INTO FOCUS B2

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Students' Book

TEXT AND TALK ON PERSONAL GENETICS

3 GOOD HEALTH AND WELL-BEING

PART 1 – TUNING IN

DNA 147

DNA, or deoxyribonucleic acid, is a molecule containing the biological instructions that make each species unique. DNA, along with the instructions it contains, is passed from adult organisms to their successors during reproduction.
DNA is extracted from human cells for a variety of reasons. With a pure sample of DNA you can test a newborn for a genetic disease, analyse forensic evidence, or study a gene involved in cancer.
Technological developments are making it possible to read a person's entire genetic code, or genome, more rapidly and at a lower cost than ever before.
Personal genome sequencing allows scientists and doctors to better understand the connections between genes and human health, to improve medical care and to help extend people's lives.

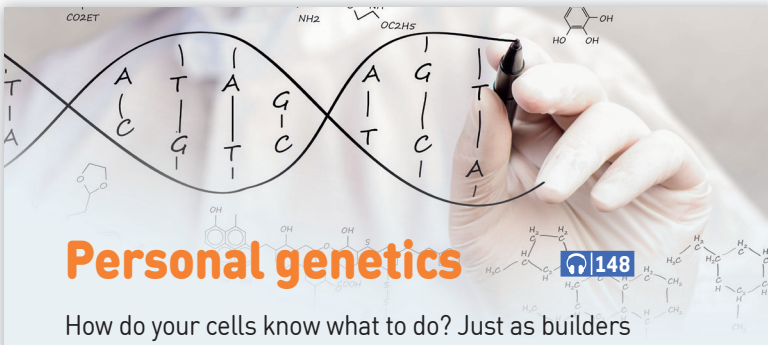
1 147 **Read and listen to the text. In pairs, discuss the following.**
Aside from health and medical information, what else might you be curious to learn about from your DNA?

2 **DIGITAL** LITERACY **Do a web search and use the words below to complete the chart of milestones in the history of human genetics.**

Oswald Avery • factors or genes • a technique to read chemical bases of DNA • a first draft of the human genome • Francis Crick

Important dates	Protagonists	What they did
1866	Gregor Mendel	He discovered 1 _____
1943	2 _____	He discovered genes are made of DNA.
1953	James Watson, 3 _____	They discovered the structure of DNA (double helix).
1975	Fred Sanger Walter Gilbert	They developed 4 _____
2000	Scientists	They completed 5 _____

PART 2 – FINDING OUT



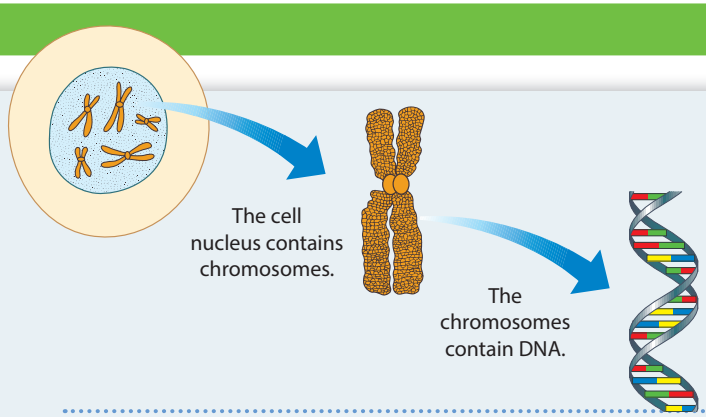
Personal genetics 148

How do your cells know what to do? Just as builders have detailed instructions to tell them how to build a house, your cells also have instructions. Your cells' instructions are molecules of DNA, or deoxyribonucleic acid. DNA is found within a person's genes. Genes are small structures found in chromosomes.
Each chromosome contains a single DNA molecule. Humans have 23 pairs of chromosomes, which are found inside the cell's nucleus.
DNA is made of a very long chain of nucleotides. In fact, in you, the smallest DNA molecule has over 20 million nucleotides.
Nucleotides are composed of three main parts:
1 a phosphate group;
2 a 5-carbon sugar (deoxyribose in DNA);
3 a nitrogen-containing base.
The only difference between each nucleotide is the identity of the base. There are only four possible bases that make up each DNA nucleotide: adenine (A), guanine (G), thymine (T), and cytosine (C).

3 148 **VOCABULARY Read and listen to the text. Match the words 1–4 with the corresponding definitions a–d.**

1 DNA ☐ **3** chromosome ☐
2 gene ☐ **4** nucleotide ☐

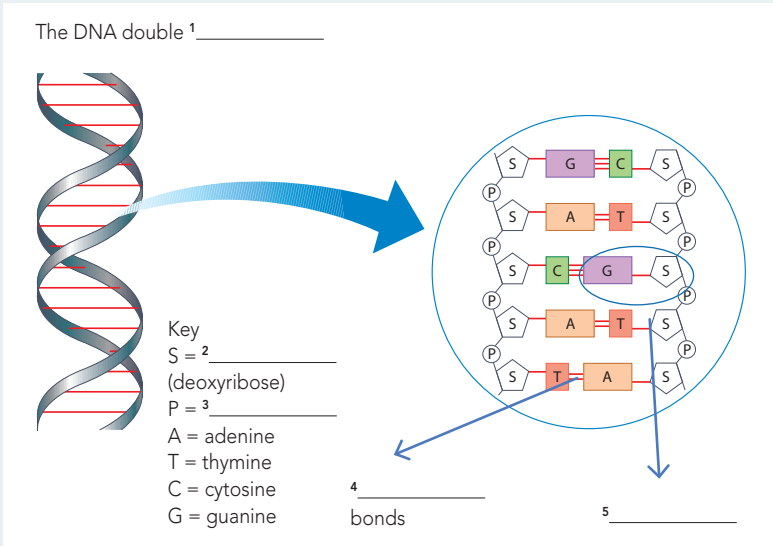
a Found in the nucleus of cells, they carry genes, smaller units that contain DNA, the code of life.
b The genetic material contained in every cell and unique to each individual.
c The basic structural unit and building block for DNA. These building blocks are hooked together to form a chain of DNA. They are of great importance to living organisms, as they are the building blocks of nucleic acids, the substances that control all hereditary characteristics.
d The specific region of the DNA in a chromosome that contains instructions for developing particular characteristics.



The Genetic Code
The various sequences of the four nucleotide bases make up the genetic code of your cells. It may seem strange that there are only four letters in the 'alphabet' of DNA. But since chromosomes contain millions of nucleotides, there are lots of different combinations possible with only four letters.

DNA structure 149

DNA is made of two strands of nucleotides formed into a double helix, or a two-stranded spiral.
A DNA molecule consists of two strands that wind around each other like a twisted ladder. Each strand has a backbone made of alternating groups of sugar (deoxyribose) and phosphate groups. Attached to each sugar is one of four bases: adenine (A), cytosine (C), guanine (G), or thymine (T).
A and T, and G and C, are 'complementary bases,' or bases that always pair together, known as a base-pair.
The base-pairing rules state that A always binds to T, and G always binds to C. For example, if one DNA strand reads ATGCCAGT, the other strand will be made up of the complementary bases: TACGGTCA.
Hydrogen bonds hold the complementary bases together, with two bonds forming between an A and a T, and three bonds between a G and a C.



4 149 **VOCABULARY** **Read and listen to the text. Label the different parts of the image of a DNA molecule with the words below.**

helix • hydrogen • nucleotide • phosphate • sugar

5 **Complete the text with the words in the box.**

bases • genes • G • complementary living organisms • sugar • double helix • nucleotide • T • genetic information

6 **Answer these questions.**

1 With what base does adenine (A) pair?
2 With what base does guanine (G) pair?
3 What is the smallest unit of DNA called?
4 What is the shape of the DNA molecule?
5 What is the name of the sugar in the DNA backbone?
6 Suppose you know the sequence of bases on one DNA strand is AGCTCAG. What is the sequence of bases on the opposite strand?

- DNA carries the [1]_____ in all types of [2]_____ . Each DNA molecule contains multiple [3]_____ .
- DNA consists of two strands of nucleotides wound together in a spiral called a [4]_____ . Each [5]_____ is composed of a phosphate group, a sugar molecule, and one of four different nitrogenous [6]_____ : adenine (A), thymine (T), guanine (G), or cytosine (C). The phosphate and [7]_____ parts of the nucleotides form the backbone of each strand in the DNA double helix.
- The bases extend toward the centre of the double helix, and each base in one strand is matched with a [8]_____ base in the other strand. In accordance with the base-pairing rules, A pairs with [9]_____ and [10]_____ pairs with C.

1 Live and learn

"If you think education is expensive, try ignorance."

Derek Bok (1930) – former president of Harvard University

BBC VIDEO LEAD IN

BBC VIDEO 1 Watch the video and answer the questions.

- What new skill are Chris and Tahoe going to learn?
- Is it easier to learn a new skill as a child, a teenager or an adult? Why?
- Is there a new skill you would like to learn?

FOCUS ON BBC VIDEO ➤ p. 130

VOCABULARY
Education

SHOW WHAT YOU KNOW

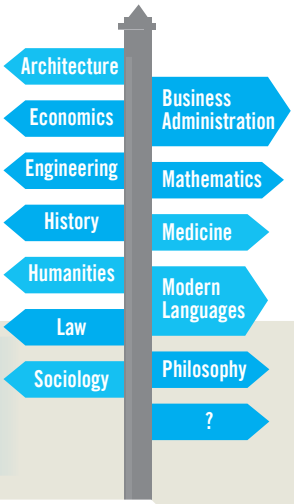
1 Match the words to make collocations.

1 arts/Bachelor's/Master's	☐	a career
2 attend/have/skip	☐	b degree
3 communication/language/people	☐	c education
4 fail/pass/take	☐	d exams
5 further/higher/private	☐	e lessons
6 long/rewarding/successful	☐	f skills

2 Write two true sentences and one false sentence using collocations in Exercise 1. Can your partner guess which one is false?

I'd like to do a Master's degree in business studies.

3 Look at some traditional fields of study on the signpost. What are the three most/least appealing subjects? Which way would you go? Discuss your ideas with a partner.



4 002 Read and listen to the information on the webpage. Which degree would you like to do most?

DEGREE COURSES YOU DIDN'T KNOW EXISTED

Is this you?

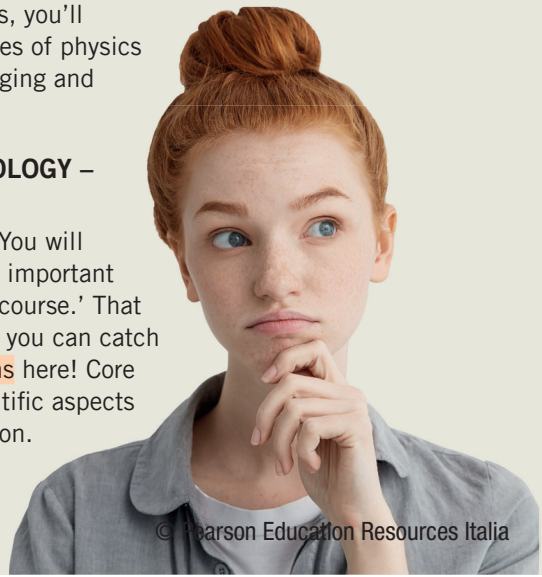
You're keen to **go on to** higher education. But none of the traditional subjects appeal. Don't worry, these days you can get a degree in most things. You like baking? You can **major in** baking technology management. More inclined towards fashion? How about writing a dissertation on handbag and accessories design? If you have a passion for something, you can usually find a course that specialises in your area. Here are three courses you never knew existed.

1 THE SCIENCE OF SUPERHEROES –
University of California, USA

This course is a new, creative way to learn physics. Through studying heroes and villains, you'll learn the answers to important real-life questions such as what the chemical composition of Captain America's armour is. In other words, you'll attend lectures on the real principles of physics but they'll be given in a more engaging and accessible way.

2 SURF SCIENCE AND TECHNOLOGY –
University of Plymouth, UK

The university website warns that 'You will not be taught how to surf, and it is important to realise that this is an academic course.' That means you don't graduate because you can catch a good wave – you have to sit exams here! Core modules include ecology and scientific aspects of health, fitness and sports nutrition.



5 003 **Listen to a father and daughter discussing the webpage. What does the daughter find out about her father?**

6 003 **Listen again and choose the correct options. Use a dictionary if necessary.**

1 The daughter is *gifted* / *weak*.
2 The daughter is *lazy* / *a swot* compared to her father.
3 The father couldn't ***settle down*** / *make friends* in class.
4 The father was *disruptive* / *self-disciplined*.
5 The father nearly *got expelled* / *got a scholarship*.
6 The father had *lenient* / *strict* teachers.
7 The father's teachers ***gave up on*** / *supported* him.
8 The father was *dyslexic* / *a bully*.
9 The father *did well* / ***fell behind*** at school.
10 The father ***scraped through*** / *failed* his exams.

7 FOCUS ON YOU What do you know about your parents' education? Discuss with a partner.

FOCUS ON WORDS | Phrasal verbs

8 004 **Complete the definitions with the base form of the phrasal verbs in red in the text and in Exercise 6. Then listen, check and repeat.**

1 become calm or confident = *settle down*
2 do sth after finishing another thing = _____
3 make less progress than others = _____
4 only just succeed in doing sth = _____
5 start working in a type of job = _____
6 quit doing sth; stop hoping sb will change = _____
7 study sth as your main subject = _____

9 Complete the questions with the correct prepositions. In pairs, ask and answer the questions.

1 How often do you only just scrape _____ exams?
2 If you go _____ university what subjects do you think you will major _____ ?
3 In what subject or lesson do you find it most difficult to settle _____ and concentrate?
4 What profession would you like to go _____ ?

❸ BEATLES, POPULAR MUSIC AND SOCIETY – Liverpool Hope University, UK

If you enrol on this course, you'll deepen your knowledge of the band's music as well as how it was influenced by the city of Liverpool. The Beatles not only changed the world of music, but they also had a big impact on youth culture and fashion. This course will be of interest to those working in the field of cultural studies and if you want to go into the music industry.

FOCUS ON WORDS | Teachers and students

10 005 **Translate these words from Exercise 6. Then listen and repeat. Which words are used more often to describe a student (*S*) and which ones to describe a teacher (*T*)?**

1 a bully	☐	5 lenient	☐
2 disruptive	☐	6 self-disciplined	☐
3 dyslexic	☐	7 strict	☐
4 gifted	☐	8 a swot	☐

11 Complete the sentences with the words in Exercise 9.

1 Mr Morris is a _____ teacher. He doesn't mind if you hand your homework in late.
2 Jackie is _____ . She spends all her time studying and always gets top marks.
3 May is musically _____ . She can play almost any instrument and has a beautiful voice.
4 Barry is quite _____ in class. He shouts out and generally causes problems.
5 Mike is very _____ . He always does his homework as soon as he gets home.

FOCUS ON WORDS | Collocations

12 006 **Complete the collocations with the base form of the verbs highlighted in the text and in Exercise 6. Then listen, check and repeat.**

1 *attend*/_____ a lecture
2 _____ of interest to sb
3 _____ your knowledge
4 _____ on a course
5 _____ a degree/a scholarship
6 _____ expelled
7 _____ a passion for sth
8 _____ exams
9 _____ in the field(s) of sth
10 _____ a dissertation

13 FOCUS ON YOU Complete the sentences. Do you agree or disagree with them?

1 Don't enrol on a university _____ unless you have a _____ for it.
2 Sitting _____ is much more stressful than writing a _____ .
3 Getting a _____ to study at a foreign university is an impossible dream.
4 You don't have to attend _____ to deepen your _____ . Just Google everything.