1

Make a prediction

PREDICTION A 50 g ice cube melts completely in a SEALED beaker. What will the scale show?

☐ More than 50 g ☐ Exactly 50 g ☐ Less than 50 g

2 Box 2

Test it: melt the ice

In the simulator: Melt all 50 g of ice with the lid sealed.

Read the scale. What is the mass of the water now?

Answer: _____ g ✓ **50**

Compare to your prediction

What happened to the mass when the ice melted?

☐ It stayed the same, 50 g ☐ It went up because water is heavier ☐ It went down because ice "shrinks"
☐ It went to 0 because the ice disappeared

✓ **It stayed the same, 50 g**

3 Box 3

Collect more data

For each row, press the ice amount, melt it with the lid sealed, and type the scale readings.

Trial	Mass of ice before (g)	Mass of water after (g)
Trial A: 20 g of ice	from simulator	from simulator
Trial B: 100 g of ice	from simulator	from simulator

Look for a pattern

Look at all three trials (50 g, 20 g, 100 g). What pattern do you see?

- ☐ The mass after melting always equals the mass before ☐ Bigger ice cubes lose more mass
☐ The mass always goes up by a little ☐ There is no pattern

✓ The mass after melting always equals the mass before

4 Box 4

Now open the lid

In the simulator: Open the lid, heat the water to 80 °C or more, and let the scale drop by at least 3 g.

The mass went DOWN this time. Where did that matter go?

- ☐ It escaped into the air as water vapor ☐ It was destroyed by the heat ☐ It turned into nothing
☐ The scale broke

✓ It escaped into the air as water vapor

Catch the missing matter

Suppose you started with 100 g of water. After boiling it in an open beaker, the scale reads 88 g. How many grams of water vapor escaped into the air?

Answer: _____ g ✓ 12

5 Box 5

Freeze it back

In the simulator: With the lid sealed, turn melted water back into ice (set the plate below 0 °C).

What did the scale show when the water froze again?

- ☐ The same mass as before ☐ More mass because ice is solid ☐ Less mass because cold makes things lighter

✓ The same mass as before

Legend challenge: a trick question Legend only

A sealed bottle of water freezes in a freezer and the ice cracks the bottle open. Which statement is true?

- ☐ The mass stayed the same; ice takes up MORE space than water
☐ The ice has more mass, so it pushed the bottle ☐ Freezing added air particles
☐ The mass went down, so it shrank

✓ The mass stayed the same; ice takes up MORE space than water

6 Box 6

Explain it to a classmate

Is Lena right? Explain using a number from your data.

Look for: Says the mass stayed the same; Talks about the matter or particles; a number from the simulator

Model: Lena is not right. When 50 g of ice melted in the sealed beaker, the water was still 50 g. The particles only changed their arrangement, so the mass stayed the same.

7 Box 7

Final claim (CER)

Does matter disappear when it melts, freezes, or evaporates?

Claim

Look for: States that matter does not disappear; at least 6 words

Evidence

Look for: Gives masses in grams; a number from the simulator; at least 10 words

Reasoning

Look for: Uses the idea of particles or matter; Explains where the "missing" mass went in the open beaker; at least 12 words



Exit ticket: answer the big question in your own words

Does matter disappear when it melts, freezes, or evaporates?

Look for: When a substance is heated or cooled, its particles rearrange but none are created or destroyed. In a sealed container the mass stays the same. In an open container, mass seems to "disappear" only because water vapor escapes into the air.

Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	KQD-E
 Investigator	T19-I
 Legend	UUG-L



Watch for these misconceptions

- "Dissolved things disappear and have no mass." The particles are still there and still have mass.

- "Gas has no mass." Gas is matter. When it escapes an open container, the scale drops because matter left.
- "Ice weighs more than water because it is solid." Freezing changes volume a little, but mass stays the same.