Science Arena

Dave Rear

最新科学の探求

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To Teachers and Students

The world of science and technology never sits still. Whether it concerns computers, robots, transportation, space, sports, health, or the environment, human beings are always pushing the boundaries of what is possible, seeking new ways to improve our lives and extend our knowledge. This book looks at some of the most interesting and exciting developments that are taking place in science today.

It is divided into five main sections, each with four units that illustrate the major theme. The first section deals with the human body. It looks at the world of sports science, showing what it takes to reach the very pinnacle of human performance. It also introduces people with abilities that might even be classed as 'superhuman'. In the second section, we examine developments in health and medicine. We investigate how scientists are attempting to combat serious health problems like antibiotic resistance and mosquito-borne diseases, while also turning to more everyday issues such as boredom, creativity, and sleep. The third section concerns the very important issue of nature and the environment. We dive into the Great Pacific Garbage Patch and examine its implications for our use of plastics and recycling. We learn about efforts to solve food shortages by growing crops in the desert, and get a glimpse of the scientific work being carried out in the frozen wastes of Antarctica. The fourth section is about the universe. Will human beings ever colonize Mars? Is a mysterious star in the universe evidence of alien life? Have humans caused environmental problems in space too? Finally, we reach the fifth and final section, entitled *Future Inspirations*. Here we look at some other cutting-edge advances in science, including quantum computers, high-speed transportation, and high-tech clothing.

To guide students through the topics introduced in the book, each unit has a number of different activities for them to complete. They consist of two vocabulary exercises, one pre-reading and the other post-reading, which give them practice in using the key terms introduced in the article. There are also two reading activities, designed to test the students' comprehension of both details and main ideas. Following this is a grammar activity which helps students to increase the complexity and accuracy of their sentence building, and a listening exercise that helps them learn the art of summarizing. The unit ends with a pair of discussion questions which encourage students to use their own experiences to think beyond the topic. Thank you for taking an interest in this book. I hope you enjoy using it!

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目次

Table of Contents

Section I: **Human Beings**

Section II: **Health**

Section III: **Nature**

Section IV: **Space**

Section V: **Future Inspirations**

Section I

Human Beings

Unit 1
Real-Life Superhumans

•

Unit 2
The 10,000-hour Rule

•

Unit 3
Why are Human Brains So Big?

•

Unit 4
The Advances of Sports Science

UNIT 1

Real-Life Superhumans

あなたの周りにいる超能力者たち

スパイダーマンや X-MEN のような超能力を持つ人間は、SF 映画の中だけの存在なのでしょうか。実は私たちの住むこの世界にも、そのような能力を持つ人々が存在するのです。それらの人々には、どのような超能力が備わっているのか、また、どのようにその能力を得たのかをご紹介しましょう。

Key Vocabulary

次の単語について、その定義を結びつけましょう。

1. discover	**(a)** a problem or fault that makes something not perfect
2. ability	**(b)** to find or invent something new
3. regard	**(c)** to change to fit a new situation
4. defect	**(d)** a power or skill to do something
5. adapt	**(e)** to view something in a particular way

Reading

CD 1-2〜6

CD 1-2 Have you ever dreamed of having a superpower? Do you wish you could fly like Superman, climb like Spider-Man, or run like the Flash? Or perhaps you'd like to be able to transport yourself instantly from one place to another so you would never be late for class? Unfortunately, superheroes only exist in science fiction. Or do they? As a matter of fact, around the world scientists have discovered a surprising number

of people who possess abilities that might be regarded as superhuman.

CD 1-3 Take Liam Hoekstra in the United States, for example. When Liam was just five months old, he was not only able to walk, he could support his entire body on his arms. Less than a year later, he was pushing heavy furniture around his house, lifting weights, and climbing ropes in his local gym. He could eat constantly without gaining weight and had almost no body fat. It turned out that Liam's super strength had come about through a genetic mutation, rather like the X-Men we see in the movies. He was diagnosed with a rare condition which leads to a lack of proteins that regulate muscle development. Now Liam is 15 years-old and, since there are fortunately no health problems associated with his condition, he is free to enjoy a normal life with his family and friends.

CD 1-4 Genetic mutation has given rise to other superhuman abilities too. In Pakistan, researchers discovered a street performer who could cut himself with knives without feeling pain. His condition was caused by a defect in the SCN9A gene, which meant pain did not flow from the nerves to the brain. Scientists hope that the discovery might help them to find a way to treat people suffering from chronic pain.

CD 1-5 Another group of superhumans are the Bajau Laut people from south-east Asia, who spend all their lives in houseboats or villages built on top of coral reefs almost two kilometers out to sea. They spend 60 per cent of their time in or under the water, which is the equivalent to a sea otter. Making their living from free-diving fishing, these so-called 'human fish' can descend 20 meters to the ocean floor without scuba equipment and hold their breath for five minutes by slowing their heartbeats to 30 beats per minute. Many of their children have eyes that have adapted to the sea, enabling them to see twice as clearly under water as normal people.

CD 1-6 These are just a few examples of people around the world in possession of what might be considered as superhuman powers. So next time you watch a superhero movie on television, just think. Someday you might get to meet one in real life.

note

genetic mutation 遺伝子の突然変異　**diagnose** 診断する　**condition** 病状，病気
protein タンパク質　**chronic** 慢性の　**sea otter** ラッコ

Reading Comprehension

次の文が本文の内容と一致する場合 T、一致しない場合は F を記入しましょう。

1. (　　) Although some people have special abilities, they shouldn't be regarded as superhuman.

2. (　　) It became clear that Liam Hoekstra had amazing strength even when he was a baby.

3. (　　) Liam gained his strength by training hard in the gym.

4. (　　) The gene SCN9A might be a key for helping people who suffer from untreatable pain.

5. (　　) The Bajau Laut are able to breathe under water thanks to a genetic mutation in their lungs.

Finding Details

次の質問に英語で答えましょう。

1. As well as walking, what could Liam Hoekstra do before he was one year old?

_____

2. What is the function of the SCN9A gene?

_____

3. What are the children of the Bajau Laut able to do better than ordinary people?

_____

Vocabulary in Context

次の英文の空所に入れるのに正しい語句を下から選びましょう。

1. Scientists hope that the discovery could (　　) a new way to treat chronic pain.

2. Since it is such a rare (　　), doctors do not yet understand it fully.

3. After a lot of research, the cause of the superhuman ability was found to be (　　).

4. The new machine should (　　) the factory to produce goods much more quickly.

5. 100° Celsius is (　　) to 212° Fahrenheit.

genetic	condition	lead to	equivalent to	enable

Writing

次の英文の [ ] 内の単語を並び替えて、意味の通る文にしましょう。

1. 科学者たちは、超人的な能力を持つと思われる人々の発見に驚いた。
Scientists were surprised to find [abilities people superhuman seem who possess to].

_____

_____

2. バジャウ・ラウトの人々は、長い時間息を止めるために心拍数を減らす。
The Bajau Laut people slow their [to heartbeats hold in breath order their] for a long time.

_____

_____

3. 遺伝子の突然変異の結果、彼は痛みを感じることなく自分に切り傷をつけることができる。
As a result of a genetic mutation, he [experiencing without could himself cut pain].

_____

_____

Listening Summary

CD 1-7

次の英文を聞いて、空所を埋めましょう。

Superhumans come from science fiction and [1] _____ in the real world. Or do they? Surprisingly enough, there are a number of people around the world who [2] _____ that could be classed as superhuman. One of these people is Liam Hoekstra, a young boy who gained super strength even when he was just a baby. The reason for Liam's super strength was [3] _____ _____ which meant that he lacked proteins that control muscle development. Another superhuman also gained his ability from a genetic mutation. This was a street performer in Pakistan who [4] _____ with knives without feeling any pain. A third group of people are the Bajau Laut in south-east Asia. They spend as much time under the water as sea otters, and over time [5] _____ _____ themselves to their lifestyle by learning to dive to the ocean floor and [6] _____ for long periods. You never know, one day you might meet a real-life superhero.

Express your Ideas

次の英文を読んで、自分の考えを書きましょう。

1. Which of the three examples of superhumans in the article surprised you the most?

_____

_____

_____

2. If you could have any superpower, what superpower would you like to have and why?

_____

_____

_____