

Mixtures, solutions and dissolving

Grade 6 science (Year 7 · Class 6) · Worksheet

Name: _____ Date: _____ Class: _____

These problems train you to sort mixtures, name solutes and solvents, calculate the mass of a solution and read solubility graphs. Early problems check the key words; later ones involve saturation, percentages and evaluating a claim. They suit Grade 6, Year 7 and Class 6 students.

Level: Grade 6 science (Year 7 · Class 6) · **Curriculum:** MS-PS1-2

Problem 1 Uniform or not? (easy)

Write homogeneous or heterogeneous for each mixture.

1. Sweet tea.
2. A salad.
3. Muddy water.
4. Air.
5. Vinegar.
6. Pizza.

Problem 2 Key words (easy)

Match each word to its meaning: solute, solvent, solution, dissolving.

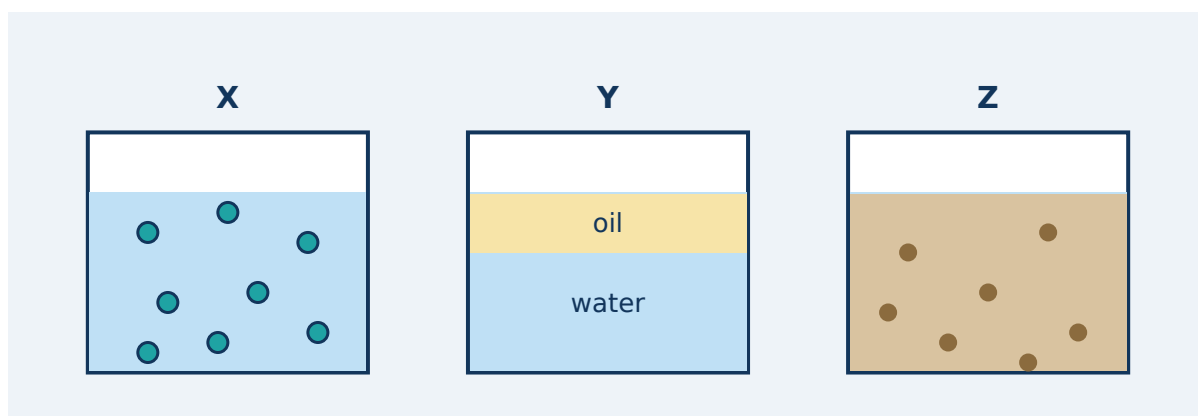
- A. The mixture formed.
- B. The substance that dissolves.
- C. The process in which a solute spreads through a liquid.
- D. The liquid that does the dissolving.

Problem 3 Solute and solvent (easy)

Name the solute and the solvent in each solution.

1. Sugar in chai.
2. Salt in sea water.
3. Orange squash powder in water.

Problem 4 Three beakers (easy)



Beakers X, Y and Z.

1. Identify the beaker that holds a solution.
2. Describe what you see in Y.
3. State whether Z is homogeneous or heterogeneous.

Problem 5 Mass of a solution (easy)

Mei dissolves 30 g of sugar in 170 g of water in Singapore.

1. Calculate the mass of the solution.
2. State the mass of sugar present in the solution.

Problem 6 Faster dissolving (easy)

Write yes or no: does it make a solid dissolve faster?

1. Stirring.
2. Using colder water.
3. Crushing the solid.
4. Using warmer water.

Problem 7 True or false (easy)

Write true or false and correct the false ones.

1. A solute is the liquid that does the dissolving.
2. A solution looks the same everywhere.
3. Sand dissolves in water.
4. In a saturated solution no more solute dissolves.

Problem 8 Finding the solvent mass (medium)

A solution of salt in water has a mass of 350 g. It contains 50 g of salt.

1. Calculate the mass of water.
2. Calculate the new mass of the solution if 100 g more water is stirred in.

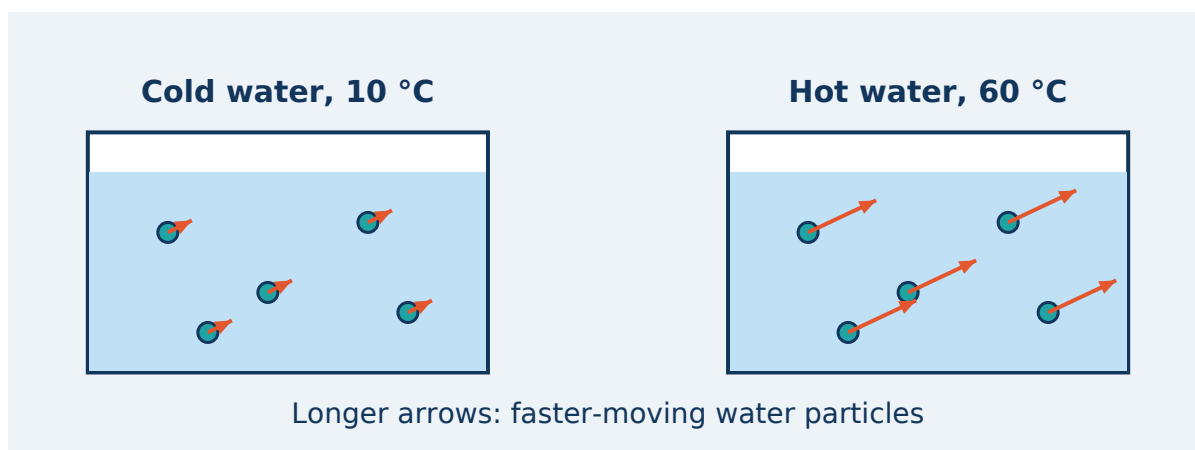
Problem 9 Reaching saturation (medium)

Hira in Lahore adds salt to 100 g of water at 20 °C.

Total salt added (g)	Result
10	all dissolved
20	all dissolved
30	all dissolved
40	some salt left at the bottom

1. State between which two amounts the solution became saturated.
2. The most that dissolves is 36 g. Calculate the mass of undissolved salt after adding 40 g.
3. Suggest one way to make the leftover salt dissolve.

Problem 10 Hot chai, cold chai (medium)



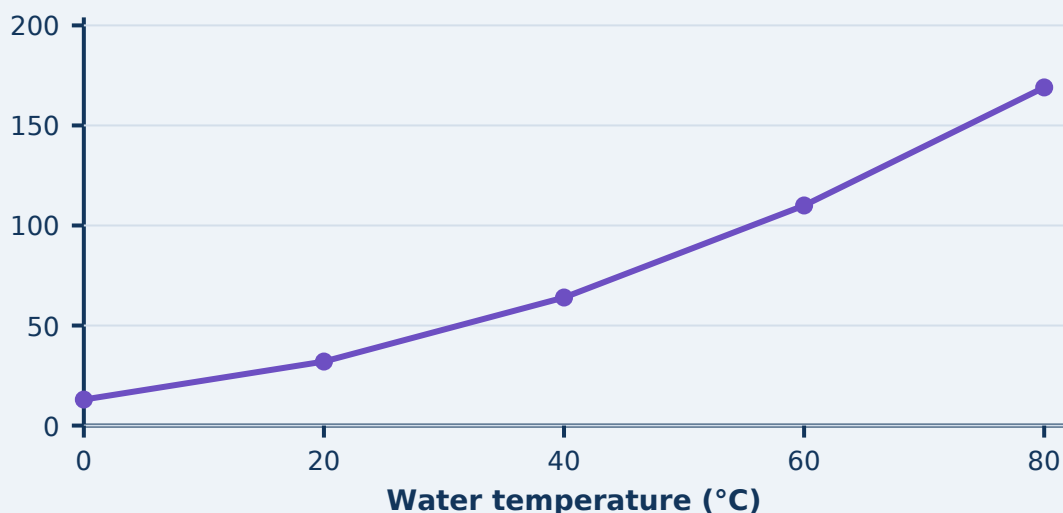
Water particles at two temperatures.

Aarav in Pune notices that sugar dissolves faster in hot chai than in cold chai.

1. Describe the particles in hot water, using the picture.
2. Explain why the sugar dissolves faster in the hot chai.

Problem 11 Reading a solubility graph (medium)

Dissolving in 100 g of water (g)

*Solubility of salt Z.*

1. State the mass of Z that dissolves in 100 g of water at 40 °C.
2. Calculate how much more dissolves at 60 °C than at 20 °C.
3. Decide whether 90 g of Z in 100 g of water at 60 °C is saturated, and explain.

Problem 12 Alloys and gases (medium)

Brass is a solid mixture of copper and zinc that looks the same all through. A fizzy drink contains carbon dioxide gas dissolved in water.

1. Classify brass as homogeneous or heterogeneous.
2. Name the solute and the solvent in the fizzy drink.
3. Explain why bubbles appear when the bottle is opened.

Problem 13 Spot the errors (medium)

Diego writes: "When sugar dissolves it disappears, so 20 g of sugar in 100 g of water gives a solution of mass 100 g."

1. Identify the mistake.
2. Calculate the correct mass of the solution.

Problem 14 A muddy puddle (medium)

After a storm in Kampala, Namatovu finds a puddle that looks brown and cloudy. An hour later, the water looks clearer and mud lies at the bottom.

1. State whether the puddle is a solution.
2. Explain what happened over the hour.

Problem 15 Sharing a drink (medium)

Chidi in Enugu stirs 18 g of sugar into 250 g of water to make a drink, then pours a quarter of the solution into a cup.

1. Calculate the mass of the whole drink.
2. Calculate the mass of the drink in the cup.
3. Calculate the mass of sugar in the cup.

Problem 16 Saturating a larger tank (hard)

At 20 °C, 100 g of water dissolves at most 36 g of salt. Bilal in Lahore has 250 g of water at 20 °C and adds 100 g of salt.

1. Calculate the most salt that can dissolve.
2. Calculate the mass of undissolved salt.
3. Calculate the mass of the solution.

Problem 17 Cooling a hot solution (hard)

Use the graph of salt Z from Problem 11. A student dissolves 90 g of Z in 100 g of water at 60 °C.

1. State whether the solution is saturated at 60 °C.
2. State the most Z that can stay dissolved when it cools to 20 °C.
3. Calculate the mass of solid that will appear on cooling.

Problem 18 Plan a solubility test (hard)

Lina wants to know whether salt or sugar dissolves more in 100 g of water at 20 °C.

1. Describe the method.
2. State the variables to keep the same.
3. State what you would measure and how you will know when the solution is saturated.

Problem 19 Does hot water dissolve more? (hard)

A student claims that hot water always dissolves more of any solid.

Solid	At 20 °C (g/100 g)	At 60 °C (g/100 g)
Sugar	204	287
Salt	35.9	37.1
Baking soda	9.6	16.4

1. Calculate the extra mass dissolving for each solid.
2. Calculate each increase as a percentage of the 20 °C value, to the nearest whole number.
3. Evaluate the claim using your answers.

Problem 20 Dilution thinking (hard)

Hamza makes a salt solution from 12 g of salt and 188 g of water. He then adds 100 g of water.

1. Calculate the mass of the first solution.

2. Calculate the mass of the diluted solution.
3. State what happens to the mass of salt.
4. Explain why the diluted solution tastes less salty.