

Sea Level Submarine

Mission: Pilot the research submarine through the ocean's levels, from the sunlight zone to the midnight zone. Read elevations, compare depths, and use sonar to measure distances between things above and below sea level.

Big question: How do positive and negative numbers describe elevation, and how do we find distances between them?

★ Warm-up: Real-world riddle

Answer with an integer.

A diver is 12 meters below the surface. ✓ **-12.**

A bird flies 25 meters above the water. ✓ **+25.**

Key vocabulary

Integer	A whole number or its opposite: ..., -2, -1, 0, 1, 2, ...
Elevation	Height above (+) or below (-) sea level.
Opposite	The same distance from 0 on the other side: -15 and 15.
Absolute value	Distance from 0, always positive: $ -15 = 15$.

1 Box 1

Level 2: Elevation chart

Record each elevation from the chart.

Thing	Elevation (m)	Absolute value (m)
Seagull	25	25
Diver	-15	15
Shipwreck	-60	60
Anglerfish	-90	90

2 Box 2

Level 3: Order

Order from LOWEST elevation to HIGHEST.

Put in order: Anglerfish -90 • Boat 0 • Diver -15 • Sea turtle -8 • Seagull 25 • Shipwreck -60

- Anglerfish -90**
- Shipwreck -60**
- Diver -15**
- Sea turtle -8**
- Boat 0**
- Seagull 25**

Compare

Which statement is true?

☐ $-60 < -15$ ☐ $-60 > -15$ ☐ $|-60| < |-15|$

✓ **$-60 < -15$**

3 Box 3

Level 4: Sonar

In the simulator: Take the sub to -60 m and aim the sonar at the boat.

How far is the sub from the boat?

Answer: _____ m ✓ **60**

4 Box 4

Across sea level

In the simulator: Go to -30 m and aim the sonar at the seagull.

How far is it from the seagull ($+25$) to the sub (-30)?

Answer: _____ m ✓ **55**

5 Box 5

Level 5: Rescue Legend only

The sub is at -90 m and must rise to the shipwreck, then to the diver. How many meters does it rise in total?

Answer: _____ m ✓ **75**

Show your thinking:

6 Box 6

Captain's log

Explain why -60 is less than -15 even though 60 is bigger than 15 .

Look for: Uses below/deeper; Refers to 0 / sea level



Exit ticket: answer the big question in your own words

How do positive and negative numbers describe elevation, and how do we find distances between them?

Look for: Sea level is 0. Above it is positive, below it is negative. A deeper depth is a LOWER (smaller) number: $-60 < -15$. The distance between two elevations is always positive: find it by adding the distances to 0 when they are on opposite sides, or subtracting when they are on the same side.

Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	592-E
 Investigator	11V-I
 Legend	FDM-L

 Watch for these misconceptions

- "–8 is greater than –3 because $8 > 3$." On the number line, –8 is farther left.
- "Absolute value makes a number the opposite." It is distance, so $|5|$ is still 5.
- " $(3, 2)$ and $(2, 3)$ are the same point." Order matters: x first, then y.