



ROBOT

ON the ice



Me with NOMAD.

**We talked to the robot
through our computers.**

We stood on a giant ice field about 1,000 miles from the South Pole. We were surrounded by blowing snow, with nothing in sight but a few crates of supplies and a robot.

First things first – we started putting up tents.

Seven of us had just arrived on the Antarctic Plateau to work on a project for National Aeronautics and Space Administration. We were part of a research team from the Field Robotics Center at Carnegie Mellon University in Pittsburgh, Pennsylvania. I was one of three students in robotics who were lucky enough to be invited to go on this trip by the project leader, Dr. Dimitrois Apostolopoulos.

Robot on the Ice

Rocks from Space

We had come to see if our robot could find meteorites – rocks that have fallen to Earth from space.

Meteorites are important to NASA because they can tell us more about what is in space. Some were blasted off the surface of Mars long ago by asteroids. They have given us clues about the red planet. Even older meteorites hold clues about the birth of the solar system.

“Nomad” roamed Antarctica to find meteorites.

We needed to come to this faraway place because Antarctica is the best place to find meteorites. When space rocks fall on Antarctic ice fields, snow covers them. As the ice fields creep towards the ocean, some of them run into hills and mountains. There the ice stops, and the wind blows away the top layers of snow. The buried meteorites then come to the surface, where they can be found.

A few people come to Antarctica every summer to hunt for meteorites, but searching on the ice is cold and tiring. Even in the summer, the temperature can feel like forty degrees below zero.

We were not typical meteorite hunters, though. We had a robot. We would stay in a heated tent and “talk” to the robot through our computers while the robot searched on the ice more than a mile away.

A Wandering Robot

We called our robot Nomad. We had designed it to explore remote places, just as a space robot explores other planets. Nomad had to be able to travel over rough ground and drive for long distances. It had to be able to look around, study objects that we had programmed it to look for, and send its information back to humans. So we gave Nomad a sturdy frame, four wheels, lots of sensors and computers, and wireless access so that humans could communicate with it.

Nomad had already explored a desert in South America, but before we went to Antarctica we had to make some changes. We added heaters to keep the computers and sensors warm, and we added studs to the tires so Nomad could move on the ice without slipping.

Robot on the Ice

After setting up our tents, we went to work on our robot. It had traveled from the coast hanging under a helicopter, so we had taken off all the fragile parts before the trip. Now we put them all back on: cameras and a laser to help the robot see, and a sensor called a spectrometer.

The spectrometer was attached to the end of Nomad's robot arm, so Nomad could lower the sensor onto rocks. The spectrometer measures changes in light as the light reflects off rock. Using those changes, Nomad can tell better than our eyes if a rock is a meteorite or an ordinary rock. We call those ordinary rocks "meteor-wrongs".

Dr. William "Red" Whittaker, director of the Field Robotics Center, said that Nomad was a new kind of robot because it could search on its own and even sort meteorites from Earth rocks.

"Humans classify (things) every time they sort pennies from nickels, and they search every time they lose their car keys", he said. "But these are new skills for robots."

Searching for Meteorites

We started up the robot and all its computers, and told it to start searching. But Antarctica is very different from Pennsylvania, where we had done most of our original testing. We needed to test Nomad in this new environment, and we had to make some changes to the software and the sensors.

Finally, we had everything working, and we sent off the robot. We sat in our tent and watched Nomad's progress from our computer. It found several ordinary rocks, and then, suddenly, my computer screen flashed an alert. Nomad had found a meteorite!

Nomad found several more meteorites before we left Antarctica. After we returned to the United States, scientists began to study the rocks for clues and outer space. And our robot had returned a hero.

ELA Reading Comprehension Fiction Sample

Robot on the Ice

1. What was the NASA team looking for in the Antarctica?

2. How are meteorites important to NASA?

3. Why did the scientists choose Antarctica as the place to look for meteorites?

- ☐ Not many people live there so it is easier to find the meteorites
- ☐ They wanted to try using the robot in really cold weather
- ☐ It is the best place to find meteorites
- ☐ Someone invited them to

4. Why did these meteorite hunters decide to bring a robot?

- ☐ To see if it would work in the cold climate
- ☐ It is very cold and tiring for people
- ☐ It is very new and exciting for people
- ☐ To see if it could help the meteorite hunters

5. What two changes were made to Nomad before sending him out on a search in Antarctica?

6. What is the purpose of the spectrometer?

7. What did Dr. William “Red” Whittaker mean when he said Nomad was a “new kind of robot”?

8. Was it a successful trip for the research team? Give evidence from the text to support your answer.
