

10 SCIENCE AND TECHNOLOGY

WARM-UP

Write on the board: *Astronomy, Biology, Chemistry, Maths, Physics, Information Technology*. In pairs, students choose two areas they are best at or most interested in and list 5–8 words from each of them. Students come to the board (three at a time) and write words under the headings. This warm-up works best at the beginning of the unit.

VOCABULARY ▶ Thematic Part pages 130–131

The whole section can be set for homework if needed.

- 1 Astronomy: orbit, solar system, universe
Biology: cell, organ, species
Chemistry: compound, element, molecule
Mathematics: coordinate system, equation, variable
Physics: elementary particle, gravity, velocity
- 2 Astronomy 1 solar system 2 orbit 3 universe
Biology 4 cell 5 species 6 organs
Chemistry 7 elements 8 compound 9 molecule
Mathematics 10 equations 11 variable 12 coordinate system
Physics 13 Gravity 14 velocity 15 elementary particle
- 3 verbs: 1, 3, 6, 7, 10, 12, 14
nouns: 2, 4, 5, 8, 9, 11, 13
1 formulated 2 factor 3 investigating (also possible: analysing) 4 research 5 records 6 collaborating 7 analysed 8 group 9 experiments 10 confirmed 11 evidence 12 published 13 link 14 reject
- 4 1 i 2 h 3 d 4 f 5 b 6 g 7 e 8 a 9 c
- 5 1 adapter 2 electric shaver 3 hairdryer 4 light bulb 5 plug 6 socket
- 6 1 sockets 2 hairdryer 3 electric shaver 4 plug 5 adapter 6 bulb
- 7 1 peripherals 2 resolution 3 shortcuts 4 extension 5 responding 6 memory stick 7 inbox
- 8 1 world wide web
2 hypertext transfer protocol
3 random access memory
4 digital versatile disc (also: digital video disc)
5 liquid crystal display
6 local area network
7 universal serial bus
- 9 1 addition 2 subtract 3 multiplication 4 divide
- 10 1 mathematician 2 chemist 3 physicist 4 archaeologist 5 psychologist

ADDITIONAL VOCABULARY INFORMATION

- Students may want to know how to read mathematical symbols in English. The operations in Exercise 9 are read as follows:
Two plus two equals/is four.
Four minus two equals two.
Two times two OR Two multiplied by two equals four.
Four divided by two equals two.
In Exercise 2, ax^2 is pronounced *a ex squared*; ax^3 is *a ex cubed*; $\sqrt{2}$ is *square root of two*.
- You may wish to point out to students that as a majority of science words come either from Latin or from Greek, some of them have unusual plural forms:
species – *species* (Latin 5th declension plural)
supernova – *supernovae* (Latin 1st declension plural)
axis – *axes* (Latin 3rd declension plural)

ADDITIONAL ACTIVITY

Refer to the quotation that opens the unit: 'Normal people believe that if it ain't broke...' (Explain that 'ain't broke' is an American colloquial form for 'isn't broken'. It would be inappropriate in formal writing.) In pairs, students discuss whether they find the statement convincing, and think of examples to illustrate it.

READING ▶ Thematic Part pages 132–133

Do not let the initial discussion (Exercise 1) run for too long – there will be more opportunity for discussion after the exam task.

When approaching the exam task, students should start by reading the whole text. You can set the following introductory question (after Exercise 1): *Read the article once quickly. Which of your ideas are mentioned? Which ideas are new to you?* The purpose of Exercise 4 is to elicit observations and opinions supported with examples. Insist on students giving specific examples rather than making general statements such as 'You can find information on the Internet.'

2 (examTASK)

1 D 2 B 3 C, D 4 A 5 A, B 6 B 7 D 8 C 9 C

3 A correlation B unclear C found D claim

LISTENING ▶ Thematic Part page 133, Tapescript page 169

ADDITIONAL ACTIVITY

Check that students realise the four areas of science in Exercise 1 match the four speakers in Exercise 2. Students look back at the words listed in Exercise 1 and try to remember in what context they were used by the speakers. Elicit answers from the class, e.g. *The woman's father told her about the structure of DNA when she was very young. She learned from her friend that a light year is not a unit of time.*

1 Biology: predator, sexual reproduction, the structure of DNA

Chemistry: nitric acid, reaction, test tube

Astronomy: red giant, white dwarf, light year

Engineering: jet engine, gas tank

2 (examTASK) 1 C 2 D 3 E 4 B

USE OF ENGLISH ▶ Thematic Part page 134

The **examWORKOUT** focuses on vocabulary choices. Encourage students first to attempt the exercises without any aid. After that they should be able to do the exam task without help.

- 1 A 1 at the age 2 of age 3 in the age 4 aged
B 1 turned out 2 found out 3 turned up 4 came up
C 1 disapproval 2 distaste 3 disappointment
4 disagreement

2 (examTASK) 1 C 2 B 3 B 4 D 5 A 6 A

SPEAKING ▶ Thematic Part page 135

The **examWORKOUT** focuses on supporting ideas with examples. Remind students of why examples are useful: they are the evidence which supports your opinion; they make what you say more interesting; and they simply allow you to say more. As students give their mini-presentations in pairs, circulate and monitor, paying attention to the examples they use. Comment on a few especially interesting ones to the whole class.

2

Finding information online:

- entrance requirements of a university
- how to get a passport
- whether a book you need is available and where

Communicating with the people you love:

- email
- chat
- video calls

People getting organised:

- support group for families of people with a rare illness
- help for victims of natural disasters

Free speech:

- governments cannot stop people sharing information or expressing their views.

Bad uses of the Internet:

- rude and aggressive opinions posted on websites
- scams
- pornography, including child pornography
- advice on how to build bombs

WRITING ▶ Thematic Part page 135

The **examWORKOUT** focuses on enriching stories with details. Details make a story feel real and unique; they allow the reader to relate to the characters and their adventures. However, it is important to warn students that if there is a word limit they should adhere to, it is likely they will only have enough space for one or two details.

1 technology danger

3 1 e 2 d 3 f 4 b 5 a 6 c

QUICK REVISION ▶ Thematic Part page 137

1 1 mathematician 2 physicist 3 chemist 4 psychologist
5 archaeologist

2 1 e 2 d 3 a 4 b 5 c

3 1 b 2 a 3 system 4 hypothesis 5 an adapter
6 a, c 7 b 8 c

REVISION ACTIVITY

Students work individually. Ask them to go through all of Unit 10 and write down ten words or phrases which they find the most useful and would like to remember. Students then compare lists in pairs, explaining why they chose those specific vocabulary items.

ADDITIONAL READING

- Isaac Asimov, *Starlight* (short and with an interesting twist);
- Issac Asimov, *I, Robot* – any chapter (each chapter is a separate story; you just have to start by reading *The Three Laws of Robotics* on the first page);
- or any science fiction story you like.

11 NATURE AND ENVIRONMENT

WARM-UP

- 1 Ask students to look at the pictures on the vocabulary pages (138–139). Ask which of the things in the pictures they saw on the way to school / during the last weekend. Do they know any of their names? Can they identify the names in the lists in the exercises?
- 2 Alternatively, you can start the unit by discussing the quotation from Charles Lindbergh. Do students agree with the great aviator? Why / why not?

VOCABULARY ▶ Thematic Part pages 138–139

After warm-up activity 1, the rest of the section can be set for homework if you're short of time.

- 1 1 peninsula 2 range, peak 3 lake 4 island 5 coastline 6 Gulf 7 Bay 8 Cape

2

	mild/light	extreme
Rain	drizzle	downpour
Wind	breeze	gale hurricane
Fog	mist	
Cloudy (sky/day)		overcast
Hot (weather)		scorching a heatwave

- 3 1 thick 2 light 3 heavy 4 strong 5 sleet 6 snowstorm
- 4 1 oak 2 maple 3 pine 4 spruce 5 birch 6 horse chestnut
- 5 1 snowdrop 2 daffodil 3 tulip 4 daisy 5 pansy 6 lily of the valley 7 forget-me-not 8 heather
- 6 1 swan 2 seagull 3 sparrow 4 great tit 5 magpie 6 raven
- 7 1 breed 2 mating 3 nests 4 lay 5 hatch 6 young 7 feed 8 graze 9 hunt 10 migrate 11 hibernate
- 8 1 g 2 a 3 d 4 f 5 b 6 e 7 c
- 9 1 recycling 2 conserve 3 vegetarian 4 carbon 5 cycle 6 logging 7 plant 8 renewable

ADDITIONAL ACTIVITY

After covering the Vocabulary section, set the following additional homework: ask students to go for a walk and tick all the things on pages 138–139 they notice – birds, flowers, trees, weather, perhaps even some animal behaviour, perhaps landscape features or threats to the environment. (You can hardly leave the house without seeing 'the burning of fossil fuels'.) In the next lesson ask a few students with the largest number of observations to report to the class on what they have seen.

READING ▶ Thematic Part pages 140–141

The **examWORKOUT** focuses on linking words and the way they show connections between sentences. When approaching the exam task, students should start by reading the whole text. You can ask the following introductory question (after Exercise 2): *Read the article once quickly. Why is global warming bad for penguins?*

- 1 1 however 2 otherwise 3 because
- 2 1 B 2 C 3 A
- 3 (examTASK) 1 E 2 A 3 B 4 F 5 C

USE OF ENGLISH ▶ Thematic Part page 141

The **examWORKOUT** focuses on identifying what parts of speech are missing from a gapped text. Inserting words which match the general sense of the text but not the grammar of the sentence is a common mistake. When working on the exam task, remind students to read the whole text first, so the meaning of the gapped sentences in the context of the whole piece is clear.

- 1 1 to 2 have 3 who 3 a 5 more
- 2 1 c 2 b 3 e 4 a 5 d
- 3 (examTASK) 1 in 2 been 3 most 4 which 5 the 6 to

LISTENING ▶ Thematic Part page 142, Tapescript page 170

The **examWORKOUT** focuses on identifying the correct answer and eliminating the wrong ones in a multiple-choice task. One of the challenges is understanding why the wrong answers are wrong, as they always have something in common with the recording. The **examWORKOUT** shows some typical distractors.

- 2 1 C 2 D
- 3 1 with a book, thinking, waste of time 2 best, buy less, consume less
- 4 1 someone else's opinion: answer D (*People ask me: 'Don't you value your time?'*) something the speaker says about a different form of travel: answer B (*When I cycle, I listen to my ipod*) 2 actions the speaker mentions, but not as the best way: answers A, B, C.
- 5 (examTASK) 1 C 2 A 3 A 4 C 5 C
- 7 1 renewable energies 2 carbon neutral 3 wind turbines 4 solar panels
- 8 1 c 2 b 3 a

SPEAKING ▶ Thematic Part page 143

The exam task requires students to talk about their country in English. Your students may have already discovered for themselves that describing their own country and its culture through English to foreign friends is one of the most important language skills in an increasingly connected world. In the **examWORKOUT**, students can choose useful words from the boxes, but more importantly, they have to think about the most characteristic features of their country and come up with English words to describe those features.

1

Geographical features: B
Climate and the weather: E
Agriculture: A
Wildlife: C
Areas of outstanding natural beauty: D

WRITING ▶ Thematic Part page 143

The aim of the **examWORKOUT** is to sensitise students to some of the most typical grammar, spelling and punctuation errors made by candidates. It is worth explaining to students that, while their English is not likely to be 'perfect' by the day of the exam (especially as there is no such thing as knowing a language 'perfectly'), they can learn to avoid certain basic mistakes. The nine mistakes in the sample letter illustrate nine rules, for example:

- 1 A singular, countable noun is nearly always preceded by an article.
- 2 The relative pronoun used to refer to people is 'who', not 'which' – and so on.

You may ask students to formulate the rules.

- c One of the most ⁶beautiful places in Poland is Słowiński National Park. It is located in the north-west of the country, on the Baltic coast. I have very fond memories of that area, as ⁴I was going there every summer when I was a child. ⁸Its scenery is spectacular. There are dunes of incredibly pure, white sand, which give the landscape a fantastic appearance. There are lakes so close to the ⁹sea, that sea water gets into them whenever there is a storm. It is a perfect place for people ²which enjoy walking, ⁷taking photos, and especially birdwatching. With over 260 bird species, the area is a birdwatchers' paradise. You ⁵also can walk up Rowokół hill, which is not very high, but there is a viewing tower on top of it from which you can see a panorama of the surrounding area. If you are also interested in man-made landscape elements, I recommend a walk to ¹old lighthouse in the small village of Czolpino. Several years ago it was closed for repairs, but since last summer ³it is open again.
- d 1 the old lighthouse 2 who 3 it has been 4 I used to go 5 can also 6 beautiful 7 taking 8 Its 9 sea that

QUICK REVISION ▶ Thematic Part page 145

- 1 1 b 2 d 3 a 4 e 5 c
- 2 1 b 2 A mountain range. 3 gale is stronger than breeze 4 a, c 5 A swan. 6 a, d 7 They hibernate. 8 Turbines. 9 a 10 d
- 3 1 snowstorm 2 downpour 3 overcast 4 heatwave

REVISION ACTIVITY

- 1 Prepare little slips of paper with the headings from Word Bank on them: *landscape features, weather* etc. The number of the slips should be the same as the number of students.
- 2 Students start by working in pairs. Each pair draws two slips. If they draw the same heading twice, they need to exchange it. Students open their books at page 144 and revise the vocabulary from the categories they've drawn.
- 3 Now students work individually. The task is to prepare a short presentation (1–2 minutes) on *both* topics on the slips *together*, for example, on *trees* and *birds*, including at least 10 words from the relevant sections of Word Bank.
- 4 Students take turns to deliver their presentations in pairs. Circulate and monitor, then ask for a few funniest talks to be repeated to the whole class.

ADDITIONAL READING

This is not easy, as not many teenagers like reading literary descriptions of nature. If you have *Lord of the Rings* fans in your class, they might enjoy the following extract:

- J.R.R. Tolkien, *The Lord of the Rings, The Two Towers*, Chapter 4: *Treebeard* – the passage (approximately 2–3 pages) where Merry and Pippin meet Treebeard.

If your students enjoy poetry, consider reading a poem connected with the current season of the year, for example:

- Spring: William Wordsworth, *To My Sister (It is the first mild day of March ...)*
- Summer: Denise Levertov, *Living (The fire in leaf and grass ...)*
- Autumn: John Keats, *To Autumn (Season of mists and mellow fruitfulness ...)* – probably only the first stanza, as the poem is quite difficult
- Winter: Robert Frost, *Stopping by Woods on a Snowy Evening*

12 STATE AND SOCIETY

WARM-UP

This activity works best at the beginning of the unit. Write *Government, society, politics, the economy* on the board. Ask everyone to write down 10 words related to these topics. Allow one minute to 90 seconds. Invite students to come to the board (three at a time) and write two words each. When the board is full, look at it as a class. Students explain any words they have written that other students do not know. If there are any surprising words, discuss why people associate them with these topics.

VOCABULARY ▶ Thematic Part pages 146–147

The whole section could be set for homework, but it is rather challenging, so perhaps it is a better idea to do at least Exercises 1, 2, 4 and 5 in class, with students working in pairs. Using dictionaries is strongly recommended when doing exercises 4 and 5.

- 1 1 pass 2 approve 3 implement 4 administer
5 represent 6 interpret 7 for resolving
- 2 a 1 equal 2 rights 3 liberty 4 happiness
b 5 speech 6 censorship 7 conscience 8 assembly
c 9 judgment 10 law 11 process
d 12 proof 13 innocent 14 guilty 15 doubt
e 16 trial 17 witness 18 counsel
- 3 1 f 2 g 3 a 4 b 5 c 6 d 7 e
- 4 Noun (abstract): economy, economics
Noun (person): economist
Adjective: economic, economical
Verb: economise
- 5 1 economic 2 economy 3 economist 4 economical
5 economics 6 economise
- 6 1 Prime Minister
2 Member of Parliament
3 gross domestic product
4 weapons of mass destruction
5 World Trade Organization
- 7 1 b, h 2 a, d 3 c, e 4 f, g
- 8 1 b 2 c 3 a 4 d 5 e 6 f 7 g
- 9 1 for 2 of 3 of 4 with 5 of, from 6 to, for
- 10 1 possession
2 punishment, imprisonment
3 poverty
4 homelessness
5 immigrants

ADDITIONAL VOCABULARY INFORMATION

Some state offices and institutions in English-speaking countries have names that are very different from those we are used to. Students with an interest in politics might be interested to know that...

- The *US Secretary of State* is a very important position in the USA. There is only one Secretary of State at a time; he/she is in charge of the USA's foreign affairs, and is the most important person in the country after the President. (The UK equivalent is the Foreign Secretary.)
- Britain does not have a Minister of Finance. The person who performs that function is called the *Chancellor of the Exchequer*. The Exchequer was a medieval institution responsible for the collection of taxes. It does not exist any more, but the name of the Chancellor's office remains. (The US equivalent is the Secretary of the Treasury.)

- Taxes in the UK are collected by *Her Majesty's Revenue and Customs*, often still referred to by its previous name, *Inland Revenue*, and popularly known as *the taxman*. The USA equivalent is the *Internal Revenue Service*, also known as the *IRS*.
- The judges of the US and UK *Supreme Courts* are not called judges, but *justices*. The most important of them is the *Chief Justice* in the USA, and the *President of the Supreme Court* in the UK.

READING ▶ Thematic Part pages 148–149

As the topic of the text is both serious and exciting, it is worth focusing on its content. That is why most of the exercises in this section are content-oriented: pre-reading Exercise 1 encourages students to think of the historical context; Exercise 5 asks them to take notes as they might do in a history lesson; and Exercises 4 and 6 are intended to stimulate discussion about the described events and related questions.

When approaching the exam task, students should start by reading the whole text. You can ask the following introductory question (after Exercise 2): *Read the text once quickly. How did Scotland come to lose its independence?*

- 2 1 e 2 d 3 a 4 b 5 c

- 3 (examTASK) 1 C 2 D 3 A 4 C 5 D

- 5 (Suggested answers)

Scotland's situation in the late 17th century: not much industry, tiny navy, no foreign colonies, foreign trade routes blocked by England.

Paterson's plan: to set up a colony in Darien and control both oceans.

The difficulties encountered in Darien: hot and humid climate, failed crops, disease caused by insects, malnutrition.

The effects of the Darien disaster: 71 per cent of settlers died; colony surrendered to the Spanish; huge financial losses destabilised Scotland's economy; loss of political independence

LISTENING ▶ Thematic Part page 149, Tapescript page 170

The recording contains a lot of relevant vocabulary; exercises 3–5 will help students to identify it. Exercise 6 can be set up with students pretending to be real newsreaders: everyone in turn can sit in front of the whole class and say: 'Good morning, this is the BBC World News, I'm XY ...'

- 2 (examTASK) 1 C 2 E 3 B 4 A

- 3 1 c 2 e 3 g 4 a 5 b 6 d 7 f

- 4 A *landslide victory* means the election was won by a very large margin; a *closely fought contest* means the difference in the number of votes was small.

A *ceasefire* is a temporary agreement to stop fighting; a *peace treaty* is the next and more permanent step, and agreement that formally ends an armed conflict.

- 5 1 recklessly 2 disqualified 3 eligible 4 hand
5 delinquent, destroying 6 attempted

SPEAKING ▶ Thematic Part page 150

In this section students assess each other's performance. Assessing the quality of the language in this way presents some difficulty: as all our students are learners at approximately the same level, they may not be able to identify many of their language errors. The table in Exercise 2 is intended to help them focus on specific aspects which they *can* assess: fluency, rich vocabulary and *basic* grammatical errors, which they can identify and correct.

USE OF ENGLISH ▶ Thematic Part page 151

The **examWORKOUT** focuses on inversion. There are more exercises on inversion in the Lexical-grammatical Part: exercises 9 and 10 on page 46.

- 1 2 Rarely have I seen such a well-organised society.
3 On no account must we invest any money in this venture.
4 Not only does the company use child labour, but it dumps toxic waste next to farms as well.
5 Little did they realise what we were planning.
6 No sooner had the news been announced than riots broke out in the city.
7 Not a word did he say about the proposed redundancies.
- 2 (**examTASK**)
1 does the undertaking involve a significant risk, but
2 no account should you believe
3 have I made any of the statements
4 did they know that they would be
5 had the protest march started than the police

WRITING ▶ Thematic Part page 151

Students prepare to write an article in three stages. Exercise 1 invites them to think about the issue in question and consider their opinions, which is a way of brainstorming ideas for the article.

In Exercise 2 students look at contrasting ideas, some of which they might want to include in their articles.

In Exercise 3 they have to think about what constitutes a good first and last sentence. Sentence *d* is a good opening, because it introduces the issue in a relatively neutral way, by quoting the information from the input, without giving an opinion yet. In contrast, sentence *c* sounds very opinionated and definite. Sentence *a* provides a balanced ending, while sentence *b*, besides being very definite, uses language which is inappropriately colloquial and aggressive: 'the whole idea', 'stupid'.

- 2 1 a, e 2 b, f 3 c, d
- 3 Opening sentence: d (introduces the topic by referring to the input)
Closing sentence: a (sums up the discussion in a balanced way)
Sentences b and c are very definite, direct, brusque statements of opinion; b uses the word *stupid*, which is stylistically inappropriate. Neither b nor c refers to the input or introduces the issue in any other way; nor does either of them sum up the whole issue or suggest constructive solutions.

QUICK REVISION ▶ Thematic Part page 153

- 1 1 possession 2 imprisonment 3 punishment 4 poverty
5 homelessness 6 burglary
- 2 1a 2b 3c 4b 5 a economic; b economical
6 a economics; b economy 7 a 8 b 9 of 10 a
11 c 12 peace

REVISION ACTIVITY

Write the following topics on the board. Invite students to imagine that a foreigner has asked them to explain one of these aspects of life in their country:

- politics
- the economy
- an important event from their country's history, or from the history of their town / city / region
- crime in their town / city

Each student has to choose a topic and prepare to talk about it for two minutes. Using Word Bank on page 152 when preparing is recommended. Students deliver their short presentations in pairs. Circulate and monitor. Choose 4–8 presentations to be repeated to the whole class. You may simply choose the best ones; however, you may also choose contrasting pairs of talks on the same topic, but presenting very different views. Encourage the class to ask the presenters questions – the more challenging the better, but they should be *questions*, not attacks.

ADDITIONAL READING

Consider reading extracts from famous political speeches, for example:

- Abraham Lincoln, *The Gettysburg Address*
- Martin Luther King, *I have a dream*
- Winston Churchill, *Blood, toil, tears and sweat*
- J.F. Kennedy's inaugural address