

Choosing a method to separate mixtures

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

Check your answers against the model method. For planning problems, look for the correct order of steps and a reason for each one. For calculations, write the formula, then the substitution, then the result with its unit or percentage sign.

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

Problem 1 Match the method

A = **magnet**; B = **decanting**; C = **sieving**; D = **evaporation**; E = **filtering**.

Problem 2 Pick a method

1. **Magnet.**
2. **Filtering** (or decanting).
3. **Evaporation.**
4. **Sieving.**
5. **Decanting.**

Problem 3 Labelling filtration

1. A: **filter paper.**
2. B: **residue.**
3. C: **funnel.**
4. D: **filtrate.**

Problem 4 Pasta water

1. **Sieving** (a colander is a coarse sieve).
2. Water passes through.
3. The pasta stays.

Problem 5 Magnet or not?

1. **Yes.**
2. **No.**
3. **Yes.**
4. **No.**
5. **No.**

Problem 6 Put the steps in order

Order: **B, C, A**. Filtering collects the sand as residue, and evaporating the filtrate collects the salt.

Problem 7 Why does the paper work?

The holes in filter paper are tiny. Water particles are small enough to pass through, but sand grains are too big, so **the sand is held back**.

Problem 8 Rice and stones

1. **Rice** (2 mm is smaller than 3 mm).
2. **Stones** (5 mm is bigger than 3 mm).
3. Nothing would pass, because even the rice grains (2 mm) are wider than 1 mm.

Problem 9 Percentage recovered

1. $18.6 \div 20.0 \times 100 = \mathbf{93\%}$.
2. Some salt stuck to the glassware, and some may have spat out as the last water evaporated.

Problem 10 Choosing for each case

1. **Magnet**: steel is attracted, sawdust is not.
2. **Evaporation**: the salt is dissolved.
3. **Sieving** with a strainer: leaves are bigger than the holes.
4. **Decanting or filtering**: sand is an insoluble solid.

Problem 11 Sugar solution

1. The sugar is dissolved, so its particles are far smaller than the holes in the paper.
2. Heat the solution so the water **evaporates**, leaving the sugar.

Problem 12 Salt pans

1. **Evaporation**.
2. A shallow pan exposes a large surface, and the sun supplies heat, so water evaporates quickly.
3. $20 \times 35 \text{ g} = \mathbf{700 \text{ g}}$ of salt.

Problem 13 Spot the errors

1. Filtering does not remove dissolved salt, and evaporating sand and water does not separate them.
2. Salt water needs **evaporation**; sand and water need **filtering or decanting**.

Problem 14 Cloudy water

1. **Decanting.**
2. **Filtering.**
3. **Not pure:** dissolved substances and germs can still be in the water.

Problem 15 Tracking masses

1. $11.9 + 29.6 + 17.1 = \mathbf{58.6\ g}.$
2. $60.0 - 58.6 = \mathbf{1.4\ g}.$
3. $58.6 \div 60.0 \times 100 = \mathbf{97.7\ \%}.$

Problem 16 Three-part mixture

1. Use a magnet to remove the iron; add water to dissolve the sugar; filter; evaporate the filtrate.
2. The magnet goes first because the iron is easiest to remove while the mixture is dry, before water is added.
3. Residue: **sand**; filtrate: **sugar solution**.

Problem 17 Recycling plant

1. $0.35 \times 2400 = \mathbf{840\ kg}.$
2. $0.95 \times 840 = \mathbf{798\ kg}.$
3. $840 - 798 = \mathbf{42\ kg}.$
4. Aluminium is not magnetic, so a magnet does not attract it.

Problem 18 Heating a dish

1. A: water vapour; B: evaporating dish; C: flame.
2. When almost no water is left, the dish is very hot and the last drops boil suddenly, throwing salt out.
3. Stop heating when crystals begin to form and let the **remaining water evaporate** from the warm dish.

Problem 19 Compare two plans

1. **Plan 1**, since filtering removes the sand first and evaporation gives clean salt.
2. The residue is the sand.
3. In Plan 2 the sand and salt end up mixed again, so it is almost impossible to pick the sand out.

Problem 20 Design a water filter

1. The gravel traps big pieces, the coarse sand traps smaller ones and the fine sand traps

the smallest, so each layer acts like a finer sieve.

2. Dissolved substances and germs (any two).

3. She should **boil the water first**, because filtering does not remove germs or dissolved substances.