

Fatima turned the important ideas from the writing prompt into questions to guide her research. As she conducted her research, Fatima kept careful notes, including where she found her information. Below is a sample of her notes.

### **What are robonauts?**

- Robonaut has a head, torso, arms, and hands like a person and weighs 300 pounds.
- machines that help humans work in space or go where humans cannot go ([www.nasa.gov](http://www.nasa.gov))
- "The newest model is called Robonaut 2, or R2. NASA and car manufacturer General Motors worked together to create R2." ([robonaut.jsc.nasa.gov](http://robonaut.jsc.nasa.gov))

### **How do robonauts help astronauts?**

- could save time and reduce risks to spacewalking astronauts by going outside first to prepare work sites. ([science.howstuffworks.com/robonaut2.htm](http://science.howstuffworks.com/robonaut2.htm))
- "Robonaut 2 or R2 . . . is the first dexterous humanoid robot in space, and the first US-built robot at the space station. But that was just one small step for a robot and one giant leap for robot-kind." ([robonaut.jsc.nasa.gov](http://robonaut.jsc.nasa.gov))

### **How do they work?**

- have almost the same dexterity or the ability to make small movements as a human hand ([science.howstuffworks.com/robonaut2.htm](http://science.howstuffworks.com/robonaut2.htm))
- "can be operated by remote control. An operator can use a headset to see what Robonaut sees through its cameras. The operator can then use controls to make Robonaut move." ([www.nasa.gov](http://www.nasa.gov))

### **Avoiding Plagiarism**

Plagiarism is copying a passage directly from a book and using it in your paper without giving credit to the writer. Avoid plagiarism by paraphrasing, or putting information in your own words. As you take notes from your sources, be sure to put quotation marks around any passages you copy directly from the source. This will help you identify which information is in your own words and which is a direct quotation. Notice which of Fatima's notes are direct quotations.

GO ON 

- "a person—either an astronaut or an operator at mission control—guides the robot remotely while seeing through its eyes via onboard cameras. The operator can wear gloves to operate R2's hands, or control R2's head motions by wearing a helmet remotely linked to the robot's head." ([science.howstuffworks.com/robonaut2.html](http://science.howstuffworks.com/robonaut2.html))

- Currently R2 is on a fixed pedestal inside the International Space Station (ISS). ([robotnaut.jsc.nasa.gov](http://robotnaut.jsc.nasa.gov).)

- R2 will turn on switches and replace connectors at the ISS. ([science.howstuffworks.com/robonaut.html](http://science.howstuffworks.com/robonaut.html))

- "Eventually, R2 will be equipped with legs complete with toes that fit toeholds built into the station's walls, which will enable R2 to climb while leaving its hands free to carry equipment or perform tasks." ([news.discovery.com/tech/robonaut-humanoid-robots.html](http://news.discovery.com/tech/robonaut-humanoid-robots.html))

### **What will robonauts do in the future?**

- The hope is that R2 will be able to be programmed to do tasks on its own. ([science.howstuffworks.com/robonaut.html](http://science.howstuffworks.com/robonaut.html))

- might enter dangerous locations on Earth in place of humans, like volcanoes and nuclear plants. ([science.howstuffworks.com/robonaut.html](http://science.howstuffworks.com/robonaut.html))

- a four-wheeled rover called Centaur 2 is being "evaluated as an example of these future lower bodies for R2." ([robotnaut.jsc.nasa.gov](http://robotnaut.jsc.nasa.gov).)

- can explore other worlds ([www.nasa.gov](http://www.nasa.gov))

From her notes, Fatima created an outline. This helped her organize her ideas before she wrote her paper.

### **Main Idea**

Robonauts are intelligent robots designed to help astronauts perform tasks in space.

- I. What is a Robonaut?
  - A. Humanlike machines that can help astronauts in space or that can go where humans cannot go
  - B. Partnership with General Motors
  - C. Recent robonaut—R2
    1. Has head, torso, arms, hands, gold helmet
    2. Is dexterous, can use hands and fingers to make small movements
- II. How Do Robonauts Work?
  - A. Remotely controlled by an operator who moves own hands or head, causing R2 to move
  - B. Can do simple task on own with special programming
  - C. Software can be updated to do new tasks
- III. What Can They Do?
  - A. Can assist astronauts with simple tasks
  - B. R2 attached to fixed pedestal in space station 1.
    1. Undergoing tests—turning on switches and replacing connectors
    2. Eventually will be equipped with legs with toes to climb the wall of the station
- IV. What Will Robonauts Do in the Future?
  - A. Can conduct emergency repairs outside the space station
  - B. Can be mounted on a four-wheeled vehicle
  - C. Can explore dangerous volcanoes and nuclear plants

GO ON 

Read Fatima's paper and answer the questions in the Looking at Fatima's Writing boxes.

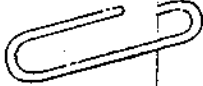
## Astronauts of the Future

The suited figure slowly moves out of the space capsule. He makes his way down the side of the capsule until his feet rest on the surface of the planet. Slowly, he tests the ground, his legs moving slowly and steadily along the ground. His helmet turns side to side, as he surveys the landscape. He appears to be an astronaut, but he isn't. He is a robonaut, a very advanced robot developed to help astronauts explore space.

### What is a Robonaut?

The robonaut program began in 1996 as a partnership between NASA and car manufacturer General Motors. The two companies worked together to adapt the robotic technology used to assemble automobiles for use in space travel. The goal was to create humanlike machines that can help astronauts in space or that can go where humans cannot go. The most recent robonaut is called Robonaut 2, or R2 ("R2 Robonaut").

R2 looks much like a human astronaut wearing a white spacesuit. It has a head, torso, arms, and hands. It wears a gold helmet and weighs 300 pounds. R2 kind of looks like C-3PO from *Star Wars*. Isn't that cool? Cameras inside the helmet provide vision (Hitt). Robonauts are dexterous, which means their hands and fingers can move the same way a human's can. The goal of the robonaut program is to create "intelligent" robots that can do some of the tasks that astronauts currently do ("R2 Robonaut").



### Looking at Fatima's Writing

Find and underline Fatima's main idea statement.

Does the introduction get your attention?

Yes ☐ No ☐

Does the order make sense?

Yes ☐ No ☐

Circle any transitional words or phrases.

Does she meet the requirement of using at least four sources?

Yes ☐ No ☐

Cross out any sentences that stray from the main idea of the paragraph.