

Soft-Bodied Robots

Difficulty:



Date of release:

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Discussion activities to be done after completing this EA lesson

Today's report was about robots with soft bodies. Where have they been developed? What can they be used for? How many types are presented in the report?

Extension discussion topics

A. Talking about and going over the specific topic / idea / issue in listening text

Introduction = How many types of soft robot are presented in the report? Where was each developed?

1. How many types of soft robot are presented the report? Where was each developed? What are the characteristics of each?
 - Two types; one was developed at Harvard University by a team of researchers led by George Whitesides, in a project paid for by the United States Department of Defense. The second was developed at Tufts University by a team of scientists.
 - The design of the Harvard robot was based on sea creatures without hard shells or skeletons. It is made with elastomers. It is about 13 centimeters long and has four legs that can move separately. The movements are controlled by compressed air and can be operated from a computer. It can move at a speed of about 13 meters an hour.
 - The Tufts robot is made of silicone rubber. This robot is about 10 centimeters long and shaped like a caterpillar. It is able to roll up into a ball shape and move itself forward.

Using the information given in the report about these robots' characteristics, try to draw what you imagine each one looks like. Compare your drawing with that of a partner. (You are allowed to laugh).

2. What do we learn in the report about results from tests and first uses? What objectives for improvement were mentioned?
 - In tests, researchers have guided the Harvard robot under a plate of glass less than three centimeters high.
 - Ability to move across uneven surfaces (rocks, wet dirt) but difficulties in making the robots move.
 - Objectives for improvement: finding a way for the robots to transport their own power source and are also hoping to improve its speed. (Not 100% clear whether these difficulties and objectives concern both types or just the Tufts robot).

3. What potential applications are mentioned in the report?
 - difficult jobs like moving through a battlefield or wreckage from a natural disaster.

B. Expanding on (one of) the topics / ideas / issues in listening text

Topic = Robots, from imagination to reality.

1. A robot is an inanimate object which seems to act intelligently. Before the term "robot" was invented, what other stories of inanimate objects being given life existed?
 - In Greek mythology, Pygmalion fell in love with his sculpture of a woman, who was given life.
 - In Jewish folk stories a Golem is a creature given life. The stories are very old but were put into literary form in 16th century Prague.
 - Find out more about the story of either Pygmalion or Rabbi Eliyahu's Golem and exchange your findings with a partner or your teacher.
2. Where does the term "robot" come from? Do you know of any robots in literature or in films? Describe those you know to a partner or your teacher.
 - "Robot" was first used by the Czech writer Karel Capek in 1920 in a theater play called "Rossum's Universal Robots". The term comes from a root in Slavonic languages meaning "hard worker".
 - Science fiction literature has often used the theme of robots (Isaac Asimov's "Robots" series, Philip K. Dick, etc...).
 - In the cinema, the best known occurrences are probably "Metropolis" (Fritz Lang, 1927), The Star Wars films (George Lucas and others from 1977) with their astromech droids R2-D2 and C-3PO, "Blade Runner" (Ridley Scott, 1982) and "Terminator" (James Cameron, 1984). We might also mention the robot dog (K9) of Doctor Who in the television series of the same name.
3. How long have "hard" robots existed and what uses do they have?
 - First used (for "serious" applications) in 1961 (the Unimate robot on General Motors production lines).
 - Their use was generalized in industry during the 1970's.
 - Uses too numerous to make a complete list, but, apart from industry (notably the auto industry), important applications include space exploration (Moon and Mars Rovers) and exploration of the sea floor.
 - The android robot Actroid-DER (in the form of a woman) was introduced in 2005. "She" acts a hostess.
4. For "soft robots" some potential applications are mentioned in the report (see above). Can you imagine any others? Exchange ideas with a partner or with your teacher.

C. Extending discussion of (one of) the topics / ideas / issues in listening text

Topic = Ivy League Universities.

1. What is the "Ivy League"? Which of the two universities mentioned in the report is a member of the Ivy League?

- A group of 8 private universities in the Northeastern United States. Brown University, Columbia University, Cornell University, Dartmouth College, Harvard University, Princeton University, the University of Pennsylvania and Yale University. (Tufts University is not in the Ivy League).
 - They are known for their academic excellence, their selective admission procedure and (because of their high fees) social elitism.
 - If you have seen the films "The Firm" (Sydney Pollack, 1993) or "The Social Network" (D. Fincher, 2010), tell a partner or your teacher how Ivy League universities were depicted in the film you saw.
2. Why the name "Ivy League"?
 - "Ivy" because the brick walls of these institutions were traditionally covered with this climbing plant.
 - "League" because these universities compete each other in sports. It is an "athletic conference" and the universities "buy" athletes with free scholarships (regardless of their academic ability).
 3. Is it fair that only children from rich families can obtain the best higher education in the United States? Do private universities exist in your country?

Audioscript

Music.

When many of us think of robots, we picture large, metal objects in the shape of humans, having difficulty moving around. But robots have come a long way. A team at Harvard University in Massachusetts recently developed a soft-bodied robot. The team based the design of its robot on sea creatures without hard shells or skeletons.

The robotic device was made with soft materials called elastomers. It is about 13 centimeters long and has four legs that can move separately. The movements are controlled by compressed air and can be operated from a computer.

George Whitesides led the Harvard researchers. The United States Department of Defense paid for the project. The robot itself took two months to develop. In tests, researchers have guided the robot under a plate of glass less than three centimeters high. The researchers say their invention can move at a speed of about 13 meters an hour.

A report about the robot was published in November in the journal Proceedings of the National Academy of Sciences.

Increasingly, soft robots are being developed for difficult jobs like moving through a battlefield or wreckage from a natural disaster. The robot can move across uneven surfaces including small rocks and wet dirt.

Earlier this year, scientists from Tufts University in Massachusetts developed another kind of soft robot made of silicone rubber. This robot is about 10 centimeters long and shaped like a caterpillar. It is able to roll up into a ball shape and move itself forward.

But researchers say there are difficulties in making these robots move. For one, they want to find a way for the robot to transport its own power source. They are also hoping to improve its speed.

Music.

From SCIENCE IN THE NEWS in VOA Special English with Shirley Griffith and Steve Ember.