

Answer Key: Mixtures and Solutions

Grade: 5 **Subject:** Science **For teacher use only** Science

How to use this key

Answers are grouped by section and question number. Many items are open-ended; accept any response that shows correct thinking even if the wording differs. Notes flag where more than one answer is defensible and list common misconceptions to watch for. Estimated grading time: ~4–6 min per packet.

Start Notice & Wonder grade for effort · ~1 min

1 Trail mix — notice & wonder.

Full credit for any reasonable notice + wonder. **Sample:** Notice — "you can see the peanuts, raisins, and pretzels; they are not stuck together." Wonder — "could I pick out just the raisins?" Any on-topic response is fine. Trail mix is a good example of a *plain mixture you can see and pick apart*.

2 Where did the salt go?

Accept any honest idea; this surfaces the pre-lesson thinking. **Target idea (taught in Build):** the salt did not disappear — it **dissolved** into tiny bits too small to see, spread through the water. Watch for the misconception "the salt disappeared / is gone." Note it and revisit after the reading.

Build Read the Science ~1 min

3 How the solution jar looks different (Figure 1).

The solution looks the **same all the way through** (the tiny bits are spread out evenly), while the plain mixture has **separate clumps you can see and pick apart**. Accept any sentence that captures "same throughout / spread out" vs. "you can see the parts."

Apply Use the Data ~2 min

4 Classify: Solution (S) or Plain mixture (P).

- A. Sand + iron filings — **P** (you can see the parts; nothing dissolved).
- B. Sugar in water — **S** (looks the same all through; dissolved = "Yes").
- C. Sand + water — **P** (bits float and settle; does not dissolve).
- D. Beads + buttons — **P** (dry, visible parts).

Only B is a solution. The key clue for S is the "looks the same all through" + "dissolves = Yes" columns.

5 Best way to separate + the clue used.

5a. Mixture A (sand + iron filings) → magnet. Clue: "a part is magnetic (iron)." Pull the iron out with a magnet; sand is left. *Defensible alternate:* sifting could work if the grain sizes differ, but the magnetic clue is the strongest and cleanest choice — magnet is the intended answer.

5b. Mixture B (sugar in water) → evaporate. Clue: "dissolves = Yes / looks the same all through." Let the water evaporate and the sugar stays behind. A filter would **not** work because dissolved sugar passes right through the paper.

5c. Mixture C (sand + water) → filter. Clue: "does not dissolve; bits float and settle." Pour through a filter to catch the sand; water passes through. *Defensible alternate:* letting it settle and pouring off (decanting) is reasonable; accept with sound reasoning, but filter is the intended answer.

5d. Mixture D (beads + buttons) → sift. Clue: "small beads vs. big buttons" (a size difference). A screen lets small beads fall through and holds back big buttons.

6 Observation (O) vs. Inference (I).

a) **O** — you can see it (looks clear all through).

b) **I** — a reasoned idea; you cannot see the sugar, so you conclude it is still there.

c) **O** — you can see the filings jump to the magnet.

Observation = seen or measured directly; inference = an idea you figure out from evidence.

Explain CER (Q7) ~1–2 min

7 Explain how to separate Mixture A or B.

Model answer — Mixture A. Claim: I would separate the sand and iron filings with a **magnet**. Evidence: Table 1 shows a part of Mixture A is **magnetic (iron)**. Reasoning: A magnet pulls magnetic iron but not sand, so the iron sticks to the magnet and the sand is left behind.

Model answer — Mixture B. Claim: I would separate the sugar from the water by letting the water **evaporate**. Evidence: Table 1 shows Mixture B **dissolves** and looks the same all through. Reasoning: Dissolved sugar cannot be caught by a filter, but when the water dries into the air the sugar is left behind.

Grade for a correct method matched to a real clue from Table 1, not for wording. Either mixture earns full credit if the tool fits the evidence.

CER scoring rubric (3 points)

Score	Claim	Evidence	Reasoning
3	Names a correct way to separate the chosen mixture.	Uses a real, matching clue from Table 1.	Clearly tells why that tool works on that property.
2	Names a mostly-correct method.	Clue is close but vague or not from the table.	Some correct why, but incomplete.
1	Method is vague or does not fit.	Little or off-topic evidence.	Little or unclear reasoning.
0	No/incorrect method.	No evidence.	No reasoning.

Close ACE ~1 min

ACE Articulate / Connect / Extend.

Articulate: accept any accurate plain-language difference (e.g., "in a plain mixture you can see the parts; in a solution one part dissolves so it looks the same all through").

Connect: the only solution in Table 1 is **B (sugar in water)**; students should cite "dissolves = Yes" or "looks the same all through."

Extend: any real home mixture with a sensible separation (e.g., cereal + milk → strain/filter; pasta + water → strain; a salad → pick apart; salt water → evaporate). More than one answer is defensible.

Watch Common misconceptions

- **"Dissolving means disappearing."** The dissolved solid is still there — it broke into bits too small to see and spread out. You can still taste it and weigh it.
- **"You can't get the salt (or sugar) back."** You can — let the water evaporate and the dissolved solid stays behind. Dissolving is not permanent.
- **"All mixtures are solutions."** Only mixtures that dissolve and look the same throughout are solutions. Trail mix, sand + iron, and beads + buttons are plain mixtures, not solutions.
- **"Filtering removes dissolved things."** A filter only catches bits too big to pass; dissolved sugar/salt goes right through. Use evaporation instead (Q5b).
- **Observation vs. inference (Q6).** Students often mark a figured-out idea (like "the sugar is still there") as something they saw. If you cannot see it directly, it is usually an inference.

Teacher follow-up based on likely errors

If many students miss Q4B or Q5b, do a quick review of "dissolve = spread out, not gone" and show that evaporation brings a dissolved solid back. If Q5 mixes up filter and evaporate, re-anchor with "a filter catches what is too big; dissolved bits are too small." If Q6 shows observation/inference confusion, sort a few statements aloud into "seen" vs. "figured out." The "dissolving = disappearing" idea is the highest-value one to revisit next class.

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