

For Teachers: Please have the students read the sentences one at a time and correct their pronunciation of each sentence then have them repeat after you. Wait until after they read the sentence (use the number in place of the missing word) to have the students choose the correct answer to fill in the blank. When the students finish the article, move on to the further questions.

日本語訳なしタイプ B もございます。スクロールダウンするとございますので好きな方をご利用下さい。

3[B] – The Natural Way



AP1E 10-2

1. At the 2000 Summer Olympics in Sydney, 83 percent of the medal-winning swimmers wore the Speedo Fastskin swimsuit. This revolutionary swimsuit allows wearers to glide through the water with much less resistance, thanks to a material designed to mimic the skin of one nature's fastest swimmers, the shark. The Fastskin is an example of "biomimetics," the field of research in which product designs are based on phenomena found in nature.

Further Questions&A*Ask student to answer the question on their own at first. If the student can't answer correctly, have him look at the last page and read the "example answer" for the question. Have the student try to memorize the answer, if it's too long or difficult, you should divide the sentence into 2 or 3 parts to make it easier to remember. Once they have memorized the answer, the teacher should ask the question one last time so that the student can practice answering. Also if you find any mistakes, please mark the page and let me know ASAP.

- 1) What did 83 percent of the medal-winning swimmers wear during the 2000 Summer Olympics?
- 2) What is "biomimetics"?
- 3) Biomimetics is the field of research in which product designs are based on phenomena found in nature.

7. This is not a new idea—Leonardo da Vinci designed aircraft in the same way—but biomimetics has taken off only in the last 10 to 15 years as more scientists from a variety of disciplines turn to nature for inspiration. In Japan, for example, researchers are carrying out trials of a nearly painless hypodermic needle with a design based on the mosquito's proboscis (the thin tube that forms part of its mouth). Researchers in the United States are studying the humpback whale's flippers in the hope of developing wind turbines that can turn even at low wind speeds.

Further Questions&A



- 3) What are biomimetic researchers in Japan doing?
11. 日本のバイオミメテックス (生体模倣技術) の研究者は何をしていますか。

12. *Researchers are carrying out trials of a nearly painless hypodermic needle with a design based on the mosquito's proboscis.*
13. **4) Why have researchers in the United States been studying the humpback whale?**
14. アメリカの研究者はなぜザトウクジラを研究しているのですか。
15. *They hope to develop wind turbines that can turn even at low wind speeds.*

16. Given that natural organisms have evolved over millions of years, researchers in the field of biomimetics can be confident that they are imitating extremely efficient systems. Nevertheless, they face great difficulty in copying all aspects of nature's complex designs.
17. The makers of the Stickybot, a robot designed to copy the gecko lizard's ability to climb smooth glass surfaces, envisioned it being used in search-and-rescue operations. Unfortunately, the technological limitations mean the robot can only climb at the expense of speed—unlike the gecko, which can climb incredibly quickly. Mark Cutkosky, one of the Stickybot's developers, admits that in order to build the robot at all, “there are a lot of things about the gecko that we simply had to ignore.”

Further Questions&A



19. **5) Why are researchers in the field of biomimetics confident about imitating animals?**
20. *Given that natural organisms have evolved over millions of years, researchers in the field of biomimetics can be confident that they are imitating extremely efficient systems.*
21. **6) Why couldn't the Stickybot be used in search and rescue operations?**
22. Stickybot はなぜ搜索救助活動に使われないのですか。
23. *The technological limitations mean that the robot can only climb at the expense of speed—unlike the gecko.*

24. So far, the number of commercially successful biomimetic products has been limited. As technology continues to advance, however, biomimetic research may find it easier to catch up with nature. Nevertheless, history suggests that they need not only technical skill but also a great deal of persistence. Biomimetic projects tend to scare off investors because such projects lack clear practical applications and do not guarantee immediate gains. One of the earliest biomimetic products, the

粘着性 (ねんちやくせい) の

開発 (かいはいはつ) された

adhesive material Velcro, was first developed by George de Mestral in the 1940s. It took years for de Mestral to perfect the design and decades for a practical application to be found. It was not until the 1970s that Velcro became widely used.

広 (ひろ) く

Further Questions&A



27.7) Why do biomimetic projects tend to scare off investors?

28. バイオミメティックス (生体模倣技術) の計画はなぜ投資家をおじけづかせたのですか。

29. Biomimetic projects tend to scare off investors because such projects lack clear practical applications and do not guarantee immediate gains.

30.8) What is one example of a successful biomimetic product?

31. 成功したバイオミメティックス (生体模倣技術) 製品の一例は何ですか。

32. The adhesive material Velcro was one of the earliest biomimetic products.

*Choose the correct answer from these choices.

33.(35) What has led to the increased interest in biomimetics in recent years?

34. ここ数年バイオミメティックス (生体模倣技術) についての興味を増加させているのは何ですか。

35.1. Products based on mosquitoes and humpback whales have experienced commercial success.

商業的 (しょうぎょうてき) な 成功

科学的 (かがくてき) に

36.2. Scientifically advanced countries like Japan and the United States are working together to develop biometric products.

投資家 (とうしか)

10年間 (ねんかん)

37.3. Investigations over the last two decades have shown that many of Leonardo da Vinci's designs were biometric.

科学者 (かがくしゃ)

分野 (ぶんや)

38.4. Scientists from many fields are realizing that designs from nature can provide them with new products.

与 (あた) える

39.(36) The creation of the Stickybot has shown that? Stickybot の創作は以下のことを示している。

研究者 (けんきゅうしゃ)

進化 (しんか)

完璧 (かんぺき)

40.1. researchers should remember evolution is not perfect and may not always produce designs worth copying.

含 (ふく) む

発展 (はってん) させる

41.2. researchers need not include all aspects of natural designs to develop products whose overall performance matches nature.

全体 (ぜんたい) の

現在 (げんざい) の

42.3. current levels of technology can prevent researchers from producing designs as effective as those found in nature.

有効 (ゆうこう) な

実際 (じっさい) に

43.4. Geckos are actually faster but have worse climbing ability than researchers at first believed.

44.(37) What challenge do researchers in biomimetics face when attempting to market their products? バイオミメティックス (生体模倣技術) の研究者が彼らの発明した製品を市場に広げようと試みた時、どのような試練に直面しますか。

ようとう 試みた時、どのような試練に直面しますか。

投資家 (とうしか)

興味 (きょうみ) がある

機会 (きかい)

45.1. Investors are usually only interested in opportunities that promise profits in the short term.

46. The public reluctant to buy biomimetic products as it is suspicious of new developments in the field .
47. Biomimetics has yet to be recognized by the wider scientific community as a respectable field of research.
48. Product development takes so long that conventional products for the same purpose are usually released first.

Review Questions



- 49.1) What did 83 percent of the medal-winning swimmers wear during the 2000 Summer Olympics?
They wore Speedo Fastskin swimsuits.
- 50.2) What is “biomimetics”?
Biomimetics is the field of research in which product designs are based on phenomena found in nature.
- 51.3) What are biomimetic researchers in Japan doing?
Researchers are carrying out trials of a nearly painless hypodermic needle with a design based on the mosquito’s proboscis.
- 52.4) Why have researchers in the United States been studying the humpback whale?
They hope to develop wind turbines that can turn even at low wind speeds.
- 53.5) Why are researchers in the field of biomimetics confident about imitating animals?
Given that natural organisms have evolved over millions of years, researchers in the field of biomimetics can be confident that they are imitating extremely efficient systems.
- 54.6) Why couldn’t the Stickybot be used in search and rescue operations?
The technological limitations mean that the robot can only climb at the expense of speed—unlike the gecko.
- 55.7) Why do biomimetic projects tend to scare off investors?
Biomimetic projects tend to scare off investors because such projects lack clear practical applications and do not guarantee immediate gains.
- 56.8) What is one example of a successful biomimetic product?
The adhesive material Velcro was one of the earliest biomimetic products.

解答: (35) 4 (36) 3 (37) 1

At the 2000 Summer Olympics in Sydney, 83 percent of the medal-winning swimmers wore the Speedo Fastskin swimsuit. This revolutionary swimsuit allows wearers to glide through the water with much less resistance, thanks to a material designed to mimic the skin of one nature's fastest swimmers, the shark. The Fastskin is an example of "biomimetrics," the field of research in which product designs are based on phenomena found in nature.

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This is not a new idea—Leonardo da Vinci designed aircraft in the same way—but biomimetrics has taken off only in the last 10 to 15 years as more scientists from a variety of disciplines turn to nature for inspiration. In Japan, for example, researchers are carrying out trials of a nearly painless hypodermic needle with a design based on the mosquito's proboscis (the thin tube that forms part of its mouth). Researchers in the United States are studying the humpback whale's flippers in the hope of developing wind turbines that can turn even at low wind speeds.

Further Questions

3) What are biomimetric researchers in Japan doing?

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Given that natural organisms have evolved over millions of years, researchers in the field of biomimetrics can be confident that they are imitating extremely efficient systems. Nevertheless, they face great difficulty in copying all aspects of nature's complex designs. The makers of the Stickybot, a robot designed to copy the gecko lizard's ability to climb smooth glass surfaces, envisioned it being used in search-and-rescue operations. Unfortunately, the technological limitations mean the robot can only climb at the expense of speed—unlike the gecko, which can climb incredibly quickly. Mark Cutkosky, one of the Stickybot's developers,

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(35) What has led to the increased interest in biomimetrics in recent years?

1. Products based on mosquitoes and humpback whales have experienced commercial success.
2. Scientifically advanced countries like Japan and the United States are working together to develop biometric products.
3. Investigations over the last two decades have shown that many of Leonardo da Vinci's designs were biometric.
4. Scientists from many fields are realizing that designs from nature can provide them with new products.

(36) The creation of the Stickybot has shown that?

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1. Investors are usually only interested in opportunities that promise profits in the short term.
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Answers for “Further Questions”

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