



# The Cosmic Crystal Caper

Grade 6 math · Place value, Percentages, Exponents, Order of operations, Division · Reading level grades 3-4

Detective: \_\_\_\_\_ Date: \_\_\_\_\_

Someone has stolen the hyper-drive crystal from the Starship Nebula! The Chief Astrophysicist needs your help. We must scan the space crew to find the Cosmic Saboteur before they warp away.

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 Cosmic Saboteur is** \_\_\_\_\_

## Possible suspects

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

NAME	PRIMARY SPACE GEAR	SECONDARY TOOL	LASER ALIGNMENT	SPACESUIT HAIR COLOR	DEFENSIVE WEAKNESS
Michael Collins	gravity boots	stellar radio	left-handed laser	meteor black hair	freeze rays
Guion Bluford	jetpack thrusters	nebula compass	right-handed laser	neon blue hair	freeze rays
Neil Armstrong	gravity boots	laser cutter	left-handed laser	neon blue hair	magnetic nets
Mary Jackson	jetpack thrusters	laser cutter	right-handed laser	neon blue hair	gravity traps
Peggy Whitson	sonic scanner	space wrench	right-handed laser	meteor black hair	freeze rays
Caroline Herschel	gravity boots	nebula compass	right-handed laser	cosmic silver hair	magnetic nets
Ellen Ochoa	force shield	laser cutter	left-handed laser	meteor black hair	magnetic nets
Dorothy Vaughan	sonic scanner	nebula compass	right-handed laser	meteor black hair	freeze rays
Valentina Tereshkova	sonic scanner	space wrench	left-handed laser	neon blue hair	gravity traps
John Glenn	force shield	stellar radio	left-handed laser	meteor black hair	freeze rays
Mae Jemison	force shield	space wrench	right-handed laser	meteor black hair	gravity traps
Buzz Aldrin	sonic scanner	stellar radio	left-handed laser	neon blue hair	freeze rays
Annie Cannon	jetpack thrusters	stellar radio	left-handed laser	neon blue hair	freeze rays
Alan Shepard	gravity boots	laser cutter	right-handed laser	neon blue hair	magnetic nets
Edwin Hubble	force shield	nebula compass	right-handed laser	meteor black hair	magnetic nets
Vera Rubin	plasma torch	quantum map	right-handed laser	meteor black hair	freeze rays
Carl Sagan	plasma torch	nebula compass	left-handed laser	meteor black hair	freeze rays
Katherine Johnson	jetpack thrusters	laser cutter	left-handed laser	meteor black hair	freeze rays
Chris Hadfield	gravity boots	quantum map	right-handed laser	neon blue hair	freeze rays
Christa McAuliffe	plasma torch	quantum map	left-handed laser	meteor black hair	gravity traps
Stephen Hawking	jetpack thrusters	space wrench	left-handed laser	meteor black hair	freeze rays

**CLUE 1** Place value

The ship computer locked its files. To open it, we must find the digit in the hundreds place of the warp drive coordinates.

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

<b>T</b>						<b>T</b>											<b>T</b>
3000	50	8000	70	800	100	4000	3000	8000	6000	7000	200	4000	8000	70	300	4000	3000
6000	70	8000	800	70	600	800	900	8000	500	7000	8000	300	900	50			

What is the value of the 3 in 23,677?  → **T**

What is the value of the 6 in 480,627?  → **P**

What is the value of the 2 in 53,273?  → **D**

What is the value of the 7 in 214,979?  → **S**

What is the value of the 1 in 27,185?  → **B**

What is the value of the 7 in 897,108?  → **R**

What is the value of the 8 in 710,855?  → **A**

What is the value of the 8 in 78,593?  → **E**

What is the value of the 5 in 78,156?  → **H**

What is the value of the 3 in 445,368?  → **N**

What is the value of the 4 in 324,263?  → **O**

What is the value of the 6 in 276,101?  → **U**

What is the value of the 5 in 303,538?  → **W**

What is the value of the 9 in 285,927?  → **C**

Scratch space:

**CLUE 2** Percentages

The power grid is failing fast. We need to calculate what percentage of the backup solar panels are still online.

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

<b>T</b>																			<b>T</b>
33	17	44	25	20	37	37	16	20	24	10	29	44	29	16	37	44	45	33	
17	16	24	40	44	40	37	16	29	44	7									

10% of 330 =  → **T**

20% of 225 =  → **F**

50% of 32 =  → **A**

25% of 176 =  → **E**

50% of 74 =  → **L**

20% of 50 =  → **U**

5% of 580 =  → **S**

20% of 35 =  → **R**

20% of 100 =  → **I**

10% of 170 =  → **H**

10% of 250 =  → **V**

5% of 800 =  → **D**

60% of 40 =  → **N**

Scratch space:

**CLUE 3**

# Exponents

The computer system grows its security codes by powers of ten. Solve the exponential code to unlock the next deck.

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

<b>T</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
16	169	128	9	49	243	243	216	49	125	81	128	216	400	144	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
81	400	128	128	8	128	400	216	32	144						

$2^4 = \square \rightarrow$ <b>T</b>	$12^2 = \square \rightarrow$ <b>S</b>	$2^3 = \square \rightarrow$ <b>Z</b>	$3^4 = \square \rightarrow$ <b>F</b>
$6^3 = \square \rightarrow$ <b>A</b>	$7^2 = \square \rightarrow$ <b>I</b>	$5^3 = \square \rightarrow$ <b>N</b>	$2^7 = \square \rightarrow$ <b>E</b>
$3^5 = \square \rightarrow$ <b>L</b>	$2^5 = \square \rightarrow$ <b>Y</b>	$20^2 = \square \rightarrow$ <b>R</b>	$3^2 = \square \rightarrow$ <b>V</b>
$13^2 = \square \rightarrow$ <b>H</b>			

Scratch space:

**CLUE 4** Order of operations

The bridge door needs a secret code. We must solve the multi-step math equation in the correct order to open it.

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

<b>W</b>																	
66	20	74	76	46	50	38	60	20	59	20	76	6	68	9	12	36	30
49	12	71	6	12	59	59	49	20	65	36	20	50	20				

$6 \times 12 - 6 = \square \rightarrow$ <b>W</b>	$12 \times 7 - 16 = \square \rightarrow$ <b>B</b>	$55 + 3 \times 7 = \square \rightarrow$ <b>O</b>
$3 + 5 \times 7 = \square \rightarrow$ <b>D</b>	$3 + 3 \times 3 = \square \rightarrow$ <b>A</b>	$20 + 8 \times 2 = \square \rightarrow$ <b>C</b>
$11 \times 6 - 20 = \square \rightarrow$ <b>U</b>	$10 \times 4 - 10 = \square \rightarrow$ <b>K</b>	$46 + 4 \times 7 = \square \rightarrow$ <b>F</b>
$8 \times 4 - 23 = \square \rightarrow$ <b>L</b>	$11 \times 8 - 28 = \square \rightarrow$ <b>M</b>	$37 + 4 \times 3 = \square \rightarrow$ <b>H</b>
$10 \times 7 - 20 = \square \rightarrow$ <b>N</b>	$11 \times 3 - 27 = \square \rightarrow$ <b>R</b>	$7 \times 12 - 13 = \square \rightarrow$ <b>I</b>
$5 \times 12 - 1 = \square \rightarrow$ <b>T</b>	$2 + 6 \times 3 = \square \rightarrow$ <b>E</b>	$9 \times 8 - 7 = \square \rightarrow$ <b>S</b>

Scratch space:

**CLUE 5****Division facts (1-12) - the last clue**

We have a pile of fuel canisters to distribute evenly among the escape pods. Splitting them up gives us our final answer.

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:**

$12 \div 4 = \square$

$110 \div 11 = \square$

$42 \div 6 = \square$

$44 \div 11 = \square$

$25 \div 5 = \square$

$108 \div 9 = \square$

$6 \div 3 = \square$

$81 \div 9 = \square$

$40 \div 5 = \square$

$77 \div 7 = \square$

$60 \div 10 = \square$

**Step 2 - cross out the sentence with each answer:**

1. The villain blocks the hallway using a force shield, then calls for backup on a stellar radio.
2. The villain floats away using gravity boots, then slices open the safe with a laser cutter.
3. The villain cuts the lock using a plasma torch, then navigates the stars with a nebula compass.
4. The villain floats away using gravity boots, then checks the route on a quantum map.
5. The villain flies off using jetpack thrusters, then navigates the stars with a nebula compass.
6. The villain floats away using gravity boots, then navigates the stars with a nebula compass.
7. The villain floats away using gravity boots, then calls for backup on a stellar radio.
8. The villain flies off using jetpack thrusters, then tightens a bolt with a space wrench.
9. The villain searches the vault using a sonic scanner, then tightens a bolt with a space wrench.
10. The villain flies off using jetpack thrusters, then slices open the safe with a laser cutter.
11. The villain blocks the hallway using a force shield, then navigates the stars with a nebula compass.
12. The villain floats away using gravity boots, then tightens a bolt with a space wrench.

# Answer Key

## The Cosmic Crystal Caper

### Culprit: John Glenn

force shield · stellar radio · left-handed laser · meteor black hair · freeze rays

Trail: Start 21 → Clue 1 17 → Clue 2 9 → Clue 3 6 → Clue 4 4 → Clue 5 1

#### Clue 1 (Place value): "THE SABOTEUR DOES NOT USE A SPACE WRENCH"

What is the value of the 3 in 23,677? = 3000 (T) · What is the value of the 6 in 480,627? = 600 (P) · What is the value of the 2 in 53,273? = 200 (D) · What is the value of the 7 in 214,979? = 70 (S) · What is the value of the 1 in 27,185? = 100 (B) · What is the value of the 7 in 897,108? = 7000 (R) · What is the value of the 8 in 710,855? = 800 (A) · What is the value of the 8 in 78,593? = 8000 (E) · What is the value of the 5 in 78,156? = 50 (H) · What is the value of the 3 in 445,368? = 300 (N) · What is the value of the 4 in 324,263? = 4000 (O) · What is the value of the 6 in 276,101? = 6000 (U) · What is the value of the 5 in 303,538? = 500 (W) · What is the value of the 9 in 285,927? = 900 (C)

#### Clue 2 (Percentages): "THE VILLAIN USES A LEFT HANDED LASER"

10% of 330 = 33 (T) · 20% of 225 = 45 (F) · 50% of 32 = 16 (A) · 25% of 176 = 44 (E) · 50% of 74 = 37 (L) · 20% of 50 = 10 (U) · 5% of 580 = 29 (S) · 20% of 35 = 7 (R) · 20% of 100 = 20 (I) · 10% of 170 = 17 (H) · 10% of 250 = 25 (V) · 5% of 800 = 40 (D) · 60% of 40 = 24 (N)

#### Clue 3 (Exponents): "THE VILLAIN FEARS FREEZE RAYS"

$2^4 = 16$  (T) ·  $12^2 = 144$  (S) ·  $2^3 = 8$  (Z) ·  $3^4 = 81$  (F) ·  $6^3 = 216$  (A) ·  $7^2 = 49$  (I) ·  $5^3 = 125$  (N) ·  $2^7 = 128$  (E) ·  $3^5 = 243$  (L) ·  $2^5 = 32$  (Y) ·  $20^2 = 400$  (R) ·  $3^2 = 9$  (V) ·  $13^2 = 169$  (H)

#### Clue 4 (Order of operations): "WE FOUND METEOR BLACK HAIR AT THE SCENE"

$6 \times 12 - 6 = 66$  (W) ·  $12 \times 7 - 16 = 68$  (B) ·  $55 + 3 \times 7 = 76$  (O) ·  $3 + 5 \times 7 = 38$  (D) ·  $3 + 3 \times 3 = 12$  (A) ·  $20 + 8 \times 2 = 36$  (C) ·  $11 \times 6 - 20 = 46$  (U) ·  $10 \times 4 - 10 = 30$  (K) ·  $46 + 4 \times 7 = 74$  (F) ·  $8 \times 4 - 23 = 9$  (L) ·  $11 \times 8 - 28 = 60$  (M) ·  $37 + 4 \times 3 = 49$  (H) ·  $10 \times 7 - 20 = 50$  (N) ·  $11 \times 3 - 27 = 6$  (R) ·  $7 \times 12 - 13 = 71$  (I) ·  $5 \times 12 - 1 = 59$  (T) ·  $2 + 6 \times 3 = 20$  (E) ·  $9 \times 8 - 7 = 65$  (S)

#### Clue 5 (Division facts (1-12)): surviving statement is box 1 → John Glenn

$12 \div 4 = 3$  ·  $110 \div 11 = 10$  ·  $42 \div 6 = 7$  ·  $44 \div 11 = 4$  ·  $25 \div 5 = 5$  ·  $108 \div 9 = 12$  ·  $6 \div 3 = 2$  ·  $81 \div 9 = 9$  ·  $40 \div 5 = 8$  ·  $77 \div 7 = 11$  ·  $60 \div 10 = 6$