9 Science and technology

Reading and Use of English

Part 5 Exam task

You are going to read a newspaper article about an exciting discovery. For questions **1–6**, choose the answer (**A**, **B**, **C** or **D**) which you think fits best according to the text.

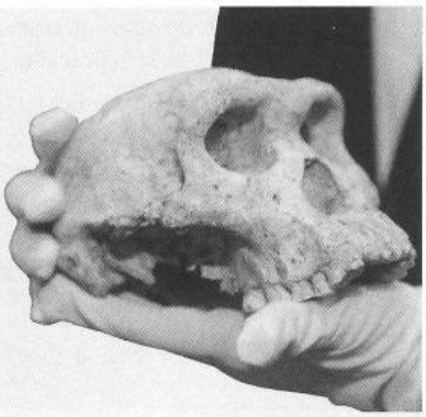
Spectacular skull discovery in Georgia

The spectacular fossilised skull of an ancient human ancestor that died nearly two million years ago has forced scientists to rethink the story of early human evolution. Anthropologists, scientists who study human development, unearthed the skull at a site in Dmanisi, in southern Georgia in the west of Asia, where other
7 remains of human ancestors, simple stone tools and long-extinct animals have been dated to 1.8 million years old. Experts believe the skull is one of the most important fossil finds to date, but it has proved as controversial as it is amazing. Analysis of the skull and other remains at Dmanisi suggests that in the past scientists may have been too ready to give different names to species of human ancestors who were discovered at different places in Africa. Many of those names may now have to be wiped from the textbooks.

The latest fossil is the only complete skull ever found of a human ancestor that lived at the time when our predecessors first walked out of Africa. The skull adds to
20 a collection of bones recovered from Dmanisi that belong to five individuals, most likely an elderly male, two other
22 adult males, a young female and a juvenile of unknown sex.

24 The site was a busy watering hole that human ancestors shared with giant extinct cheetah-like animals, sabre-toothed cats and other beasts. The carcasses of the
27 individuals were found in collapsed dens where carnivores had apparently dragged them to eat. They are thought to have died within a few hundred years of one another. 'Nobody has ever seen such a well-preserved skull from this period,' said Christoph Zollikofer, a professor at Zurich University's Anthropological Institute, who worked on the remains. 'This is the first complete skull of an adult early Homo. They simply did not exist before,' he said. Homo as a species emerged around 2.4m years ago and includes modern humans.

But while the skull itself is spectacular, it is the implications of the discovery that have caused scientists in the field to pause for thought. Over decades excavating sites in Africa, researchers have named half a dozen different species of early human ancestor, but most, if not all, are now on shaky ground. The most recently unearthed individual had a long face, big teeth, and a very small braincase.



The remains at Dmanisi are thought to be early forms of *Homo erectus*, the first of our relatives to have body proportions like a modern human. The species arose in Africa around 1.8m years ago and may have been the first to harness fire and cook food. The Dmanisi fossils show that *Homo erectus* migrated as far as Asia soon after appearing in Africa.

The latest skull discovered in Dmanisi probably belonged to an adult male and was the largest of the collection. It had a long face and big teeth. But at just under 550 cubic centimetres, it also had the smallest braincase of all the individuals found at the site. The odd dimensions of the fossil prompted the team to look at normal skull variation, both in modern humans and chimps, to see how they compared. They found that while the Dmanisi skulls looked different from one another, the variations were no greater than those seen among modern people and among chimps.

The scientists went on to compare the Dmanisi remains with those of supposedly different species of human ancestors that lived in Africa at the time. They concluded that the variation among them was no greater than that seen at Dmanisi. Rather than being separate species, the human ancestors found in Africa from the same period may simply be normal forms of *Homo erectus*.

'Everything that lived at the time of the Dmanisi remains was probably just *Homo erectus*,' said Professor Zollikofer. 'We are not saying that scientists did things wrong in Africa, but they didn't have the reference points we have. Part of the community will like it, but for another part it will be shocking news.'

David Lordkipanidze at the Georgian National Museum, who leads the Dmanisi excavations, said: 'If you found the Dmanisi skulls at isolated sites in Africa, some people would give them different species names. But one population can have all this variation. Five or six names are being used, but they could all be from one family.'

1 The discovery at Dmanisi showed that
   A existing theories of human development were correct.
   B scientists had given our human ancestors the wrong names.
   C previous ideas about human history may have been wrong.
   D some of our human ancestors did not originate in Africa.
2 According to the text, what is special about the most recent find at Dmanisi?
   A It was found in one piece.
   B It belonged to an old man.
   C It was the first human skull.
   D It is African in origin.
3 What had scientists assumed about skulls they had previously found in Africa?
   A They were much older than the skulls found at Dmanisi.
   B They were the remains of several distinct classes of early humans.
   C They belonged to humans who first used fire for cooking.
   D They might have belonged to a type of monkey.
4 How did the skulls found at Dmanisi compare with those of modern humans?
   A They were completely different.
   B They contained smaller braincases.
   C They were much larger.
   D They varied in size to a similar extent.
5 What do scientists now think about early humans found in Africa?
   A They almost certainly belonged to the same species.
   B There were more different species than they had thought.
   C They were of a completely different species from those found at Dmanisi.
   D They were not ancestors of human beings.
6 Who does Professor Zollikofer think will be shocked by the discovery at Dmanisi?
   A people of all kinds
   B everyone involved in archaeology
   C some scientists working in archaeology
   D the people of Dmanisi

Vocabulary

Answer these questions referring to a dictionary if necessary.

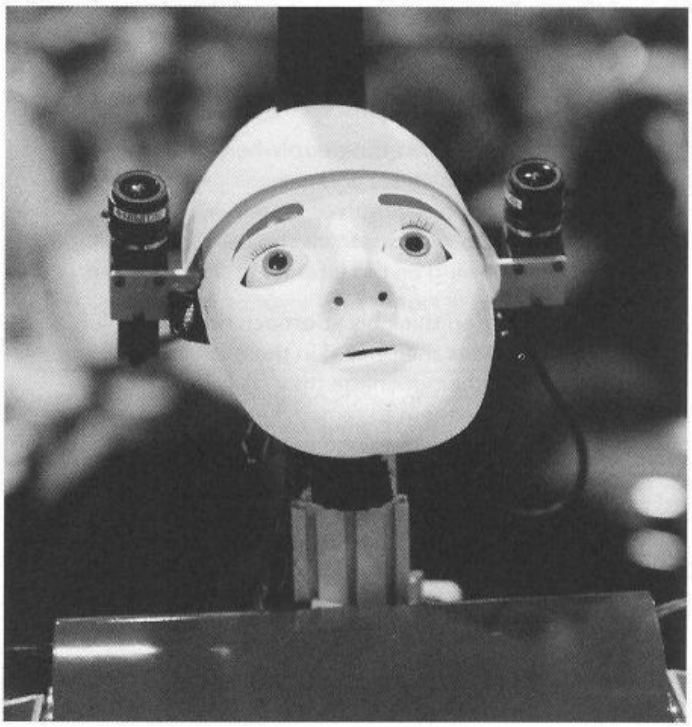
1 Does the word *long* in *long-extinct* (line 7) refer to time or shape?
2 *Recovered* (line 20) is a transitive verb meaning to retrieve or salvage. What is the intransitive meaning of this verb?
3 Is a *juvenile* (line 22) young or old?
4 What is the purpose of a *watering hole* (line 24)?
5 What kind of food do *carnivores* (line 27) eat?
6 What is the word *chimps* (line 67) short for?

Part 2 Exam task

For questions **1–8**, read the text below and think of the word that best fits each gap. Use only **one** word in each gap. There is an example at the beginning (**0**).

Example: (0) WITH

A robot **(0)** ..... an artificial brain is learning languages by stringing words and sentences together. Scientists in France have taught the robot to learn speech patterns and even to think before **(1)** ..... speaks. Our brains process spoken words in real time and anticipate **(2)** ..... is coming next, which allows us to hold meaningful conversations without pausing to stop and think. This is possible **(3)** ..... of connections between parts of the brain. Scientists have incorporated an artificial version of this structure into their robot, **(4)** ..... is designed to look like a three-year-old human. Their work could help researchers studying the brain by showing which pathways are important in processing language. But **(5)** ..... importantly, it could help robots learn more efficiently. **(6)** ..... to one of the scientists, 'At present, engineers are simply unable to program all the knowledge required in a robot, but we now know that the way robots acquire their knowledge of the world could **(7)** ..... partially achieved through a learning process – in the same way **(8)** ..... children.



Listening

Part 3 Exam task

10 You will hear an interview in which Karl Mann, a university research scientist, and Laura Fern, a secondary school science teacher, talk about teaching people science. For questions **1–6**, choose the answer (**A, B, C or D**) which fits best according to what you hear.

1 Karl Mann starts by talking about his work
- A as a research scientist.
- B with unintelligent people.
- C with non-experts.
- D as a school teacher.

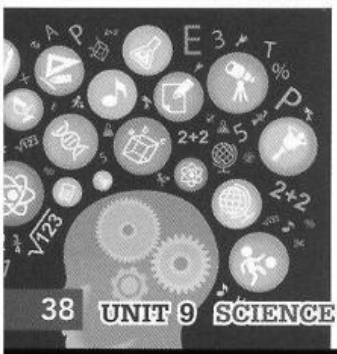
2 Laura Fern assumes that the people Karl works with
- A are not as bright as her students.
- B are over sixty years old.
- C are similar to the people she teaches.
- D are not as young as her students.

3 What does Karl think of the science curriculum Laura describes?
- A He approves of it.
- B He fears it might put students off.
- C He thinks it sounds too theoretical.
- D He thinks it will help students get into university.

4 In Laura's experience as a teacher,
- A girls have a deeper understanding of science.
- B boys and girls perform equally well at science.
- C girls avoid getting jobs which involve science.
- D boys and girls approach science in different ways.

5 Karl points out that the people he works with
- A need to pass tests and exams.
- B have a limited length of time to learn.
- C attend his sessions from choice.
- D are renewing an old interest in science.

6 How does Karl think his approach helps people?
- A It increases their belief in themselves.
- B It helps them manage their daily lives.
- C It enables them to remain healthy.
- D It enables them to understand scientific theory.



Grammar

Modal verbs

1 Complete these sentences using the words in italics and an appropriate modal verb. Sometimes more than one modal verb can be used.

1 Our car broke down on the motorway, so *we / call* a breakdown company.

2 We arrived on time but the meeting was cancelled which means *we / hurry*.

3 I've lost my glasses which means *I / read* my emails this evening.

4 If you feel as ill as you look, *you / go* to work tomorrow.

5 Omar is usually home by now. I suppose *he / get* stuck in a traffic jam.

6 There's no strict uniform policy at this college, so *you / wear* smart clothes if you don't want to.

7 It's important that my application reaches the company tomorrow, so *you / forget* to post my letter.

8 They're expecting us quite early, so if we're going to be late, *we / let* them know.

2 Work out what's happening from these descriptions and make a deduction like the example. Use the following modals in your answers: *must be, can't be, might be.*

1 You haven't seen Ben for some time, but the bathroom door is closed and you can hear water running.
Ben must be having a shower.

2 There's loud music and people's voices coming from a neighbour's flat.

3 The friend you are with suddenly says "Isn't that your brother?" Your brother is working abroad.

4 You wake in the middle of the night and hear noises coming from your kitchen.

5 Dan has arranged to come to your house at 7 o'clock. At 6.30 there is a knock at your door.

6 You are woken by the sound of your neighbour starting his car. It's earlier than usual.

Writing

Part 2 Exam task: report

Result links

1 Complete these sentences with the correct linking word or phrase from this list. In some cases, more than one answer is possible.

as a consequence	consequently	in view of
on account of	or else	otherwise
owing to	result in	

1 Twenty minutes of moderate exercise should ..... slight shortness of breath.
2 The government has accepted that climate change is a fact and has, ... introduced new green policies.
3 The health authority has closed a hospital ward ..... the recent epidemic.
4 Don't forget to check the oil level in your car, ... you could do serious damage to the engine.
5 ..... the high temperatures, many rivers dried up.
6 More snow than usual has fallen this month and ..... transport services have been disrupted.

2 Read the exam task and the model answer which follows. As you read the report, match these headings with the appropriate sections. There are two more headings than you need.

Attracting adults
Conclusion
Environmental concerns
Food and health
Introduction
The importance of science
Useful classes

Your school or college is thinking of putting on science classes for adults in your neighbourhood. The director has asked you to write a report on the kinds of classes that would be appropriate.

Your report should suggest reasons why such classes are necessary, suggest specific science topics that might be of interest to adults, and suggest ways of encouraging people to attend the classes.

Write your **report**.

Science classes for adults

A .....
Research shows that many adults do not understand basic scientific ideas. In view of the increasing importance of science, it has been suggested that the college puts on science classes for adults. This report focuses on why there might be a need for such classes.

B .....
Today more than ever, scientific ideas are fundamental to everyday life. Many of our daily concerns and interests are related to science. For example, everyone needs to know something about digital technology, to make full use of their computers or mobile phones. Equally important is an understanding of the dangers facing the environment and what can be done to minimise these. Today's adults grew up at a time when these matters were less important. This is why science classes might appeal to adults.

C .....
Most adults I have spoken to freely admit that their knowledge of science is at best out-of-date and at worst non-existent. Consequently, I believe that classes should not assume any prior knowledge or understanding, but should relate to aspects of life that are relevant to the majority of adults. These would include energy use, food science and family health.

D .....
Adults are more likely attend classes they regard as relevant to their lives and needs. Introductory sessions similar to those that would be taught on the course could be organised and the college might also consider sending out a questionnaire to people living in the area asking what aspects of science they would like to know more about.

3 Now do this exam task.

- Remember the word limit is 220–260 words.
- Give readers an indication of what the sections of your report are about.
- Make sure you cover all areas mentioned in the question.
- Don't forget to write your report in an appropriate style.

Your local council is thinking about organising a science exhibition in the town next summer. You have been asked to write a report on public attitudes to science.

Your report should describe what the exhibition should be like, say who should be invited to exhibit and suggest ways of publicising the event.

Write your **report**.