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Fleas have organ-saving antifreeze

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25 October, 2005

THE ARTICLE

Fleas have organ-saving antifreeze

Scientists have discovered new secrets from a tiny snow flea that can survive in freezing conditions. The fleas contain a protein that could be very useful for transplant surgery and farming. Researchers from Queen's University in Ontario, Canada have published a study* about the flea and its antifreeze properties. The researchers said the antifreeze could help protect plants or animals from frost. It could also allow transplant organs to be stored and transported at lower temperatures. The microscopic, six-legged snow fleas survive by lowering the freezing point of their bodies by 11 degrees.

Scientists are talking about many possible uses for the new protein. One is to store transplant organs at cooler temperatures to keep them for longer. Lead researcher Dr. Laurie Graham said filling an organ with the antifreeze might prevent it from freezing. She said: "You would have longer to do tissue matching to get the organ to the patient and just increase the...life of organs." Another possibility could be to allow crops to survive a cold snap. Dr. Graham said scientists could genetically modify any crop that didn't like frost to make it stronger in freezing temperatures.

*http://qnc.queensu.ca/story_loader.php?id=435803469f4c0

WARM-UPS

1. I AM A FLEA: You are now a flea. Walk around the class and talk to the other “fleas” about your everyday life. Where do you like to spend your days? What do you think of the giant sized life around you? What makes you happy or worried?

2. ANTIFREEZE ADVANTAGES: One day, humans and plants could be genetically modified to survive in freezing temperatures. What do you think of this? With your partner(s), talk about the following advantages:

- Transplant organs would last longer in storage.
- Farmers in Finland could grow bananas.
- People could start living on Antarctica.
- We would use less heating fuel and save money.
- More people could successfully climb Mt. Everest.
- Frozen food would last much longer.
- We wouldn't need to wear gloves any more.
- Your idea _____.

3. CHAT: In pairs / groups, decide which of these topics or words are most interesting and which are most boring.

Scientists / secrets / snow / fleas / freezing conditions / transplants / farming / antifreeze / frost / cold snaps / genetically modified crops

Have a chat about the topics you liked. For more conversation, change topics and partners frequently.

4. FLEA: Spend one minute writing down all of the different words you associate with fleas. Share your words with your partner(s) and talk about them. Together, put the words into different categories.

5. TWO-MINUTE DEBATES: Debate each of the points below with a partner for just two minutes. After two minutes, move on to the next partner and debate. Student A agrees with the first argument, Student B, the second.

- a. Fleas are very useful. vs. Fleas are not useful.
- b. Freezing cold weather is best. vs. Boiling hot weather is best.
- c. Organ transplantation is wrong. vs. Organ transplantation is important.
- d. Crops should not be genetically modified. vs. GM crops are very safe.
- e. Humans should be genetically modified to survive the cold better. vs. No way!
- f. Scientists research too much. vs. Scientists must explore everything.
- g. Fleas are more useful than ants. vs. Ants are more useful than fleas.
- h. Having antifreeze in our blood would be useful. vs. I like the way I am now.

6. FLEA USES: In pairs / groups, brainstorm all the possible uses of fleas. Change partners and add to the uses on your list. Talk about the uses with your partner(s). Rank them in order of most useful. Change partners again and compare your ranked lists.

BEFORE READING / LISTENING

1. TRUE / FALSE: Look at the article's headline and guess whether these sentences are true (T) or false (F):

- a. Scientists have created fleas that can survive in very cold weather. T / F
- b. Some fleas contain a protein that may help organ transplants. T / F
- c. A protein from a snow flea may help protect plants against frost. T / F
- d. The snow flea can live in temperatures of minus 111 degrees. T / F
- e. Scientists are talking about possible uses for the new protein. T / F
- f. A researcher said filling a car with antifreeze prevents it from freezing. T / F
- g. The researcher said tissues make organs last longer. T / F
- h. The researcher said people could easily snap their fingers in the cold. T / F

2. SYNONYM MATCH: Match the following synonyms from the article:

- | | |
|---------------|-----------------|
| a. discovered | characteristics |
| b. surgery | cold weather |
| c. properties | reducing |
| d. frost | stop |
| e. lowering | cold |
| f. store | found |
| g. lead | change |
| h. prevent | keep |
| i. cold snap | operations |
| j. modify | head |

3. PHRASE MATCH: Match the following phrases from the article (sometimes more than one combination is possible):

- | | |
|----------------------------------|--------------------------|
| a. Scientists have discovered | matching |
| b. survive in | point |
| c. protect plants or animals | uses for the new protein |
| d. stored and transported | freezing conditions |
| e. freezing | snap |
| f. many possible | from frost |
| g. prevent it from | that didn't like frost |
| h. tissue | new secrets |
| i. allow crops to survive a cold | at lower temperatures |
| j. genetically modify any crop | freezing |

WHILE READING / LISTENING

GAP FILL: Put the words in the column on the right into the gaps in the text.

Fleas have organ-saving antifreeze

Scientists have _____ new secrets from a tiny snow flea that can survive in freezing conditions. The fleas _____ a protein that could be very useful for transplant _____ and farming. Researchers from Queen's University in Ontario, Canada have published a _____ about the flea and its antifreeze properties. The researchers said the antifreeze could help _____ plants or animals from frost. It could also allow transplant organs to be _____ and transported at lower temperatures. The microscopic, six-legged snow fleas _____ by lowering the freezing point of their bodies by 11 _____.

Scientists are talking about many possible _____ for the new protein. One is to store transplant organs at _____ temperatures to keep them for longer. Lead researcher Dr. Laurie Graham said _____ an organ with the antifreeze might prevent it from _____. She said: "You would have longer to do _____ matching to get the organ to the patient and just increase the...life of organs." Another possibility could be to allow crops to _____ a cold snap. Dr. Graham said scientists could genetically _____ any crop that didn't like frost to make it _____ in freezing temperatures.

study
degrees
contain
survive
surgery
stored
discovered
protect

modify
freezing
filling
stronger
uses
tissue
survive
cooler

LISTENING

Listen and fill in the spaces.

Fleas have organ-saving antifreeze

Scientists have discovered new secrets _____ snow flea that can survive in freezing conditions. The fleas contain a protein that could be very _____ transplant surgery and farming. Researchers from Queen's University in Ontario, Canada have published _____ the flea and its antifreeze properties. The researchers said the antifreeze could help protect plants or animals from _____. It could also allow transplant organs to be stored and transported at _____ temperatures. The microscopic, six-legged snow fleas survive by lowering the freezing _____ of their bodies by 11 degrees.

Scientists are talking about many possible _____ the new protein. One is to store transplant organs at cooler temperatures to keep them _____. Lead researcher Dr. Laurie Graham said filling an _____ with the antifreeze might prevent it from freezing. She said: "You would have longer _____ matching to get the organ to the patient and just increase the...life of organs." Another possibility could be to allow crops to survive _____. Dr. Graham said scientists could genetically modify _____ that didn't like frost to make it stronger in freezing temperatures.

AFTER READING / LISTENING

1. WORD SEARCH: Look in your dictionaries / computer to find collocates, other meanings, information, synonyms ... for the words 'snow' and 'flea'.

- Share your findings with your partners.
- Make questions using the words you found.
- Ask your partner / group your questions.

2. ARTICLE QUESTIONS: Look back at the article and write down some questions you would like to ask the class about the text.

- Share your questions with other classmates / groups.
- Ask your partner / group your questions.

3. GAP FILL: In pairs / groups, compare your answers to this exercise. Check your answers. Talk about the words from the gap fill. Were they new, interesting, worth learning...?

4. VOCABULARY: Circle any words you do not understand. In groups, pool unknown words and use dictionaries to find their meanings.

5. STUDENT "FLEA" SURVEY: In pairs / groups, write down questions about fleas and other tiny bugs.

- Ask other classmates your questions and note down their answers.
- Go back to your original partner / group and compare your findings.
- Make mini-presentations to other groups on your findings.

6. TEST EACH OTHER: Look at the words below. With your partner, try to recall exactly how these were used in the text:

- | | |
|-------------|------------|
| • secrets | • uses |
| • contain | • cooler |
| • published | • prevent |
| • protect | • matching |
| • stored | • snap |
| • lowering | • modify |

DISCUSSION

STUDENT A's QUESTIONS (Do not show these to student B)

- a. Did the headline make you want to read the article?
- b. What do you think of fleas?
- c. Have you ever had any problems with fleas?
- d. Would you like to know more about the microscopic world?
- e. What do you think of this new scientific discovery?
- f. Can you think of any other uses for the antifreeze protein?
- g. Would you like to have the antifreeze protein in your body?
- h. Would you eat vegetables that had been genetically modified by the new antifreeze protein?
- i. Do you like the cold?
- j. What do you do to keep warm during a cold snap?

STUDENT B's QUESTIONS (Do not show these to student A)

- a. Did you like reading this article?
- b. What do you think about what you read?
- c. How great do you think this discovery is?
- d. Do you think tiny bugs have many more secrets?
- e. Would you like to work as a scientist and do research on fleas and other microscopic life?
- f. What do you think this discovery means for global farming?
- g. Do you think this new discovery might allow people to live in colder countries?
- h. Do you think this discovery might allow scientists to freeze people's bodies and bring them back to life later?
- i. Would you prefer to live in a cold or hot country?
- j. Did you like this discussion?

AFTER DISCUSSION: Join another partner / group and tell them what you talked about.

- a. What question would you like to ask about this topic?
- b. What was the most interesting thing you heard?
- c. Was there a question you didn't like?
- d. Was there something you totally disagreed with?
- e. What did you like talking about?
- f. Do you want to know how anyone else answered the questions?
- g. Which was the most difficult question?

SPEAKING

BUG RESEARCH: You are a scientist. You must choose a bug to research that you think could greatly help people. In pairs/groups, discuss which of these bugs might have many secrets to find. In the middle column brainstorm all of the powers and abilities each bug has. In the right hand column write the possible uses these powers and abilities might have for humans.

BUG	POWERS AND ABILITIES	POTENTIAL PRACTICAL APPLICATIONS
Flea		
Ant		
Worm		
Cockroach		
Housefly		
Spider		

Change partners and discuss what you talked about earlier. Compare your ideas.

Decide which bug is the most useful to help mankind.

Give a presentation on your thoughts to the rest of the class. Vote on which is the best bug.

HOMEWORK

1. VOCABULARY EXTENSION: Choose several of the words from the text. Use a dictionary or Google's search field (or another search engine) to build up more associations / collocations of each word.

2. INTERNET: Search the Internet and find more information on fleas. Share your findings with your class in the next lesson.

3. PROS AND CONS: Make a poster describing the pros and cons of genetically modified food. Show your posters to your classmates in your next lesson. Did you all write similar things?

4. DIARY/JOURNAL: You are a flea. Write your diary/journal entry for one day in your life. Show what you wrote to your classmates in the next lesson. Did you all write about similar things?

ANSWERS

TRUE / FALSE:

- a. F b. T c. T d. F e. T f. F g. F h. F

SYNONYM MATCH:

- | | |
|---------------|-----------------|
| a. discovered | found |
| b. surgery | operations |
| c. properties | characteristics |
| d. frost | cold |
| e. lowering | reducing |
| f. store | keep |
| g. lead | head |
| h. prevent | stop |
| i. cold snap | cold weather |
| j. modify | change |

PHRASE MATCH:

- | | |
|----------------------------------|--------------------------|
| a. Scientists have discovered | new secrets |
| b. survive in | freezing conditions |
| c. protect plants or animals | from frost |
| d. stored and transported | at lower temperatures |
| e. freezing | point |
| f. many possible | uses for the new protein |
| g. prevent it from | freezing |
| h. tissue | matching |
| i. allow crops to survive a cold | snap |
| j. genetically modify any crop | that didn't like frost |

GAP FILL:

Fleas have organ-saving antifreeze

Scientists have **discovered** new secrets from a tiny snow flea that can survive in freezing conditions. The fleas **contain** a protein that could be very useful for transplant **surgery** and farming. Researchers from Queen's University in Ontario, Canada have published a **study** about the flea and its antifreeze properties. The researchers said the antifreeze could help **protect** plants or animals from frost. It could also allow transplant organs to be **stored** and transported at lower temperatures. The microscopic, six-legged snow fleas **survive** by lowering the freezing point of their bodies by 11 **degrees**.

Scientists are talking about many possible **uses** for the new protein. One is to store transplant organs at **cooler** temperatures to keep them for longer. Lead researcher Dr. Laurie Graham said **filling** an organ with the antifreeze might prevent it from **freezing**. She said: "You would have longer to do **tissue** matching to get the organ to the patient and just increase the...life of organs." Another possibility could be to allow crops to **survive** a cold snap. Dr. Graham said scientists could genetically **modify** any crop that didn't like frost to make it **stronger** in freezing temperatures.