



# The Abyssal Reef Heist

Grade 7 math · Multiplication, Word problems, Fractions of a number, Multi-step word problems · Reading level grades 7-9

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

A daring saboteur has breached the high-tech underwater labs of the Sunken Reef Research Station! The primary energy core has been taken, and the marine sanctuary is losing power. We must analyze the physical evidence and use tactical mathematics to identify the culprit before they escape into the open ocean.

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 deep-sea saboteur is** \_\_\_\_\_

# Possible suspects

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

| NAME                  | DEEP SEA GEAR         | INFILTRATION DEVICE    | OBSERVED DEVICE PLACEMENT | STRAY HAIR SAMPLE      | COUNTERMEASURE STRATEGY  |
|-----------------------|-----------------------|------------------------|---------------------------|------------------------|--------------------------|
| Jacques Cousteau      | hydro-jet thrusters   | thermal engine boost   | wears a right-wrist sonar | shimmering silver hair | sticky sea-foam spray    |
| Charles Darwin        | laser glass cutter    | black ink smoke-screen | wears a left-wrist sonar  | kelp green hair        | sticky sea-foam spray    |
| Edith Widder          | mechanical claw       | chameleon kelp camo    | wears a right-wrist sonar | shimmering silver hair | loud high-frequency ping |
| Ernest Shackleton     | hydro-jet thrusters   | thermal engine boost   | wears a left-wrist sonar  | neon coral hair        | loud high-frequency ping |
| Fridtjof Nansen       | hydro-jet thrusters   | high-voltage eel shock | wears a right-wrist sonar | neon coral hair        | bright high-beam flash   |
| James Cameron         | heavy depth armor     | magnetic anchor lock   | wears a right-wrist sonar | kelp green hair        | sticky sea-foam spray    |
| Sylvia Earle          | sonar tracking system | high-voltage eel shock | wears a right-wrist sonar | shimmering silver hair | sticky sea-foam spray    |
| Robert Ballard        | hydro-jet thrusters   | thermal engine boost   | wears a right-wrist sonar | kelp green hair        | sticky sea-foam spray    |
| Alistair Hardy        | sonar tracking system | high-voltage eel shock | wears a right-wrist sonar | kelp green hair        | sticky sea-foam spray    |
| Rachel Carson         | laser glass cutter    | chameleon kelp camo    | wears a left-wrist sonar  | neon coral hair        | sticky sea-foam spray    |
| Matthew Henson        | sonar tracking system | magnetic anchor lock   | wears a right-wrist sonar | kelp green hair        | sticky sea-foam spray    |
| Walter Munk           | laser glass cutter    | high-voltage eel shock | wears a left-wrist sonar  | kelp green hair        | bright high-beam flash   |
| Jeanne Baret          | sonar tracking system | magnetic anchor lock   | wears a left-wrist sonar  | neon coral hair        | loud high-frequency ping |
| Vilhjalmur Stefansson | hydro-jet thrusters   | high-voltage eel shock | wears a left-wrist sonar  | neon coral hair        | sticky sea-foam spray    |
| James Cook            | hydro-jet thrusters   | chameleon kelp camo    | wears a right-wrist sonar | kelp green hair        | sticky sea-foam spray    |
| Eugenie Clark         | heavy depth armor     | black ink smoke-screen | wears a right-wrist sonar | shimmering silver hair | sticky sea-foam spray    |
| William Beebe         | mechanical claw       | black ink smoke-screen | wears a right-wrist sonar | kelp green hair        | bright high-beam flash   |
| Vasco da Gama         | heavy depth armor     | magnetic anchor lock   | wears a right-wrist sonar | kelp green hair        | loud high-frequency ping |
| John Cabot            | heavy depth armor     | thermal engine boost   | wears a right-wrist sonar | kelp green hair        | loud high-frequency ping |
| Roger Revelle         | laser glass cutter    | chameleon kelp camo    | wears a left-wrist sonar  | shimmering silver hair | bright high-beam flash   |
| Auguste Piccard       | mechanical claw       | black ink smoke-screen | wears a right-wrist sonar | neon coral hair        | bright high-beam flash   |

## Multiplication facts (1-12)

The salvage crew finds several storage racks inside the flooded chamber, each containing a grid of gear boxes. Multiply the rows of gear by the columns to count the total kits and recover the first encoded clue.

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

A 2x10 grid of boxes. The top row contains the following values from left to right: 16 (with an orange 'T' above it), 132, 9, 108, 10, 12, 121, 33, 1, 35, 9, 108, 70, 35, 16 (with an orange 'T' above it), 8, 108, 9. The bottom row contains the following values from left to right: 10, 132, 12, 121, 9, 54, 9, 35, 70, 30, 9, 54, 33, 10, 12, 121, 35.

$$2 \times 8 = \boxed{\phantom{00}} \rightarrow \boxed{\text{T}}$$

$$1 \times 8 = \boxed{\phantom{00}} \rightarrow \boxed{\text{U}}$$

$$11 \times 11 = \boxed{\phantom{00}} \rightarrow \boxed{\mathbf{M}}$$

$10 \times 7 = \boxed{\phantom{00}} \rightarrow \boxed{\text{N}}$

$5 \times 6 = \boxed{\phantom{00}} \rightarrow \boxed{\text{K}}$

$6 \times 9 = \boxed{\phantom{00}} \rightarrow \boxed{\text{L}}$

$11 \times 3 = \square \rightarrow \boxed{\text{P}}$

$9 \times 1 = \boxed{\phantom{00}} \rightarrow \boxed{\text{E}}$

$11 \times 12 = \boxed{\phantom{00}} \rightarrow \boxed{\text{H}}$

$9 \times 12 = \boxed{\phantom{000}} \rightarrow \boxed{\mathbf{S}}$

$$7 \times 5 = \boxed{\phantom{00}} \rightarrow \boxed{0}$$

$10 \times 1 = \boxed{\phantom{00}} \rightarrow \boxed{\text{C}}$

$2 \times 6 = \square \rightarrow \boxed{\mathbf{A}}$

$1 \times 1 = \boxed{\phantom{00}} \rightarrow \boxed{\mathbf{D}}$

Scratch space:

## CLUE 2

## Word problems

We intercept a scrambled acoustic signal bouncing off the deep ocean trench. Deciphering the sonar logs reveals a word puzzle about supply distributions that unlocks the second lead.

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

A witness saw the villain was

|    |    |    |    |    |    |    |     |    |  |   |   |    |    |     |    |  |   |    |   |   |    |    |
|----|----|----|----|----|----|----|-----|----|--|---|---|----|----|-----|----|--|---|----|---|---|----|----|
| W  |    |    |    |    |    |    |     |    |  | H | T | W  |    |     |    |  | T |    | O | N |    |    |
| 80 | 18 | 57 | 56 | 34 | 57 | 56 | 110 | 66 |  |   |   | 80 | 56 | 110 | 34 |  |   | 34 |   |   | 57 | 56 |

There were 99 pearl clams. 19 were used up. How many pearl clams are left?

Answer:  → **W**

There were 44 coral samples. 26 were used up. How many coral samples are left?

Answer:  → **E**

There were 68 diving tanks. 11 were used up. How many diving tanks are left?

Answer:  → **A**

The marine biologist found 15 coral samples yesterday and 41 more today. How many coral samples in all?

Answer:  → **R**

The marine biologist found 11 pearl clams yesterday and 23 more today. How many pearl clams in all?

Answer:  → **S**

The marine biologist lined up 10 rows of 11 diving tanks. How many diving tanks in all?

Answer:  → **I**

The marine biologist lined up 6 rows of 11 coral samples. How many coral samples in all?

Answer:  → **G**

Scratch space:

**CLUE 3**

## Fractions of a number

A locked copper trunk from the sunken wreck requires a fraction of the gold coins to be placed on a pressure plate. Calculating this exact fraction pops open the double latch.

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

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |    |    |  |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|----|----|--|
| U  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |    |    |  |
| 31 | 53 | 55 | 37 | 15 | 55 | 53 | 37 | 13 | 46 | 56 | 11 | 53 | 55 | 52 | 26 | 8 | 52 | 51 |  |
|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |    |    |  |
| 53 | 19 | 42 | 52 | 11 | 8  | 3  | 37 | 15 | 55 | 51 |    |    |    |    |    |   |    |    |  |

$1/2 \text{ of } 62 = \square \rightarrow \text{U}$

$3/6 \text{ of } 52 = \square \rightarrow \text{F}$

$3/6 \text{ of } 74 = \square \rightarrow \text{T}$

$2/4 \text{ of } 106 = \square \rightarrow \text{S}$

$4/8 \text{ of } 102 = \square \rightarrow \text{M}$

$3/5 \text{ of } 70 = \square \rightarrow \text{R}$

$1/2 \text{ of } 16 = \square \rightarrow \text{O}$

$5/10 \text{ of } 110 = \square \rightarrow \text{E}$

$4/10 \text{ of } 130 = \square \rightarrow \text{A}$

$1/8 \text{ of } 104 = \square \rightarrow \text{I}$

$4/6 \text{ of } 69 = \square \rightarrow \text{C}$

$1/8 \text{ of } 152 = \square \rightarrow \text{P}$

$3/4 \text{ of } 20 = \square \rightarrow \text{H}$

$1/4 \text{ of } 12 = \square \rightarrow \text{N}$

$1/3 \text{ of } 168 = \square \rightarrow \text{K}$

$3/6 \text{ of } 22 = \square \rightarrow \text{Y}$

Scratch space:

## CLUE 4

## Multi-step word problems

Our submarine needs to balance its fuel tanks and ballast weight before descending into the abyss. Solving the multi-step load calculations allows the main computer to scan the seafloor.

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

A strand of K          H A I  hair turned up at the scene.

89      9      19      46      7      90      9      9      25      90

The marine biologist filled 4 boxes with 6 diving tanks each, then found 65 more diving tanks. How many diving tanks are there in all?

Answer:  → K

The marine biologist collected 31 lead anchors in the morning and 14 lead anchors in the afternoon, then split them equally among 5 the research vessel crew. How many lead anchors did each get?

Answer:  → E

There were 358 lead anchors in all. 36 lead anchors were set aside. The rest were shared equally among 7 the research vessel crew. How many lead anchors did each get?

Answer:  → P

The marine biologist collected 117 lead anchors in the morning and 153 lead anchors in the afternoon, then split them equally among 3 the research vessel crew. How many lead anchors did each get?

Answer:  → R

The marine biologist collected 29 diving tanks in the morning and 13 diving tanks in the afternoon, then split them equally among 6 the research vessel crew. How many diving tanks did each get?

Answer:  → G

The marine biologist earned 6 pearl clams in each of 2 rounds, plus 21 bonus pearl clams. Then 8 pearl clams were lost. How many pearl clams are left?

Answer:  → N

The marine biologist collected 19 diving tanks in the morning and 38 diving tanks in the afternoon, then split them equally among 3 the research vessel crew. How many diving tanks did each get?

Answer:  → L

Scratch space:

**CLUE 5****Fractions of a number - the last clue**

The pressure-dome vault is sealed by a water-wheel lock. We must drain a precise fraction of the total gallons in the main tank to stop the gears and grab the final piece of evidence.

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:**

$2/6 \text{ of } 36 = \boxed{\phantom{00}}$

$1/5 \text{ of } 10 = \boxed{\phantom{00}}$

$2/8 \text{ of } 28 = \boxed{\phantom{00}}$

$1/8 \text{ of } 32 = \boxed{\phantom{00}}$

$2/4 \text{ of } 2 = \boxed{\phantom{00}}$

$2/8 \text{ of } 20 = \boxed{\phantom{00}}$

$1/10 \text{ of } 30 = \boxed{\phantom{00}}$

$3/10 \text{ of } 20 = \boxed{\phantom{00}}$

$8/10 \text{ of } 10 = \boxed{\phantom{00}}$

$1/5 \text{ of } 55 = \boxed{\phantom{00}}$

$4/8 \text{ of } 18 = \boxed{\phantom{00}}$

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

1. The villain sabotaged the sub's propellers, then hid in the dark trenches.
2. The villain cracked open the deep sea vault, then fled into the sunken shipwreck.
3. The villain stole the giant pearl of the reef, then slipped away through the kelp forest.
4. The villain reprogrammed the research drone, then swam off into the barrier reef.
5. The villain disabled the underwater habitat generator, then hid in the dark trenches.
6. The villain sabotaged the sub's propellers, then fled into the sunken shipwreck.
7. The villain stole the giant pearl of the reef, then escaped in a swift mini-sub.
8. The villain cracked open the deep sea vault, then swam off into the barrier reef.
9. The villain disabled the underwater habitat generator, then escaped in a swift mini-sub.
10. The villain sabotaged the sub's propellers, then slipped away through the kelp forest.
11. The villain reprogrammed the research drone, then escaped in a swift mini-sub.
12. The villain stole the giant pearl of the reef, then fled into the sunken shipwreck.

# Answer Key

## The Abyssal Reef Heist

### Culprit: Robert Ballard

hydro-jet thrusters · thermal engine boost · wears a right-wrist sonar · kelp green hair · sticky sea-foam spray

Trail: Start 21 → Clue 1 17 → Clue 2 12 → Clue 3 7 → Clue 4 4 → Clue 5 1

### Clue 1 (Multiplication facts (1-12)): "THE SCAMP DOES NOT USE CHAMELEON KELP CAMO"

$2 \times 8 = 16$  (T) ·  $1 \times 8 = 8$  (U) ·  $11 \times 11 = 121$  (M) ·  $10 \times 7 = 70$  (N) ·  $5 \times 6 = 30$  (K) ·  $6 \times 9 = 54$  (L) ·  $11 \times 3 = 33$  (P) ·  $9 \times 1 = 9$  (E) ·  $11 \times 12 = 132$  (H) ·  $9 \times 12 = 108$  (S) ·  $7 \times 5 = 35$  (O) ·  $10 \times 1 = 10$  (C) ·  $2 \times 6 = 12$  (A) ·  $1 \times 1 = 1$  (D)

### Clue 2 (Word problems): "WEARS A RIGHT WRIST SONAR"

There were 99 pearl clams. 19 were used up. How many pearl clams are left? = 80 (W) · There were 44 coral samples. 26 were used up. How many coral samples are left? = 18 (E) · There were 68 diving tanks. 11 were used up. How many diving tanks are left? = 57 (A) · The marine biologist found 15 coral samples yesterday and 41 more today. How many coral samples in all? = 56 (R) · The marine biologist found 11 pearl clams yesterday and 23 more today. How many pearl clams in all? = 34 (S) · The marine biologist lined up 10 rows of 11 diving tanks. How many diving tanks in all? = 110 (I) · The marine biologist lined up 6 rows of 11 coral samples. How many coral samples in all? = 66 (G)

### Clue 3 (Fractions of a number): "USE THE STICKY SEA FOAM SPRAY ON THEM"

$1/2$  of 62 = 31 (U) ·  $3/6$  of 52 = 26 (F) ·  $3/6$  of 74 = 37 (T) ·  $2/4$  of 106 = 53 (S) ·  $4/8$  of 102 = 51 (M) ·  $3/5$  of 70 = 42 (R) ·  $1/2$  of 16 = 8 (O) ·  $5/10$  of 110 = 55 (E) ·  $4/10$  of 130 = 52 (A) ·  $1/8$  of 104 = 13 (I) ·  $4/6$  of 69 = 46 (C) ·  $1/8$  of 152 = 19 (P) ·  $3/4$  of 20 = 15 (H) ·  $1/4$  of 12 = 3 (N) ·  $1/3$  of 168 = 56 (K) ·  $3/6$  of 22 = 11 (Y)

### Clue 4 (Multi-step word problems): "KELP GREEN HAIR"

The marine biologist filled 4 boxes with 6 diving tanks each, then found 65 more diving tanks. How many diving tanks are there in all? = 89 (K) · The marine biologist collected 31 lead anchors in the morning and 14 lead anchors in the afternoon, then split them equally among 5 the research vessel crew. How many lead anchors did each get? = 9 (E) · There were 358 lead anchors in all. 36 lead anchors were set aside. The rest were shared equally among 7 the research vessel crew. How many lead anchors did each get? = 46 (P) · The marine biologist collected 117 lead anchors in the morning and 153 lead anchors in the afternoon, then split them equally among 3 the research vessel crew. How many lead anchors did each get? = 90 (R) · The marine biologist collected 29 diving tanks in the morning and 13 diving tanks in the afternoon, then split them equally among 6 the research vessel crew. How many diving tanks did each get? = 7 (G) · The marine biologist earned 6 pearl clams in each of 2 rounds, plus 21 bonus pearl clams. Then 8 pearl clams were lost. How many pearl clams are left? = 25 (N) · The marine biologist collected 19 diving tanks in the morning and 38 diving tanks in the afternoon, then split them equally among 3 the research vessel crew. How many diving tanks did each get? = 19 (L)

### Clue 5 (Fractions of a number): surviving statement is box 10 → Robert Ballard

$2/6$  of 36 = 12 ·  $1/5$  of 10 = 2 ·  $2/8$  of 28 = 7 ·  $1/8$  of 32 = 4 ·  $2/4$  of 2 = 1 ·  $2/8$  of 20 = 5 ·  $1/10$  of 30 = 3 ·  $3/10$  of 20 = 6 ·  $8/10$  of 10 = 8 ·  $1/5$  of 55 = 11 ·  $4/8$  of 18 = 9