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New super gecko and mussel glue

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20th July, 2007

THE ARTICLE

New super gecko and mussel glue

Scientists have stuck to basics and taken a lesson from nature to create a new, super-sticky glue. Researchers looked at the amazing sticking abilities of geckos and mussels to see if their adhesive powers could be used for medical purposes. The result is a kind of silicone substance that sticks to wet and dry surfaces that can be used again and again. The new chemical has been dubbed "geckel" after the two creatures that inspired its research. Researcher Professor Phillip Messersmith said: "I envision that adhesive tapes made out of *geckel* could be used to replace sutures for wound closure, and may also be helpful as a water-resistant adhesive for bandages and drug-delivery patches." He added: "Such a bandage would remain firmly attached to the skin during bathing but would permit easy removal upon healing."

The ability of the gecko to stick to anything and even hang upside down on polished glass is a marvel of the natural world. For decades, scientists have been trying to unravel the mysteries of how these small reptiles have so much grip. The suction ability of mussels has similarly intrigued researchers. Technology companies are now excited the two properties have been combined to create a gum that is both powerful and waterproof. Laboratory tests found the new glue could be stuck and unstuck over 1,000 times, even under water. Professor Messersmith said the next step is for a product that can be mass produced and used commercially: "The challenge will be to scale up the technology and still have the geckel material exhibit adhesive behaviour," he said.

WARM-UPS

1. GLUE: Walk around the class and talk to other students about glue. Change partners often. After you finish, sit with your original partner(s) and share what you found out.

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

scientists / basics / nature / glue / geckos / mussels / inspiration / bandages / hanging upside down / mysteries / reptiles / waterproof / mass production

Have a chat about the topics you liked. Change topics and partners frequently.

3. ADHESIVES: In pairs / groups, talk about how useful these are:

- stick glue
- super glue
- Velcro
- sellotape
- friends
- Blue tack
- Post-it notes
- duct tape

4. ANIMAL MARVELS: How could scientists use these amazing animal abilities to make our lives better? Discuss with your partners and talk about commercial possibilities. Change partners and share what you said and heard.

- a) sticking ability of geckos
- b) changing colour like a chameleon
- c) the speed of a cheetah
- d) the flight of birds
- e) preserving water like a camel
- f) the hearing of a dog

5. GLUE: Spend one minute writing down all of the different words you associate with the word 'glue'. Share your words with your partner(s) and talk about them. Together, put the words into different categories.

6. FUTURE PRODUCTS: Talk about these future products. Would you buy them? How might they change your life? Change partners and share your findings.

- a) Cat-o-Vision pills – See in the dark
- b) Bat navigation juice – Walk around with your eyes closed
- c) Eagle-eyes drops – Enhance your vision
- d) Chameleon clothes – Blend into any background
- e) Spider fibre – Be like Spiderman
- f) Turtle tonic – Live to be 150 years old

7. I'M A GECKO: You are a gecko. Walk around the classroom and talk to the other 'geckos' about your daily life. Change partners and share what you said and heard.

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 a glue to stick lizards to walls and ceilings. T / F
- b. The new glue could be used in operating rooms and hospitals. T / F
- c. The glue loses adhesiveness after contact with water. T / F
- d. Drug addicts could solve their addiction via an adhesive patch. T / F
- e. Geckos can hang upside down from polished glass. T / F
- f. Mussels have interested scientists for many years. T / F
- g. It may be possible that the new glue can be used over 1,000 times. T / F
- h. The glue will be on shop shelves later this year. T / F

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

- | | |
|--------------|---------------|
| 1. lesson | a. stitches |
| 2. adhesive | b. fascinated |
| 3. dubbed | c. wonder |
| 4. sutures | d. sticking |
| 5. wound | e. solve |
| 6. marvel | f. cut |
| 7. unravel | g. example |
| 8. intrigued | h. display |
| 9. scale up | i. named |
| 10. exhibit | j. increase |

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

- | | |
|---|-------------------------------|
| 1. Scientists have stuck | a. adhesive for bandages |
| 2. their adhesive powers could be used | b. up the technology |
| 3. The new chemical has been dubbed | c. down on polished glass |
| 4. helpful as a water-resistant | d. for medical purposes |
| 5. remain firmly attached | e. the mysteries |
| 6. hang upside | f. to basics |
| 7. scientists have been trying to unravel | g. have been combined |
| 8. intrigued | h. to the skin during bathing |
| 9. the two properties | i. "geckel" |
| 10. The challenge will be to scale | j. researchers |

WHILE READING / LISTENING

GAP FILL: Put the words into the gaps in the text.

New super gecko and mussel glue

Scientists have stuck to _____ and taken a lesson from nature to create a new, super-sticky glue. Researchers looked at the amazing sticking _____ of geckos and mussels to see if their adhesive powers could be used for medical _____. The result is a kind of silicone substance that sticks to wet and dry surfaces that can be used again and again. The new chemical has been _____ "geckel" after the two creatures that _____ its research. Researcher Professor Phillip Messersmith said: "I envision that adhesive tapes made out of geckel could be used to replace sutures for wound _____, and may also be helpful as a water-resistant adhesive for bandages and drug-delivery patches." He added: "Such a bandage would remain _____ attached to the skin during bathing but would permit easy removal upon _____."

The ability of the gecko to stick to anything and even _____ upside down on polished glass is a _____ of the natural world. For decades, scientists have been trying to unravel the _____ of how these small reptiles have so much _____. The suction ability of mussels has similarly intrigued researchers. Technology companies are now excited the two properties have been combined to create a gum that is both powerful and _____. Laboratory tests found the new glue could be stuck and unstuck over 1,000 times, even under water. Professor Messersmith said the next _____ is for a product that can be _____ produced and used commercially: "The challenge will be to scale up the technology and still have the geckel material _____ adhesive behaviour," he said.

inspired

healing

abilities

dubbed

closure

basics

firmly

purposes

waterproof

mysteries

exhibit

grip

hang

step

marvel

mass

LISTENING

Listen and fill in the spaces.

New super gecko and mussel glue

Scientists have stuck to basics and taken a lesson _____ new, super-sticky glue. Researchers looked at the amazing sticking abilities of geckos and mussels _____ powers could be used for medical purposes. The result is a kind of silicone substance that sticks to wet and dry surfaces _____ again. The new chemical has been dubbed "geckel" _____ inspired its research. Researcher Professor Phillip Messersmith said: "I envision that adhesive tapes made out of *geckel* _____ for wound closure, and may also be helpful as a water-resistant adhesive for bandages and drug-delivery patches." He added: "Such a bandage would remain firmly attached to the skin during bathing _____ upon healing."

The ability of the gecko to stick to _____ upside down on polished glass is a marvel of the natural world. For decades, scientists have _____ mysteries of how these small reptiles have so much grip. The suction ability of mussels has similarly intrigued researchers. Technology companies are now _____ have been combined to create a gum that is both powerful and waterproof. Laboratory tests found the new glue could _____ 1,000 times, even under water. Professor Messersmith said the next step is for _____ produced and used commercially: "The challenge _____ technology and still have the geckel material exhibit adhesive behaviour," he said.

AFTER READING / LISTENING

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

glue	gum
-------------	------------

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

<ul style="list-style-type: none">• basics• amazing• silicone• inspired• closure• permit	<ul style="list-style-type: none">• upside down• unravel• intrigued• waterproof• 1,000 times• scale
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STUDENT GLUE SURVEY

Write five GOOD questions about GLUE in the table. Do this in pairs. Each student must write the questions on his / her own paper.

When you have finished, interview other students. Write down their answers.

	STUDENT 1 _____	STUDENT 2 _____	STUDENT 3 _____
Q.1.			
Q.2.			
Q.3.			
Q.4.			
Q.5.			

- Now return to your original partner and share and talk about what you found out. Change partners often.
- Make mini-presentations to other groups on your findings.

DISCUSSION

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

- a) What did you think when you read the headline?
- b) Do you use glue a lot?
- c) What would life be like without glue and sellotape?
- d) Do you think geckos and mussels are interesting?
- e) What animal powers and abilities would you like to have?
- f) Would you like to be a researcher?
- g) Do you think we have many lessons to learn from nature?
- h) What do you think of the name "geckel"?
- i) Have you ever had stitches?
- j) What would you use a super-sticky substance like geckel for?



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

- a) Did you like reading this article?
- b) How would your life be different if you could walk on walls and ceilings?
- c) What mysteries of the natural world would you like to unravel?
- d) What animal are you most intrigued by and why?
- e) Do you think scientists will one day unravel all the mysteries of the natural world?
- f) What mysteries are there within us that scientists do not understand?
- g) Which do you think is the more intriguing animal, the gecko or mussel?
- h) What other combination of animal abilities do you think might be interesting or useful?
- i) What questions would you like to ask a gecko and a mussel?
- j) Did you like this discussion?

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

- a) What was the most interesting thing you heard?
- b) Was there a question you didn't like?
- c) Was there something you totally disagreed with?
- d) What did you like talking about?
- e) Which was the most difficult question?

LANGUAGE

CORRECT WORD: Put the correct words from a–d below in the article.

New super gecko and mussel glue

Scientists have stuck (1) _____ basics and taken a lesson from nature to create a new, super-sticky glue. Researchers looked at the amazing sticking abilities of geckos and mussels to see if their adhesive powers could be used for (2) _____ purposes. The result is a kind of silicone substance that sticks to wet and dry surfaces that can be used again and again. The new chemical has been dubbed "geckel" (3) _____ the two creatures that inspired its research. Researcher Professor Phillip Messersmith said: "I envision that adhesive tapes made (4) _____ of geckel could be used to replace sutures for wound closure, and may also be helpful (5) _____ a water-resistant adhesive for bandages and drug-delivery patches." He added: "Such a bandage would remain firmly attached to the skin during bathing but would permit easy (6) _____ upon healing."

The ability of the gecko to stick to anything and even hang upside (7) _____ on polished glass is a (8) _____ of the natural world. For decades, scientists have been trying to unravel the mysteries of how these small reptiles have so much grip. The suction ability of mussels has (9) _____ intrigued researchers. Technology companies are now excited the two properties have been combined to create a gum that is (10) _____ powerful and waterproof. Laboratory tests found the new glue could be stuck and unstuck over 1,000 times, (11) _____ under water. Professor Messersmith said the next step is for a product that can be mass (12) _____ and used commercially: "The challenge will be to scale up the technology and still have the geckel material exhibit adhesive behaviour," he said.

- | | | | | |
|-----|----------------|----------------|----------------|------------------|
| 1. | (a) of | (b) for | (c) by | (d) to |
| 2. | (a) medics | (b) medic | (c) medical | (d) medicine |
| 3. | (a) after | (b) following | (c) post | (d) later |
| 4. | (a) from | (b) out | (c) for | (d) by |
| 5. | (a) like | (b) by | (c) for | (d) as |
| 6. | (a) removal | (b) remove | (c) removing | (d) removes |
| 7. | (a) side | (b) out | (c) down | (d) up |
| 8. | (a) marvelous | (b) marvel | (c) marveling | (d) marvels |
| 9. | (a) similarly | (b) similarity | (c) similar | (d) same |
| 10. | (a) whole | (b) all | (c) both | (d) few |
| 11. | (a) though | (b) when | (c) odd | (d) even |
| 12. | (a) production | (b) produced | (c) productive | (d) productivity |

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 about geckos and mussels. Talk about what you discover with your partner(s) in the next lesson.

3. REPTILES AND SHELLFISH: Make a poster about the abilities of different reptiles and shellfish. Show your poster to your classmates in the next lesson. Did you all find out similar things?

4. MAGAZINE ARTICLE: Write a magazine article about how *Geckel* will change our lives. Include imaginary interviews with the manufacturers and average people.

Read what you wrote to your classmates in the next lesson. Which article was best and why?

5. LETTER: Write a letter to the manufacturer of Geckel. Ask them three questions about the new product. Give them three suggestions about how to make the product more useful. Read your letter to your partner(s) in your next lesson. Your partner(s) will answer your questions.

6. A DAY IN THE LIFE: Write the diary entry for a day in the life of a gecko or mussel. Read your entry to your classmates in your next lesson. Who wrote the most interesting account?

ANSWERS

TRUE / FALSE:

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

SYNONYM MATCH:

- | | |
|--------------|---------------|
| 1. lesson | a. example |
| 2. adhesive | b. sticking |
| 3. dubbed | c. named |
| 4. sutures | d. stitches |
| 5. wound | e. cut |
| 6. marvel | f. wonder |
| 7. unravel | g. solve |
| 8. intrigued | h. fascinated |
| 9. scale up | i. increase |
| 10. exhibit | j. display |

PHRASE MATCH:

- | | |
|---|-------------------------------|
| 1. Scientists have stuck | a. to basics |
| 2. their adhesive powers could be used | b. for medical purposes |
| 3. The new chemical has been dubbed | c. "geckel" |
| 4. helpful as a water-resistant | d. adhesive for bandages |
| 5. remain firmly attached | e. to the skin during bathing |
| 6. hang upside | f. down on polished glass |
| 7. scientists have been trying to unravel | g. the mysteries |
| 8. intrigued | h. researchers |
| 9. the two properties | i. have been combined |
| 10. The challenge will be to scale | j. up the technology |

GAP FILL:

New super gecko and mussel glue

Scientists have stuck to **basics** and taken a lesson from nature to create a new, super-sticky glue. Researchers looked at the amazing sticking **abilities** of geckos and mussels to see if their adhesive powers could be used for medical **purposes**. The result is a kind of silicone substance that sticks to wet and dry surfaces that can be used again and again. The new chemical has been **dubbed** "geckel" after the two creatures that **inspired** its research. Researcher Professor Phillip Messersmith said: "I envision that adhesive tapes made out of geckel could be used to replace sutures for wound **closure**, and may also be helpful as a water-resistant adhesive for bandages and drug-delivery patches." He added: "Such a bandage would remain **firmly** attached to the skin during bathing but would permit easy removal upon **healing**."

The ability of the gecko to stick to anything and even **hang** upside down on polished glass is a **marvel** of the natural world. For decades, scientists have been trying to unravel the **mysteries** of how these small reptiles have so much **grip**. The suction ability of mussels has similarly intrigued researchers. Technology companies are now excited the two properties have been combined to create a gum that is both powerful and **waterproof**. Laboratory tests found the new glue could be stuck and unstuck over 1,000 times, even under water. Professor Messersmith said the next **step** is for a product that can be **mass** produced and used commercially: "The challenge will be to scale up the technology and still have the geckel material **exhibit** adhesive behaviour," he said.

LANGUAGE WORK

1 - d 2 - c 3 - a 4 - b 5 - d 6 - a 7 - c 8 - b 9 - a 10 - c 11 - d 12 - b