Cove Tide Decisions

Use tide measurements to plan work along a shoreline.

MAQ.2 "Students will develop an understanding of the principles of fluid dynamics as it relates to both salt and freshwater systems. Characterize wave features and wave properties, including wavelength, period, wave speed, breakers..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the words that explain how to find tidal range. Circle the moon phases named in the passage, then number the table rows from largest to smallest range.

A Workday at Gull Cove

1 At Gull Cove, fishers watch the waterline climb and fall along a wooden dock. On calm days, the moon and sun exert most of the forces that shape this regular rise and fall. The table shows illustrative water heights, in meters above the same reference level, recorded near four moon phases at this one harbor.

2 At a harbor, tidal range is the difference between a high tide and the low tide that follows it. Around new and full moons, the sun's and moon's gravitational effects reinforce each other, producing spring tides, usually with larger ranges. Around quarter moons, their effects partly oppose each other, producing neap tides, usually with smaller ranges.

GULL COVE WATER HEIGHTS

Moon phase	High tide (m)	Following low tide (m)
New moon	2.5	0.1
First quarter	1.7	0.7
Full moon	2.6	0.0
Third quarter	1.8	0.7

3 Moon phase does not set an exact water height. Wind and air pressure can push water above or below the predicted level. At many coasts, semidiurnal tides bring two high tides per lunar day, with about 12 hours and 25 minutes between highs. A harbor crew checks local tide predictions before moving boats or inspecting an exposed shore.

2 ANSWER WITH EVIDENCE

Use the passage

1. Calculate the tidal ranges at new moon and first quarter. Show each subtraction.

2. Which table rows show the largest and smallest tidal ranges? Name the tide pattern associated with each pair of moon phases.

3. Compare high water at full moon and third quarter. How might that difference affect a crew inspecting the shore?

4. A classmate says the table proves Gull Cove has only one high tide each day. Why does the table not support that claim?

3 YOUR TURN

Your own words

Write a three- or four-sentence field plan for a shoreline cleanup at Gull Cove. Choose two moon phases, calculate each range, explain which phase you would favor for work near the waterline, and name one factor that could change your plan.

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PART 1 · READ AND MARK

Underline the words that explain how to find tidal range. Circle the moon phases named in the passage, then number the table rows from largest to smallest range. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Calculate the tidal ranges at new moon and first quarter. Show each subtraction.	**New moon: 2.5 − 0.1 = 2.4 m. First quarter: 1.7 − 0.7 = 1.0 m.**
2	Which table rows show the largest and smallest tidal ranges? Name the tide pattern associated with each pair of moon phases.	**Full moon (2.6 m) and new moon (2.4 m) have the largest ranges and are associated with spring tides. First quarter (1.0 m) and third quarter (1.1 m) have the smallest ranges and are associated with neap tides.**
3	Compare high water at full moon and third quarter. How might that difference affect a crew inspecting the shore?	**The full-moon high is 2.6 m, compared with 1.8 m at third quarter. At high tide, the higher water could cover more of the shore the crew wants to inspect.**
4	A classmate says the table proves Gull Cove has only one high tide each day. Why does the table not support that claim?	**Each row gives only one high tide near a moon phase, not every tide in a day. The table cannot establish how many daily high tides Gull Cove has.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would schedule the cleanup near a predicted low tide at new moon, when the measured range is 2.4 m (2.5 m minus 0.1 m). At third quarter, the range is 1.1 m (1.8 m minus 0.7 m), and its measured low leaves less shore exposed. The crew should leave the waterline before the tide rises. Strong onshore wind could raise the water and force us to move the cleanup inland.

For the marking job, the ranges rank full moon, new moon, third quarter, then first quarter. Accept other field plans that calculate both chosen ranges correctly, use the water heights to support a workable choice, and account for changing conditions.