The Mystery of the Apex Trench Saboteur

Grade 10 math · Place value, Skip counting, Multi-step word problems, Word problems, Missing addends · Reading level grades 7-9

Detective: _____ **Date:** _____

A covert intruder sabotaged the deep-sea shark observation grid at the Apex Reef Submarine Research Station! The culprit raided the telemetry deck and scrambled the tagging archives. Examine the technical clues, decode the sonar logs, and identify the culprit before they escape into the trench.

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 rogue diver is _____

Possible suspects

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

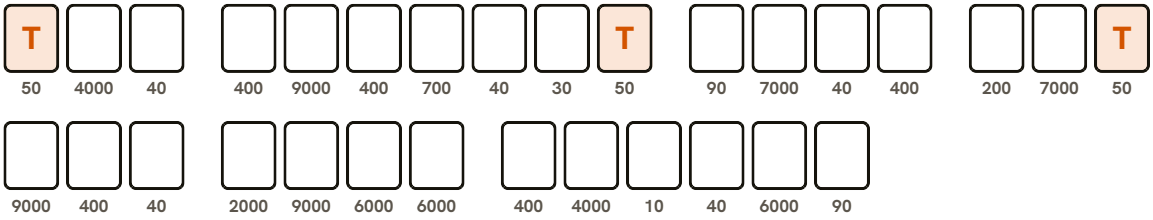
NAME	PRIMARY RIG	GADGET TOOL	TAG PLACEMENT	DORSAL FIN PATTERN	DETERRENT TECH
Alison Kock	Whale Shark Module	Zebra Mesh	Left Fin Tagged	Striped Dorsal Fin	Copper Element
Valerie Taylor	Mako Shark Module	Sawfish Blade	Left Fin Tagged	Striped Dorsal Fin	Copper Element
Barbara Block	Great White Module	Sawfish Blade	Right Fin Tagged	Spotted Dorsal Fin	Bright Strobe
Ramon Bonfil	Hammerhead Module	Sawfish Blade	Right Fin Tagged	Solid Dorsal Fin	Bright Strobe
Gregg Skomal	Tiger Shark Module	Bull Shield	Right Fin Tagged	Striped Dorsal Fin	Bright Strobe
Hans Hass	Great White Module	Thresher Whip	Left Fin Tagged	Striped Dorsal Fin	Copper Element
Michael Domeier	Great White Module	Thresher Whip	Right Fin Tagged	Striped Dorsal Fin	Copper Element
Mauricio Hoyos	Great White Module	Zebra Mesh	Left Fin Tagged	Spotted Dorsal Fin	Bright Strobe
Riley Elliott	Whale Shark Module	Bull Shield	Left Fin Tagged	Striped Dorsal Fin	Copper Element
Jacques Cousteau	Great White Module	Thresher Whip	Left Fin Tagged	Spotted Dorsal Fin	Bright Strobe
David Attenborough	Hammerhead Module	Goblin Snout	Left Fin Tagged	Spotted Dorsal Fin	Bright Strobe
Andrea Marshall	Mako Shark Module	Thresher Whip	Left Fin Tagged	Spotted Dorsal Fin	Bright Strobe
Demeur Taylor	Mako Shark Module	Sawfish Blade	Left Fin Tagged	Striped Dorsal Fin	Bright Strobe
Neil Hammerschlag	Mako Shark Module	Zebra Mesh	Right Fin Tagged	Striped Dorsal Fin	Copper Element
Craig OConnell	Mako Shark Module	Sawfish Blade	Left Fin Tagged	Spotted Dorsal Fin	Copper Element
Dr Sylvia Earle	Great White Module	Goblin Snout	Left Fin Tagged	Striped Dorsal Fin	Copper Element
Chris Fallows	Mako Shark Module	Thresher Whip	Left Fin Tagged	Spotted Dorsal Fin	Copper Element
Jess Cramp	Hammerhead Module	Bull Shield	Left Fin Tagged	Solid Dorsal Fin	Bright Strobe
Eugenie Clark	Mako Shark Module	Zebra Mesh	Left Fin Tagged	Spotted Dorsal Fin	Bright Strobe
Rob Stewart	Whale Shark Module	Bull Shield	Left Fin Tagged	Spotted Dorsal Fin	Bright Strobe
Vicki Baracos	Mako Shark Module	Sawfish Blade	Left Fin Tagged	Striped Dorsal Fin	Acoustic Pulse

make your own at mathcrackers.com

CLUE 1 Place value

To unlock the digital security log on the station dive console, analyze the place value digits in the access code.

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



What is the value of the 5 in 24,052? ☐ → T

What is the value of the 9 in 48,498? ☐ → D

What is the value of the 2 in 651,215? ☐ → N

What is the value of the 4 in 14,266? ☐ → H

What is the value of the 1 in 560,613? ☐ → I

What is the value of the 2 in 32,386? ☐ → B

What is the value of the 7 in 341,766? ☐ → P

What is the value of the 6 in 86,079? ☐ → L

What is the value of the 4 in 95,541? ☐ → E

What is the value of the 3 in 240,635? ☐ → C

What is the value of the 4 in 555,412? ☐ → S

What is the value of the 9 in 69,318? ☐ → U

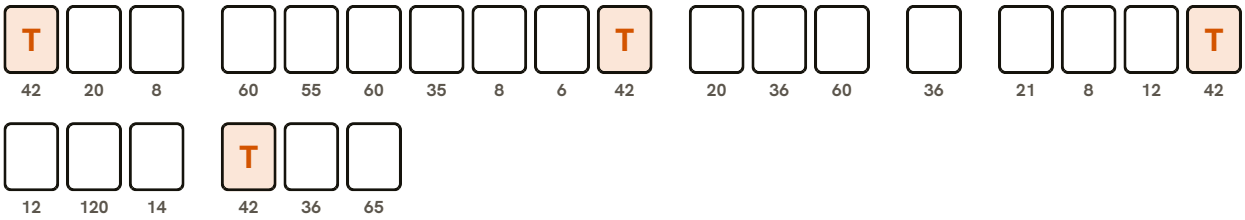
What is the value of the 7 in 97,592? ☐ → O

Scratch space:

CLUE 2 Skip counting

> The Hydrophone Array records sonar signals in set intervals, skip count through the pulse sequences to isolate the suspect lead.

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



Skip-count by 3s. Fill the blank: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, ___, 45, 48 ☐ → **T**

Skip-count by 3s. Fill the blank: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, ___, 39, 42 ☐ → **A**

Skip-count by 10s. Fill the blank: 10, 20, 30, 40, 50, ___, 70, 80 ☐ → **S**

Skip-count by 2s. Fill the blank: 2, 4, 6, 8, 10, 12, 14, 16, 18, ___, 22, 24 ☐ → **H**

Skip-count by 5s. Fill the blank: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, ___, 70, 75 ☐ → **G**

Skip-count by 2s. Fill the blank: 2, 4, 6, ___, 10, 12 ☐ → **E**

Skip-count by 2s. Fill the blank: 2, 4, ___, 8, 10 ☐ → **C**

Skip-count by 3s. Fill the blank: 3, 6, 9, 12, 15, 18, ___, 24, 27 ☐ → **L**

Skip-count by 2s. Fill the blank: 2, 4, 6, 8, 10, 12, ___, 16, 18 ☐ → **N**

Skip-count by 10s. Fill the blank: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, ___, 130, 140 ☐ → **I**

Skip-count by 2s. Fill the blank: 2, 4, 6, 8, 10, ___, 14, 16 ☐ → **F**

Skip-count by 5s. Fill the blank: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, ___, 60, 65 ☐ → **U**

Skip-count by 5s. Fill the blank: 5, 10, 15, 20, 25, 30, ___, 40, 45 [ ] → **P**

Scratch space:

CLUE 3 Multi-step word problems

Analyzing the multi step telemetry logs requires computing total distances across several search sectors.

Solve each problem, then write its letter in the boxes to fill in the missing word.

Someone scared the villain off with

C											N	T
54	69	67	67	7	28	7	81	7	80	7		

.

There were 450 dive tanks in all. 18 dive tanks were set aside. The rest were shared equally among 8 Shark Patrol Unit. How many dive tanks did each get?

Answer: ☐ → C

There were 455 sonar buoys in all. 4 Shark Patrol Unit used 30 sonar buoys each. The other 5 Shark Patrol Unit shared the rest equally. How many sonar buoys did each of the other Shark Patrol Unit get?

Answer: ☐ → P

Marine Researcher collected 76 sonar buoys in the morning and 62 sonar buoys in the afternoon, then split them equally among 2 Shark Patrol Unit. How many sonar buoys did each get?

Answer: ☐ → O

There were 269 tracking probes in all. 2 Shark Patrol Unit used 13 tracking probes each. The other 3 Shark Patrol Unit shared the rest equally. How many tracking probes did each of the other Shark Patrol Unit get?

Answer: ☐ → L

There were 534 tracking probes in all. 2 Shark Patrol Unit used 27 tracking probes each. The other 6 Shark Patrol Unit shared the rest equally. How many tracking probes did each of the other Shark Patrol Unit get?

Answer: ☐ → M

Marine Researcher collected 8 dive tanks in the morning and 6 dive tanks in the afternoon, then split them equally among 2 Shark Patrol Unit. How many dive tanks did each get?

Answer: ☐ → E

Marine Researcher collected 32 acoustic tags in the morning and 24 acoustic tags in the afternoon, then split them equally among 2 Shark Patrol Unit. How many acoustic tags did each get?

Answer: ☐ → R

Scratch space:

CLUE 4 Word problems

> The supply manifest lists equipment carried during the underwater excursion, solve the word problem to verify the exact counts.

Solve each problem, then write its letter in the boxes to fill in the missing word.

A strand of | S | | | | | | | | O | | S | A | L | F | | N | hair turned

| | 99 | 105 | 11 | 93 | 98 | 115 | 9 | 9 | | 11 | 99 | | | | 93 | |

up at the scene.

There were 118 tracking probes. 19 were used up. How many tracking probes are left?

Answer: ☐ → **S**

There were 132 dive tanks. 34 were used up. How many dive tanks are left?

Answer: ☐ → **P**

Marine Researcher found 7 sonar buoys yesterday and 4 more today. How many sonar buoys in all?

Answer: ☐ → **R**

There were 110 tracking probes. 17 were used up. How many tracking probes are left?

Answer: ☐ → **I**

There were 30 dive tanks. 21 were used up. How many dive tanks are left?

Answer: ☐ → **D**

There were 144 acoustic tags. 39 were used up. How many acoustic tags are left?

Answer: ☐ → **T**

There were 141 tracking probes. 26 were used up. How many tracking probes are left?

Answer: ☐ → **E**

Scratch space:

CLUE 5 Missing addends - the last clue

A section of the dive log is missing data entries, find the missing addend to complete the daily dive ledger.

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:

21 + ___ = 24 ☐	14 + ___ = 21 ☐	38 + ___ = 49 ☐	24 + ___ = 34 ☐
24 + ___ = 26 ☐	33 + ___ = 37 ☐	21 + ___ = 30 ☐	10 + ___ = 15 ☐
6 + ___ = 14 ☐	3 + ___ = 15 ☐	1 + ___ = 7 ☐	

Step 2 - cross out the sentence with each answer:

1. The villain activated the great white module, then extended a goblin snout.
2. The villain revved the mako shark module, then swept with a thresher whip.
3. The villain deployed the whale shark module, then cloaked in zebra mesh.
4. The villain fired up the hammerhead module, then extended a goblin snout.
5. The villain activated the great white module, then sliced with a sawfish blade.
6. The villain activated the great white module, then blocked with a bull shield.
7. The villain activated the great white module, then swept with a thresher whip.
8. The villain engaged the tiger shark module, then swept with a thresher whip.
9. The villain engaged the tiger shark module, then cloaked in zebra mesh.
10. The villain deployed the whale shark module, then swept with a thresher whip.
11. The villain revved the mako shark module, then sliced with a sawfish blade.
12. The villain fired up the hammerhead module, then cloaked in zebra mesh.

TEACHER / PARENT

Answer Key

The Mystery of the Apex Trench Saboteur

Culprit: Dr Sylvia Earle

Great White Module · Goblin Snout · Left Fin Tagged · Striped Dorsal Fin · Copper Element

Trail: Start 21 → Clue 1 17 → Clue 2 13 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Place value): "THE SUSPECT DOES NOT USE BULL SHIELD"

What is the value of the 5 in 24,052? = 50 (T) · What is the value of the 9 in 48,498? = 90 (D) · What is the value of the 2 in 651,215? = 200 (N) · What is the value of the 4 in 14,266? = 4000 (H) · What is the value of the 1 in 560,613? = 10 (I) · What is the value of the 2 in 32,386? = 2000 (B) · What is the value of the 7 in 341,766? = 700 (P) · What is the value of the 6 in 86,079? = 6000 (L) · What is the value of the 4 in 95,541? = 40 (E) · What is the value of the 3 in 240,635? = 30 (C) · What is the value of the 4 in 555,412? = 400 (S) · What is the value of the 9 in 69,318? = 9000 (U) · What is the value of the 7 in 97,592? = 7000 (O)

Clue 2 (Skip counting): "THE SUSPECT HAS A LEFT FIN TAG"

Skip-count by 3s. Fill the blank: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, ___, 45, 48 = 42 (T) · Skip-count by 3s. Fill the blank: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, ___, 39, 42 = 36 (A) · Skip-count by 10s. Fill the blank: 10, 20, 30, 40, 50, ___, 70, 80 = 60 (S) · Skip-count by 2s. Fill the blank: 2, 4, 6, 8, 10, 12, 14, 16, 18, ___, 22, 24 = 20 (H) · Skip-count by 5s. Fill the blank: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, ___, 70, 75 = 65 (G) · Skip-count by 2s. Fill the blank: 2, 4, 6, ___, 10, 12 = 8 (E) · Skip-count by 2s. Fill the blank: 2, 4, ___, 8, 10 = 6 (C) · Skip-count by 3s. Fill the blank: 3, 6, 9, 12, 15, 18, ___, 24, 27 = 21 (L) · Skip-count by 2s. Fill the blank: 2, 4, 6, 8, 10, 12, ___, 16, 18 = 14 (N) · Skip-count by 10s. Fill the blank: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, ___, 130, 140 = 120 (I) · Skip-count by 2s. Fill the blank: 2, 4, 6, 8, 10, ___, 14, 16 = 12 (F) · Skip-count by 5s. Fill the blank: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, ___, 60, 65 = 55 (U) · Skip-count by 5s. Fill the blank: 5, 10, 15, 20, 25, 30, ___, 40, 45 = 35 (P)

Clue 3 (Multi-step word problems): "COPPER ELEMENT"

There were 450 dive tanks in all. 18 dive tanks were set aside. The rest were shared equally among 8 Shark Patrol Unit. How many dive tanks did each get? = 54 (C) · There were 455 sonar buoys in all. 4 Shark Patrol Unit used 30 sonar buoys each. The other 5 Shark Patrol Unit shared the rest equally. How many sonar buoys did each of the other Shark Patrol Unit get? = 67 (P) · Marine Researcher collected 76 sonar buoys in the morning and 62 sonar buoys in the afternoon, then split them equally among 2 Shark Patrol Unit. How many sonar buoys did each get? = 69 (O) · There were 269 tracking probes in all. 2 Shark Patrol Unit used 13 tracking probes each. The other 3 Shark Patrol Unit shared the rest equally. How many tracking probes did each of the other Shark Patrol Unit get? = 81 (L) · There were 534 tracking probes in all. 2 Shark Patrol Unit used 27 tracking probes each. The other 6 Shark Patrol Unit shared the rest equally. How many tracking probes did each of the other Shark Patrol Unit get? = 80 (M) · Marine Researcher collected 8 dive tanks in the morning and 6 dive tanks in the afternoon, then split them equally among 2 Shark Patrol Unit. How many dive tanks did each get? = 7 (E) · Marine Researcher collected 32 acoustic tags in the morning and 24 acoustic tags in the afternoon, then split them equally among 2 Shark Patrol Unit. How many acoustic tags did each get? = 28 (R)

Clue 4 (Word problems): "STRIPED DORSAL FIN"

There were 118 tracking probes. 19 were used up. How many tracking probes are left? = 99 (S) · There were 132 dive tanks. 34 were used up. How many dive tanks are left? = 98 (P) · Marine Researcher found 7 sonar buoys yesterday and 4 more today. How many sonar buoys in all? = 11 (R) · There were 110 tracking probes. 17 were used up. How many tracking probes are left? = 93 (I) · There were 30 dive tanks. 21 were used up. How many dive tanks are left? = 9 (D) · There were 144 acoustic tags. 39 were used up. How many acoustic tags are left? = 105 (T) · There were 141 tracking probes. 26 were used up. How many tracking probes are left? = 115 (E)

Clue 5 (Missing addends): surviving statement is box 1 → Dr Sylvia Earle

21 + ___ = 24 = 3 · 14 + ___ = 21 = 7 · 38 + ___ = 49 = 11 · 24 + ___ = 34 = 10 · 24 + ___ = 26 = 2 · 33 + ___ = 37 = 4 · 21 + ___ = 30 = 9 · 10 + ___ = 15 = 5 · 6 + ___ = 14 = 8 · 3 + ___ = 15 = 12 · 1 + ___ = 7 = 6