Ocean Evidence Network

Choosing tools and careers for global ocean research

MAQ.1.5 "Research, analyze, and communicate current technology and career opportunities available to collect this data on a global scale using CTD, buoy data, or satellites."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline what each technology measures, circle limits on its coverage, and number the career roles. Use your marks to compare how teams collect and analyze ocean data.

Tracking a Marine Heat Wave

1. During a marine heat wave, warm water can threaten coral reefs far from the nearest research ship. To see where surface warming spreads, scientists use satellite sensors to measure sea surface temperature across broad stretches of ocean, often within a day or two. These readings help teams compare distant regions, but they do not show how warm the water is below the surface. Clouds can also hide the sea from some temperature sensors. A satellite data analyst processes repeated measurements, checks for missing readings, and identifies places that need closer sampling.

2. At a fixed site, a moored buoy can record water temperature every hour and send readings ashore by satellite. A buoy captures changes between satellite passes, yet one station cannot describe the whole ocean. For a vertical view, a ship lowers a CTD instrument, which records conductivity, temperature, and depth as it moves through the water. Scientists use conductivity to estimate salinity. A shipboard CTD gives detailed profiles, but ships cannot sample every location often. Some Argo floats carry CTD sensors, cycle through the upper ocean, and transmit profiles after surfacing, extending coverage beyond ship routes.

3. No single instrument can explain a changing ocean on its own. A marine technician maintains buoy sensors and checks their readings for errors. A float engineer prepares and tests Argo floats so they can collect profiles over months or years. An ocean data scientist combines buoy records, CTD profiles, and satellite measurements to compare surface patterns with conditions below. These careers exist in research institutes and government ocean programs, where teams share observations across national borders. When they report results, scientists must say which depths and places each tool represents, as well as where measurements are missing.

2 ANSWER WITH EVIDENCE

Use the passage

1. A team wants to compare warming across distant reefs, then check the temperature below the surface at one reef. Which two tools should it use, and what would each contribute?

2. Why might an hourly buoy record add evidence that satellite temperature measurements miss? Which career helps keep the buoy readings reliable?

3. A team needs more temperature profiles beyond ship routes. Which technology and career could help, and what would they add to the team's satellite data?

4. A report claims that shipboard CTD casts show temperature at every point in the ocean. What evidence challenges the claim, and which career could help the team report the data's limits?

3 YOUR TURN

Your own words

A research team spots a cold patch far offshore and wants to investigate whether deeper water is involved. Write four or five sentences proposing two tools, what each would measure, one coverage limit, and two career roles with different jobs. State what evidence would support further investigation of the deeper water.

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PART 1 · READ AND MARK

Underline what each technology measures, circle limits on its coverage, and number the career roles. Use your marks to compare how teams collect and analyze ocean data. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	A team wants to compare warming across distant reefs, then check the temperature below the surface at one reef. Which two tools should it use, and what would each contribute?	**Satellite sensors would compare sea surface temperatures across distant reefs. A shipboard CTD would provide a temperature profile below the surface at one reef.**
2	Why might an hourly buoy record add evidence that satellite temperature measurements miss? Which career helps keep the buoy readings reliable?	**The buoy records changes between satellite passes, including times when clouds may block some sensors. A marine technician maintains its sensors and checks readings for errors.**
3	A team needs more temperature profiles beyond ship routes. Which technology and career could help, and what would they add to the team's satellite data?	**Argo floats carrying CTD sensors could collect profiles beyond ship routes, and a float engineer could prepare and test them. The profiles add information below the surface that satellite temperature measurements lack.**
4	A report claims that shipboard CTD casts show temperature at every point in the ocean. What evidence challenges the claim, and which career could help the team report the data's limits?	**Ships cannot sample every location often, so their CTD casts cannot cover every point. An ocean data scientist could help identify which places and depths the combined data represent.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Satellite sensors could map sea surface temperature across the cold patch, but clouds might leave gaps. Argo floats carrying CTD sensors could measure temperature at different depths if they sample the area. A satellite data analyst would identify the surface pattern and missing readings, while a float engineer would prepare floats to collect profiles. Profiles showing cold water below and near the surface would support further investigation of whether deeper water is involved.

Accept other supported tool and career combinations if their measurements, limits, and jobs are accurate. In Part 3, evidence should connect temperatures at different depths to the question about deeper water without claiming that temperature alone proves its movement.