The Great Capacity Caper

Grade 5 math · Fractions of a number, Multiplication, Order of operations, Rounding · Reading level grades 5-6

Detective: _____ **Date:** _____

An unknown thief has drained the master reservoir inside the high-tech Cubic Capacity Lab, leaving the entire facility bone dry! We must use our knowledge of three-dimensional space and liquid measurements to crack the clues and catch the culprit before the remaining reserves evaporate entirely.

1. Solve each math problem. The answer is a number, and the letter beside it is what that number stands for.
2. In the clue boxes, write that letter in every box showing the same number, then read the secret clue.
3. Use each clue to cross suspects off the list. The one suspect left at the end is the culprit!

My answer: the Volume Thief is _____

Possible suspects

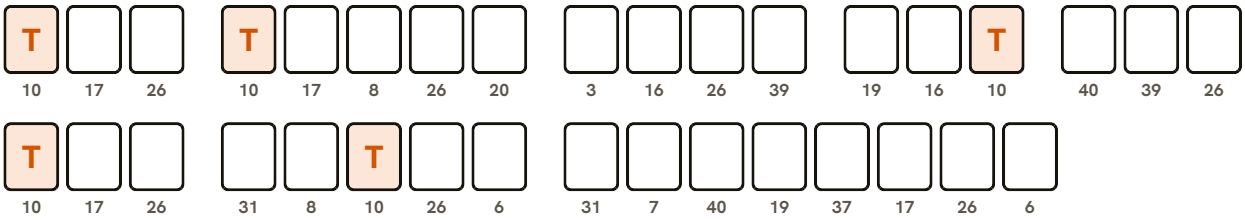
Cross off a row as each clue rules it out. The one left at the end is the culprit.

NAME	MEASUREMENT MASTERY	SPECIALIZED GEAR	POURING STANCE	HAIR RESIDUE	DEFENSE HAZARD
Niels Bohr	beaker-breaking blast	graduated cylinder gun	pours with right hand	neon liquid green hair	solid iron stopper
Archimedes	prism-packing punch	graduated cylinder gun	pours with left hand	solid carbon black hair	solid iron stopper
Thomas Edison	beaker-breaking blast	milliliter magnifier	pours with left hand	solid carbon black hair	spill-proof funnel
Blaise Pascal	liquid-volume leaking	graduated cylinder gun	pours with left hand	solid carbon black hair	spill-proof funnel
Marie Curie	cubic-unit conjuring	cubic centimeter shield	pours with left hand	bubble blue hair	sponge of absorption
Daniel Bernoulli	cylinder-scaling beam	cubic centimeter shield	pours with left hand	bubble blue hair	spill-proof funnel
Ada Lovelace	prism-packing punch	liter launcher	pours with left hand	solid carbon black hair	spill-proof funnel
Benjamin Franklin	cylinder-scaling beam	density disruptor drone	pours with left hand	neon liquid green hair	spill-proof funnel
Grace Hopper	liquid-volume leaking	density disruptor drone	pours with right hand	solid carbon black hair	sponge of absorption
Sally Ride	liquid-volume leaking	cubic centimeter shield	pours with left hand	solid carbon black hair	sponge of absorption
Stephen Hawking	liquid-volume leaking	cubic centimeter shield	pours with right hand	bubble blue hair	sponge of absorption
Albert Einstein	liquid-volume leaking	milliliter magnifier	pours with left hand	neon liquid green hair	spill-proof funnel
Jane Goodall	prism-packing punch	graduated cylinder gun	pours with right hand	bubble blue hair	spill-proof funnel
Gregor Mendel	prism-packing punch	liter launcher	pours with left hand	neon liquid green hair	sponge of absorption
Rosalind Franklin	cubic-unit conjuring	liter launcher	pours with left hand	solid carbon black hair	spill-proof funnel
Charles Darwin	cubic-unit conjuring	liter launcher	pours with left hand	neon liquid green hair	solid iron stopper
Galileo Galilei	cylinder-scaling beam	graduated cylinder gun	pours with left hand	solid carbon black hair	spill-proof funnel
Alan Turing	prism-packing punch	density disruptor drone	pours with left hand	solid carbon black hair	spill-proof funnel
Rachel Carson	cubic-unit conjuring	milliliter magnifier	pours with right hand	solid carbon black hair	spill-proof funnel
Louis Pasteur	liquid-volume leaking	cubic centimeter shield	pours with right hand	solid carbon black hair	spill-proof funnel
Nikola Tesla	cubic-unit conjuring	cubic centimeter shield	pours with left hand	bubble blue hair	spill-proof funnel

CLUE 1 Fractions of a number

> The culprit drained a fractional portion of the liquid storage tanks. Calculate the exact fraction of the total liters remaining to discover a clue about the thief's gear.

Solve each problem, then write its letter in every clue box that shows the same number.



4/6 of 15 = ☐ → T

2/5 of 65 = ☐ → E

2/3 of 30 = ☐ → F

2/8 of 68 = ☐ → H

1/3 of 93 = ☐ → L

1/2 of 6 = ☐ → D

1/10 of 190 = ☐ → N

4/8 of 32 = ☐ → O

4/8 of 80 = ☐ → U

1/3 of 111 = ☐ → C

4/8 of 14 = ☐ → A

1/2 of 12 = ☐ → R

2/6 of 117 = ☐ → S

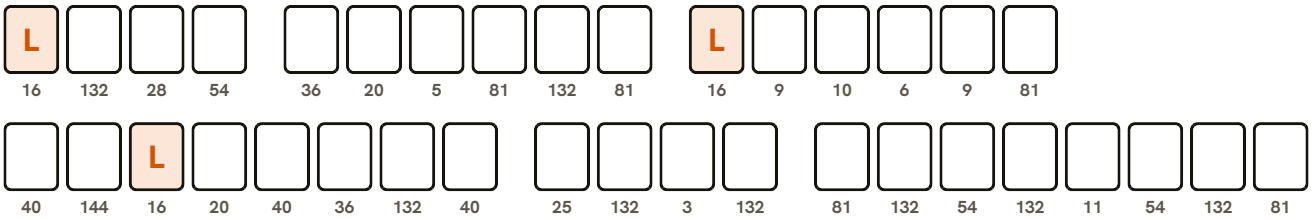
2/4 of 16 = ☐ → I

Scratch space:

CLUE 2 Multiplication facts (1-12)

> To measure the total capacity of the storage grid, we must multiply the number of box containers by the volume of each cube. Doing so reveals a physical trace of the villain.

Solve each problem, then write its letter in every clue box that shows the same number.



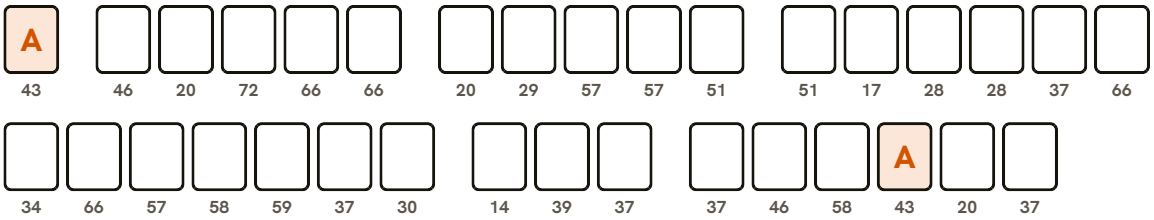
4 × 4 = ☐ → L	9 × 9 = ☐ → D	12 × 11 = ☐ → E
6 × 1 = ☐ → U	10 × 1 = ☐ → Q	1 × 9 = ☐ → I
1 × 3 = ☐ → R	5 × 5 = ☐ → W	6 × 6 = ☐ → H
6 × 9 = ☐ → T	1 × 5 = ☐ → N	12 × 12 = ☐ → P
5 × 8 = ☐ → S	11 × 1 = ☐ → C	5 × 4 = ☐ → A
4 × 7 = ☐ → F		

Scratch space:

CLUE 3 Order of operations

> The lab's electronic valves must be shut off in a precise sequence using the order of operations. Solve this formula to pinpoint the weakness of our runaway suspect.

Solve each problem, then write its letter in every clue box that shows the same number.



6 × 8 - 5 = ☐ → A	66 + 2 × 3 = ☐ → I	17 + 4 × 5 = ☐ → E
9 × 5 - 15 = ☐ → D	12 + 5 × 9 = ☐ → O	10 × 6 - 2 = ☐ → C
2 × 11 - 8 = ☐ → T	10 + 8 × 7 = ☐ → L	31 + 4 × 5 = ☐ → F
4 × 7 - 11 = ☐ → U	8 × 4 - 4 = ☐ → N	10 × 6 - 26 = ☐ → B
23 + 3 × 2 = ☐ → R	41 + 2 × 9 = ☐ → K	5 × 12 - 14 = ☐ → S
2 + 9 × 2 = ☐ → P	8 × 7 - 17 = ☐ → H	

Scratch space:

CLUE 4 Rounding

> The digital scale only displays rounded values for the heavy liquid barrels. Round the total cubic centimeters to the nearest thousand to unlock the hair analysis file.

Solve each problem, then write its letter in every clue box that shows the same number.

A						A								A									
1700	3700	110	500	230	700	9000	1700	1300	5000	110	2300	5000	500	1700	9000	200							
	A				A																		
7000	1700	230	1300	130	1700	3700	230	2300	2000	7000	30	900	290	2300	2300	30	500						

Round 1,675 to the nearest hundred ☐ → **A**

Round 289 to the nearest ten ☐ → **U**

Round 5,292 to the nearest thousand ☐ → **B**

Round 114 to the nearest ten ☐ → **O**

Round 130 to the nearest ten ☐ → **W**

Round 1,837 to the nearest thousand ☐ → **T**

Round 229 to the nearest ten ☐ → **I**

Round 7,297 to the nearest thousand ☐ → **H**

Round 8,835 to the nearest thousand ☐ → **C**

Round 515 to the nearest hundred ☐ → **L**

Round 218 to the nearest hundred ☐ → **K**

Round 2,330 to the nearest hundred ☐ → **N**

Round 737 to the nearest hundred ☐ → **D**

Round 1,344 to the nearest hundred ☐ → **R**

Round 34 to the nearest ten ☐ → **E**

Round 938 to the nearest hundred ☐ → **F**

Round 3,745 to the nearest hundred ☐ → **S**

Scratch space:

CLUE 5 Fractions of a number - the last clue

> Only a small fraction of the spill-zone has been cleaned by our drone fleet. Solve for the remaining fraction of the volume to reveal the suspect's physical pouring stance.

First solve each problem. Then find each answer in the numbered list below and cross that sentence out. One sentence will be left - that is exactly what the villain did!

Step 1 - solve these:

2/6 of 15 = ☐	6/10 of 15 = ☐	1/10 of 70 = ☐	2/4 of 2 = ☐
4/8 of 12 = ☐	2/8 of 32 = ☐	1/10 of 100 = ☐	5/10 of 24 = ☐
2/4 of 6 = ☐	3/6 of 8 = ☐	1/6 of 12 = ☐	

Step 2 - cross out the sentence with each answer:

1. The villain conjured towering stacks of cubic units, then escaped using a fast density disruptor.
2. The villain drained the giant graduated cylinder, then escaped using a fast density disruptor.
3. The villain shrank the water reservoir three levels, then escaped using a fast density disruptor.
4. The villain shattered the master volumetric flask, then vanished using a graduated cylinder gun.
5. The villain shrank the water reservoir three levels, then zoomed away in a milliliter magnifier.
6. The villain shattered the master volumetric flask, then fled behind a cubic centimeter shield.
7. The villain shattered the master volumetric flask, then escaped using a fast density disruptor.
8. The villain drained the giant graduated cylinder, then zoomed away in a milliliter magnifier.
9. The villain drained the giant graduated cylinder, then vanished using a graduated cylinder gun.
10. The villain conjured towering stacks of cubic units, then vanished using a graduated cylinder gun.
11. The villain scrambled the laboratory beaker markings, then vanished using a graduated cylinder gun.
12. The villain shattered the master volumetric flask, then zoomed away in a milliliter magnifier.

TEACHER / PARENT

Answer Key

The Great Capacity Caper

Culprit: Galileo Galilei

cylinder-scaling beam · graduated cylinder gun · pours with left hand · solid carbon black hair · spill-proof funnel

Trail: Start 21 → Clue 1 17 → Clue 2 11 → Clue 3 8 → Clue 4 4 → Clue 5 1

Clue 1 (Fractions of a number): "THE THIEF DOES NOT USE THE LITER LAUNCHER"

4/6 of 15 = 10 (T) · 2/5 of 65 = 26 (E) · 2/3 of 30 = 20 (F) · 2/8 of 68 = 17 (H) · 1/3 of 93 = 31 (L) · 1/2 of 6 = 3 (D) · 1/10 of 190 = 19 (N) · 4/8 of 32 = 16 (O) · 4/8 of 80 = 40 (U) · 1/3 of 111 = 37 (C) · 4/8 of 14 = 7 (A) · 1/2 of 12 = 6 (R) · 2/6 of 117 = 39 (S) · 2/4 of 16 = 8 (I)

Clue 2 (Multiplication facts (1-12)): "LEFT HANDED LIQUID SPLASHES WERE DETECTED"

4 × 4 = 16 (L) · 9 × 9 = 81 (D) · 12 × 11 = 132 (E) · 6 × 1 = 6 (U) · 10 × 1 = 10 (Q) · 1 × 9 = 9 (I) · 1 × 3 = 3 (R) · 5 × 5 = 25 (W) · 6 × 6 = 36 (H) · 6 × 9 = 54 (T) · 1 × 5 = 5 (N) · 12 × 12 = 144 (P) · 5 × 8 = 40 (S) · 11 × 1 = 11 (C) · 5 × 4 = 20 (A) · 4 × 7 = 28 (F)

Clue 3 (Order of operations): "A SPILL PROOF FUNNEL BLOCKED THE ESCAPE"

6 × 8 - 5 = 43 (A) · 66 + 2 × 3 = 72 (I) · 17 + 4 × 5 = 37 (E) · 9 × 5 - 15 = 30 (D) · 12 + 5 × 9 = 57 (O) · 10 × 6 - 2 = 58 (C) · 2 × 11 - 8 = 14 (T) · 10 + 8 × 7 = 66 (L) · 31 + 4 × 5 = 51 (F) · 4 × 7 - 11 = 17 (U) · 8 × 4 - 4 = 28 (N) · 10 × 6 - 26 = 34 (B) · 23 + 3 × 2 = 29 (R) · 41 + 2 × 9 = 59 (K) · 5 × 12 - 14 = 46 (S) · 2 + 9 × 2 = 20 (P) · 8 × 7 - 17 = 39 (H)

Clue 4 (Rounding): "A SOLID CARBON BLACK HAIR WAS IN THE FUNNEL"

Round 1,675 to the nearest hundred = 1700 (A) · Round 289 to the nearest ten = 290 (U) · Round 5,292 to the nearest thousand = 5000 (B) · Round 114 to the nearest ten = 110 (O) · Round 130 to the nearest ten = 130 (W) · Round 1,837 to the nearest thousand = 2000 (T) · Round 229 to the nearest ten = 230 (I) · Round 7,297 to the nearest thousand = 7000 (H) · Round 8,835 to the nearest thousand = 9000 (C) · Round 515 to the nearest hundred = 500 (L) · Round 218 to the nearest hundred = 200 (K) · Round 2,330 to the nearest hundred = 2300 (N) · Round 737 to the nearest hundred = 700 (D) · Round 1,344 to the nearest hundred = 1300 (R) · Round 34 to the nearest ten = 30 (E) · Round 938 to the nearest hundred = 900 (F) · Round 3,745 to the nearest hundred = 3700 (S)

Clue 5 (Fractions of a number): surviving statement is box 11 → Galileo Galilei

2/6 of 15 = 5 · 6/10 of 15 = 9 · 1/10 of 70 = 7 · 2/4 of 2 = 1 · 4/8 of 12 = 6 · 2/8 of 32 = 8 · 1/10 of 100 = 10 · 5/10 of 24 = 12 · 2/4 of 6 = 3 · 3/6 of 8 = 4 · 1/6 of 12 = 2