

Mars Data Journey

Trace how technology turns a remote investigation into usable scientific evidence.

SC.8.E.5.10 "Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each technology named in the passage. Write one or more codes beside it: A for access, S for sample collection, M for measurement, D for data collection or storage, C for computation, or I for communication, to show how it helps the investigation.

Investigating Mars from Far Away

- ① Scientists cannot stand on Mars to test every rock or watch every storm. The Perseverance rover gives researchers access to this remote world. Its cameras and weather instruments measure landforms, temperature, wind, and dust. A laser can vaporize a tiny spot on a rock. Sensors study the resulting light to identify some elements. The rover's drill collects rock cores and seals them in tubes for a possible future return to Earth for detailed laboratory analysis later.
- ② During each Martian day, the rover records far more observations than people could remember by hand. Its onboard computer labels measurements with time and location, stores images and instrument readings, and chooses which data to send first. Radio signals travel from Mars to antennas on Earth, where computers receive and organize the information. Scientists use software to compare thousands of spectra, find patterns, and calculate possible mineral mixtures. Communication technology also lets teams send careful commands back to the rover.
- ③ Technology does not replace scientific thinking. It extends scientists' senses and makes evidence available when a place is dangerous, distant, or too small to examine directly. Engineers test instruments before launch because a broken sensor can create missing or misleading data. Scientists check results from several tools, save raw data so others can examine it, and share methods and findings with researchers worldwide. Without the rover, its instruments, computers, and communication system, this Mars investigation could not collect or deliver the same evidence.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 How do the rover and its drill help scientists investigate Mars without standing on the planet?

2 Name two kinds of measurements the rover's cameras or weather instruments can make.

3 How does the rover's onboard computer prepare information before it is sent to Earth?

4 Why do scientists save raw data and share it with other researchers?

3 YOUR TURN _____ Your own words

Plan a technology system for investigating one remote location other than Mars, such as a deep-ocean vent, a volcano, Antarctica, or the Moon. Fill all four rows, including a way to reach the location, collect a sample or measure something, store or compute data, and communicate information.

TOOL OR SYSTEM	SCIENTIFIC PURPOSE	HOW THE DATA OR SAMPLE IS HANDLED

PART 1 • READ AND MARK

Underline each technology named in the passage. Write one or more codes beside it: A for access, S for sample collection, M for measurement, D for data collection or storage, C for computation, or I for communication, to show how it helps the investigation. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How do the rover and its drill help scientists investigate Mars without standing on the planet?	The rover provides access to Mars, and its drill collects rock cores and seals them in tubes for possible return to Earth.
2	Name two kinds of measurements the rover's cameras or weather instruments can make.	Any two: landforms, temperature, wind, or dust.
3	How does the rover's onboard computer prepare information before it is sent to Earth?	It labels measurements with time and location, stores images and readings, and chooses which data to send first.
4	Why do scientists save raw data and share it with other researchers?	They save raw data so others can examine it, check results, and study the methods and findings.

PART 3 • YOUR TURN (SAMPLE ANSWER)

TOOL OR SYSTEM	SCIENTIFIC PURPOSE	HOW THE DATA OR SAMPLE IS HANDLED
Underwater robot	Reaches a deep-ocean vent and collects water	Carries the sample to a research ship
Temperature and pressure sensor	Measures conditions near the vent	Logs readings in the robot computer
Water sampler	Collects water without contamination	Seals and labels the sample for laboratory testing
Ship computer and satellite link	Compares data and shares results	Stores data and sends it to scientists on shore

Accept equivalent technologies and purposes that form a logical investigation of a remote location. For Part 3, the plan should include access, evidence collection or measurement, data storage or computation, and communication.