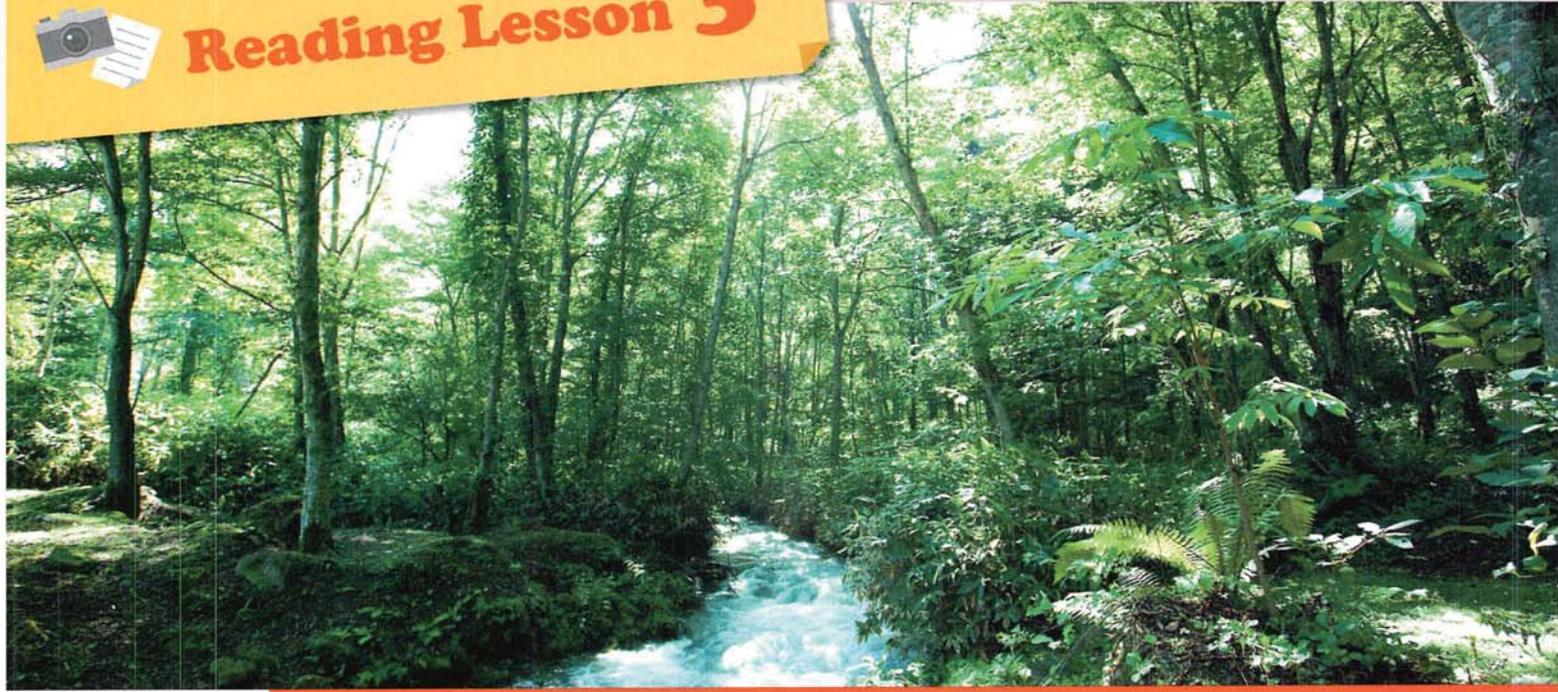




Reading Lesson 3



Learning from Nature

New Words

- including** [ɪnklú:dɪŋ]
...を含めて
- observe(d)** [əbzə:rv(d)]
観察する
- flying** [fláɪɪŋ] 飛行 (用) の
- inspire(d)** [ɪnspáɪə(r)(d)]
奮い立たせる
- instance(s)**
[ɪnstəns(ɪz)] 例
- academic** [ækədémɪk]
学問の
- following** [fólouɪŋ] 次の
- clarify** [klærəfáɪ]
明らかにする
- method(s)** [méθəd(z)]
方法

Leonardo da Vinci
[li:əná:rdou də vɪntʃɪ]
レオナルド・ダ・ビンチ
(名前)

mimic(ked) [mímik(t)]
まねする

biomimetics
[báɪoumímétɪks]
生体模倣技術

私たちは、自然界の生き物を研究し、そこからヒントを得て、便利な生活を手に入れてきました。身近な例として「面ファスナー」と「新幹線」があります。それらはどんな仕組みをヒントに作られたのでしょうか。

① Have you ever thought of flying like a bird? Many people have, including Leonardo da Vinci. He observed birds very carefully and made designs for flying machines that mimicked the actions of birds' wings. His designs did not work, but they inspired others. His designs were also early instances of getting ideas from nature and using the ideas to create new products and technologies. This academic field is called biomimetics. The following examples will clarify the methods and uses of biomimetics.



10

② Look around you. One of you might be using a biomimetic product — the hook-and-loop fasteners on your wallet, shoes, or bag.

③ The idea for these fasteners came to a Swiss engineer while he was walking through the woods with his dog. Burs were sticking to his clothing and the dog's fur. It was difficult to remove the burs. He looked at one more closely. There were hundreds of small hooks on it. The hooks easily caught onto loops of clothing, animal fur, and other things. By closely observing nature, the engineer got the idea for a new product that we now see every day.



④ You may know another example of biomimetics: the Shinkansen. Before the 1990s, the Shinkansen was facing a problem. When a train went through a tunnel, it made a very loud noise which annoyed people almost half a kilometer away. What was happening?



New Words

- wallet [wáɪlət] さいふ
- engineer [ɛndʒənɪə] 技師
- while** [hwaɪl] …する間に
- bur(s) [bɜːr(z)] イガ
- stick(ing) [stɪk(ɪŋ)] くっつく
- clothing [klóʊðɪŋ] 衣類
- fur [fɜːr] 毛
- closely [klóʊslɪ] 接近して
- hook(s) [húk(s)] かぎ
- onto [ɒntə] …の上に
- loop(s) [lú:p(s)] 輪
- tunnel [tʌnl] トンネル
- annoy(ed) [ənoɪ(d)] いらいらさせる

biomimetic

[bàioumimétik]

生体模倣技術を使った

fastener(s) [fæsnə(r)]

留めるもの

hook-and-loop

fastener(s)

[húk ənd lú:p fæsnə(r)]

面ファスナー

Swiss [swɪs] スイス人の

Tips for Reading

- 参考にした生き物や、その特徴に注目して読んでみよう。

Notes

hook-and-loop fastener

面ファスナー。重ね合わせだけで布をとめる、テープ式のしかけ。

New Words

- ☑ speed [spi:t] 速度
- ☑ **pressure** [préʃə] 圧力
- ☑ **inside** [insáid] …の内側に
- ☑ **increase(s)** [ínkri:s(is)] 増える
- ☑ *slow down* 速度を落とす
- ☑ **himself** [hímself] 彼自身を
- ☑ *say to oneself* ひとりごとを言う
- ☑ **manage** [mánidʒ] 何とかうまく…する
- ☑ **sudden** [sádn] 突然の
- ☑ **kingfisher** [kínʃíʃə] カワセミ
- ☑ **pointy** [póinti] 先のとがった
- ☑ **beak** [bi:k] くちばし
- ☑ *because of ...* …のために
- ☑ **dive** [dáiv] 飛び込む
- ☑ **smoothly** [smú:ðli] なめらかに
- ☑ **splash** [splæʃ] 水しぶき

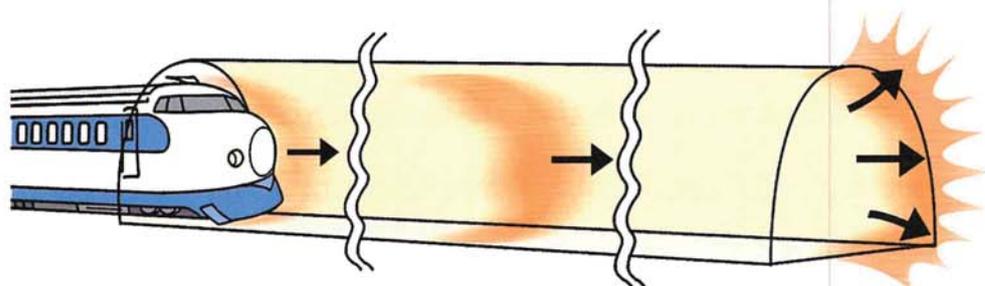
Notes

500系新幹線

1997年3月に山陽新幹線でデビュー。1990年代後半、新幹線の高速化を図るために開発された車両。それまで走っていた新幹線の大きな課題であった車外の騒音問題を解決するために、車両の先端部分の形が改良された。

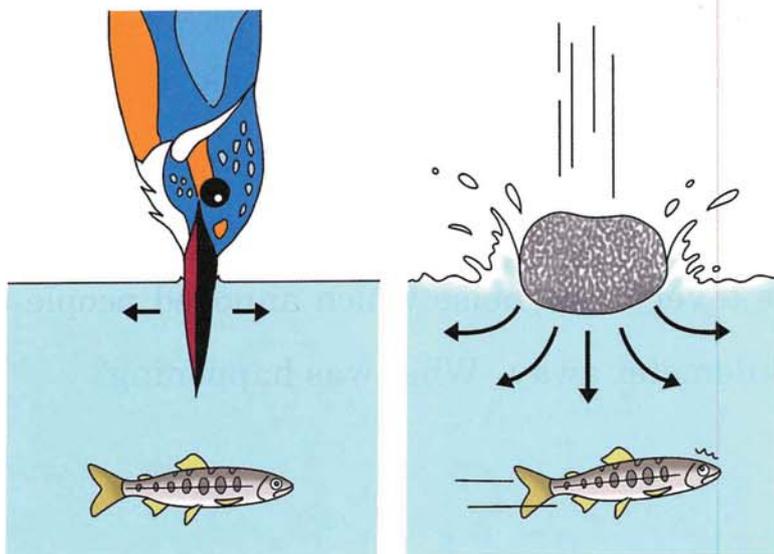


⑤ When a train enters a narrow tunnel at high speed, air pressure inside the tunnel suddenly grows. It increases as the train moves through the tunnel. When the air is pushed out of the tunnel, it makes a big boom.



⑥ The train company made a team to solve the problem. The team decided to slow down the trains before they went into the tunnels. This reduced the noise, but it increased the travel time.

⑦ Then an engineer on the team said to himself, “We can do better than this. Is there a way to manage sudden changes in air pressure?” One day, he found an idea in the design of a bird, the kingfisher. This bird has a long, pointy beak. Because of the beak’s shape, the bird can dive smoothly into water without much of a splash or noise.



⑧ The team tested a train design that imitated the kingfisher's beak. It worked. The design reduced air pressure in the tunnel. This lowered the noise trains made. In addition, trains could go faster and save energy due to the new design. This biomimetic design produced good results for people living nearby, travelers, and the company.

⑨ As all living things evolve, they develop specific adaptations to their environments. Burs stick to people and animals to spread the plant's seeds. With its long beak, a kingfisher can dive smoothly into water and catch fish. These and other ideas from nature inspire humans in many fields: engineering, design, art, and life. The wisdom of nature broadens our minds and helps us improve our lives.

[488 words]

New Words

- test(ed)** [tést(id)] 試す
- imitate(d)** [imətéit(id)] 模造する
- lower(ed)** [láuə(r)d] 減らす
- due** [dju:] (㊦)
- due to ...** ...のために
- nearby** [niə'baɪ] 近くに
- traveler(s)** [trævlə(r)(z)] 旅行者
- living** [liviŋ] 生きている
- evolve** [ivʊlv] 進化する
- develop** [divéləp] 発達させる
- specific** [spəsifik] 特定の
- adaptation(s)** [ædæptéifən(z)] 適応
- seed(s)** [si:d(z)] 種
- human(s)** [hju:mən(z)] 人間
- engineering** [éndʒənɪəriŋ] 工学
- wisdom** [wizdəm] 知恵
- broaden(s)** [brɔ:dn(z)] 広げる



Read

記事の要点をとらえよう。

Guide

記事の内容を整理しよう。

	参考にしたもの	参考にした特徴
面ファスナー	bur	It has hundreds of () (). The () easily catches onto () of clothing, animal fur, and other things.
新幹線	()	With a (), () beak, the bird can dive () into water without much of a () or ().

★ Goal ★

バイオミメティクスは人々にどのように役立ちますか。

By observing and learning from (), we can get ideas to () new products and technologies. The () of nature broadens our () and helps us () our lives.



ふり返し

- 主題と具体例に着目して、記事の要点を読み取ることができた。
- 書かれた内容を整理しながら、雑誌記事を読もうとした。