

Liquid Robots: Real-Life

Terminators

ESL Reading Worksheet -- Intermediate | tahricteaches.com

Have you ever seen the movie Terminator 2? In the film, a robot called the T-1000 is made of liquid metal. It can change its shape, squeeze through tiny spaces, and put itself back together after being damaged. Scientists have always dreamed of building something like this. Now, a team of researchers from South Korea has created tiny **liquid** robots that can do some of these amazing things in real life.

The robots are very small, about the size of a grain of rice. Each one is made of water covered with a special **coating** of Teflon particles. Teflon is the same **material** used on non-stick cooking pans. This coating acts like armor, giving the soft water droplet a strong outer shell. Scientists use sound waves to **control** the robots and move them around. The robots can slide across surfaces, roll over **obstacles**, and even float on water.

What makes these robots truly special is their ability to **deform** and change shape. In one test, researchers guided a robot toward a set of metal bars. The robot squeezed its body open, oozed through the narrow gap, and then **merged** back into its original shape on the other side. In another experiment, two separate robots were pushed together using sound waves. They touched, combined, and became one bigger robot. This ability to split and merge is very similar to how living cells **behave** in our bodies.

The researchers also tested the robots as tiny **chemical** carriers. They loaded two robots with different chemicals. The robots jumped off a ledge, merged together without breaking, and the chemicals mixed inside their Teflon shells. This showed that the robots can act as miniature **laboratories**, carrying and combining substances on demand.

In the future, these liquid robots could be used in **medicine**. Doctors might send them inside the human body to deliver drugs to hard-to-reach areas, such as tumors. Because they are made of water and Teflon, they are safe for living tissue. The research was published in the journal Science Advances, and scientists around the world are excited about the **potential** of this technology.

A. Vocabulary

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|--------------------|--|
| 1. liquid ____ | a. a substance that flows freely, like water |
| 2. coating ____ | b. a thin layer covering a surface |
| 3. material ____ | c. the substance something is made from |
| 4. control ____ | d. to direct or manage something |
| 5. obstacles ____ | e. things that block or get in the way |
| 6. deform ____ | f. to change shape by bending or squeezing |
| 7. merged ____ | g. combined or joined together |
| 8. behave ____ | h. to act or function in a certain way |
| 9. chemical ____ | i. a substance used in or made by a reaction |
| 10. potential ____ | j. the possibility for future development |

B. True or False

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|---|--|--|
| 1. The T-1000 is from the movie Terminator 3. _____ | 2. The robots are about the size of a grain of rice. _____ | 3. The robots are made of liquid metal. _____ |
| 4. Teflon is used on non-stick pans. _____ | 5. The robots are controlled by magnets. _____ | 6. The robots can squeeze through narrow gaps. _____ |
| 7. Two robots can merge into one. _____ | 8. The chemicals broke the robots when they merged. _____ | 9. The robots could be used in medicine someday. _____ |

C. Fill in the Blanks

Word Bank: liquid, coating, deform, merged, control, potential, obstacles

1. Water is a _____ that flows freely and takes the shape of its container.
2. The Teflon _____ protects the robot like a suit of armor.
3. Scientists use sound waves to _____ the tiny robots.
4. The robot can _____ its body to squeeze through narrow spaces.
5. Two separate robots _____ together to become one bigger robot.

D. Comprehension Questions

1. What are the liquid robots made of?
2. How do scientists move the robots around?
3. What happened when a robot met a set of metal bars?
4. How did the researchers test the robots as chemical carriers?
5. Why could these robots be useful in medicine?

E. Discussion Questions

1. Would you feel comfortable having tiny robots inside your body for medical treatment? Why or why not?
 2. What other uses can you think of for robots that can change shape?
 3. Do you think robots like the T-1000 from Terminator will ever be real? Is that exciting or scary?
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Answer Key

A. Vocabulary: 1-a, 2-b, 3-c, 4-d, 5-e, 6-f, 7-g, 8-h, 9-i, 10-j

B. True/False: 1. F (Terminator 2), 2. T, 3. F (water and Teflon), 4. T, 5. F (sound waves), 6. T, 7. T, 8. F (they merged without breaking), 9. T

C. Fill Blanks: 1. liquid, 2. coating, 3. control, 4. deform, 5. merged

D. Comprehension: 1. Water covered with Teflon particles. 2. Using sound waves. 3. It squeezed through and reformed on the other side. 4. They loaded two robots with different chemicals and had them merge. 5. They could deliver drugs to hard-to-reach areas like tumors.