

Cambridge English for
Scientists

ADDITIONAL ACTIVITIES

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 1 a 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		

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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/>).

- 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.
 - 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



- Students read the completed summary before answering the questions.

Answers

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



- 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