Science and the body
Note-taking 1

Read the article about special hi-tech spectacles that are being adapted to help children suffering from dyslexia. Then write short notes under each heading.

Tackling dyslexia in children

Children who are dyslexic have problems processing specific visual information, resulting in trouble reading and also difficulty with writing. Until recently, it was thought to be language-related areas of the brain which were deficient, but new research suggests that dyslexics have difficulty with the control of eye movement, or 'eye wobble'.

Scientists based at the QinetiQ Laboratory and researchers at the Dyslexia Research Trust are working together to adapt special glasses known as hi-tech specs (spectacles) to help dyslexics. These specs, originally developed to monitor the eye movements of fighter pilots, are being adapted into small versions for children as young as five.

It is hoped the technology will help children like the six-year-old boy who said to Dr Sue Fowler, a researcher at the Dyslexia Research Trust's clinic, 'Do you want to know a secret? All the words on the page move and I don't know how they do it because they don't have any legs.' Other children with dyslexia may report a disturbing sensation of 'glare' from the printed page, making them rub their eyes frequently. In some dyslexic children, reading causes a headache.

Professor John Stein, professor of neurology at Magdalen College, Oxford, has spent 20 years researching the connection between lack of eye control and reading difficulties. He says, 'We are visual people and eye movements are possibly the most important movements we make because they allow us to inspect the world around us. I believe problems with eye wobble account for up to two-thirds of dyslexia cases.'

'Dyslexia is not a disease. It is a brain difference, like left-handedness. We also believe that a cell in the brain, the magnocell, is related to eye movement. It seems that magnocells in dyslexics do not develop as well as those in good readers.'

The professor, who trained at Oxford and St Thomas's Hospital in London, will be meeting government officials to prepare for a trial of the hi-tech specs in primary schools in London and Hampshire. Professor Stein and his colleague Dr Fowler used the first prototype on a child last summer.

Professor Stein explains, 'Eye wobble is not obvious to the naked eye. The movements are small and very rapid. The hi-tech specs, which are worn for only a few minutes during tests, are the most accurate technique we have for detecting the amount of eye wobble. The child focuses on a point 45 centimetres away and then follows a moving target. The specs show whether the child's eyes are tracking steadily, or whether they wobble. We would like the specs to be mass-produced, becoming cheap enough to be used in all primary schools.'

Dr Fowler adds, 'We see 800 children a year from all over the country. They are mostly aged seven to twelve, but people of any age can be assessed. Because we are a charity and investigations are part of our research, children are seen free.'

'Children's brains are flexible enough to enable them to improve their eye control so it's important to identify young dyslexics early. After seeing them at the clinic, we give patients daily exercises to enable them to keep their eyes still and fixed on one object. In time, we believe these exercises become marked onto the brain. The result is that reading improves greatly.'

Problems a dyslexic child may complain of

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Original use of the hi-tech specs

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How the specs are used to test children for dyslexia

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Treatment after the tests

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Skills builder

Using the ideas in your notes, write a paragraph on the ways dyslexia may affect children, a technique for diagnosing dyslexia and how dyslexia can be treated. Write about 100 words (and not more than 120 words). Use your own words as far as possible.

TIP **Being aware of your reading speed**

The speed at which students feel comfortable reading is a very personal matter and there is no doubt that individual speeds of reading vary a lot. Reading speed does not show how intelligent someone is, although young people often believe it does.

The fact is we all speed up and slow down as we read, depending on the difficulty of the content. We often do this without thinking, whether we are reading for pleasure or reading for information. We sometimes read groups of words quite fast, understanding the information quickly and easily, without any conscious effort. You may be surprised by how quickly you 'get through' several chapters of an exciting novel. On the other hand, we naturally slow down or reread a section of text when we want to be sure that we are getting the correct meaning from what we are reading.

Next time you read, you could try to be more aware of your reading speeds. When practising exam-style exercises, slow down a little if you begin to feel confused. Reread a sentence or group of words, checking back with the question to see if this bit of text contains relevant information. Approaching your reading in this way is a more mature attitude to study than rushing through without understanding. Don't be worried about taking more time, as the few extra seconds of double-checking are definitely worth it.

Summary 1

Read the internet article about the role of the placebo in medicine. Write a summary outlining what a placebo is, and why it may be effective for some people. Write about 100 words (and not more than 120 words). Use your own words as far as possible.

All in the mind?

Before the 20th century, doctors discovered that inert substances, with no active chemical ingredients, could have a dramatic effect on a patient's condition when other medicines failed to cure them. Doctors used these fake or pretend medicines in the hope that they might stimulate a patient's personal healing powers. They found that a person's belief in the power of the treatment was enough by itself to make them better. Patients might be prescribed fake medicines by doctors when other treatments had failed. Medicines of this kind became known as placebos, from the Latin 'to please'. It seems that placebos can affect the brain in some way, resulting in positive changes.

In modern times, clinical trials (research studies to investigate the best medical approaches to help patients) have demonstrated that placebos can be very effective for about 30 per cent of people. Placebos are considered especially valuable for subjective health conditions that have a psychological component, such as anxiety, pain or sleep disorders.

Maya dos Santos, a hairdresser, recently took part in a clinical trial to find out whether a placebo could help her lose weight. Maya says she had no idea that the slimming pills she was prescribed on the trial were a placebo. 'I was delighted when I was asked to participate as I wanted to lose weight to look good at my son's wedding. My previous attempts to slim had failed and nothing seemed to work. I believed in the pills and that made a difference. While I was on the trial, the doctor's advice was to take more exercise and to eat in moderation. To my amazement, I had no hunger pangs or cravings. I used to be obsessed with fatty food and high-calorie treats. I was convinced it was the slimming pills which decreased my appetite and took away my desire to snack. Instead, I enjoyed nutritious meals.'

Soon Maya was receiving compliments about her trim shape, glowing skin and glossy hair. She says, 'It was thrilling when the doctor confirmed that I had reached my target weight. I had never felt more energetic and had a new zest for life. My only regret was that the pills had not been available before. I was stunned when he explained that the tablets were a placebo and contained nothing but a bit of flour and water.'

Maya clearly had a strong belief in the power of the pills and Professor Miller, who organised the project, says that this is important. 'We do not fully understand how a placebo works because the mind is so complex. However, the size and colour of the pills seem to matter. Large red or blue pills are perceived as more powerful than small white pills. Injections create even stronger expectations of a successful outcome. Giving strict instructions to follow also helps.'

Maya says, 'I was given big blue tablets to take 15 minutes before meals and I was careful to check the time was correct.' She adds, 'Halfway through the trial, I received an injection. I believed it boosted weight loss but I now know the nurse was injecting water.'

In addition to the pills, Maya was supported by a nurse. She says, 'Justina rang me on my mobile regularly and was so sympathetic. She praised me for my efforts.' Professor Miller says that comfort and reassurance help perhaps because they generate feel-good hormones.

The professor insists that the imagination also plays a powerful role. During the trial, Maya used her imagination to visualise the pills burning fat. Maya smiles as she explains, 'I pictured myself slim and radiantly healthy, wearing stylish clothes.'

It is unethical to prescribe a placebo without the patient's consent, unless they have agreed to be part of a clinical trial. Does Maya feel cheated? 'No!' Maya declares. 'It was not unfair. My mind is powerful – that is something I did not appreciate enough. Positive thinking helps me achieve my goals. My self-respect and self-esteem are higher now. What's more, I have just bought a gorgeous new trouser suit for the wedding!'

TIP Ethical issues

This article raises an ethical issue – the use of placebos. It is an ethical issue because some people might think it is harmful to prescribe placebos to sick people who believe they are being given genuine medicine.

An ethical issue raises 'moral and ethical concerns' – involving questions of right and wrong.

However, the tone used to describe the placebo response is not sensational. Ethical issues are not necessarily discussed in an emotive way. The article distinguishes clearly between medical theories expressed by the professor and the emotional and psychological reactions of the patient. Some of the professor's phrases sound cautious, for example: *we do not fully understand; perhaps because it may.* The idea of the article is not to give false hope that the placebo is a 'miracle cure'. The writer's aim is to interest readers who have no specialist knowledge and encourage them to make up their own minds.

The task focuses on finding the facts and evidence about the placebo response. This is shown by the key words for the answer: ***what*** *a placebo* is, ***why*** *it may help* and *the* ***factors*** *that can make it more effective.* These key words are clues that help you understand the idea of a placebo and the potential seriousness of its use.

Note-taking 2

Read the article about the increase in the resistance to antibiotics. Then write short notes under each heading.

Antibiotic resistance

For many years, doctors have prescribed antibiotic medicines to help their patients recover from a wide range of common illnesses including nose, ear and throat problems, chest infections and stomach upsets. Antibiotics are also given for many more serious infectious diseases. In hospital, antibiotics have been relied on to help patients get over the health problems that can occur following surgical operations.

Unfortunately, some antibiotics now seem to be less powerful at overcoming serious bacterial infections. Scientists and doctors believe that there is growing evidence that antibiotics are no longer dependable. In hospitals, for instance, there have been many cases of patients who have developed a resistance to antibiotics. As a result, doctors and nurses are finding these patients much more difficult to treat. For example, tuberculosis (TB) used to be curable with antibiotics but now about 6 per cent of strains of six TB do not respond to a variety of antibiotics. Some new kinds of antibiotic-resistant infections are called superbugs. The superbug 'MRSA', for example, which patients might catch during a stay in hospitals, cannot be cured by antibiotics.

Scientists have always known that bacteria will eventually develop resistance to antibiotics. It was simply a matter of time. However, in recent times, this natural process has speeded up. Dr Afzaz, a surgeon who works in infection control in Brazil, believes we need to stop antibiotic resistance from accelerating. He thinks that part of the problem is that patients are not taking antibiotics in the correct way. He tells his patients that they should always complete the course of treatment he prescribes for them. However, he knows that some people stop as soon as they feel better, which can trigger resistance. Another issue is that patients sometimes share their medicine with family or friends for whom it was not prescribed. In addition, Dr Afzaz believes that some doctors prescribe antibiotics for illnesses such as colds, flu or other common viruses, which do not respond to antibiotics.

Dr Afzaz says, 'If people are suffering, they should rest, but some of my patients don't want to take time off work to get better. They ask me to prescribe antibiotics because they believe these are the most effective drugs. Also, when parents have sick children who have caught a cough or a cold, they automatically think the best

medicine is antibiotics. However, taking antibiotics, whether in liquid or tablet form, will not help you can recover any more quickly if the illness you suffer from is a virus.'

The World Health Organization (WHO) has given warnings that we are moving towards a 'post-antibiotic era'. In future, antibiotic resistance may result in more complex treatment for bacterial infections. Medical staff may no longer be able to use one course of medication to cure a single illness. Patients suffering from a bacterial infection may have to undergo multiple treatments over a longer time period and this will be more costly. Those on low incomes may not be able to afford to pay for all the prescriptions, so they are less likely to complete their treatment or may simply not go to the doctor when they are unwell because they are worried about the cost. WHO says that we will see a rise in infection-related deaths in future, especially in the world's poorest countries.

Pharmaceutical companies are hoping to develop a new class of antibiotic but have not yet succeeded. In the meantime, Dr Afzaz thinks we should pay attention to our general health. He says, 'A healthy lifestyle based on nutritious food and exercise will strengthen the immune system, making us more able to fight off disease without any medication.'

Reasons for rise in antibiotic resistance

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Consequences of resistance

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Scientific research focus

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Skills builder

Using the ideas in your notes, write a paragraph explaining the effects of antibiotic resistance. Write about 100 words (and not more than 120 words). Use your own words as far as possible.

TIP Using linking words

When writing a summary, you often have to make a series of separate points. You can link them in different ways.

To build up a list of points, use **linking words** such as *firstly*, *secondly*, *also*, *in addition*, *as well as*, *furthermore* and *moreover*.

Linking words that show **contrast** include *but*, *although*, *on the other hand*, *in spite of*, *despite*, *however* and *nevertheless*.

Words for **reasoning** include *because*, *as*, *since* and *for this reason*. Result or consequence can be expressed by *so*, *consequently*, *therefore* and *as a result*.

You can **round** up your argument or list of points with expressions such as *finally*, *on balance*, *to sum up* and *in conclusion*.

Apart from showing that you can reason and sequence your ideas clearly and logically, using linking words will also demonstrate that you are in control of sentence structure, and your paragraph will flow much better. This will help you to improve the quality of your answer.

Reflecting on your learning also helps you become more objective about your progress. You will think more clearly about how your skills are improving and the ways in which you want to develop them further.

Summary 2

Read the article about allergies. Then write a summary outlining why some people may suffer from allergies and how medication can help. Write about 100 words (and not more than 120 words). Use your own words as far as possible.

The enemy within

Allergy has become more and more common over the last 30 years. Now one-third of us are affected by allergy at some point in our lives and half of these sufferers are children. In the UK, three million people suffer from asthma, and five per cent of children suffer from food allergy.

Allergy is a reaction that occurs when the immune system has a strange and unnecessary reaction to a substance that is normally harmless, such as pollen or peanuts. The immune system is there to protect the body against outside attackers, including viruses, bacteria and parasites. To defend your body against an attacker, the immune system remembers these dangerous micro-organisms and attacks them if it meets them again. This work is done by antibodies. The immune system in allergy sufferers makes antibodies against harmless substances because it mistakenly believes them to be dangerous.

An allergic reaction may not happen the first time a sufferer meets an allergen (the substance causing the reaction, such as pollen, milk or strawberries). Sometimes people can eat nuts for years and then suddenly become allergic to them. What has happened is that the immune system has now decided the substance is dangerous and has made an allergy antibody. This antibody then attaches itself to cells that contain histamine. When the antibodies meet the allergen the next time, they attempt to destroy it. As they do that, the surface of the cells is broken and histamine is released. The histamine and other chemicals inflame the tissues. This leads to the symptoms of allergy, such as swelling, rashes, sneezing, sore eyes and breathlessness. Anaphylaxis is the most severe allergic reaction of all and is most often triggered by wasp or bee stings or peanuts. This must be treated immediately.

Allergies run in families. Some people are born with the ability to make lots of allergy antibodies, and they are more likely to develop allergies and allergic disorders such as hay fever and asthma.

Experts believe more people have developed allergies because of changes in our lifestyle that have exposed us to more allergens. We eat more processed foods, with a wide range of additives and colourings. More and more people in countries with cold climates have central heating and double-glazing, making houses warmer and less draughty – an ideal environment to breed the house dust mite, which some people are allergic to.

There may also be a link between allergies and antibiotics. At one time our immune systems were kept busy fighting off disease and trying to win the battle for health, but antibiotics have reduced the amount of work our immune systems have to do. Now experts think they may direct spare energy to harmless substances such as strawberries. In other words, our immune systems have become oversensitive.

A good deal of research is being devoted to finding a cure for allergies. Sufferers may be given medicine to control symptoms, and they may also be offered tests to find out which substances trigger allergic reactions so that they can avoid contact with these in future.

TIP Writing concisely

The summary question asks you to write 'about 100 words' – you are allowed to write a few words under or over 100, but not more than 120 words. When practising summary writing, however, think about ways you can save on the number of words you use.

For example, **do not copy** out whole sentences from the text as this usually leads to using too many words. Also, try to use one collective noun instead of several separate nouns from the text. The **collective noun** you need may actually be in the text – for example, *allergen* can be used to refer to a list of substances such as *pollen*, *milk*, *strawberries*, *nuts* and so on. You have to decide yourself whether it is necessary to name each item separately in your summary or whether it is possible to use the collective noun. As well as reducing the number of words you write, using collective nouns shows that you have a good command of English.

Animal life
Note-taking 3

You are going to give a talk to a group of school friends hoping to take part in a whale-watching activity holiday, observing whales, porpoises and dolphins. Using information from the internet article, write short notes under each heading, as a basis for your talk.

The thrill of watching whales

When I volunteered to spend a summer on a land-based whale-watching project in the west of Scotland, the project secretary warned me, 'You have to be able to detect the whales from the shore – it's not as easy as you think.' Although I assumed I was well qualified for the job, at the start of the project I often imagined I could see dorsal fins in the dark tip of every wave and dolphins leaping in the wake-tracks on the water made by passing boats. I had a few embarrassing moments, screaming 'Whale!' before realising that what I was pointing out were only waves breaking over submerged rocks, not sea creatures at all!

After a while, I trained my eyes to 'see' – to distinguish between waves splashing over rocks and the rolling movement of whales underwater. I spent a lot of time just watching the sea through my binoculars, looking actively for anything that indicated sea life below. Learning more about the marine environment increased my ability to differentiate, especially in regard to the tides and currents, as these draw whales to certain areas. My binoculars enabled me to spot the fins of a porpoise against the darkness of the sea, and without a good pair of binoculars I definitely would have missed out on lots of stunning marine life.

In addition, I eventually realised that the birds provide us with signals that cetaceans – whales, dolphins and porpoises – may be in the area. Where there is a flock of feeding seabirds such as seagulls or gannets, there is often a whale feeding beneath them. Gannets are really easy to spot from a distance – they drop out of the sky at speeds of up to 100 kilometres per hour, spearing the surface and sending bursts of water up behind them. I also learned how to take my time, to be patient, peaceful and quiet so that the whales were undisturbed by my presence. One of my favourite moments occurred when I was sitting quietly by the sea on the Isle of Mull and a group of porpoises came in so close to the shoreline I could hear the gentle puffs of their breath.

If you want to try this activity, it is worth organising and planning carefully for whale-watching. I recommend having a notebook and pencil nearby to record details of what you've seen and the environmental conditions at the time. This is not only a helpful aid in general, but you can also contribute your sightings to research projects, such as the Sea Watch Foundation, that are monitoring the distribution of whales and dolphins.

Despite the early disappointments I had, I think there is undoubtedly something very special about watching whales. Nothing can compare with the secret thrill and the tranquillity of seeing a wild animal just doing its own thing.

How to get the most out of watching whales, porpoises and dolphins

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Useful equipment for this activity

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Skills builder

Using the ideas in your notes, write a paragraph explaining how whale watching can be made as satisfying as possible. Write about 100 words (and not more than 120 words). Use your own words as far as possible.

TIP Selecting relevant information

Often no word limit is given in the instructions for the note-taking exercise, and so students sometimes copy out long extracts from the text, hoping to 'cover' the required information for the answer in this way. This strategy does not produce good notes because you have to show that you have the skill of extracting only the relevant information. **Select information carefully**. If you copy out a large amount from the text, you will not be rewarded for it, even if what you copy contains some of the relevant points.

Your notes should be **clear and concise**, and you do not need to write complete sentences. You should find one piece of information for each bullet point given.

Don't worry if you can't find information to answer the question at the beginning of the text. The question may be designed to require information that comes later in the text.