

Sugar Dissolve Lab

Mission: The cafeteria wants to make lemonade faster. Test how water temperature and stirring change how fast sugar dissolves, and prove the sugar is still there even after you can't see it.

Big question: What happens to sugar's mass when it dissolves, and what makes it dissolve faster?

★ Warm-up: Notice & wonder

Picture a glass of iced tea with a spoonful of sugar at the bottom. Write 2 things you notice and 1 thing you wonder.

What do you notice about sugar in cold tea versus hot tea? ✓ **Sugar dissolves faster in hot tea; it can sit at the bottom of cold tea.**

If sugar disappears into tea, how could you prove it is still there? ✓ **Taste it (sweet), or weigh it: the mass stays the same.**

Key vocabulary

Dissolve	When a solid mixes into a liquid so evenly you cannot see it.
Solution	A mixture where one substance is dissolved in another.
Variable	Something you change or measure in an experiment.
Fair test	Changing only ONE variable at a time.
Particles	Tiny pieces of matter too small to see.

1 Box 1

Predict the mass

PREDICTION The beaker + water + 2 sugar cubes weigh 310 g. After the sugar dissolves, the scale will read...

☐ Less than 310 g ☐ Exactly 310 g ☐ More than 310 g

Dissolve the sugar

In the simulator: Drop in 2 sugar cubes and wait until they fully dissolve.

What does the scale read now?

Answer: _____ g ✓ **310**

2 Box 2

Plan a fair test

You want to test if TEMPERATURE changes dissolving speed. What should you keep the same?

☐ Stirring and number of cubes ☐ Nothing ☐ Only the beaker color ☐ The temperature

✓ **Stirring and number of cubes**

3 Box 3

Temperature trials

Run each temperature and record the timer when the sugar is gone.

Water temp	Time to dissolve (s)
10 °C (cold)	from simulator
40 °C (warm)	from simulator
80 °C (hot)	from simulator

4 Box 4

Read the graph

Look at the graph. As the temperature goes up, the time to dissolve...

☐ goes down (faster) ☐ goes up (slower) ☐ stays the same

✓ goes down (faster)

5 Box 5

Test stirring

In the simulator: Run a trial at 40 °C with Stir ON.

How many seconds did it take with stirring? Compare it to 40 °C without stirring.

Answer: _____ s ✓ varies: check the student's simulator readout

The lemonade plan

The cafeteria makes lemonade with cold water. What is the BEST advice from your data?

- ☐ Dissolve the sugar in a little warm water and stir, then add cold water
☐ Add more sugar cubes so it dissolves faster ☐ Don't stir, just wait ☐ Use colder water

✓ Dissolve the sugar in a little warm water and stir, then add cold water

6 Box 6

Legend: explain the particles Legend only

Explain in terms of particles why stirring makes sugar dissolve faster.

Look for: Uses particles; Describes movement or mixing; at least 12 words

7 Box 7

Final claim (CER)

What happens to sugar's mass when it dissolves, and what makes it dissolve faster?

Claim

Look for: Mass stays the same; Names what makes it faster; at least 8 words

Evidence

Look for: Uses the scale reading; Uses timing data; a number from the simulator; at least 12 words

Reasoning

Look for: Explains with particles; at least 10 words



Exit ticket: answer the big question in your own words

What happens to sugar's mass when it dissolves, and what makes it dissolve faster?

Look for: Dissolved sugar breaks into particles too small to see, but the mass stays the same. Hotter water and stirring make particles move and mix faster, so sugar dissolves faster.



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	JDH-E
 Investigator	16J-I
 Legend	O9B-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.