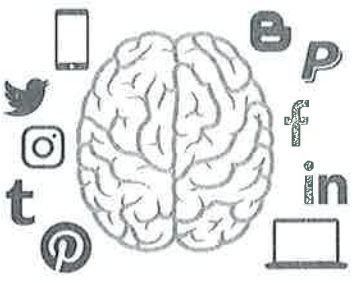
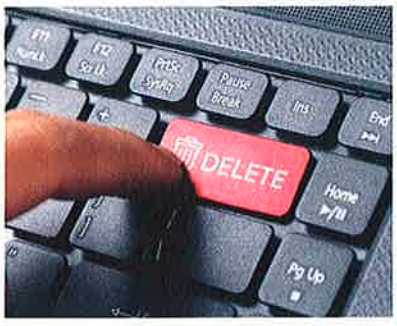
# 4 science

EVERYONE'S A SCIENTIST p44



SMART TECH, LAZY BRAIN? p47




DELETE ME! p50


SCIENCE LOVER? p52

**SPEAKING** **4.1** Talk about real vs hypothetical situations **4.2** Talk about technology **4.3** Discuss your use of social media **4.4** Talk about famous scientists

**LISTENING** **4.1** Listen to a radio programme about citizen science **4.3** Listen to people discussing the internet **4.4** Watch people talking about science

**READING** **4.2** Read an article about technology **4.3** Read an article: *Delete me!*

**WRITING** **4.1** Write a proposal **4.4** Write a short biography

# 4.1 EVERYONE'S A SCIENTIST

G zero, first and second conditionals
P would vs will
V science





## VOCABULARY

### SCIENCE

**1 A** Work in pairs. Are any of these statements true for you? Explain to your partner.

1 I love/loved science at school.
2 Science is far too complicated for me.
3 I can see how science is used in everyday life.

**B** What do scientists do and why is their work important?

**2 A** Read sentences a)–f). What do the words in bold mean? Match them with definitions 1)–10). Which words match the photos?

a) We put the **data** into a **database**.
b) We **monitor** changes in the animals' **habitat**.
c) We try to publish our research **findings**.
d) We take water **samples** from the river and **analyse** them.
e) We do **experiments** to **measure** changes in the environment.
f) We use a microscope to examine tiny **organisms**.

1 facts or information
2 find out or prove something
3 a living thing – usually very small
4 a large amount of information stored in one place in a computer system
5 a small amount of something that you take in order to examine it
6 find out the size, weight or quantity of something
7 the natural environment in which a plant or animal lives
8 information people have learned as a result of their study or work
9 examine or think about something closely in order to understand it
10 carefully watch something to see how it changes over time

**B** Put sentences a)–f) in Exercise 2A in a logical order (1–6).

1 *We do experiments to measure the changes in the environment.*
2 *We monitor changes in the animal's habitat.*

▷ page 123 VOCABULARYBANK

## LISTENING

**3 A** Read the introduction to a radio programme. How does citizen science work?

**Science Matters** ON NOW 14:15–15:00

**Citizen science**

On *Science Matters* today, Anthony Walker looks at how we can all be scientists. For years, real scientists have been giving scientific tasks to amateurs – ordinary, unqualified people. Once they are trained, these citizens go out and use special tools to monitor and measure the natural world. Then they report their findings to a central database. This fast-growing trend in science means that everyone can be a scientist!

**B** 4.1 Listen to the radio programme. What else do you learn about citizen science?

**C** Listen again and answer the questions.

1 What do citizen scientists study?
2 How important are the contributions of citizen scientists?
3 Who are these scientists and what exactly do they do?
4 How is technology a part of this?
5 Can citizen science make the world a better place?

**D** Work in pairs. Discuss the questions.

1 Why do people want to become citizen scientists?
2 Would you or anyone you know like to become a citizen scientist? What area would you explore: weather, animals, pollution, the ocean? Why?

## GRAMMAR

### ZERO, FIRST AND SECOND CONDITIONALS

**4 A** Match sentences 1–3 from the recording with rules a)–c) below.

1 If it's in the natural world, they study it.
2 If we didn't have citizen scientists working on these research projects, we wouldn't be able to do them.
3 If you can make a model of how a disease like malaria might spread, you'll have a chance to stop it.

**RULES**

**a)** zero conditional (*if* + present simple + present simple): to talk about a general situation which is always true
**b)** first conditional (*if* + present simple + *will/won't*/a modal verb): to talk about a specific situation in the future
**c)** second conditional (*if* + past simple + *would/wouldn't*): to talk about hypothetical/imaginary situations

**B** Read sentences 1–4. Then complete rules a)–d) below with *unless*, *as soon as* or *when*.

1 Unless you have the tools, you can't do the work.
2 When you have the tools, you do the work.
3 When you have the tools, you'll be able to do the work.
4 As soon as you have the tools, you can do the work.

**RULES**

**a)** Used with the zero conditional, *if* and _____ mean the same.
**b)** With the first conditional, if something is certain to happen, we use _____.
**c)** _____ + positive verb means *if not*.
**d)** We can use _____ instead of *if* to show that something happens immediately.

**C** Rewrite the sentence using *when*, *as soon as* and *might*. How does the meaning change?

If I see you, I'll give you the money.

**D** Rewrite the sentences using *unless*.

1 Scientists couldn't do all the research if citizens didn't help.
*Scientists couldn't do all the research unless citizens helped.*
2 If we don't find an answer to global warming, we are in trouble.
3 We won't get enough data if we don't monitor the habitat.

▷ page 110 **LANGUAGEBANK**

**5** Match 1–8 with a)–h) to make sentences. What type of conditional does each sentence use?

1 When we get new data, *h), zero conditional*
2 You'll have nothing to analyse
3 She won't be able to join us
4 If he didn't do these experiments,
5 You'll know it's a dinosaur fossil
6 They would help us
7 As soon as we get an idea for a new project,
8 Unless you have the right tools,

**a)** unless her flight arrives early.
**b)** it's impossible to do this research.
**c)** as soon as you see it.
**d)** we look at ways of funding it.
**e)** he wouldn't be able to find new organisms.
**f)** if they had time.
**g)** if you don't take samples.
**h)** we add it to the database.

**6 A** 4.2 ***would vs will*** Listen and circle the sentence you hear, a) or b).

| | | |
|---|---|---|
| 1 | **a)** Where would she go? | **b)** Where will she go? |
| 2 | **a)** He'd like that very much. | **b)** He'll like that very much. |
| 3 | **a)** They wouldn't ask for money. | **b)** They won't ask for money. |
| 4 | **a)** What would you eat? | **b)** What will you eat? |
| 5 | **a)** I'd stay longer. | **b)** I'll stay longer. |
| 6 | **a)** Would you do it for me? | **b)** Will you do it for me? |

**B** Listen again and repeat.

**C** Work in pairs. Say some of the sentences from Exercise 6A fast. Your partner decides if you said a) or b). Then swap roles.

## SPEAKING

**7 A** Are situations 1–6 real or hypothetical? Write conditional sentences about them. Then work in pairs and discuss your ideas.

1 I become a citizen scientist.
*If I became a citizen scientist, I'd monitor changes in the environment.*
2 I start a new course.
3 I have some free time tomorrow.
4 I visit a foreign country next summer.
5 I get a new job.
6 I join a new sports team.

## WRITING

### A PROPOSAL; LEARN TO USE POSITIVE LANGUAGE

**8 A** Read the proposal below. What are the goals of the proposed project?

**B** Which section of the proposal describes:

1 what you are asking for and why?
*Executive summary*
2 how the money will be spent?
3 who you are?
4 what the project will achieve?
5 how success will be judged?
6 the processes involved: who, when, how, where?

## GRANT PROPOSAL
for Hollins Chubb Foundation

HCF

**EXECUTIVE SUMMARY**

**Smartsurf is seeking a grant of 20,000 euros to develop a smart surfboard that can provide data about the oceans.**

**ORGANISATION INFORMATION** Smartsurf was founded in 2017 to help save the oceans from environmental damage. The organisation is located in Cornwall, UK, and consists of six full-time personnel.

**GOALS AND OBJECTIVES** Our goal is to develop a smart surfboard that is equipped with the tools to measure the effects of climate change on the world's oceans. The project will begin in Cornwall, UK, where Smartsurf is based. However, because surfing is a worldwide sport, we believe the smart surfboard will be used globally. It will allow us to monitor changes in the oceans' temperatures around the world and to measure the damage caused by climate change. The objective is to make data collection easier and to make this data available to climate scientists. Through this, Smartsurf will make a valuable contribution to protecting the oceans.

**PROJECT DESCRIPTION** We are working with designers, engineers and a research team to develop a prototype of the smart surfboard. The board uses sensors that measure the immediate environment. When we complete the prototype, we will identify and train surfers to use the board. We will send our data to an already existing database, the British Oceanographic Data Centre. The data includes information about temperatures and acidity. The boards will remain the property of Smartsurf and will be loaned to surfers for a period of six months at no cost.

**EVALUATION CRITERIA** The smart surfboard will be measured by the amount and quality of data collected, cost-effectiveness, and user-friendliness rating by the surfing community.

**BUDGET** Our main cost is the prototype for the smart surfboard: 20,000 euros. This figure includes payment of research scientists, engineers, designers and a project manager. We attach a breakdown of the costs involved.

**9** Underline the correct alternatives to complete the sentences.

Proposals:
1 are written in *an informal/a formal* style.
2 use *subheadings/only a major heading*.
3 must describe *who, what and why/previous grants won by the company*.
4 *use/don't use* very positive language.
5 use *'may'*, *'might'* and *'could'/'will'* a lot.

**10 A** Cover the proposal in Exercise 8. Replace the words/phrases in bold in sentences 1–6 with the more positive words/phrases in the box.

| ~~goal~~ develop identify objective make a valuable contribution to will allow us to |
|---|

1 Our **wish** is to develop a smart surfboard. *goal*
2 It **may let us** monitor changes.
3 The **hope** is to make data collection easier.
4 Smartsurf will **help in** protecting the oceans.
5 We are working to **make** a prototype.
6 We will **look for** and train surfers to use the board.

**B** Look at the proposal again and check your answers.

### speakout TIP

When writing a proposal:
1 don't use acronyms unless they are very famous (e.g. *BBC*, *USA*).
2 don't use negative language or sound uncertain (use *will*, not *could*).
3 check you followed all the instructions.

Do you think the proposal in Exercise 8 follows the advice above?

**11 A** Read the invitation to apply for a grant below.

**B** Choose one of these ideas or use your own. Plan and write your proposal for the GoodWorks Council.

- an app for monitoring local environmental damage
- a science/nature club for bored teenagers
- a new playground for children
- a centre for homeless people to sleep and eat in

### GoodWorks Council:
invitation to submit proposal

GoodWorks Council invites applications for grants of up to 25,000 euros. We are looking for projects that will benefit the community. Please include the following sections: *Project summary, Organisational background, Goals and objectives, Project plan, Evaluation criteria, Budget.*

Send proposals and supporting documents to GWCproposal@goodworks.orgs before 10 December.

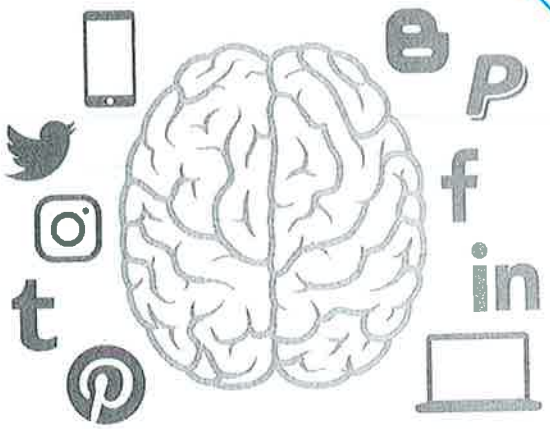
# SMART TECH, LAZY BRAIN?

G passive reporting structures
V reporting verbs
P stressed words/syllables

4.2

## Is tech rewiring our brains?

We increasingly rely on social media to talk to friends, GPS to navigate and the web for information. But reports suggest that modern technology is making us less intelligent and more antisocial. We struggle to remember our own phone number when only a few years ago we could recall dozens. Online readers have short attention spans and many of us panic when separated from our smartphone. So what's happening?



The reality is that our brains do change when we use a smartphone or computer–but they also change when we use a pen, a screwdriver or any other tool. They change when we mow the lawn, play golf or cook dinner. Our experiences continually shape the way the brain works.

**So how are our brains adapting to living in today's screens-first, always-online, networked world?**

### Attention

Phones buzzing with text messages, Facebook notifications and news alerts continually distract us. Many experts believe that this continuous bombardment has decreased our ability to focus. A study by Microsoft found that the average human attention span had dropped from twelve seconds in the year 2000 to just eight seconds in 2015.

### Memory

With phone numbers, routes and facts just a touch away, we're becoming less dependent on our memory. German neuroscientist Manfred Spitzer warns that this 'cognitive offloading' could lead to a kind of 'digital dementia', where people can no longer remember everyday information because they rely on technology to remember for them.

Studies on internet and gaming addicts have shown their brain's grey matter actually shrinking. Digital offloading may also make memories less vivid. A US study showed that we are actually less likely to clearly remember things or events which we have taken photographs of.

### Mood

Scientists have reported strong links between heavy internet use and depression. Health education expert Dr Aric Sigman says, 'There's a relationship between the amount of time you spend on social media and increased body dissatisfaction.' Sigman also cites a study in which girls who instant messaged their mothers released the stress hormone cortisol, rather than the feel-good hormone oxytocin associated with face-to-face interaction.

### Multitasking

Our 'always-on' culture has been referred to as 'infomania' by psychologist Dr Glenn Wilson. It has been reported that working in a room full of distractions (mobiles ringing and emails arriving) reduces workers' IQ by ten points. Research also shows that multitasking while learning is likely to lead to knowledge which is not as deeply embedded in our memory.

### Sleep

We now spend more time on our devices than we do sleeping. According to a survey, we engage in media or communication activities for eight hours and forty-one minutes daily, and sleep for eight hours and twenty-one minutes. Technology keeps us up for two reasons. First, we are stimulated by the content. Second, the LED screen uses blue light, which prevents the brain from producing the sleep hormone melatonin.

## READING

**1 A** Work in pairs. Look at the headings in the article. How do you think technology affects these things? Read the article and check your ideas.

• attention • memory • mood • multitasking • sleep

**B** Work in pairs. Read the article again and answer the questions.

1 What examples does the article give of how people rely on technology?
2 What effects does it claim that this has on our brains?
3 According to the article, why has our attention span decreased?
4 How can you explain the term 'cognitive offloading'? Why might it be a problem?
5 Why might it be a bad idea for girls to text their mothers?
6 Can you give two reasons why technology makes us sleep less?

**2** Work in groups. Discuss the questions.

1 Does any of the information in the article surprise you?
2 Look at the underlined sentence in the article. Who does *we* refer to?
3 Do you trust research like this? Why/Why not? Do you believe IQ drops by ten points in a room full of distractions? Doesn't it depend on the kind of work you're doing?
4 Do you see your own use of technology reflected in the research claims in the article?

## VOCABULARY

### REPORTING VERBS

**3 A** Work in pairs. Discuss the statements. One of the statements is false. Which do you think it is?

1 Reports **suggest** that modern technology is changing our brains and our personalities.
2 Experts **agree** that children who spend too much time in front of screens have short attention spans.
3 A US study **showed** that searching on the internet can increase brain function in older people (aged 55–76).
4 Scientists **report** that some teenagers spend eighteen hours a day interacting with technology.
5 Research **claims** that millennials (people who reached adulthood around the year 2000) have better memories than older people.
6 Experts **believe** that the more we constantly interact with technology, the harder it is for us to experience deep emotions.
7 A report has **confirmed** that digital screens affect the brain like cocaine.
8 Research **proves** that our brains physically change as a result of using technology.

**B** Check you understand the verbs in bold in Exercise 3A.

## GRAMMAR

### PASSIVE REPORTING STRUCTURES

**4** Read the pairs of sentences. Then underline the correct alternative to complete the rule below.

1 a) People say that using your phone at night is bad for your sleep.
b) It is said that using your phone at night is bad for your sleep.
2 a) People say that social media is responsible for increased feelings of loneliness.
b) Social media is said to be responsible for increased feelings of loneliness.
3 a) People think that teenage overuse of technology impedes their social skills.
b) It is thought that teenage overuse of technology impedes their social skills.
4 a) Studies have suggested that brain activity seen in excessive internet users is similar to that of drug addicts.
b) It has been suggested that brain activity seen in excessive internet users is similar to that of drug addicts.
5 a) A study showed that the grey matter in the brains of internet addicts was shrinking.
b) The grey matter in the brains of internet addicts was reported to be shrinking.

**RULE**

Use the following passive reporting structures in *formal/informal* writing to report opinions and beliefs:

***it* + passive reporting verb + *that* + clause**
It is said that …
It was thought that …
It has been suggested/estimated/claimed that …

**subject + passive reporting verb + infinitive clause**
It is thought/reported/estimated to be …
He was claimed to be …

**5 A** Complete the second sentence so that it means the same as the first, using the word in bold. Use between two and five words, including the word in bold. More than one answer may be possible.

1 People are using their mobile phones more than before. **thought**
Mobile phone use _____ increasing.
2 Experts have said that people aren't getting enough sleep. **claimed**
It _____ people aren't getting enough sleep.
3 People agree that too much gaming causes addiction. **reported**
Too much gaming _____ addiction.
4 Research says that thirteen percent of Americans do not use the internet. **shown**
It _____ thirteen percent of Americans do not use the internet.
5 Police think teenagers may have been responsible for the explosion. **suggested**
It _____ teenagers may have been responsible for the explosion.
6 Experts said that the overuse of the device can cause depression. **confirmed**
It _____ that overuse of the device can cause depression.
7 People think that around 500 students attended the event. **estimated**
Around 500 students _____ attended the event.
8 The parents have said they will supervise their children. **agreed**
It has _____ will supervise their children.

**B** 4.3 Listen and check your answers.

▷ page 110 **LANGUAGEBANK**

**6 A STRESSED WORDS/SYLLABLES** Listen again and underline the stressed words/syllables in the sentences.

Mobile *phone* use is *thought* to be increasing.

**B** Listen again and notice how the unstressed words become weaker (e.g. *to be* in *thought to be:* /təbiː/). Then repeat the sentences. Cor sentence stress.

## SPEAKING

**7 A** Look at the mind maps and write some questions to ask a partner.


**B** Work in pairs or groups. Ask and answer your questions from Exercise 7A.

*A: Do you think social media is a good thing?*
*B: Yes, I use it all the time.*

**C** Work in small groups. Answer the questions.

1 Do you think technology has changed your generation? If so, how and is this a good thing?
2 Does your generation use social media differently from other generations? If so, how and why?

**D** Summarise your group's discussion for the class. Use these phrases.

- It has been suggested that our generation has …
- It is claimed that …
- It is thought that …

## VOCABULARY PLUS

### COMMONLY CONFUSED WORDS

**8** Look at the pairs of commonly confused words in the box. Do you know the difference between the words in each pair?

| |
|---|
| accept/except advice/advise<br>economic/economical experience/experiment<br>possibility/opportunity principal/principle<br>right/rightly sensible/sensitive<br>complement/compliment stationary/stationery |

**9 A** Complete the sentences with words from Exercise 8.

1 Use of mobile phones is _____ banned during examinations, in my opinion.
2 **A:** That's a beautiful necklace. Where did you get it?
**B:** My mother gave it to me. Thanks for the _____!
3 The _____ reason for the failure was poor communication, although there were other factors.
4 We were lucky to have had the _____ to explore the area.
5 **A:** I'm worried about Aisha. I don't know where she can be.
**B:** Don't panic. She'll turn up soon. She's a very _____ girl.
6 The printer has run out of paper and I can't find a pen that works. I need some new _____.
7 **A:** I really think you should take this opportunity.
**B:** Thanks for the _____.
8 People struggle to _____ that the world is changing.
9 I couldn't accept the offer on a matter of _____.
10 It's a great car, and very _____.

**B** Work in pairs. Act out these situations. Student A: follow the instructions for each situation. Student B: give a natural response. You only have thirty seconds for each situation. Then swap roles.

**Student A**

- Give your partner a compliment.
  *A: That shirt really suits you.*
  *B: Thanks for the compliment!*
- Suggest three pieces of advice about technology use.
- Describe an enjoyable experience.
- Describe an opportunity you shouldn't miss.

**Student B**

- Think of a crazy experiment.
- Describe the most economical holiday.
- Give your partner advice on how to cure internet addiction.
- Describe the most sensible person in your family.

▷ page 123 VOCABULARYBANK

# 4.3 DELETE ME!

F hedging
V internet words/phrases
P hesitation devices

## VOCABULARY

### INTERNET WORDS/PHRASES

**1 A** Work in pairs. Discuss the questions.

1 Is it possible to delete yourself from the internet?
2 How would you do this?
3 Why do you think people might choose to delete themselves from the internet?
4 Would you consider doing this? Why/Why not?

**B** Complete the article with the words/phrases in the box.

| |
|---|
| click of a button digital footprint social media<br>posted updates delete email account profiles<br>screenshots online search engine<br>google cyberbullying |


So they say the internet never forgets, but a new website, deleteme.com, promises to erase your [1]_____ at the [2]_____. You might ask why you would want to do that.

Figures suggest that eighty percent of employers [3]_____ you before inviting you to an interview. And almost ninety percent of people research new contacts using an [4]_____.

So, if you've been a victim of [5]_____, online abuse or you're just not happy with your online presence (maybe you've [6]_____ and information online in the past which you would now like to remove), then this could be the web service for you.

However, things are rarely as simple as they sound. The website relies on the fact that you've used a Google account to set up your networks. If you have used various [7]_____ to set up [8]_____ accounts, for example on Instagram or Snapchat, then you'll need to remove these separately. Also, people can take [9]_____ of images and posts, and save things that were said, so it can be hard to remove your digital traces completely.

You may have to accept that there are some things you can never [10]_____ from the internet.

**C** Look at the words/phrases in the table and underline the correct alternatives to complete the rule below.

| **hedging** |
|---|
| I guess/I suppose<br>presumably<br>may/might/could<br>perhaps/maybe/possibly<br>(not) particularly/ really |
| **vague language** |
| kind of/sort of<br>just<br>… or something |

**RULE** We use hedging and vague language to soften what we say, to make it *more/less* direct. This makes you sound *more/less* polite.

## FUNCTION

### HEDGING

**2 A** 4.4 Listen to people discussing the questions in Exercise 1A. For each conversation (1–3), circle the correct answer, a) or b).

1 The speakers think that a website like Deleteme
  a) could be useful as we have so many different internet accounts, and some are difficult to deactivate.
  b) isn't useful because people can easily deactivate their own internet accounts if necessary.
2 The speakers think that cyberbullying
  a) is such a problem that social media sites should be avoided altogether.
  b) may be an issue, but deleting yourself from the internet isn't the solution.
3 The man believes that
  a) face-to-face interaction is much more satisfying than social media.
  b) social media is a useful tool for social interaction.

**B** 4.5 Listen to conversation 1 again. Circle the sentence you hear, a) or b).

1 a) Presumably you can do that, right?
  b) You can do that, right?
2 a) That's a problem.
  b) That might be a problem.
3 a) You can delete most of them.
  b) I guess you can delete most of them.
4 a) So maybe a website like this would be useful after all.
  b) So a website like this is useful after all.

**D** 4.6 **Listen to conversations 2 and 3 again and complete the extracts.**

1 I _____ one reason _____ be that you've experienced some kind of bullying, I mean cyberbullying or _____.
2 Yes, I _____ that's possible.
3 … the idea that you can _____ disappear from the internet.
4 … it's _____ of the same on the internet.
5 I _____ avoid social media in the first place.
6 I just don't think it's _____ interesting.

**3** **Change the sentences to make them less direct. Use the words in brackets.**

1 I'm not happy about this. (particularly)
2 We should have asked him first. (suppose)
3 We have a problem. (may)
4 It's not my favourite. (really)
5 I thought you should know. (just)
6 We could buy her some flowers. (or something)

▷ page 110 **LANGUAGEBANK**

## LEARN TO

### USE HESITATION DEVICES

**4** **Read the sentences from the conversations in Exercise 2. If you remove the underlined parts, does it change the meaning of the sentence? What do you think the function of the underlined language is?**

1 OK, so, <u>umm</u> … <u>let me see</u> … I guess I would start with the obvious sites.
2 I think you can, <u>you know</u>, deactivate the account.
3 Oh <u>hold on</u>, I didn't think about YouTube.
4 <u>Well</u>, I guess one reason might be that you've experienced some kind of bullying – <u>I mean</u> cyberbullying or something.
5 I don't really understand it – <u>you know</u>, the idea that you can just disappear from the internet.
6 <u>The thing is</u>, if I want to talk to someone, I arrange to meet up.
7 <u>Hmm</u> … but <u>you see</u>, I just don't think it's particularly interesting.

**speakout TIP**

We use hesitation devices (*umm, ah, well, let me see*, etc.) in conversation to give us time to think. They tell the speaker that we have understood the question and we are thinking about our answer. They are very common in spoken English and using them can help you sound more fluent. Look at audio script 4.4 on page 137 and underline the hesitation devices.

**5** **A** **Match questions 1–6 with responses a)–f).**

1 What did you do on Saturday?
2 Where shall we go to eat?
3 Have you decided whether to take the job?
4 Have you got her phone number?
5 Do you want to come with us to the cinema?
6 Have you bought the tickets?

a) Well, we could try the new restaurant on Oxford Street.
b) Hmm … that would be great, but the thing is I really need to finish that report.
c) Er … hold on, I think I might have it here.
d) Umm … let me see … I was working.
e) Umm … no. You see, the problem is I don't have enough money.
f) The thing is, you know, I'm not sure that I'm really qualified.

**B** 4.7 **Listen and check your answers.**

**C** **HESITATION DEVICES** **Listen again and notice how the speaker slows down their speech and pauses when they use the hesitation device. Then listen again and repeat.**

*Umm … [pause] let me see … [pause] … I was working.*

**6** 4.8 **Listen to the questions. Use the prompts in the box to come up with your own responses.**

| Umm … Er … Hold on … Let me see … Well … The thing is … You see … |
|---|

## SPEAKING

**7** **Work in groups. Play *Just a minute*. Take turns to speak about one of these topics. You have to keep speaking for a minute. Use hedging and hesitation devices to help you. If you stop speaking for more than five seconds, you are out.**

- your mobile phone
- your favourite social network
- your last holiday
- whether you like/dislike technology
- the food you eat
- a hobby you have
- a good friend

*OK, well, let me see … This is my phone and I bought it … err … about three months ago because …*

# 4.4 SCIENCE LOVER?

## DVD PREVIEW

**1 A** Work in pairs. Can you name three famous scientists? Why are they famous? Tell other students.

**B** Look at the words/phrases in the box. Check you understand their meaning. Do you associate the words with science (S), arts (A) or both (SA)?

| | | |
|---|---|---|
| biology | chemistry | English Lit |
| equations | experiments | formulas |
| geology | innovation | inventors |
| medical advances | practical/hands-on | |
| quantum mechanics | space | |
| split the atom | string theory | |
| theatre director | theory of relativity | |

**C** Work in pairs and compare your ideas. Do you agree with each other?


## DVD VIEW

**2 A** Watch Part 1 of the interviews. Are the speakers more sciency (S) or artistic (A)?

Samantha _____
Juliet _____
Anthony _____
Caitlin _____
Atri _____

**B** Watch Part 1 again. Answer the questions.

1 Who was hopeless at science subjects at school?
2 Who works in physical therapy?
3 Who couldn't get their head around all the equations and formulas?
4 Who did their best to study a few science subjects at school but found it didn't go so well?
5 Who is currently training to be a theatre director?
6 Who enjoys English literature, theatre and music?
7 Who can think quite logically but has to be quite innovative in their logic?

**C** Work in pairs and discuss. What about you? Are you more sciency or more artistic?

**3 A** Watch Part 2 of the interviews. Complete what the speakers say.

1 There were a lot of _____. It was very hands-on.
2 I can remember being supremely _____ at Chemistry, so I dropped out of that very early on.
3 I completed O level _____ but I didn't take it any further.
4 There's many different ways to get to a certain conclusion with _____.
5 I was surprised at how much I used to _____ and how little I actually remember now.

**B** Work in pairs. Answer the questions.

1 What does Errol mean when he says 'there were a lot of practicals'?
2 What does it mean to be 'supremely bad' at something?
3 If you 'drop out of something', do you continue to study it?
4 Do you know what an O level is?
5 Why was Caitlin reading through her old science books?

**C** Work in groups and discuss. What can you remember about science lessons at school? Did you enjoy them?

**4 A** Watch Part 3 of the interviews. Match the scientists 1-5 with what the speakers say about them a)-e).

| | |
|---|---|
| 1 Stephen Hawking | a split the atom |
| 2 Albert Einstein | b string theory of multiple realities/ theory of quantum mechanics |
| 3 Ernest Rutherford | c something to do with blood |
| 4 Antonie van Leeuwenhoek | d theoretical scientist |
| 5 Max Planck | e theoretical scientist/invented the theory of relativity |

**B** Watch Part 3 again to check your answers. Which of these scientists did you already know about?


**5 A** Watch Part 4 of the interviews. Tick the items in the box which are mentioned.

| | | |
|---|---|---|
| antibiotics | bicycles | cars |
| iPad | laptop | medical advances |
| microscopes | phone/telephone | |
| planes | trains | |

**B** Number the quotes in the order they are heard in the interviews.

a) 'I couldn't live without my laptop, I don't think, or my mobile phone.'
b) 'The medical advances that have been made in the last century or two are the most important.' *1*
c) 'I could live without most other things.'
d) 'I think I'd be stranded without both those things.'
e) 'I think without a telephone I think I would be really lost.'
f) 'My phone, my laptop and my iPad.'
g) 'Just hearing someone's voice on the other end is always a nice thing to hear.'

**C** Watch Part 4 again to check your answers.

**D** Work in pairs. Which scientific inventions could you not live without?

## speakout famous scientists

**6 A** Work in groups. You are going to find out more about the scientists that were mentioned in the interviews. Make notes in the table for the scientist you read about.

**Student A:** read about Antonie van Leeuwenhoek on page 128.
**Student B:** read about Stephen Hawking on page 130.
**Student C:** read about Ernest Rutherford on page 132.
**Student D:** read about Albert Einstein on page 133.

| Name | Where and when was the scientist born? | What scientific work are they famous for? | Other interesting facts/ information |
|---|---|---|---|
| Antonie van Leeuwenhoek | | | |
| Stephen Hawking | | | |
| Ernest Rutherford | | | |
| Albert Einstein | | | |

**B** In your groups, tell each other about the scientist you researched. Make notes to complete the table.

**C** Do you think it's interesting that all the speakers talked about scientists who were men? Why do you think this is?

## writeback a short biography

**7 A** Read the article. What is its main focus? Do you know any famous female scientists?

### Female scientists you should know about

It has always been harder for women to succeed in science than for men. Historically, women had limited access to education and suffered discrimination in the science world. However, despite the difficulties, there are many brilliant female scientists who made important discoveries in a variety of fields. Many of their contributions have been hugely influential. When it comes to talking about women in science, Marie Curie is usually at the top of people's list. Here are a few others you should know about.

**Dorothy Hodgkin (1910–1994)**

Dorothy Hodgkin studied Chemistry at Oxford University and later worked at Cambridge, studying X-ray crystallography. Much of her work focused on the structure of penicillin, Vitamin B12 and insulin. She is the only British woman scientist to win a Nobel Prize in Chemistry, which she was awarded in 1964.

**Emilie du Chatelet (1706–1749)**

Emilie du Chatelet studied mathematics, and then physics. She collaborated with the philosopher Voltaire, who was also interested in science, and they worked together from a laboratory which she set up in her home. She also translated Isaac Newton's work *Principia* into French, in a version which is still used today.

**B** Research a female scientist and write a short paragraph about her to include in the article above (80–100 words).

# 4.5 LOOKBACK

## SCIENCE

**1 A** **Put the letters in brackets in the correct order to complete the sentences.**

1 She studied chimpanzees in their _____ (aihtbtas).
2 She did _____ (peermxtiens) that led to the discovery of certain brain cells.
3 She _____ (miteoonrd) the environment and wrote important books about environmental damage.
4 He _____ (aalydsen) bacteria, which led to the discovery of penicillin.
5 His study of ocean _____ (oanigrmss) and his TV series revolutionised marine biology.
6 He _____ (maueserd) the movements of the stars, which led to the idea of black holes.

**B** **Work in pairs. Match sentences 1–6 in Exercise 1A with scientists a)–f).**

a) Jacques Cousteau
b) Jane Goodall
c) Alexander Fleming
d) May-Britt Moser
e) Subrahmanyan Chandrasekhar
f) Rachel Carson

**C** **Turn to page 129 and check your answers.**

## ZERO, FIRST AND SECOND CONDITIONALS

**2 A** **Work in pairs. Student A: use an *if* clause with the phrases in your box. Decide if the situation is real or unreal. Student B: complete your partner's conditional sentence using the phrases in your box.**

**Student A**

| |
|---|
| ~~I / have / more time~~ |
| I / have / chance / travel |
| my car / break down |
| I / go / to restaurant / today |
| I / not go / to bed early tonight |
| learn / new instrument |
| not do / my homework |

**Student B**

| |
|---|
| not eat / meat |
| feel tired / tomorrow |
| teacher / get / angry |
| be / violin go / Australia |
| ~~not need / rush~~ take / taxi |

*A: If I had more time, …*
*B: … I wouldn't need to rush!*

**B** **Write true sentences about you using the *if* clauses in box A in Exercise 2A. Then work in pairs and share your answers.**

*If I had more time, I'd read more.*

## PASSIVE REPORTING STRUCTURES

**3 A** **Complete the sentences with the words in the box.**

| | | | |
|---|---|---|---|
| reported | is | be | have |
| to | been | it | that |

1 Every person is thought to _____ a unique pattern of connections in their brain.
2 It has been suggested _____ in the future 'brainprints' may be used instead of fingerprints.
3 It has been _____ that people who are paralysed can be trained to walk again.
4 It _____ claimed that virtual reality can help patients learn to use robotics.
5 Listening to music has _____ claimed to help people concentrate.
6 Special headphones are reported _____ be able to block out all sound.
7 _____ has been suggested that lack of physical exercise is a serious health threat.
8 The number of minutes of exercise we need to do in a week is estimated to _____ 150.

**B** **Work in pairs. Discuss the sentences in Exercise 3A. Do you find any of the information surprising?**

## REPORTING VERBS

**4** **Put the letters in brackets in the correct order to make words.**

1 A study has _____ (camdiel) there will be no more seafood by 2048 due to overfishing.
2 Research _____ (sgesgust) we are born to dance. Dancing is in our DNA.
3 A report has _____ (merdfoinc) that mobile phones are killing gorillas. Mining for minerals in the Congo is destroying their natural habitat.
4 Scientists _____ (eblevie) that many animals are capable of creative problem-solving.
5 Researchers have _____ (toderper) that children who go to nursery have better social skills.
6 Listening to poetry has been _____ (wonsh) to trigger positive feelings in listeners' brains.

## HEDGING

**5 A** **Match questions 1–5 with responses a)–e).**

1 Do you think perhaps you could turn the music down?
2 Don't you like the food?
3 Do you want to meet up on Saturday?
4 Do you want to go to a classical music concert on Wednesday? I've got spare tickets.
5 Do you think you could possibly help me?

a) It's fine, thanks. I'm just not particularly hungry.
b) Of course. What sort of help do you need?
c) I suppose that might be a good idea. We don't want to annoy the neighbours.
d) I'm afraid I'm kind of busy this weekend.
e) Actually, it's not really my kind of thing. Perhaps you could ask Jean.

**B** **Work in pairs. Practise the conversations in Exercise 5A.**