

4 Innovations from nature

LISTENING SKILLS Using visuals (1) and (2) • Listening for detail (1)

SPEAKING SKILLS Defining and describing objects • Helping the listener (3) and (4)

RESEARCH Using the Internet (2)

VOCABULARY DEVELOPMENT Register (1) • Multi-word verbs

LISTENING Biomimicry

- 1 Work with a partner. Look at the dictionary entries. Discuss what you understand by 'biomimicry'.
- 2 Look at Figures 1 and 2. Discuss the questions with a partner.
 - 1 How do the shoes close?
 - 2 What is sticking to the denim material?
 - 3 How do they stick there?

bio- /'baɪəʊ/ **prefix** (in nouns, adjectives and adverbs) connected with living things or human life: *biology* ◊ *biodegradable*

mimic² /'mɪmɪk/ **noun** [C] a person who can copy sb's behaviour, movements, voice, etc. in an amusing way ► **mimicry** /'mɪmɪkri/ **noun** [U]

Biomimicry: an introduction – how nature has inspired inventions

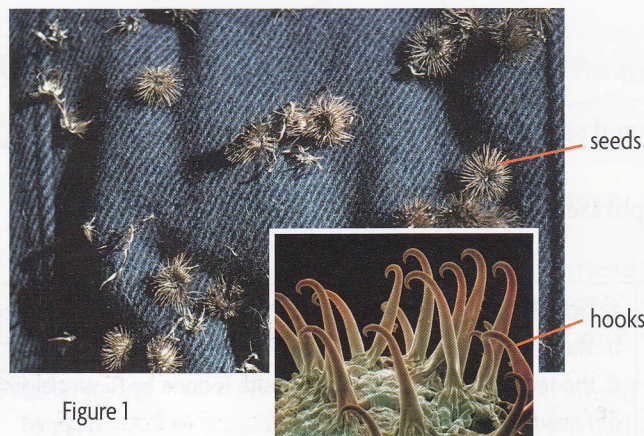


Figure 1

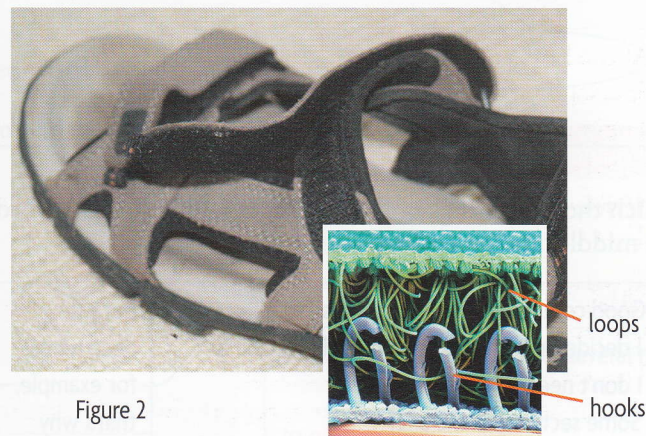


Figure 2

- 3 4.1 Listen to a talk on biomimicry. Work with a partner. Discuss what you think the main topics of the talk are.
- 4 **Read STUDY SKILL** 4.1 Listen again and use Figures 1–2 to answer the questions.
 - 1 When did George de Mestral go for a walk in the countryside?
 - 2 What did he notice after his walk?
 - 3 How long did it take for de Mestral to invent Velcro?
 - 4 What material is Velcro made of?
 - 5 How does Velcro stick together?
 - 6 What happens when you pull Velcro open?
 - 7 What is Velcro used for?
- 5 Match words 1–4 with definitions a–d.

- | | |
|-----------------------------------|---|
| 1 ☐ hook | a small, hard part of a plant, from which a new plant can grow |
| 2 ☐ loop | b to close or join two parts of something |
| 3 ☐ fasten | c a curved piece of metal, plastic, etc. that is used for hanging something on or catching fish |
| 4 ☐ seed | d a curved or round shape, made by a line curving round and joining or crossing itself |

STUDY SKILL Using visuals (1)

New or important words are often presented in labelled pictures and diagrams in a talk. Study these diagrams and pictures while you listen to help you understand.

- 6 **Read STUDY SKILL** Look at Figures 3 and 4 and label them with the words in the box.

surface blood vessels cut hairs

fibres resin hole

Biomimicry

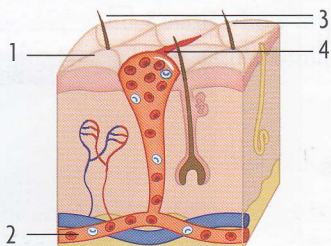


Figure 3: A cross-section through skin

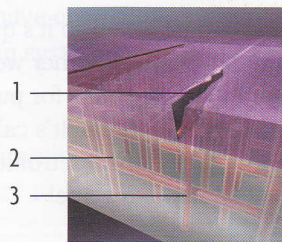


Figure 4: Self-healing plastic

4.2 Listen to a radio programme on other examples of biomimicry and check your answers.

- 7 4.2 Listen again and complete the sentences.

- You can see the _____ of the skin at the top, with a few _____ coming through.
- At the bottom, there are red and blue _____.
- Special blood cells move from the _____ to the _____.
- These cells _____ the bleeding and _____ the healing, or repairing process.
- These fibres, which contain _____, go horizontally and vertically through the material.

- 8 **Read STUDY SKILL** 4.3 Listen to the extracts and complete the sentences which rephrase the words in bold.

- This is the material that **fastens**, or _____ things.
- He noticed that the seeds stuck **repeatedly**, so he could remove the seed and stick _____.
- When the loops and hooks are separated, they produce a **characteristic ripping sound**. This is _____ tearing.
- What happens when you cut yourself? Your body **heals**, or _____.

- 9 4.4 Complete the sentences with a word or phrase in the box. Listen and compare your answers.

These are This is This those that or

- Scientists are studying spider silk. _____ the material that spiders make.
- The silk is made up of polymers. _____ long chains of connected molecules.
- Lizards can walk up walls. How do they manage to adhere to, _____ stick to the wall?
- Energy-efficient processes, _____ use less energy, are necessary today.
- Many people talk about sustainable development. _____ aims to protect the environment for the future.

STUDY SKILLS Using visuals (2)

While you listen to a lecture or presentation, draw pictures or diagrams and label them. This will help you remember important information and new vocabulary.

STUDY SKILL

Listening for detail (1)

In presentations and lectures, speakers often repeat or rephrase important information. If you miss the information you need, or don't understand something, it is important to continue listening for any repetition or explanation, e.g.

*I'd like to talk about self-healing plastics. **These** are plastic materials that can heal or repair themselves.*

SPEAKING Describing objects

- 4.5 Listen to a student describing a gadget she has. Look at Figures 5–7 and tick the one she is talking about.
- Read STUDY SKILL** There are five mistakes in the description of the object below. Look at Figure 7 and correct the mistakes.

It's a really useful object. It's made of metal and it's small so it's quite light. It has a lot of faces and each one is pentagonal in shape, in other words, it has four sides. In the middle of each face there are two points for putting a plug into. Then there's a cable which is plugged into a phone. It's called an e-ball multi-plug adaptor and it's used to adapt plugs from electronic devices to an electrical supply. It's great and everyone should have one!

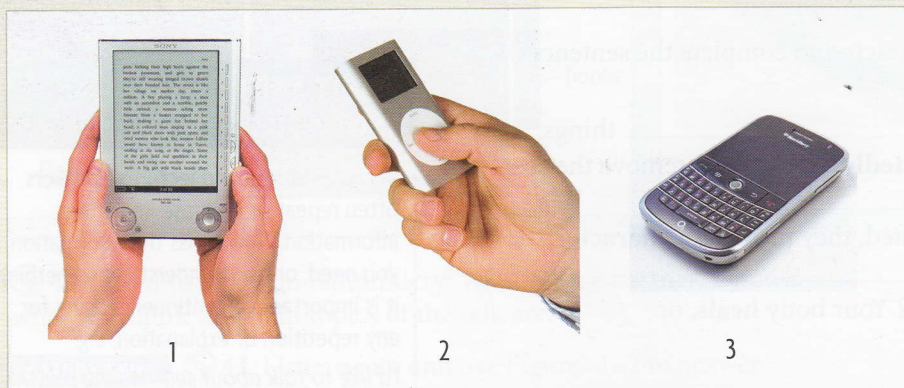
- 4.5 Listen again and check.

STUDY SKILL Defining and describing objects

If you can't remember the word for an object, define or describe it.

- Use words such as *object, thing, machine, material, device*, e.g. ... *an object that ...*
- Give a description, e.g. *It's pentagonal in shape. It's made of plastic.*
- Describe its purpose, with *for + -ing*, e.g. *It's for putting a plug into* or *to + verb*, e.g. *It's used to connect a lot of plugs.*
- Use relative pronouns, such as *which* or *that* (informal), e.g. *There's a cable which is plugged into the wall.*

- Choose an object and write a description of it. Work with a partner. Take turns to read your descriptions and guess what the objects are.



- You have three minutes to prepare a one-minute talk on an object. Answer the questions below to make notes. If you can't remember the word for something, define or describe it.

What is the object?	What does it look like?	What is it used for?	Why do you use it?
•	•	•	•
•	•	•	•
•	•	•	•

- Work with a partner. Take turns to give and listen to each other's talks.

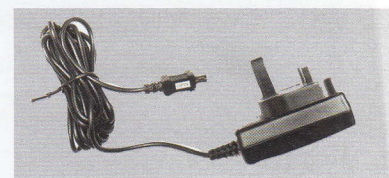


Figure 5 ☐



Figure 6 ☐

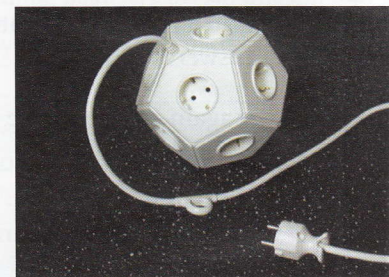


Figure 7 ☐

Structuring a talk

6 Read STUDY SKILL 4.6 Listen and complete the introduction to a talk.

1 _____ how nature has inspired architecture.
2 _____ to it – 3 _____ a
description of a natural construction which keeps a constant temperature
and 4 _____, how architects have copied this system
and built a high-rise building with a similar cooling system.

7 Complete the sentences taken from a talk with expressions from the Language Bank.

1 _____ a piece of technology that has made my life
much easier – the credit card. 2 _____ – firstly, a short
history, 3 _____, the advantages and disadvantages of
a credit card, and 4 _____, how it affects my life. If you
5 _____, you can see one of the first credit cards ever
made. That is the end of part three. So, 6 _____, you
can see how important a credit card is today.

8 Read STUDY SKILL 4.8 Listen and mark the pauses (/) in the sentences.

- 1 When a hole forms in the surface of the material, the resin moves to the hole and blocks it, or closes it.
- 2 This material can be used to cover the surface of different machines, like aeroplanes, and so improve their safety.

9 4.9 Listen and read the paragraph. Mark the pauses (/). Work with a partner. Take turns to read the paragraph aloud.

Swimmers and other athletes are always trying to swim faster, using less energy. To do this, they must wear clothes which produce very little friction, or resistance, when they move through the air or water. Scientists who design these clothes have studied some of the fastest fish in the sea, sharks. They have copied the skins of these animals and invented a material which reduces friction. The result is that swimmers can swim even faster and be more energy efficient.

RESEARCH

1 Read STUDY SKILL You are going to give a two-minute talk about a piece of technology or a process.

- 1 Choose a piece of technology to talk about.
- 2 Find some information about it.
- 3 Find a diagram or picture of it.
- 4 Write notes on your talk.
- 5 Use expressions from the Language Bank.

2 Give your talk, describing your object and pausing where necessary.

STUDY SKILL

Helping the listener (3)

Help listeners understand your talk by structuring it clearly. Use expressions to show:

- the beginning, middle, and end of a talk
- the visuals you are referring to

LANGUAGE BANK

Expressions for structuring talks

Beginnings and endings

I'd like to talk about ...

My talk today is about ...

There are (two / three) parts to it: ...

Firstly, ... Secondly..., Finally, ...

First of all, ...

To conclude / To sum up ...

Referring to visuals

As you can see in the picture, ...

The first / second / next slide shows ...

Look at Figure 2.

If you look at the diagram, you can see ...

This slide / picture / diagram shows ...

STUDY SKILL

Helping the listener (4)

In longer sentences, words are grouped together and said in phrases to make the sentences easier to understand, e.g.:

4.7

*There are two parts to it / – first of all, /
a description of a natural construction /
which keeps a constant temperature /
and secondly, / how architects have
copied this system / and built a high-rise
building / with a similar cooling system.*

STUDY SKILL

Using the Internet (2)

Images can be found on many websites, e.g.:

<http://images.google.com/>
<http://www.picsearch.com/>

Always give the source of any photograph you use with a complete reference, e.g.:

<http://en.wikipedia.org/wiki/Velcro>
(29/11/11)

VOCABULARY DEVELOPMENT Informal or formal?

1 **Read STUDY SKILL** Underline the more formal word.

- 1 adhere / stick
- 2 thing / object
- 3 invent / make
- 4 get / obtain
- 5 illustrations / pictures
- 6 prevent / stop

2 Underline the informal word or expression in the sentences which is inappropriate. Replace with a formal word or expression.

- 1 Scientists are inspired by lots of aspects of nature.
- 2 The professor thought the exam results were great.
- 3 The students were advised to watch a documentary on TV.
- 4 It is not OK to cancel an appointment at the last moment.
- 5 Schools are concerned about how much exercise kids take.
- 6 The lecture was sort of interesting.

4.10 Listen and check your answers.

3 Replace the formal word or expression in bold with an informal one from the box.

made stuck like much better get here thing

- 1 When did the speaker **arrive**?
- 2 The ring tone on his mobile is **similar to** mine.
- 3 We **produced** a model of the Formula 1 car in the lab.
- 4 This **object** is really great.
- 5 We **attached** the pieces of wood together.
- 6 My tutor said the second draft of my essay was a **great improvement**.

4 **Read STUDY SKILL** Replace the formal verb in bold with an informal multi-word verb from the box in its correct form.

get to go down go over think about carry on find out work out put off

- 1 The scientists **discovered** why the fish could swim so fast.
- 2 When he **arrived at** the library, he started writing his report.
- 3 I **reviewed** all my lecture notes before I wrote my essay.
- 4 **Continue** with the discussion until you agree.
- 5 Food prices **fell** by 5% last month.
- 6 Musical people can usually **solve** logical puzzles easily.
- 7 Don't decide until you have **considered** everything.
- 8 The meeting was **postponed** until next week.

5 Complete the questions with a multi-word verb from exercise 4 in its correct form. Work with a partner. Ask and answer the questions.

- 1 What time did you _____ college today?
- 2 Are you good at _____ mathematical problems?
- 3 Have you ever _____ changing your job/your studies?
- 4 Do you often _____ doing work until the last moment?
- 5 When you finish this course, will you _____ with your studies?
- 6 Do you always _____ your notes before an exam?

STUDY SKILL Register (1)

The register of language is the type of language you use, whether formal or informal. In an academic situation use formal language. In a more relaxed situation use informal language e.g.:

*All students will be able to **obtain** their results from the exams office. (F)*
*When did you **get** the results? (I)*

The register you use depends on the context or situation.

adhere stick
get obtain
prevent stop

STUDY SKILL Multi-word verbs

A multi-word verb is a verb combined with a preposition or adverb (or both) which can sometimes give a new meaning. These verbs are often informal, e.g.:

*The two parts of the Velcro can be **pulled apart** many times.*

*De Mestro **took** the seeds **off** his coat.*

REVIEW

- 1 You are going to listen to part of a lecture on how insects have inspired the building of an office block. Match the titles with the illustrations, using a dictionary to help you.

- a An office complex and shopping centre ____
b A cross-section through a termite mound ____

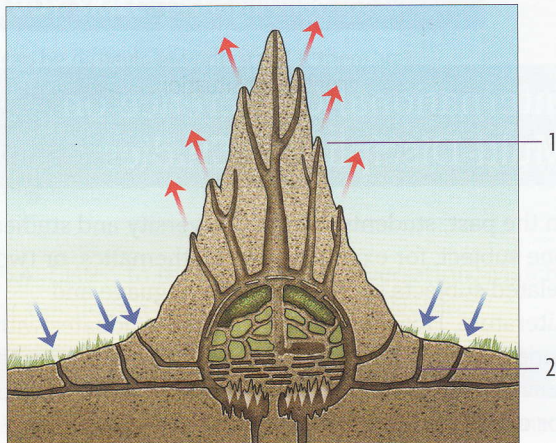


Figure 1

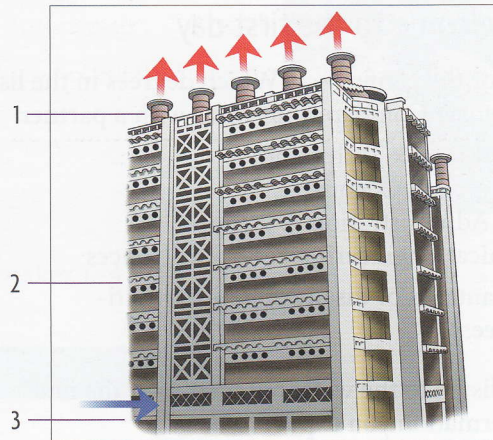


Figure 2

- 2 Label Figures 1 and 2 with the words in the box.

chimneys vents concrete arches chimneys vents

4.11 Listen and check your answers.

- 3 4.11 Listen again and answer the questions.

- Where is the Eastgate office complex and shopping centre?
- Why is the Eastgate Centre unusual?
- Why do termites open and close the vents in their mounds?
- How does warm air escape from the Eastgate Centre?
- What is the purpose of the concrete arches?
- Compared to other buildings, how much energy is used in the Eastgate Centre?

- 4 Replace the formal word or expression in **bold** with an informal one from the box. Work with a partner. Ask and answer the questions.

get out stay start left out asking

- Have you ever **omitted** a question in an exam? Why?
- What time does your first lecture **commence** in the morning?
- How late do you **remain** at university or college in the evenings?
- If you were **enquiring** about student accommodation, who would you contact?
- If you were stuck in a lift, what would you do to **escape**?