

**UNIT 1** A project summary

- 1 a** A team of researchers have written a project summary for a grant proposal to the National Science Foundation of the United States. Ignoring the words in bold, read the first sentence of each of the five paragraphs from the project summary (a–e). Then in pairs, say what you think the best order is:

1  2  3  4  5

- a Both teams for this project already have knowledge in various **features** of the problems described.
- b However there are very few **outcomes** and the **methods** that were developed **have broken down**.
- c The need for mathematical analysis of shell models is in response to a variety of technological demands, which **call for** more complex models.
- d This project will focus on stabilization and optimal control, particularly with boundary controls, of systems concerning dynamical shells.
- e We propose to **carry out** collaborative research between the French National Institute of Computer Science Research and the University of Ottawa in the general area of control theory for models **illustrated by** partial differential equations (PDEs).

- b** Ignoring the words in bold, check your answers to Exercise 1a by matching a sentence (a–e) to the correct paragraph (1–5) of the full project summary.

### NSF Grant Proposal for Stabilization and Optimal Control of Dynamic Shell Models

[1] \_\_\_\_\_. We intend to investigate problems related to stabilisation and optimal control of dynamic shell models where control actions and sensing are put into place via smart materials technology.

[2] \_\_\_\_\_. The principle model considered in this proposal is a three-dimensional structural acoustic interaction with curved walls, which is modeled by shell equations. This model occurs in the context of decreasing noise or pressure entering an acoustic chamber (e.g. airplane's cabin) and generated by an exterior source.

[3] \_\_\_\_\_. Thus mathematical investigation related to control problems of shell equations is challenging from a mathematical point of view and calls for the introduction of new tools and new techniques for the analysis and computations connected to the problem.

[4] \_\_\_\_\_. Two approaches will be considered. First, piezoelectric shell's modeling tracked by past researchers and a second centre on piezoelectric patches attached to the curved wall. These approaches will result in two different control models. Rigorous mathematical analysis of the problem, including comparative analysis, followed by numerical computations and experimental verification of the models will represent the essential part of the project.

[5] \_\_\_\_\_. Thus we wish to combine the teams' expertise to generate results leading to progress in the field.

**C** Read the completed project summary. Then in pairs, decide if the following statements are true (T) or false (F).

- 1 The summary includes information on what research will be done and who will do it.
- 2 The summary does not mention any possible commercial applications of the research.
- 3 Members of the team have worked on projects in similar areas in the past.

**2 a** The table below includes useful verbs and nouns you can use in your own project summary. Match a word in bold from the texts in Exercises 1a and b to a word with a similar meaning in the left-hand columns of the tables.

Verbs	
describe	
fail	
focus on	
implement	
lead to	result in ( <i>will result in</i> )
plan to	
produce	generate
require	

Nouns	
answer	response
aspect	
research	investigation
result	
technique	

**b** The adjectives in the first column are taken from the project summary. Complete the second and third columns in the table below as in the example.

Adjective	Noun(s)	Verb
collaborative	collaboration collaborator	collaborate
comparative		
complex		
different		
various		

**UNIT 1** Teacher's Notes*Before you begin ...*

Ask students what information a good project summary for a grant or award application should include (the aims of the research, why the research is necessary, what the expected results will be). You could also ask them to say:

- who the reader(s) will be (representatives of the organisation which is making the award)
- what the purpose of the summary is (to persuade the organisation that the research will be valuable)

**Note**

This proposal is for research in control theory. This is a branch of maths and materials sciences which is interested in creating mathematical models to describe the behaviour of dynamical systems (the movement of a pendulum is an example of a dynamical system). The following link offers a basic description: <http://mathworld.wolfram.com/ControlTheory.html>

The proposal is for an award from the National Science Foundation of the United States government (<http://www.nsf.gov>).

- 1 a** Students read the five sentences and work in pairs to decide on the best order of the paragraphs they belong to. Tell students that there may be more than one possible correct answer so they should be prepared to justify their answers. You could also mention that the words in bold are connected to Exercise 2, which they will do later.
- b** Students check whether their answer(s) to Exercise 1b fit the main part of the project summary. Remind students that the answers are correct for this team's project summary and that any alternative order for the paragraphs they suggested for Exercise 1a may also be suitable.

**Answers**

1 e 2 c 3 b 4 d 5 a



- c** Students read the completed summary before answering the questions.

**Answers**

- 1 T  
2 F – the 2nd paragraph refers to various technological demands and gives an example of airplane cabins  
3 T



- 2 a** Tell students that they will now look at some of the language used in the project summary. They should use the infinitive form of the verb to complete the first table but ask them to make a note of the form of the verb used in the text, as in the examples. In the second table, plural forms of the nouns they need may appear in the summary.

## Answers



Verbs	
describe	illustrate ( <i>illustrated by</i> )
fail	break down ( <i>have broken down</i> )
focus on	consider ( <i>considered</i> )
implement	put into place
lead to	result in ( <i>will result in</i> )
plan to	intend to
produce	generate
require	call for ( <i>calls for</i> )
Nouns	
aspect	feature ( <i>features</i> )
research	investigation
result	outcome ( <i>outcomes</i> )
technique	method ( <i>methods</i> )

- b** Tell students that many of the words used in scientific writing in English belong to word 'families'. That is, the root or stem of the word (e.g. *collabor-*) can be adapted to different parts of speech (adjective, noun, verb). These kinds of words are very common in research papers and they should make an effort to practice word-building. You could also mention that they will do work on prefixes and suffixes throughout the *Cambridge English for Scientists* course.

## Answers



Adjective	Noun(s)	Verb
collaborative	collaboration collaborator	collaborate
comparative	comparison	compare
complex	complexity complication	complicate
different	difference	differ
various	variety variation	vary

**UNIT 2** Indirect questions**a** Look at the pairs of sentences and answer the questions.

1

- a What does *human genome* mean?  
b I was wondering what human genome means.

2

- a Is methanol a suitable solvent for cleaning lab glassware?  
b Does anyone know if methanol is a suitable solvent for cleaning lab glassware?

- 1 Do the questions have the same meaning?
- 2 Which question is more polite?
- 3 Which words have been added to make sentence b more polite?
- 4 How has the word order changed?
- 5 Why is the word *does* used in 1a but not 1b?
- 6 Why is the punctuation different in 1b and 2b?
- 7 Why has the word *if* been added to the question in 2b but not in 1b?

**b** Match the beginnings and endings of the sentences to make polite questions.

1 Can anyone tell me if	a a hydrogen bond can also act as an ionic bond.
2 I'd like to know if	b there is a simple experiment to distinguish between NaOH and KOH?
3 I'm trying to find out what	c I can make a good quality ferrofluid?
4 Could anyone tell me how	d the best make of microscope is.

**c** Underline the phrases in Exercise b which are used to make the questions polite.**d** Make the questions a–d more polite. Begin with the word/phrase given.

- a How do you find electronegativity of an element?  
Could \_\_\_\_\_
- b What's the best way to store agarose gels?  
I'm trying \_\_\_\_\_
- c Where can I buy an inexpensive distillation set?  
I was wondering \_\_\_\_\_
- d Is it true that no two fingerprints are the same?  
Does \_\_\_\_\_

# UNIT 2

## Ethics Committee Approval

**a** In pairs, check the meaning of the following words and phrases.

- confidentiality
- informed consent
- privacy
- risk of harm

**b** Read the following extract from an ethical review of human research. In pairs, think of examples of research activities which would be unethical according to the information in sections A–C.

### Ethical Issues Checklist for Research Involving Humans

The aim of an ethical review of human research is to ensure that the subjects are not put at risk of harm, are not disadvantaged and are made aware that they may withdraw at any time.

The process of ethical review concentrates on three main areas:

#### **A Gathering informed consent**

Research subjects must be fully informed of relevant aspects of the research before agreeing to participate. Researchers should ensure that individuals are not pressured into participation through unequal power relationships, payments or inducements.

#### **B Protection of privacy and confidentiality of records**

The research must protect the privacy and confidentiality of subjects and the data obtained from them.

#### **C Risk of harm to subjects or to groups in the community**

Individuals could be put at risk through the use of new or invasive procedures. They could also be harmed through damage to their cultural security or through processes which might expose them to discrimination or misrepresentation.

*adapted from: Ethics Checklist [.doc 113kB]*

- C** Now read the questions in the Ethics Approval Committee checklist below. Then in pairs, match a question (1–10) to the section of the text in Exercise b (A, B or C) it is connected to.

The following checklist is designed to alert you to the major types of ethical issues in your research.

Does this proposal involve: -

	YES	NO
1 Any form of physically invasive procedure on volunteer participants?		
2 Ionising radiation (X-rays, fluoroscopy or radioisotopes)?		
3 Minors, i.e. under the age of 18?		
4 Payments, other than reasonable recompense, to participants for their participation?		
5 Persons with an intellectual or mental impairment?		
6 Separate identification of, or focus on, specific racial groups?		
7 The administration of any form of drug, or placebo?		
8 The use of any participants with whom the researcher has a relationship such as teacher-student; employer-employee?		
9 Use of human tissue samples?		
10 Use of questionnaires or interviews which may be linked to the participant at any stage of the research, including the obtaining of data?		
If you answer YES to any of the questions in the checklist, you will be required to submit an application for ethics approval. For Application Forms please contact the Ethics Committee.		

- d** Now look at the summary Ryuchi made for his critical review on page 18 of the Student's Book. In pairs, use the checklist in Exercise c and decide which questions (1–10) from the checklist can be answered using Ryuchi's summary.
- e** In pairs, look at your answers to Exercise c and then say whether you think Martin, F-P.J., Rezzi, S., Pere-Trepat, E. *et al.* needed Ethics Committee Approval for their research.

**UNIT 2** Teacher's Notes**Indirect questions**

**a** Students look at the pairs of sentences and answer the questions.

**Answers**

- 1 Yes
- 2 b is more polite. It is an indirect question whereas a is a direct question.
- 3 I was wondering... / Does anyone know...
- 4 a uses verb-subject question pattern. b uses the subject-verb statement pattern.
- 5 *does* is used as an auxiliary verb to form a question in the *present simple* in 1a. 1b does not have a *present simple* question structure so *does* is not needed.
- 6 The phrase which forms the indirect question is a statement in 1b, so no question mark is needed. It is a question phrase in 2b so the question mark remains.
- 7 In 1b the question word *how important* links the indirect question phrase to the question being asked. In 2a, there is no question word. *If* is used to link the indirect question phrase to the question.

**b** Students match the beginnings and endings of the sentences.

**Answers**

- 1 b   2 a   3 d   4 c

**c** Students find the phrases in Exercise b which are used to make the questions polite.

**Answers**

- 1 Can anyone tell me
- 2 I'd like to know
- 3 I'm trying to find out
- 4 Could anyone tell me

**d** Students rewrite a–d to make the questions less direct and more polite.

**Answers**

- a Could anyone tell me how you find the electronegativity of an element?
- b I'm trying to find out what the best way to store agarose gels is.
- c I was wondering where I can buy an inexpensive distillation set.
- d Does anyone know if it is true that no two fingerprints are the same?

## Ethics Committee Approval

- a Students work in pairs to check the meaning of the words and phrases.

### Answers



**Confidentiality** – an obligation to keep secret any personal matters the researcher finds out about a subject.

**Informed consent** – a person can give informed consent if they have been given all the relevant facts and have the mental ability to understand the facts and their implications.

**Privacy** – the subject's right to keep their personal matters secret.

Privacy and confidentiality could be breached if subjects are questioned on topics which could cause embarrassment/discomfort.

**Risk of harm** – the chance of the subject being hurt in some way by the research.

- b Students read the extracts from the ethical review. Ask students to work in pairs to think of examples of research activities which are unethical and then feed back to the whole group.

### Suggested answers



Gathering informed consent – secretly observing subjects; using subjects who are in the care of the researcher e.g. in a hospital or prison.

Protection of privacy and confidentiality of records – asking questions which may be embarrassing; storing data insecurely; publishing research in a way that could allow individuals to be identified.

Risk of harm to subjects or to groups in the community – using a procedure which could cause pain; focusing on one particular subsection of the population; withholding a particular treatment (e.g. to a control group).

- c Ask students to look at the checklist and to match the questions 1–10 to the three main aspects of the ethical review A–C.

### Answers



1 C 2 C 3 A 4 A 5 A 6 C 7 C 8 A 9 C 10 B

- d Ask students to look at Ryuchi's summary of Martin *et al.*'s research on page 18 of the Student's Book and to complete as many of the questions on the checklist as they can for this experiment. Ask students to feed back on what information they would need to answer all the questions.

### Answers



1 Y 2 N 3 N 5 N 7 Y 9 N 10 Y

The answers to questions 4, 6 and 8 are probably 'No' but more information would be needed to confirm this.

- e Ask students whether the experiment would have needed Ethics Committee Approval or not.

### Answer



The research would have needed Ethics Committee Approval because the answer to items 1, 7 and 10 are 'yes' and the form states that '*If you answer YES to any of the questions in the checklist, you will be required to submit an application for ethics approval.*'

Cambridge English for  
**Scientists**

## ADDITIONAL ACTIVITIES

**UNIT 3** Asking for more information

- a** Divide the words in the box into two groups, those which are living things and those which are not. Use a dictionary to help you.

inflammable pacemaker Resurrection Fern sea sponge termite mound whale wound healing

- b** Match the beginnings and ends of the sentences.

1 Am I right in thinking ...	a <b>you said about</b> sea sponges and making glass.
2 I still don't quite see how whales ...	b have been the inspiration for pacemakers.
3 I'm afraid I didn't understand what ...	c <b>that</b> we could mimic the beetle to make white paper even whiter?
4 I'm not really clear on ...	d animal cells have inspired inflammable materials.
5 I'm still not sure I understand how ...	e the connection between flies and wound healing.

- c** What is the function of the phrases in bold in Exercise b? Which phrases are followed by a noun and which by subject + VERB?

- d** When we speak, instead of pausing between every word, we divide our words into groups and pause between the groups. There are no rules about where to pause; instead, we pause to help the listener follow our message. In pairs, say the two sentences below, pausing at the //. Which one sounds better?

- a I'm // not really // clear on the // connection // between flies and // wound healing.  
b I'm not really clear // on the connection // between flies // and wound healing.

- e** Look at the sentence below. In pairs, say the sentence and decide where you would pause.

I still don't quite see how whales have been the inspiration for pacemakers.

- f** Look at the situations below. Write a suitable sentence for each one to ask for clarification or a further explanation. Then, work in pairs to practise saying the sentences paying attention to where you pause.

- a A student tells you he is designing solar cells which look like leaves and keeps talking about making the cells heliotropic. You don't know what this word means.  
b A researcher in your lab has just visited a building which somehow mimics a termite mound in its design. You're not sure what feature of a termite mound is being mimicked.  
c A new student at your lab is looking at mimicking the Resurrection Fern to keep vaccines alive without refrigeration. You've heard of the resurrection plant but don't know how it could be useful.

**UNIT 3** Teacher's Notes

- a** Students use a dictionary to check the meanings of the words and divide the words into two groups.

**Answers** 

Living: Resurrection Fern, sea sponge, whale

Non-living: inflammable, pacemaker, termite mound, wound healing

It is possible that there will be some debate about whether the termite mound is living. The termites are but the mound itself is not. Similarly, students may have listed wound healing as living. The animal with the wound certainly needs to be alive for the wound to heal, but the healing process is not a living thing.

**Note**

A termite mound is shown on page 22 of the Student's Book. The Resurrection Fern is mentioned on page 29 of the Teacher's Notes.

- b** Students match the beginnings and ends of the sentences.

**Answers** 

1 c 2 b 3 a 4 e 5 d

- c** Students discuss the function in pairs and work out what follows each phrase.

**Answers** 

The function is to ask for clarification.

Phrases 3 and 4 are followed by a noun (or noun phrase). Phrases 1, 2 and 5 are followed by subject + verb.

- d** Go through the information about pausing with the students. They then work in pairs to say the two sentences, pausing at the //. Feed back on which sounds better.

**Answer** 

Sentence b sounds better. The pauses come between units of meaning, which are often also grammatical units. For example, the prepositional phrase *on the connection* is kept as a unit.

- e** Students work in pairs to decide where to pause in the sentence.

**Suggested answer** 

I still // don't quite see // how whales // have been the inspiration // for pacemakers.

- f** Students write a suitable sentence for each situation and then work in pairs to practise including appropriate pauses.

**Suggested answers**

- a I'm not really clear on the meaning of heliotropic. (I'm not really clear on what heliotropic means is also possible. In this case, I'm not really clear on is followed by a noun clause rather than a noun phrase).
- b I'm still not sure I understand how the building mimics a termite mound.
- c I still don't quite see how mimicking the Resurrection Fern could be useful.

Cambridge English for  
**Scientists**

## ADDITIONAL ACTIVITIES

**UNIT 4** 'Use'

- a** The following sentences all describe equipment used by scientists in their work. Match the beginnings (1–10) to the endings (a–j).

1 Centrifuges are used ...	a ... a pipette was used.
2 An electron microscope is used ...	b ... to stop the experiment getting contaminated.
3 Scientists sometimes use a fume cupboard ...	c ... scientists often use an autoclave.
4 You can separate a mixture of compounds ...	d ... that scientists use to culture cells.
5 Liquid nitrogen can be used...	e ... several test tubes can be held at the same time.
6 To sterilize equipment, ...	f ... in an attempt to produce magnified images of very small objects.
7 A petri dish is a shallow glass or plastic dish ...	g ... for storing biological samples.
8 In order to measure and transfer exactly 1.75ml of the solution, ...	h ... by using High Performance Liquid Chromatography (HPLC).
9 One use of latex gloves is to protect the scientist; another use is ...	i ... to limit their exposure to hazardous chemicals and other airborne hazardous materials.
10 By using a test tube rack, ...	j ... to separate materials of different specific gravities, or to separate solid particles suspended in a liquid.

- b** Read the completed sentences from Exercise a (1–10) and circle or highlight every example of the word *use*. Then find an example of *use* as a(n) ...

- *-ing* form
- noun
- past passive verb
- present active verb
- present passive verb

- c** In pairs, decide how each of the examples of *use* you found in Exercise b is pronounced. Then ask your teacher or use a dictionary to check your answers.

- d** To express purpose (why the equipment is used), we can use the forms *in order to* + verb, *in an attempt to* + verb or simply *to* + verb. Underline examples of these forms in the completed sentences in Exercise a. Which form suggests that you may not necessarily get the result you intend?

- e** Complete the gaps in the following sentences with one of the five forms of *use* described in Exercise b, or with the words *in* or *to*.

- 1 A micrometer can \_\_\_\_\_ to measure very small lengths and diameters.
- 2 Generally, \_\_\_\_\_ order \_\_\_\_\_ produce high-voltage pulses from a low-voltage DC supply, an induction coil \_\_\_\_\_.
- 3 By \_\_\_\_\_ a magnetometer, the direction and strength of a magnetic field can be measured.
- 4 Physicists nowadays \_\_\_\_\_ particle accelerators \_\_\_\_\_ an attempt \_\_\_\_\_ learn more about the nature of matter and energy.
- 5 In the second experiment, a Polymerase Chain Reaction (PCR) technique \_\_\_\_\_ generate thousands of copies of the DNA sequence.
- 6 Protecting the sample being viewed is one \_\_\_\_\_ of a coverslip.

- f** Write five sentences about the use of pieces of equipment or techniques that you use in your work.

Cambridge English for  
**Scientists**

## ADDITIONAL ACTIVITIES

**UNIT 4** Teacher's Notes

**a** Students match the beginnings and ends of the sentences.

**Answers**

1 j 2 f 3 i 4 h 5 g 6 c 7 d 8 a 9 b 10 e



**b** Students find examples of the word *use* in the completed sentences from Exercise a and then identify the different forms.

**Answers**

- 4 and 10 (by) using ...
- 9 use
- 8 was used
- 3, 6 and 7 use
- 1, 2 and 5 are used / is used



**c** Students work in pairs to decide how each of the examples of *use* is pronounced.

**Answers**

-ing form /ju:zɪŋ/  
 noun /ju:s/  
 past passive verb /wəz ju:zd/  
 present active verb /ju:z/  
 present passive verb /ə ju:zd/ /ɪz ju:zd/



**d** Students find examples of the phrases in the sentences in Exercise a. In pairs they then discuss the question.

**Answer**

*In an attempt to* sounds like you will not necessarily get the result you intend.



**e** Students complete the sentences.

**Answers**

- |                 |               |
|-----------------|---------------|
| 1 be used       | 4 use/in/to   |
| 2 in/to/is used | 5 was used to |
| 3 using         | 6 use         |



**f** Students write 5 sentences about equipment or techniques they use in their work.

**UNIT 5** Writing in an  
appropriate style

- 1 a** A Chemistry student is summarising an experiment he has run. The language in the summary is grammatically correct, but the style is inappropriate. Read the three extracts (A–C) below. Then in pairs, first find examples of inappropriate style in the extracts. Then discuss what the student could do to improve the style of his report.

A

**My fermentation experiment**

I tried to make ethanol through the growth of baker's yeast (which we can also call *Saccharomyces cerevisiae*) on glucose.

The fermentation looks something like this:



glucose  $\rightarrow$  ethanol + carbon dioxide ...

B

So, to move on, I took the mixture out of a feed flask to a reactor flask. That's where all of the yeast was. I also changed the pump rate to a setpoint. Every minute, I had a look at how much carbon dioxide came out of the reaction flask, and I used a ...

C

I set up this interesting experiment to run over roughly 24 hours. At the end of the fermentation, I measured the solution ...

- b** Discuss your ideas with the class. You could think about the advice Thabo gave to Chuyu to help you (see Exercises 4 and 5 in Unit 5 of the Student's Book).

- 2 a** Vocabulary choice is very important to style. Below is a summary of another experimental procedure. For 1–10, underline the word or phrase which you think is in the most appropriate style for a formal scientific report.

In order to (1) *determine* / *find out* the value of  $n$  from (2) *just one* / *a single experiment*, (3) *you should* / *it is necessary* to have a range of stress levels acting within a (4) *one thing* / *single specimen*. (5) *You can do this* / *This is achieved by* making the sample into a coil. The stress (6) *comes from* / *is provided by* the weight of the coil itself, so that the upper part of the coil (7) *experiences* / *gets* more stress than the lower parts. The stress in a particular turn of the coil is (8) *proportional to* / *changes at* about the same speed as its number,  $N$ , where the turns are numbered beginning from the bottom turn and ending at the top. The shear stress  $\tau$  in each turn (9) *is totally different* / *varies* from zero at the centre of the turn (axis of the coil) to a maximum value at the edge of the coil. The average local strain rate (10) *is thus* / *must be kind of* related to the spacing between turns,  $s$ , and the time,  $t$ .

**b** The passive voice is also often used in formal scientific writing. Complete the sentences (1–10) by rewriting the verbs in the brackets in the passive voice and in the tense described.

- 1 In this paper, a structure is suggested for the salt of deoxyribose nucleic acid (D.N.A.). (suggest, *present simple*)
- 2 Plant seeds \_\_\_\_\_ by wind and animals. (disperse, *present simple*)
- 3 Research \_\_\_\_\_ to discredit this theory. (carry out, *present perfect simple*)
- 4 This relationship \_\_\_\_\_ by Smith *et al.* (investigate, *present perfect simple*)
- 5 The sodium hydroxide \_\_\_\_\_ in water. (dissolve, *past simple*)
- 6 The procedure \_\_\_\_\_ until there was certainty regarding the results. (repeat, *past simple*)
- 7 The problems encountered by the patients \_\_\_\_\_ by the bacteria. (cause, *past simple*)
- 8 The solution \_\_\_\_\_ to 90 °C for approximately 30 minutes and then allowed to cool. (heat, *past simple*)

**UNIT 5** Teacher's Notes

- 1 a** Students read the three extracts and try to find examples of inappropriate style in the texts. You may want to tell students that this text has been created especially for the purpose of this exercise.

When students are discussing how the style of the text could be improved, you might want to mention that words which form 'word families' (e.g. *observe, observable, observation*) tend to be more formal than words which do not (e.g. *look at*). Students might find this helpful to recognise the difference between more and less formal word choices. They should be careful to note that this is a general tendency, not a rule.

**Suggested answers** 

The writer uses words that are general rather than specific: *make ethanol, looks something like this ... , I took the mixture ... , I had a look at ... , I set up ... , ... roughly 24 hours*

The writer uses a lot of informal conversational language: *I tried to ... , So, to move on, ... That's where all of the yeast was.*

The writer could

- use more formal vocabulary (e.g. *create* not *make, observed* or *measured* not *had a look at*)
- use the passive voice where appropriate
- combine one or more of the short, simple sentences

- b** Students share their ideas with the whole group. You might want to record the results of their discussion where students will be able to see them again. For example, a poster which could go up on the wall of your classroom or a summary of their ideas on a course or school website.

- 2 a** Students underline the best choice of word or phrase. You may want to remind students that each pair of words or phrases is grammatically correct, but only one is appropriate.

**Answers** 

2 a single    3 it is necessary to    4 single specimen    5 This is achieved by  
6 is provided by    7 experiences    8 proportional to    9 varies    10 is thus

- b** The aim of this exercise is to give students practice in producing the correct form of the passive. You may want to tell students that these sentences are extracts from different papers.

**Answers** 

2 are dispersed    3 has been carried out    4 has been investigated  
5 was dissolved    6 was repeated    7 were caused    8 was heated

**UNIT 6** Writing up from notes

**a** In pairs, discuss the meanings of the following abbreviations found in Units 5 and 6.

→ w/ RT @ EM CNT g ml

**b** Match the verbs (1–7) to their meanings (a–g).

1 decant	a put two or more things together so they can't be separated
2 identify	b mix by moving in a circular pattern
3 isolate	c discover or recognize what sth is
4 mix	d stay after other things have gone or been taken away
5 remain	e separate one thing from others
6 remove	f take sth away
7 stir	g to pour a liquid from one container into another

**c** Look at the notes. In pairs, describe the procedure for making Carbon Nanotubes (CNTs).

- 0.99 g potassium – remove surface → no K<sub>2</sub>O remains
- Mix w/ 0.062 g iron dendrimer catalyst + 12 ml benzene + 2.7 ml tetrachloroethylene
- Stir 1 week @ RT
- Remove K – clean w/ t-butyl alcohol – CH<sub>3</sub>OH – H<sub>2</sub>O
- Isolate reaction product (spin in centrifuge + pour off liquid)
- EM to identify CNTs

**d** Complete the paragraph describing the procedure by putting the verb in brackets into the correct form.

The surface **(1)** \_\_\_\_\_ (remove) from 0.99g potassium so that no potassium oxide **(2)** \_\_\_\_\_ (remain). The potassium **(3)** \_\_\_\_\_ (mix) with 0.062 g of iron dendrimer catalyst, 12 ml benzene, 2.7 ml tetrachloroethylene. The mixture was stirred for one week at room temperature. The potassium **(4)** \_\_\_\_\_ (remove) and washed with t-butyl alcohol, then methanol, and finally water. The reaction product **(5)** \_\_\_\_\_ (isolate) by centrifugation and decantation of the liquid. Transmission electron microscopy **(6)** \_\_\_\_\_ (show) the presence of CNTs in the reaction product. The tubes had diameters around 15–20 nm.

**e** Look at the two different possible forms of sentence 2. They have the same meaning. In pairs, discuss why you think form 1 was used in the text rather than form 2.

- The potassium was mixed with 0.062 g of iron dendrimer catalyst, 12 ml benzene, 2.7 ml tetrachloroethylene.
- 0.062 g of iron dendrimer catalyst, 12 ml benzene, 2.7 ml tetrachloroethylene was mixed with the potassium.

**f** In English texts, sentences are often structured so that the focus of the text, or information which has been mentioned before, is used as the subject, with new information appearing later in the sentence.

Look at the sentences below and discuss which sentence (a or b) best follows the first sentence.

- 1 A sample of 37 galaxies was identified.
  - a These galaxies were cross-identified with SPIRE 500  $\mu\text{m}$  catalogs.
  - b We then cross-identified these galaxies with SPIRE 500  $\mu\text{m}$  catalogs.
- 2 A set of 13 hydrophones detects the presence of dolphins and whales.
  - a Analysis of how human-generated noise can affect these animals is made possible by this system.
  - b This system makes it possible to analyse how human-generated noise can affect these animals.
- 3 First, zinc oxide nanowires are grown around an optical fibre.
  - a Then, the nanowires are coated with the dye-sensitized solar cells, which convert light to electricity.
  - b Then, dye-sensitized solar cells, which convert light to electricity, are used to coat the nanowires.

Cambridge English for  
**Scientists**

## ADDITIONAL ACTIVITIES

**UNIT 6** Nouns and articles

- a** Look at the following nouns which have appeared in units 1–5. Work in pairs to see if you can remember what they mean.

approach	device	hypothesis
application	dimension	outcome
brittleness	evidence	research
characteristic	exposure	solubility

- b** We can divide nouns into two groups. Those we can count the number of, like electrons in an atom or species in a wood, are called countable nouns. Nouns we can't count the number of, like physiology or oxygen, are called uncountable nouns.

Look at the nouns in Exercise a. Which ones are countable nouns and which are uncountable?

- c** Countable nouns have two forms; singular and plural. For example, we say 1 enzyme (singular) but 2 enzymes (plural). Uncountable nouns do not have a plural form.

Look at the countable nouns you found in Exercise b. What is the plural form of each one?

- d** Complete the sentences by choosing the correct word in italics.

- 1 A semi-automated *device/devices* for measuring the *solubility/solubilities* of compounds in solution volumes as low as 1 mL was developed for pharmaceutical *application/applications*.
- 2 We investigated the *brittleness/brittlenesses* and *characteristic/characteristics* of the fracture of  $\beta$  titanium alloys.
- 3 *Research/Researches* on a number of animal species has led us to the *hypothesis/hypotheses* that *exposure/exposures* to solvents may cause lung disease.

- e** Whenever we use a noun in English, we need to decide whether we need to use an article with it, and if we do, which article to use. The table below shows how to choose an article. Complete the space in each box (1–8) with an example from sentences 1–3 in Exercise d.

	Countable nouns		Uncountable nouns
	Singular	Plural	
General use – there are many of this noun and we don't know which one is being referred to	a/an 1 _____	no article 2 _____	no article 3 _____ 4 _____
Specific use – there are many of this noun and we know which one is being referred to OR there is only one of this noun	the 5 _____	the 6 _____	the 7 _____ 8 _____

**f** Complete the description of a procedure for making Carbon Nanotubes by putting the correct article (a/an, the or no article) in the gaps.

0.006g of iron dendrimer and 8ml methanol were mixed and placed in (1) \_\_\_\_\_ tube wrapped with (2) \_\_\_\_\_ copper wire. (3) \_\_\_\_\_ tube was placed in (4) \_\_\_\_\_ beaker containing 3ml carbon tetrachloride and then (5) \_\_\_\_\_ beaker was put in (6) \_\_\_\_\_ CO<sub>2</sub>-reactor at 1200 psi, 125°C for 24 hours. After the reaction, (7) \_\_\_\_\_ tube contained (8) \_\_\_\_\_ black solid. Transmission electron microscopy revealed the presence of (9) \_\_\_\_\_ CNTs in the reaction product.

**UNIT 6** Teacher's Notes**Writing up from notes and the passive voice**

- 1 a In pairs, students discuss the meanings of the abbreviations.

**Answers**

leads to  
with  
room temperature  
at

electron microscope  
carbon nanotube  
grams  
millilitres



- b Students match the verbs to their meanings.

**Answers**

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



- c Students work in pairs to orally describe the procedure for making Carbon Nanotubes (CNTs).

- d Students complete the paragraph with the correct form of the verb.

**Answers**

1 was removed  
2 remained  
3 was mixed

4 was removed  
5 was isolated  
6 showed



- e Students look at the two sentences and discuss why the first was used.

**Answer**

As mentioned in Exercise f, in English sentences the focus of the text or information which has been mentioned before is preferred as the subject. New information usually appears later in the sentence. It is often this consideration which determines whether a structure with the active or passive voice is chosen.



- f Students choose the most appropriate sentence to continue from the first one given.

**Answers**

- 1 a – Using the passive voice allows the focus to be moved away from the agent *we*.  
2 b – Using the active voice keeps the focus on the system.  
3 a – Both options here use verbs in the passive voice (are coated and are used to coat). Point out that the focus of the first sentence (which in this case is zinc oxide nanowires, not dye-sensitized solar cells) is what determines the choice of subject in the sentence that follows.



## Nouns and articles

- 2 a** Students work in pairs to review what the words mean. Direct them to the Glossary on pages 117–125 of the Student's Book to check their answers.
- b** Go through the information about countable and uncountable nouns. Provide more examples if necessary. Students divide the nouns in Exercise a into two groups.

### Answers

Countable: approach, application, characteristic, device, dimension, hypothesis, outcome  
 Uncountable: brittleness, evidence, exposure, research, solubility

- c** Go through the information about singular and plural forms. Students write down the plural form of each of the countable nouns in Exercise b.

### Answers

approaches, applications, characteristics, devices, dimension, hypotheses, outcomes

- d** Students choose the correct word to complete the sentences.

### Answers

- 1 device, solubility, applications
- 2 brittleness, characteristics
- 3 research, hypothesis, exposure

- e** Point out that whenever a noun is used, we have to decide whether to use an article with it. You could elicit what the 3 articles in English are (a/an/the) and see if the students know any rules about which to use when. Go through the table with the students. You may need to clarify the difference between 'general use' and 'specific use'. Students then complete the examples with the words in the correct sentences in Exercise d.

### Answers

- |                     |                          |
|---------------------|--------------------------|
| 1 device            | 5 hypothesis             |
| 2 applications      | 6 characteristics        |
| 3 research/exposure | 7 brittleness/solubility |
| 4 exposure/research | 8 solubility/brittleness |

- f** Students complete the description with the correct article or no article.

### Answers

- |              |       |              |
|--------------|-------|--------------|
| 1 a          | 4 a   | 7 the        |
| 2 no article | 5 the | 8 a          |
| 3 The        | 6 a   | 9 no article |

**UNIT 7****Preparing visual data**

- 1 a** Complete the guidelines for preparing visual data from a scientific journal, below, using the words in the box.

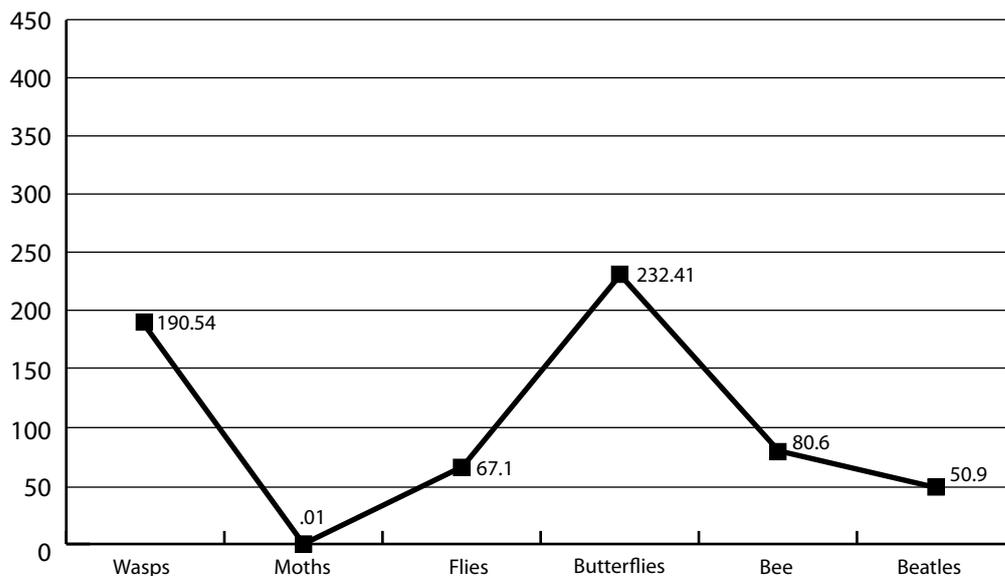
data figure grid leading notation parentheses plotted purpose space typos

- 1 Make sure you use the right type of visual to represent your \_\_\_\_\_.
- 2 Choose a title that clearly defines the \_\_\_\_\_ of the visual.
- 3 Units should be presented in \_\_\_\_\_, for example '(3.5)'
- 4 Use scientific \_\_\_\_\_ such as ' $2.3 \times 10^3$ ' for 2,300
- 5 Use \_\_\_\_\_ zeros on all decimals, for example '0.3' or '0.55' not '.3' or '.55'
- 6 Maximize the space given to presentation of the data to avoid wasted white \_\_\_\_\_.
- 7 Include the \_\_\_\_\_'s identifying number, for example 'Fig. 1.'
- 8 Scales or axes should not extend beyond the range of the data \_\_\_\_\_.
- 9 Do not use \_\_\_\_\_ lines.
- 10 Always check your visual and caption for spelling and \_\_\_\_\_, for example 'atmosphere'(✓) not 'atmopshere' (✗)

- b** A team of researchers is preparing a paper on how different insects react to pathogen agents (that is, their reaction to disease or infection). In pairs, look at the graph below, which one member of the team has prepared, and then discuss the following questions. Use the journal guidelines in Exercise 1a to help you.

- 1 Do you think the graph is ready for publication?
- 2 What do you think the researcher still needs to do to improve the graph? Make a note of any corrections on the graph below.

**Insect Reaction to the Pathogen Agent**



# Cambridge English for Scientists

## ADDITIONAL ACTIVITIES

# UNIT 7

## Teacher's Notes

### Before you begin ...

Ask students if they have ever submitted a paper to a journal, or if they plan to do so in future. Ask students to imagine that they have completed some research and want to publish. Then ask them to work in pairs and brainstorm everything they might need to do before they submit their work to the journal. Then feedback to the whole class. Students might give various answers, but the aim of this question is to elicit that every journal will have submission guidelines for authors and for the preparation of manuscripts which must be read and followed. Some examples are:

[http://assets.cambridge.org/IJA/IJA\\_ifc.pdf](http://assets.cambridge.org/IJA/IJA_ifc.pdf)

<http://www.wiley.com/bw/submit.asp?ref=0022-3751>

- 1 a** Tell students that they are going to look at an extract from some guidelines from a scientific journal for preparing visual data. Students then complete the guidelines using the words in the box.

### Answers

- |               |           |
|---------------|-----------|
| 1 data        | 6 space   |
| 2 purpose     | 7 figure  |
| 3 parentheses | 8 plotted |
| 4 notation    | 9 grid    |
| 5 leading     | 10 typos  |



- b** Students now look at an example of a graph and answer the questions

### Answers

- No
- The graph requires the following corrections:
  - This graph is a poor choice of mode to present the data visually. A histogram (which is like a bar graph) would have been better.
  - The y-axis unit is not indicated.
  - The y-axis extends beyond the range of the data.
  - There is too much wasted white space. The information could be more condensed.
  - Units should be presented in parentheses for example '(3.5)'
  - Standard scientific notation isn't used.
  - A leading zero should be added to .01 to read: 0.01
  - The graph's identification number is missing, for example, 'fig. 1.'
  - The grid lines should be removed.
  - There are three typos: bee > bees (i.e. all the other insects are described in the plural); beatles > beetles; isect > insect



Cambridge English for  
**Scientists**

## ADDITIONAL ACTIVITIES

**UNIT 8** Nobel Prize in physics 2010

**a** The 2010 Nobel Prize for physics was awarded to two scientists, Andre Geim and Konstantin Novoselov, for research on graphene. Watch the short video about the research <http://www.sixtysymbols.com/videos/nobelprize2010.htm> and make notes on the following questions.

- 1 What was Geim and Novoselov's idea?
- 2 How is graphene different from graphite?
- 3 How did Geim and Novoselov make graphene?
- 4 Why is graphene's structure exciting for physicists and chemists?

**b** Watch the video again. Number sentences a–d in the order you hear them on the video.

- a And then what they did is they found another surface and pushed the thing down and peeled off the sellotape and it stuck.
- b If we make a mark with a pencil, what we're doing is we're depositing little sheets, atomic sheets of, of carbon on the paper.
- c Well, what, what, uh, Andrei and Konstantin had was the crazy idea of making a transistor structure out of a single atomic sheet.
- d What Kostia and Andrei did in Manchester, uh, was to look at electronic properties of graphene.

**c** Sentences a–d in Exercise b add emphasis by using the structure **What subject + verb + is/was + noun/clause**. The information being emphasised moves to the end of the sentence.

e.g. Kostia and Andrei looked at electronic properties of graphene.

→ What Kostia and Andrei did was to look at electronic properties of graphene.

Underline this structure in sentences a–c.

**d** Use the structure **What SUBJECT + VERB + is/was + NOUN/CLAUSE** to add emphasis to the following sentences.

- a I'm trying to put the dopant onto the sheet.
- b I needed to see if doping graphene could neutralise the negative charge.
- c I've tried using gold and nitrogen dioxide.
- d We add boron into the crystal structure to change its properties.

Cambridge English for  
**Scientists**

## ADDITIONAL ACTIVITIES

**UNIT 8** Noun phrases

- a** Look at the table below which shows the structure of the noun phrases in the sentence in Exercise 9a.

Pre-modifier		Headword	Post-modifier
determiner/ quantifier	adjective/noun		
The	-	<b>movement</b>	of the Fermi level towards the Dirac point
-	-	<b>deposition</b>	of F4-TCNQ
-	electron	<b>transfer</b>	-
-	-	<b>graphene</b>	-
the	-	<b>molecule</b>	-

- b** Complete the last 8 rows of the table in the same way with the noun phrases from the sentences in Exercise 9b. In the first sentence, the noun phrases have been underlined to help you.
- The ability of a gecko to walk on walls demonstrates that activation of the adhesive system improves the gecko's movement over smooth surfaces.
  - The formation of a CaP layer on the surface allowed further crystal growth.
  - Although the species *M. fortunata* has a lower exposure to vent fluids, it seems to have a higher accumulation of metals in its tissues.

**UNIT 8** Teacher's Notes**Nobel Prize in physics 2010 and adding emphasis**

- a** Explain to the students that the 2010 Nobel Prize for physics was awarded to two scientists, Andre Geim and Konstantin Novoselov, for research on graphene. They watch the video (<http://www.sixtysymbols.com/videos/nobelprize2010.htm>) and make notes to answer the questions.

**Answers**

- 1 To make a transistor structure from a single carbon layer.
- 2 Graphite is made up of many layers of carbon stacked on top of each other. Graphene is one of these layers in isolation.
- 3 They took a piece of graphite, pressed a piece of sticky tape onto it and peeled off a thin sheet.
- 4 Because the graphene is only one atom thick, there are free potential bonds. The sheet therefore has special properties. In addition, because it's so thin, it is very flexible.

- b** Students watch the video again and number sentences a-d in the order they hear them.

**Answers**

1 c   2 b   3 a   4 d

- c** Explain that the sentences all use the **What subject + verb + is/was + noun/ clause structure to add emphasis, as shown in the example (from sentence d). Students underline the structure in sentences a–c in Exercise b.**

- 1 And then what they did is they found another surface and pushed the thing down and peeled off the sellotape and it stuck.
- 2 If we make a mark with a pencil, what we're doing is we're depositing little sheets, atomic sheets of, of carbon on the paper.
- 3 Well, what, what, uh, Andrei and Konstantin had was the crazy idea of making a transistor structure out of a single atomic sheet.

**Language note**

In sentence a, it would be more usual to say what they did was because the verbs *did* and *found* are in the past tense. In sentence b, it is possible to omit *we're* after *is* i.e. *what we're doing is depositing ...*

- d** Students use the structure **What subject + verb + is/was + noun/clause to add emphasis to the following sentences.**

**Answers**

- 1 What I'm doing is (I'm) putting the dopant onto the sheet.
- 2 What I needed to see was if doping graphene could neutralise the negative change.
- 3 What I've tried using is gold and nitrogen dioxide.
- 4 What we do is (we) add boron into the crystal structure to change its properties.

**Language note: *wh*- cleft sentences**

The *wh*- cleft structure is used to add emphasis by shifting the focus to information at the end of the clause. The structure is most often used with *what* although *why*, *who*, *where* etc. are possible. The structure may highlight a noun e.g. *What I've tried using is gold and nitrogen dioxide* or a whole clause or longer stretch of language e.g. *What they did was they found another surface and pushed the thing down and peeled off the sellotape*. For more information on *wh*-cleft sentences see *Cambridge Grammar of English* pages 786–788. For exercises on the *wh*-constructions for the students, see Unit 12 of *Exploring Grammar in Context: upper-intermediate and advanced*.

**Noun phrases**

- A** Elicit from the students what the subject of the completed sentence in Exercise 9a is. They are likely to say either *movement* or *The movement of the Fermi level toward the Dirac point*. Clarify that the latter is the noun phrase which forms the complete subject while the former is the head noun in the noun phrase. Use the table to go through the structure of noun phrases, making sure students understand that the elements always come in this order, but that they may not all be present.
- B** Students complete the last 8 rows of the table with the noun phrases from the sentences in Exercise 9b.

**Answers**

Pre-modifier		Headword	Post-modifier
determiner/ quantifier	adjective/noun modifier		
The	-	ability	of a gecko to walk on walls
-	-	activation	of the adhesive system
the gecko's	-	movement	over smooth surfaces
The	-	formation	of a CaP layer on the surface
further	crystal	growth	-
the	-	species	<i>M. fortunata</i>
a	lower	exposure	to vent fluids
a	higher	accumulation	of metals in its tissues

**Language note**

Post-modifiers in noun phrases are either often prepositional phrases, or relative or participle clauses. These may also contain noun phrases which can be further analysed into pre-modifier, headword and post-modifier e.g. *of the adhesive system* includes a preposition (*of*) followed by a noun phrase which can be broken down into determiner (*the*), adjective (*adhesive*) and headword (*system*). For more information on noun phrases see *Cambridge Grammar of English* pages 318–333.

**UNIT 9****Submitting your manuscript****a** In pairs, mark the following statements true (T) or false (F).

- 1 Research papers must be written in a particular style in order to be published.
- 2 The correct style of a research paper is the same for all journals.
- 3 The correct style of a research paper depends on the field it is written for (e.g. astrophysics, genomics etc.), not the journal.
- 4 The correct style of a research paper depends on the particular journal you are writing for.

**b** You are going to read an extract from *A Brief Guide for Authors* from the *American Meteorological Society*. Before you read, work in pairs and make a list of information you would need to know if you were going to submit a paper to this journal. For example, *Should we send the manuscript electronically?***c** Now read the extract and answer the following questions from different scientists who are interested in publishing in one of the journals of the *American Meteorological Society*. When you finish, check your answers in pairs.

- 1 I've just translated a paper which I published in a French-language online journal – can I submit my translation to an AMS journal?
- 2 Will the paper be copyrighted to me when it's published?
- 3 Five people worked on our paper, do we all need to sign the copyright form?
- 4 Our paper has been written by scientists working in Mexico, India and Switzerland – will it be OK if we signed the copyright form separately?
- 5 Our manuscript is very long – about 75 pages of single-spaced text – will that be OK?
- 6 Should I print off a copy of my paper and send it in the post?
- 7 After I put double spaces between the lines of the text, our paper was 30 pages long. I've changed the font size from 12 points to 10 points so now it's only 24 pages – that's OK now, isn't it?
- 8 Some researchers in our team work for a University and others work for a private company – should we say we are from the University or from the company?
- 9 Should I use the active or the passive when I write my abstract?
- 10 I've divided our paper into sections with headings – is there anything else I need to do?
- 11 I've put three tables in the Appendix – that's OK, isn't it?
- 12 OK I've put the references for our paper into the order they appear in the text – that's OK, isn't it?

**d** Prepare a list of questions for submitting a paper to a journal in your field. Then go online and find the answers to your question. Discuss the information you learn with your class.

## 1 Introduction

This document provides essential information required by authors to submit manuscripts to American Meteorological Society (AMS) journals. It is intended to serve as a quick reference for frequently needed information ...

## 2 Author disclosure and transfer of copyright

When a manuscript is submitted, the author will be asked to confirm that the publication has not been previously published in any language, and whether it is under consideration for publication by another journal. The author must promptly inform the chief editor if it is submitted for publication elsewhere before its disposition by the journal.

Each manuscript must be accompanied by a statement transferring copyright from the authors (or other holder of the copyright) to the American Meteorological Society. The appropriate form for the transfer of the copyright to AMS is available on the AMS Web site or upon request. The signed transfer of the copyright is required under U.S. Copyright Law (Title 17 USC, as revised by P.L. 94-553) in order for AMS to have valid rights to continue its wide dissemination of research results and other scientific information. Editorial action on a manuscript that is not accompanied by the completed copyright transfer form, *signed by all authors*, will be delayed until the form is received. Original, faxed, or scanned versions are acceptable for both peer review and the production process. All authors need to sign a copyright transfer form for the manuscript that is submitted, but it is acceptable for each author to provide a separate form with this or her signature rather than requiring a single form signed by all ...

## 3 Manuscript preparation

Manuscript length should be less than 7500 words (including appendixes but not references or figure captions) or about 26 double-spaced typed pages when submitted. All manuscripts must be submitted electronically ... All copy (including tables, references, and list of figure captions) must be double spaced ... and all pages must be numbered consecutively. The font used should be no smaller than 12 point and the line spacing should be no more than three lines per 2.5 cm, as measured from anywhere on the page.

- a *Components of a manuscript* Each manuscript should include the following components, which should be presented in the order shown.
- b *Title, name and affiliation of each author, dateline, any current or additional affiliations, and corresponding author address and e-mail.* These items should appear on the first page by themselves, with the abstract beginning on page 2.
- c *Abstract.* A concise (c. 250 words) abstract is required at the beginning of each article. Authors should summarize their conclusions and methods in the abstract. First person construction should not be used in the abstract, and references should be omitted.
- d *Text.* The text should be divided into sections, each with a separate heading and numbered consecutively.
- e *Appendix.* Auxiliary analyses or tables whose details are subordinate to the main theme of the paper should normally appear in an appendix. Each appendix should have a title.
- f *References.* References should be arranged alphabetically without numbering. The intext citation should consist of the author's name and year of publication
- g *Figure captions.* Each figure must be provided with an adequate caption.
- h *Illustrations and tables.* Each figure and table must be cited specifically in the text and in numerical order. The figure number should not be part of the illustration. All tables should have a double-spaced caption, and table text and headers also should be double spaced.

*Adapted from A Brief Guide for Authors from the American Meteorological Society 2010.*

**UNIT 9** Teacher's Notes*Before you begin ...*

This aim of this activity is to give students an example of reading the author guidelines for submitting a manuscript to a journal. The activity is designed to follow on from Exercises 13a and b on page 77 of the Student's Book (though it can be given to students at any time on the course).

Ask students to say which journals are most popular in their particular field. Ask them to say why (or why they think) that journal is most respected. Write the following words on the board and ask students to suggest words with a similar meaning for each one to check their understanding).

*conventions* (normal ways of doing something)

*guidelines* (instructions, rules)

*manuscript* (article, paper, research paper)

*submit* (send or give someone a written document such as a paper or application form)

- a** Ask students to work in pairs. You should have made enough copies of the Additional activity for every student in the class, but for this exercise only give one copy for each pair of students. Ask them to complete the task in a. Then feedback with the whole class.

**Answers**

1 T 2 F 3 F 4 T



- b** Explain that although this text is for American Meteorological Society, the reading skills they will practice in this task will be suitable for any journal guidelines. Students work in pairs to suggest a list of questions. You may want to ask students why it is useful to prepare a list like this (answer: it helps them think about their purpose for reading, it will focus their reading to look for specific information; this will help them to save time and may also help them to overcome any problems they might have with unfamiliar vocabulary in the guidelines).
- c** Ask students to read through the twelve questions and to say how similar/different these questions are to the list they made in Exercise b. You may want to check that students understand all the questions before they read. Some possible vocabulary items they may need to know include: *appendix / appendices* (n), *copyright* (n, v), *copyright form* (cc), *font* (n), *separately* (adv), *single-spaced* and *double-spaced* (adj) text.

**Answers**

- 1 No, authors must confirm that they have not published the same paper in another place, even if it was not published in English
- 2 No, the copyright goes to the AMS.
- 3 Yes. All the authors need to sign.
- 4 Yes. As long as they all send in the forms and remember that editorial work will not begin on the paper until all the signed forms have been received.
- 5 No. It is too long (and has not been double-spaced) and won't be accepted.
- 6 No. It must be submitted electronically.
- 7 No. Text should have a minimum 12-point font size.
- 8 You should write the affiliation of every author in the team.
- 9 You should use the passive voice (First person construction should not be used ...)
- 10 Yes, you need to number the sections in order.
- 11 Yes, but only if you give a title to each table.
- 12 No. You need to list your references alphabetically and without numbers.

**d** Students prepare the task to do in class or at home. If the task is prepared at home, remember to ask for feedback at the beginning of the next class.

**UNIT 10** Question  
and answer sessions

- 1 a** You are going to practise useful phrases for question-and-answer sessions following a talk or for during a poster presentation. In pairs, decide whether you think the following statements are true (T) or false (F) for you.
- 1 University students and junior researchers should not ask questions to professors or more senior researchers in your field.
  - 2 A speaker does not have to answer every question he/she is asked.
  - 3 We usually use more informal language during the question-and-answer session of a poster presentation.
  - 4 We usually use more informal language in the question-and-answer session following the presentation of research.
- b** Your teacher is going to give you twelve useful phrases. In pairs, read the phrases and decide what the function for each one might be. Try to identify six different functions (there should be two phrases for each one). For example, which phrases could be used to invite an audience to ask you questions?
- c** Your teacher is going to suggest six functions for the phrases. Match two phrases with each function.
- d** Work in pairs. Practise saying the phrases. Then use the cards to test each other.
- 2 a** Role play the following question-and-answer situations. Try to use the phrases you have learnt in Exercise 1d.

**Situation 1: A poster presentation**

Work in groups of 2 or 3

**Student A:** Summarise some research you are working on, or some research that you know well. Then invite Student B to ask you questions.

**Student B and C:** Ask Student A to give you more details about his/her research.

**Situation 2: A research presentation**

The whole class should work together.

**Student A:** Summarise some research you are working on, or some research that you know well. Then invite the audience to ask you questions.

**Audience:** Ask Student A to give you more details about his/her research.

- b** Make a record of the phrases you learned in Exercise 1d. Your teacher will give you a worksheet to complete.

# Cambridge English for Scientists

## ADDITIONAL ACTIVITIES

# UNIT 10

## Teacher's Notes

Notes begin on page 36.

### Phrase and function cards

Put another way, this means <i>that we may have a real result</i> .	If there are any questions, I would be pleased to answer them.
Hi! Did you have any questions for me?	I hope that answers your question.
Does that answer your question?	Perhaps I should rephrase that.
Sorry, was your question about <i>the method we used</i> ?	That's an interesting question.
I'm glad you asked me that.	Sorry, are you asking about <i>what method we used</i> ?
Sorry, I'm not the best person to answer that.	I'm afraid the research didn't look into that.
<b>giving an opportunity to ask questions</b>	<b>acknowledging a person's question</b>
<b>checking that you understood the question</b>	<b>clarifying something you have said</b>
<b>checking that you have answered the question</b>	<b>showing that you are unable to answer a question</b>

## Worksheet

### giving an opportunity to ask questions

If there are any questions, I would be \_\_\_\_\_ to \_\_\_\_\_ them.

Hi! \_\_\_\_\_ you have any \_\_\_\_\_ for me?

### acknowledging a person's question

\_\_\_\_\_ 's \_\_\_\_\_ interesting question.

I'm \_\_\_\_\_ you asked me \_\_\_\_\_.

### checking that you understood the question

\_\_\_\_\_, \_\_\_\_\_ you asking \_\_\_\_\_ *what method we used?*

Sorry, \_\_\_\_\_ your question \_\_\_\_\_ *the method we used?*

### clarifying something you have said

Perhaps I should \_\_\_\_\_ that.

\_\_\_\_\_ another \_\_\_\_\_, this means *that we may have a real result.*

### checking that you have answered the question

\_\_\_\_\_ that answer \_\_\_\_\_ question?

I \_\_\_\_\_ that answers \_\_\_\_\_ question.

### showing that you are unable to answer a question

\_\_\_\_\_, I'm not \_\_\_\_\_ best person \_\_\_\_\_ answer \_\_\_\_\_.

I' \_\_\_\_\_ afraid \_\_\_\_\_ research didn't look \_\_\_\_\_ that.

### Before you begin ...

You will need to photocopy and cut out a set of cards for each pair of students and one worksheet for each student in the class (see below).

You may find it useful to make an enlarged copy of the set of word cards before you cut them up. This avoids the problem of having (or losing!) too many 'fiddly' bits of paper. You may also find it useful to laminate the cards for future use on other courses (by yourself or your colleagues).

- 1 a Students discuss the four statements. Make it clear that there are no absolutely right or wrong answers and that the statements may be true or false in their opinion.

### Suggested answers



- 1 F – though note that in some cultures, students or more junior scientists may feel uncomfortable about asking questions (especially critical questions) of professors or other more senior staff
- 2 T – there is usually a time limit to all sessions (though further questions could be followed up by email)
- 3 T – this tends to be true as the conversation is face-to-face rather than a formal presentation. English-speakers tend to be more informal in personal situations (e.g. *Hi!* is acceptable and more usual than *Good day!*)
- 4 F – although this depends on speaker preference, answers to questions following talks tend to be more formal because even though the question may have come from one individual, the answer is usually given to the whole audience. However, the speaker's acknowledgement of the question (e.g. *That's a great question!*) and confirmation that the question has been answered (e.g. *Does that answer your question?*) may be more informal, as these statements are addressed personally to the questioner.

- b** Students work in pairs. Give each pair of students a cut out set of phrase cards (the cards in white, not the cards in grey). Make sure that you ask one student in each pair to shuffle the cards thoroughly *before* they begin the activity (you don't want the students to find that the cards are already grouped into a useful set). Students try to identify six functional categories for the phrases. Italics indicate parts of the phrase that would need to change depending on the context in which they are used.

You could also ask students to say if any of the phrases seem more formal (Put another way, this means *that we may have a real result.*) or more informal (Hi! Did you have any questions for me?).

- c** Distribute the functional category cards (the grey cards) to each pair of students. Note that this activity may not take long if they successfully managed to identify the correct pairs in Exercise 1b.
- d** Ask students to lay out each pair of phrases on a flat surface under the correct category headings (if they have not already done so). For example:

acknowledging a person's question

That's an interesting question

I'm glad you asked me that.

Give students 2–3 minutes to try to memorise as many of the phrases as they can.

Then ask one student in each pair to pick up 4 or 5 of the white phrase cards at random and then hold them so that the other student cannot see. The other student then tries to remember the missing phrases. For each phrase they remember correctly, one phrase card is replaced on the flat surface in the correct place. Students then change roles.

- 2 a** Students role play one or both of the situations. Encourage them to use the phrases they have been practising during the role play.
- b** Make sure you collect up all the cards from the students before handing out the worksheet. Students then complete the gaps in the phrases on the worksheet from memory. Feed back the answers with the whole class.

#### Answers

See white phrase cards

