

Fixing Jamal's Lab Notebook: Six Mistakes About Properties

Learning target: I can find the error in a mistaken statement about substances and their properties, explain the thinking that caused it, and rewrite the statement correctly.

Error analysis About 35 min Individual MS-PS1-2 · practice writing independent practice

Name _____ Date _____ Period _____

Directions

Jamal did the right experiments but wrote six conclusions in his notebook, and every one contains a mistake. Read all six first. In Part A, decide what each mistake is about. In Part B, write two things for each entry: what went wrong in Jamal's thinking, and a corrected sentence he could paste over the old one. Your correction must keep his observation and fix only the conclusion. Part C asks you to step back and find the pattern in his mistakes.

You will need: This worksheet, Pencil

Jamal's notebook (copied exactly) — **1.** The big iron bolt (48 g) is denser than the small iron nail (6 g) because the bolt is so much heavier. **2.** We stirred flour into water and the water turned cloudy and the flour spread everywhere, so flour dissolves in water. **3.** We stirred sugar into warm tea and it disappeared, so the sugar melted. **4.** The aluminum bar melts at 660 °C. We sawed it in half, so each half should melt at about 330 °C. **5.** Both unknown bars are shiny, gray and exactly the same size, so they must be the same substance. **6.** Boiling point is an identifying property, so water boils at 100 °C no matter where on Earth you are.

Part A: Diagnose

1. For each entry, name the property or idea that is being confused (for example, 'mass versus density') and confirm that the conclusion is incorrect.

The property or idea Jamal mixed up	Correct or incorrect conclusion?
Entry 1	
Entry 2	
Entry 3	
Entry 4	
Entry 5	
Entry 6	

Part B: Explain and rewrite

For each entry write (a) **What went wrong**: the mistaken idea behind the sentence, in one or two sentences; and (b) **Corrected entry**: a new sentence that keeps Jamal's observation and states the correct conclusion. Include a number or a specific observation wherever one is available.

2. Entry 1: the bolt and the nail.

3. Entry 2: flour in water.

4. Entry 3: sugar in tea.

5. Entry 4: the sawed aluminum bar.

6. Entry 5: the two gray bars.

7. Entry 6: boiling point everywhere on Earth.

Part C: Step back

8. Entries 1 and 4 share the same underlying mistake. Describe it in one sentence that does not mention bolts or aluminum.

9. Jamal's observations were all correct; only his conclusions were wrong. Suggest one habit he could add to his notebook so that this happens less often.

Three questions to ask each entry

For every entry, ask: (1) Would this still be true if the sample were twice as big? If the answer changes, Jamal has confused an object property with a substance property. (2) Did the substance stay the same substance? If yes, the change was physical (melting, dissolving), not a new substance. (3) Were the conditions the same? If the air pressure or temperature could differ, the property's value could differ too.

Write entry 7

Write a seventh notebook entry in Jamal's voice that contains a mistake about **flammability** or about **mixtures**, then swap with a partner and diagnose each other's entry using the three questions in the scaffold. Your entry must include a true observation and a wrong conclusion, just like the originals. Discuss which of the six original mistakes is easiest to make and why.