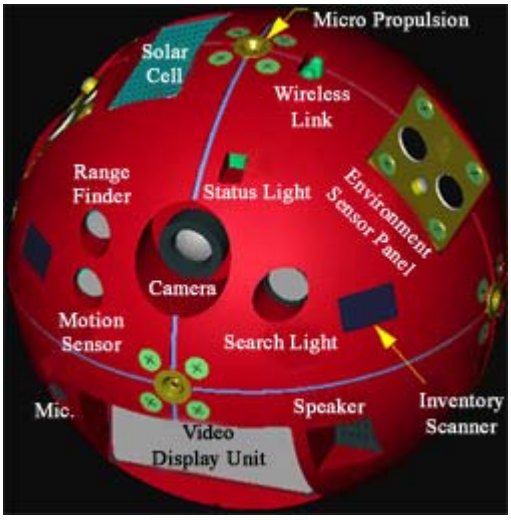
Pre-Classroom Activities

K-4 Activity #1



In the near future, astronauts will get a new helper in space. This new helper comes in the form of a **robot**. This robot will stay very busy. It will run science experiments when humans aren't around. It will make sure the air in the Space Station is healthy. It will also help with computer files and email.

This robot doesn't look like a human. It looks like a grapefruit, a large, red, flying grapefruit. It is packed with equipment that allows it to speak and understand our spoken language.

This robot moves around using fans. It zooms around like a **hummingbird**. It can go where humans can't. Astronauts can even teach it to fly behind or beside them as they work. It is very mobile and can understand much of what you want it to do.

This robot has four main jobs. One is to **monitor** the living area of the astronauts. The second is to communicate with the astronauts. The third is to go on **remote** missions and communicate back what it finds. The fourth is to support the work status of the astronauts and their mission.

The technology that has come about to create this robot is directly **transferable** to Earth.

This robot system could be used on subways and in factories. Robots can be assigned to do dangerous jobs, rather than humans.

Robots In Action

Teacher Sheet(s)

Objective: To create, illustrate, and write about how robots could be used in a student's daily life.

Level: K-4

Subjects(s): Science, Language Arts

Prep Time: Less than 10 minutes

Duration: One Class Period

Materials Category: General Classroom

Materials:

- Various books about robots
- Student Sheet
- Pencil
- Crayons

Related Links:

Robotics

Supporting Article(s):

Astronauts' Little Helpers

Pre-Lesson Instructions:

- To get the creative juices flowing, the teacher may want to share books about different robots, and discuss with the class different ways they are used. He/she may also want to use the related link listed on page 1 of the Teacher Sheets to share with the students.

Background Information:

An astronaut in space will get a little assistant in the near future. This assistant will come in the form of a robot and will follow the astronaut around, keeping track of the astronaut's schedule. It will check computer files, monitor experiments, and update inventories. This assistant will also

keep a log of conditions on the Space Shuttle and Space Station. It will check levels of oxygen and hydrogen, and if emissions reach critical levels, the assistant will let everyone know. This assistant is not humanoid; it's a robot that looks like a red grapefruit. It's packed full of sensors, miniaturized video equipment, wireless network equipment, and technology that allows the robot to understand spoken commands and reply with the same. This robot is eerily close to the flying robot that taught Luke Skywalker to fight with a light saber in the movie *Star Wars*.

Guidelines:

1. Read K-4 article, "Astronauts' Little Helpers," and discuss it.
2. Have students think of different ways they would use a robot. Would they use one for cleaning their rooms? Would they use one to do their homework? Have them really brainstorm different ways a robot would come in handy to them.
3. List their ideas on the board.
4. Hand out the Student Sheets to the students. Have them illustrate their specially designed robot. Make sure the illustration demonstrates what job the robot does for them. After their illustrations are complete, have the students write about their robot and the job it is doing for them.

Discussion/Wrap-up:

- Have the students share their illustrations and stories with the rest of the class. Hang the illustrations in the classroom and halls for display.

Extensions:

- Have the students publish their stories on the computer.
- For younger students, you may have the students skip a line on the Student Sheet for their writing level.
- Have the students create a robot using modeling clay.

K-4 Activity #2

Think Like A Robot

Teacher Sheet(s)

Objective: To demonstrate how hard it is to accurately guide a robot through simple tasks.

Level: K-4

Subjects(s): Physical Science

Prep Time: Less than 10 minutes

Duration: One Class Period

Materials Category: General Classroom

Materials:

- Blindfold
- Notebook
- Shoebox (or some other container that size)
- Baseball or tennis ball

Related Links:

Robotics

Supporting Article(s):

Astronauts' Little Helpers

Pre-Lesson Instructions:

None

Background Information:

Future robots will help astronauts inside the International Space Station. They will run science

experiments when people aren't around. Exploration robots will land on and survey distant planets, moons, asteroids. These robots must be able to "think" for themselves. If a robot comes to a cliff on Mars, for example, it has to stop without a controller back on Earth telling it to do so. Thinking robots are important because it takes many minutes to communicate between Earth and other planets, so human controllers can't respond fast enough to help a robot avoid a dangerous situation. Until robots become "true" thinking machines, able to understand their environment and make decisions about what to do to accomplish their mission, they will depend on controllers to guide them.

Guidelines:

1. Working with a partner, one student will take on the role of a robot, the other the controller. The person playing the robot should be securely blindfolded and given the ball.
2. The robot, following the verbal instructions from the controller, must move along a prescribed course (down an aisle and around a desk, for example) and then deposit the ball in the container. The robot can't talk during the first attempt and must follow directions given to it exactly ("turn right" doesn't necessarily mean all parts of the body). After the robot has successfully put the ball in the container, the robot and controller switch roles and try again.
3. Discuss how effective partners were with commands. Work out commands that are very specific to follow.
4. Repeat the mission again using a different route, taking a turn in each role. Were the commands clearer this time?

Discussion/Wrap-up:

- Ask the students:
  What problems might you face if the robot wasn't as smart as you or your partner? Answers will vary.
  What activities or problems can you think of that a robot could solve or at least help with? Answers will vary. You may want to write their ideas on the board.

Extensions: