

Choosing a method to separate mixtures

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

Name: _____ Date: _____ Class: _____

These problems train you to match separation methods to mixtures, name the parts of a filtration set-up and plan a multi-step separation. Later problems involve percentage recovery and comparing plans. They suit Grade 6, Year 7 and Class 6 students.

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

Problem 1 Match the method (easy)

Match each method to what it does.

Methods: decanting, filtering, evaporation, magnet, sieving.

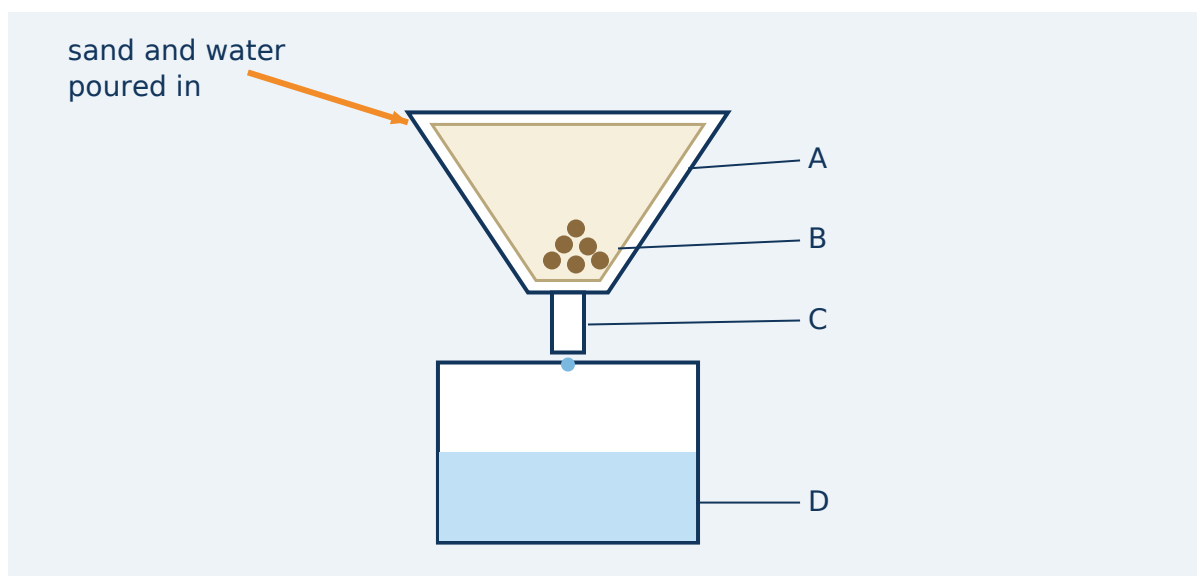
- A. Removes iron from a mixture.
- B. Pours off a liquid after the solid has settled.
- C. Separates pieces of different sizes.
- D. Leaves a dissolved solid behind.
- E. Uses paper to hold back an insoluble solid.

Problem 2 Pick a method (easy)

Name the best method for each mixture.

- 1. Iron nails and plastic beads.
- 2. Sand and water.
- 3. Salt dissolved in water.
- 4. Flour and small stones.
- 5. Muddy water that has stood overnight.

Problem 3 Labelling filtration (easy)



Filtration set-up with parts labelled A to D.

Use these words: funnel, filtrate, filter paper, residue.

1. Name part A.
2. Name part B.
3. Name part C.
4. Name part D.

Problem 4 Pasta water (easy)

Mei in Singapore pours cooked pasta and water into a colander.

1. State which separation method this is.
2. State what passes through the holes.
3. State what stays in the colander.

Problem 5 Magnet or not? (easy)

Write yes or no: would a magnet pick it up?

1. An iron nail.
2. An aluminium drinks can.
3. A steel paperclip.
4. A copper coin.
5. A plastic spoon.

Problem 6 Put the steps in order (easy)

Sand and salt are mixed. Put the steps in the correct order.

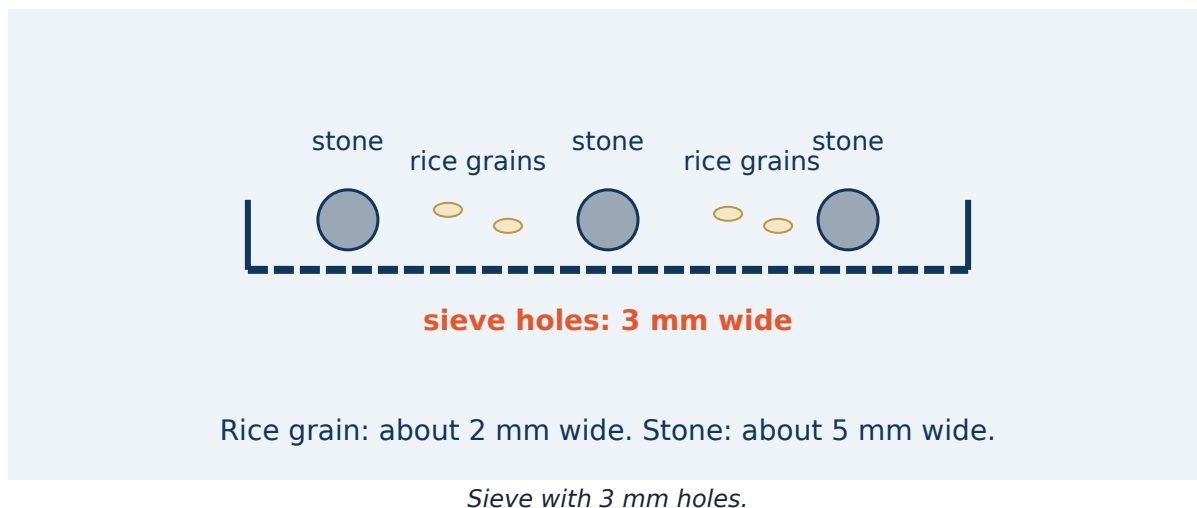
- A. Evaporate the filtrate.
- B. Add water and stir.
- C. Filter the mixture.

Then state what is collected at the end of steps A and C.

Problem 7 Why does the paper work? (easy)

Explain why filter paper lets water through but holds back sand.

Problem 8 Rice and stones (medium)



Sulaiman in Kano shakes a mixture of rice and small stones in a sieve with holes 3 mm wide.

1. State which material falls through the holes.
2. State which material stays in the sieve.
3. Predict what happens if the holes are only 1 mm wide.

Problem 9 Percentage recovered (medium)

Hira in Lahore dissolves 20.0 g of salt in water and evaporates the solution. She collects 18.6 g of dry salt.

1. Calculate the percentage of salt she recovered.
2. Suggest two reasons why it is not 100 %.

Problem 10 Choosing for each case (medium)

Choose one method, and give a reason, for each.

1. Removing steel pins spilled into sawdust.
2. Getting salt from sea water at the coast of Kenya.
3. Taking tea leaves out of the tea in a cup.
4. Clearing sand from a bucket of water.

Problem 11 Sugar solution (medium)

Aarav pours a sugar solution through filter paper. The filtrate still tastes sweet.

1. Explain why the sugar went through the paper.
2. Describe how to get the sugar back.

Problem 12 Salt pans (medium)

On the coast of Tamil Nadu, workers let sea water flow into wide, shallow pans in the sun. Each kilogram of sea water holds 35 g of salt.

1. Name the process that makes the salt appear.
2. Explain why shallow pans in the sun work well.
3. Calculate the mass of salt in 20 kg of sea water.

Problem 13 Spot the errors (medium)

Chidi writes: "To get salt from salt water, filter it. To get sand from sand and water, evaporate it."

1. Identify the two errors.
2. Write the correct method for each.

Problem 14 Cloudy water (medium)

Namatovu fills a bucket with muddy water in Kampala and leaves it overnight. In the morning the mud is at the bottom.

1. Name the method she should use to remove the clear water.
2. Name a method that gives clearer water than the first.
3. State whether the water is now pure, with a reason.

Problem 15 Tracking masses (medium)

A 60.0 g mixture contains 12.0 g of iron filings, 30.0 g of sand and 18.0 g of salt. After separation, Kofi collects 11.9 g, 29.6 g and 17.1 g.

1. Calculate the total mass collected.
2. Calculate the mass lost.
3. Calculate the total percentage recovered, to 1 decimal place.

Problem 16 Three-part mixture (hard)

A mixture contains iron filings, sand and sugar.

1. List the steps to separate the three, in order.
2. Give a reason for the order of the first two steps.
3. Name the residue and the filtrate when you filter.

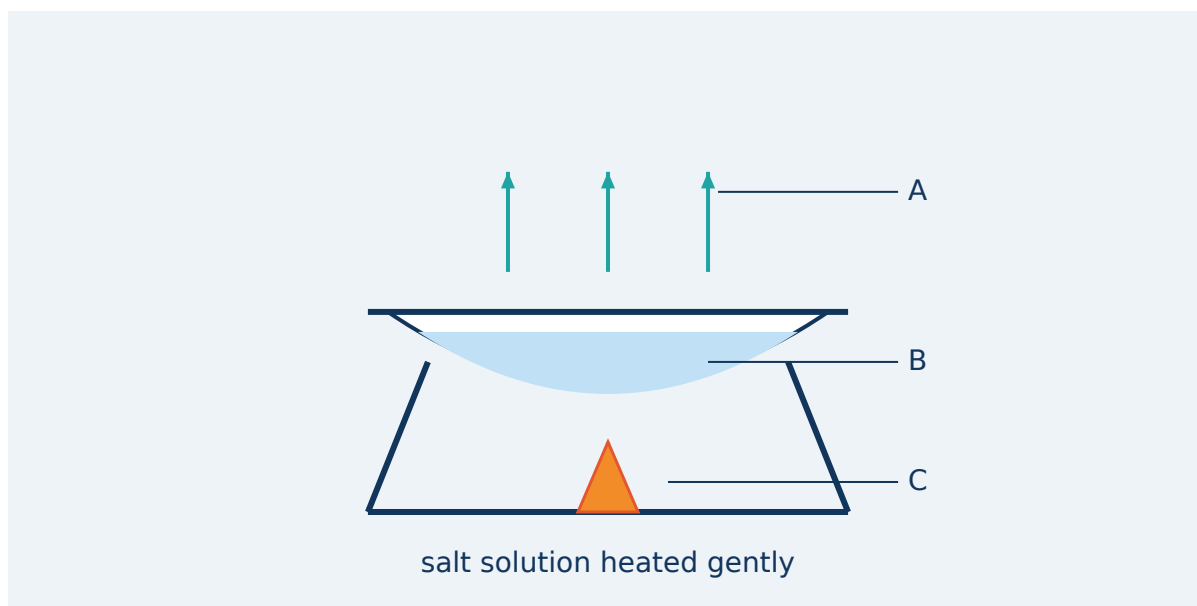
Problem 17 Recycling plant (hard)

A recycling plant receives 2400 kg of mixed metal waste. Of this, 35 % is steel cans and the rest is aluminium cans. A magnet removes 95 % of the steel.

1. Calculate the mass of steel cans.
2. Calculate the mass of steel removed by the magnet.
3. Calculate the mass of steel still in the rest of the waste.

4. Explain why aluminium cans are not picked up.

Problem 18 Heating a dish (hard)



Evaporation set-up.

Kofi heats salt solution in a dish until all the water is gone and the salt spits out.

1. Name part A (the vapour), part B and part C.
2. Explain why the salt spits.
3. Describe a better way to finish the evaporation.

Problem 19 Compare two plans (hard)

Two students separate sand from salt water. Plan 1: filter, then evaporate the filtrate. Plan 2: evaporate everything, then try to pick the sand out of the salt.

1. State which plan is better and explain why.
2. State what the residue is in Plan 1.
3. Suggest one problem with Plan 2.

Problem 20 Design a water filter (hard)

Lina builds a filter from a cut plastic bottle with gravel on top, then coarse sand, then fine sand. She pours in muddy river water.

1. Explain how the layers work like a series of sieves.
2. State two things that may still be in the water.
3. Explain what Lina should do before drinking the water.