

Matter Measure Match

Compare physical properties with measurement data.

GRADE 4 • SC.4.P.8.1

SC.4.P.8.1 "Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets."

NAME _____

DATE _____

COMPARE THE MEASUREMENTS

Mass tells how much matter is in an object, and volume tells how much space it takes up. When measurements use the same unit, compare the numbers. Subtract smaller from larger to find how much more or less.

WORKED EXAMPLE

Jar A has a mass of 240 g. Jar B has a mass of 185 g. Which jar has greater mass, and how much greater is it?

1. Compare 240 g and 185 g.
2. 240 g is greater, so Jar A has greater mass.
3. Subtract: $240 - 185 = 55$.
4. Jar A has 55 g more mass.

Answer: Jar A has greater mass by 55 g.

PRACTICE 6 problems

- 1** A piece of clay has a mass of 78 g. A sponge has a mass of 31 g. Which object has greater mass, and how much greater is it?

ANSWER _____

- 2** Cup A holds 450 mL of water. Cup B holds 375 mL of water. How much more water does Cup A hold?

ANSWER _____

- 3** A rock is placed in a water container. The water level rises from 620 mL to 705 mL. What is the rock's volume?

ANSWER _____

- 4** Two same-size blocks have different colors. The red block has a mass of 16 g, and the blue block has a mass of 22 g. Which block has greater mass, and how much greater is it?

ANSWER _____

- 5** A magnet holds 14 steel washers and 0 plastic washers. Which material is attracted to the magnet, and how many more steel washers are held than plastic washers?

ANSWER _____

- 6** A steel nail scratches a piece of wax. The wax does not scratch the steel nail. Which material is harder?

ANSWER _____

APPLY IT Show your work

- 1** At a game-design club, Lena tests three pieces for a marble run. Use the table. Which piece has the greatest mass? Which piece has the greatest volume?

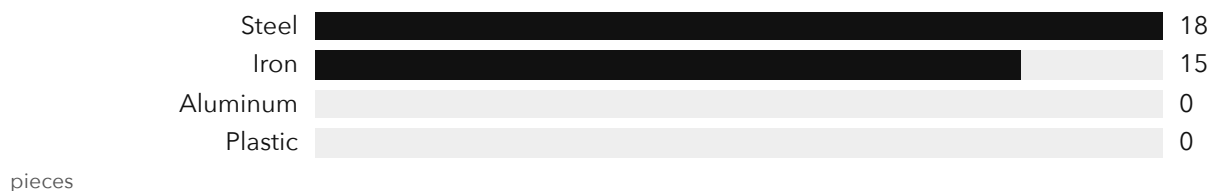
MARBLE-RUN PIECE TESTS

Piece	Mass (g)	Volume (mL)
Blue	96	70
Green	119	85
Yellow	104	92

ANSWER _____

- 2** At a robotics club, students test a magnet with small pieces of different materials. The graph shows how many pieces the magnet holds. How many more steel pieces does the magnet hold than iron pieces? Name the two materials with no attraction to the magnet.

PIECES HELD BY A MAGNET



ANSWER _____

CHALLENGE One step up

A student needs to choose all toy parts that can fit in a 79 mL compartment and have a mass less than 90 g. Part A has a mass of 88 g and a volume of 74 mL. Part B has a mass of 93 g and a volume of 76 mL. Part C has a mass of 86 g and a volume of 79 mL. Part D has a mass of 82 g and a volume of 83 mL. Which parts work? Explain using both measurements.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A piece of clay has a mass of 78 g. A sponge has a mass of 31 g. Which object has greater mass, and how much greater is it?	The clay has greater mass by 47 g.
2	Cup A holds 450 mL of water. Cup B holds 375 mL of water. How much more water does Cup A hold?	75 mL
3	A rock is placed in a water container. The water level rises from 620 mL to 705 mL. What is the rock's volume?	85 mL
4	Two same-size blocks have different colors. The red block has a mass of 16 g, and the blue block has a mass of 22 g. Which block has greater mass, and how much greater is it?	The blue block has greater mass by 6 g.
5	A magnet holds 14 steel washers and 0 plastic washers. Which material is attracted to the magnet, and how many more steel washers are held than plastic washers?	Steel is attracted to the magnet. The magnet holds 14 more steel washers.
6	A steel nail scratches a piece of wax. The wax does not scratch the steel nail. Which material is harder?	The steel nail is harder.

PART 2 • APPLY IT

- The green piece has the greatest mass. The yellow piece has the greatest volume.** Compare the mass numbers to find 119 g is greatest. Compare the volume numbers to find 92 mL is greatest.
- The magnet holds 3 more steel pieces than iron pieces. Aluminum and plastic have no attraction.** Subtract 15 from 18 to find the difference. The bars at 0 show the materials with no attraction.

CHALLENGE

Parts A and C work. Part A has a mass of 88 g and a volume of 74 mL. Part C has a mass of 86 g and a volume of 79 mL.

Accept equivalent comparison wording, such as "47 g heavier" or "75 mL more." For the challenge, students must identify both A and C and refer to both the mass and volume limits.