The Sample Sort

Use physical properties to evaluate mystery materials.

P.7.5A.1 "Collect and evaluate qualitative data to describe substances using physical properties (state, boiling/melting point, density, heat/electrical conductivity, color, and magnetic properties)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the physical properties the workers observe or test, and circle each conclusion they support with those observations.

Three Samples at the Repair Shop

1. At a repair shop, three unlabeled solid samples need sorting: a reddish strip, a gray strip, and a white pellet. The workers record properties they can observe or test without making a new substance. They first note each sample's state and color. Next, they bring a magnet near each sample and place small, solid pieces in water. A piece that sinks is denser than water, while one that floats is less dense. The workers check that no air is trapped against the pieces before recording the results.

2. The reddish strip sinks and does not stick to the magnet. The gray strip also sinks, but the magnet pulls it. Both strips let an electric current pass through a simple test circuit, so both conduct electricity. When one end of each strip touches a warm metal plate, the other end of the reddish strip warms sooner. The workers use strips of the same length and thickness for this test. These observations match copper for the reddish strip and iron for the gray strip.

3. The white pellet floats, and the magnet does not pull it. It does not complete the test circuit. In a sealed, clear bag set in warm water, the pellet changes from solid to liquid. The strips stay solid in the same warm water. The workers identify the pellet as wax. They do not claim a boiling point for any sample because their tests never heated a liquid until it boiled. Comparing several properties gives stronger evidence than using color alone, since many substances can share a color.

2 ANSWER WITH EVIDENCE

Use the passage

1. Both strips sink and conduct electricity. Which test result helps the workers tell the iron strip from the copper strip?

2. What observation shows that the wax pellet is less dense than water?

3. Which strip transfers heat faster in the workers' test? Give the observation that supports your answer.

4. A worker says the tests show the wax pellet's boiling point. Is that claim supported? Explain.

3 YOUR TURN

Your own words

A new mystery solid is blue, sinks in water, is not attracted to a magnet, completes a test circuit, and stays solid in warm water. Write four sentences describing what these results show about its physical properties, including one property the tests do not establish and how it could be tested.

ANSWER KEY

The Sample Sort

GRADE 7 · P.7.5A.1

PART 1 · READ AND MARK

Underline the physical properties the workers observe or test, and circle each conclusion they support with those observations. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Both strips sink and conduct electricity. Which test result helps the workers tell the iron strip from the copper strip?	**The magnet pulls the iron strip but does not pull the copper strip.**
2	What observation shows that the wax pellet is less dense than water?	**The wax pellet floats in water.**
3	Which strip transfers heat faster in the workers' test? Give the observation that supports your answer.	**The copper strip transfers heat faster. Its far end warms sooner than the far end of the iron strip.**
4	A worker says the tests show the wax pellet's boiling point. Is that claim supported? Explain.	**No. The workers observed the pellet melt, but they did not heat a liquid until it boiled.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The blue sample is a solid that is denser than water because it sinks. It is not attracted to a magnet and conducts electricity because it completes the circuit. It stays solid in warm water, so its melting point is above that water's temperature. Its ability to conduct heat is unknown; a supervised test could warm one end and measure how quickly the other end heats.

Accept answers that connect each claim to a stated test result. For the open task, students may instead name boiling point as unknown and propose measuring it with suitable equipment under supervision.