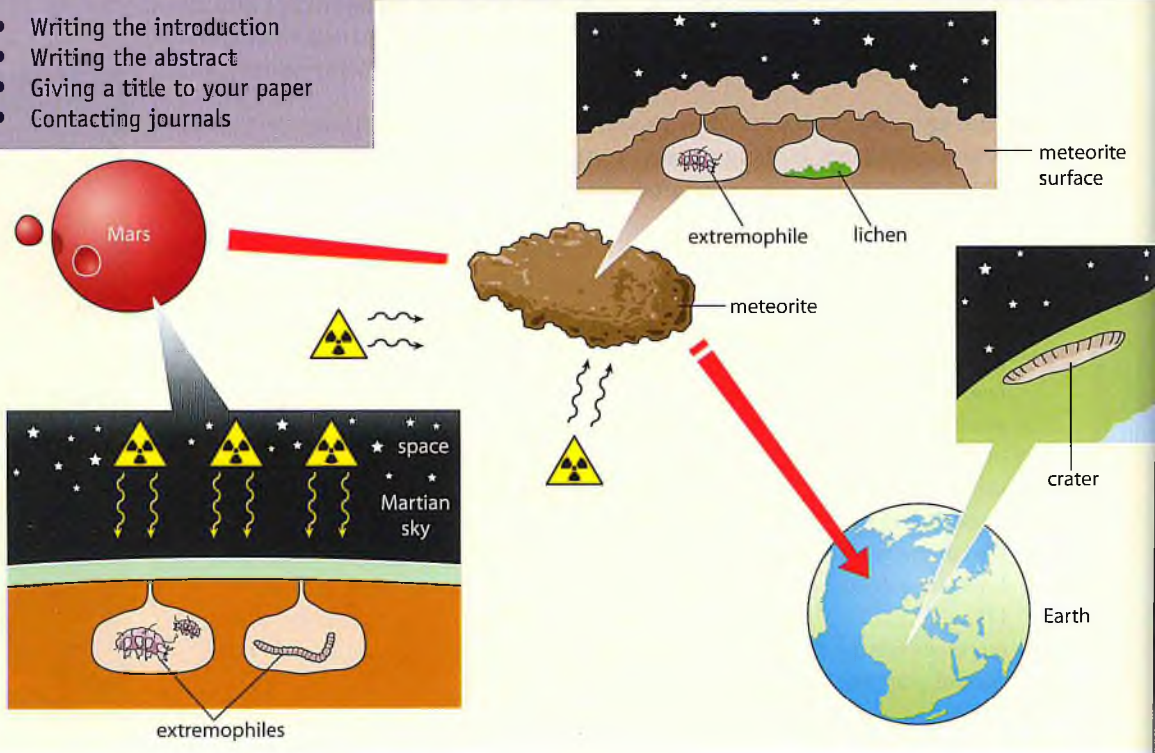
UNIT 9 Writing up research 4: introduction and abstract

- Writing the introduction
- Writing the abstract
- Giving a title to your paper
- Contacting journals



Writing the introduction

1 a **Mya is doing research into the panspermia hypothesis as part of a Master's degree in astrobiology. In pairs, use the diagram and the words in the box below to help you answer questions 1–3. Then compare your ideas with the Answer key on page 114.**

1 What do you think the panspermia hypothesis is?
2 How credible do you think the hypothesis is?
3 What kind of evidence would support this hypothesis?

deep space lichen seeds of life extremophile meteorite UV radiation
harsh conditions protective layer vehicle

b **Mya has been investigating whether it is possible for bacteria and microorganisms to survive in an environment as harsh as the surface of Mars. He has been advised to organise the text of his introduction around five key questions. Match the beginnings to the endings of the questions.**

What was I	approach the problem?
Why was it	expect to know after doing the research?
What was already	important?
What did I	investigating?
How did I	known about the subject of my research?

c **Read five extracts from the introduction to Mya's paper, ignoring the highlighted words for now. Which question from Exercise 1b is each extract answering? Write the questions above the extracts.**

1 _____

Such an extreme environment was thought to be uninhabitable, but microbial ecology studies reported the presence of microorganisms (Amaral-Zettler *et al.*, 2002). Could the surface composition of Mars protect life against radiation?

2 _____

A number of studies have investigated different extreme Martian surface conditions on terrestrial microorganisms. Nicholson and Schuerger (2005) reported that the spores of *Bacillus subtilis* were able to survive for 19 days under Mars atmospheric pressure and composition. Saffary *et al.* (2002), however, found that survival decreased due to …

3 _____

Potential habitability in the subsurface would increase if the overlaying material did play a protective role.

4 _____

For many years now, scientists have speculated about the possibility of life on Mars (Klein *et al.*, 1976; McKay, 1997). The discovery of liquid water on Mars would increase its habitability …

5 _____

We report here on our studies of protection by Río Tinto Basin iron oxides and hydroxides on two microorganisms, *Acidithiobacillus ferrooxidans* and *Deinococcus radiodurans*, under simulated Mars surface conditions.

2 a **A well-written introduction usually presents general information about the topic first before specific information about the research. What do you think is the best order for the extracts in Exercise 1c?**

b **Answer the following questions about the extracts in Exercise 1c.**

1 Write down the highlighted words and phrases which describe:

a a hypothesis / hypothetical situation

_____

b current research or knowledge on a particular topic

_____

c general statements about past research

_____

d the results or conclusions taken from specific past research

_____

2 What form or tense are the words and phrases in a–d above?

3 a Read an extract from the introduction of a paper about the ability of lichens and microbes to survive in deep space. Ignoring the gaps, how many of the questions in Exercise 1b can you answer?

Recent advances in space technology (1) _____ (provide) the possibility of studying the survival of different microorganisms in the harsh environment of space (Demets *et al.*, 2005; Baglioni *et al.*, 2007). So far, lichens (2) _____ (be) the only organisms able to survive exposure to such extreme conditions (Sancho *et al.*, 2007; de los Ríos *et al.*, 2010).

It is believed that, if sufficiently protected by meteorite-like material, microorganisms may also survive the journey through space. However, Brandstätter *et al.* (2008) (3) _____ (report) that microorganisms embedded in 2 cm thick rocks on the outer surface of a re-entry capsule, simulating the entry of a meteorite, (4) _____ (not survive).

The aim of this work (5) _____ (be) to obtain further information on the resistance of rock-colonising microbial communities and lichens to outer space conditions, during the Biopan-6 flight of ESA on board a Russian Foton satellite.

b Complete the extract by writing the verbs in brackets in the correct tense.

4 a Read two sentences which present the same information in different ways. In pairs, try to decide what the main difference is between the two sentences. Then compare your ideas with the Answer key on page 115.

a Amaral-Zettler *et al.* (2002) reported the presence of microorganisms.
b Microbial ecology studies detected the presence of microorganisms (Amaral-Zettler *et al.*, 2002).

b Complete the following sentences with phrases a–d below.

1 We usually use an author-prominent citation when _____ and when _____ .
2 An information-prominent citation is usually used when _____ and when _____ .

a dealing with ideas we wish to explore in a paper
b dealing with information which is not controversial
c comparing ideas from a variety of sources
d supporting a particular point

c A number of different reporting verbs can be used in author-prominent citations. Complete the definitions using the reporting verbs in the box.

conclude demonstrate discover hypothesise observe prove suggest

(1) _____ or (2) _____ : to use an experiment to show that something is true
(3) _____ : to carefully watch the way something happens, then record it
(4) _____ and (5) _____ : to give a possible explanation for something which has not been proved
(6) _____ : to decide something after thinking about it carefully
(7) _____ : to find or learn information, especially something new

5 a In pairs, take turns to ask and answer the questions in Exercise 1b about a piece of research you know well. Make a note of your answers.

b Use the notes you made in Exercise 5a to write a short introduction to your research. Remember to include author-prominent and information-prominent references in your introduction.

Writing the abstract

6 a **In pairs, discuss the following questions.**

1 What is the purpose of an abstract?
2 How can an abstract help a researcher choose which papers to read?
3 What information does the abstract usually include?
4 Why do some people think a good abstract is even more important in the internet age than it was before?

b **An abstract usually contains one or two key sentences from each section of a paper. Read the following extracts from Mya's draft abstract. Match a section (1–4) to an extract (A–D).**

1 Introduction _____ 3 Results _____
2 Method _____ 4 Discussion _____

A

With the aim of evaluating this possibility two microorganisms, *Acidithiobacillus ferrooxidans*, an acidophile, and *Deinococcus radiodurans*, a radiation-resistant microorganism, were exposed to simulated Mars conditions; that is, 95% CO_2, 2.7% N_2, 1.6% Ar and 0.6% H_2O with a pressure of 7 mbars. Temperature was set at 150 K and ultraviolet radiation was in the wavelength range of 200–400 nmat. Exposure was for different times under the protection of 2 and 5 mm layers of oxidised iron minerals. Survival was evaluated by growing the organisms on fresh media.

B

The resistance of organisms to extreme conditions like the conditions which exist on the surface of Mars under the protection of a thin material layer increases the possibility that life could exist on Mars.

C

Here we report that both the 2 and 5 mm thick layers provided enough protection against radiation and Mars environmental conditions for the bacteria to survive (Figs. 2 & 3).

D

Current surface conditions on Mars are extremely challenging for life. However, Nicholson and Schuerger (2005) reported that *Bacillus subtilis* was able to survive for 19 days under Mars atmospheric pressure and composition. The question is whether there are any features on Mars that could provide protection against the surface conditions. One possibility is that the surface material plays a protective role due to the fact that it is composed of iron oxides and hydroxides.

c **In pairs, decide on the best order for the extracts (A–D) in the abstract. Give reasons for your answer.**

7 a ▶ 9.1 **Svenja, Mya's supervisor, is commenting on the draft abstract in Exercise 6b. Listen to part of the conversation and say which section (A–D) Svenja does *not* comment on.**

b ▶ 9.1 **Listen again and mark the following statements true (T) or false (F).**

1 Svenja thinks the reference to Nicholson and Schuerger (2005) is useful. _____
2 Mya should remove the information on iron oxides and hydroxides. _____
3 Mya needs to include more information about the method in his abstract. _____
4 Svenja advises Mya to refer to the visuals (figures, tables etc.) in the abstract. _____
5 Overall, Svenja thinks the abstract is well written. _____

c **Look at Audioscript 9.1 on page 101. Use Svenja's advice to Mya to improve the three sections of the text of the abstract in Exercise 6b. Then compare your corrected text with the Answer key on page 115.**

8

a **Mya uses particular phrases to signal the purpose of each part of the abstract (A–D) in Exercise 6b. Underline a phrase in the extracts which Mya uses to:**

1 state the research question
2 present the hypothesis
3 introduce the method
4 introduce key results

b **The following phrases can also be used to signal the purpose of each part of an abstract. Divide the phrases (a–l) into four groups according to the functions in Exercise 8a (1–4).**

a An investigation was undertaken to explore ...
b It seems likely that ...
c Results show that ...
d The aim of the study was to ...
e The data suggest that ...
f The present study investigates ...
g The study provides strong evidence that ...
h We demonstrate that ...
i We expected that ...
j We investigated a new method of VERB-*ing*
k The method involved VERB-*ing*
l ... was found to ...

c **The text of an abstract must be concise. Replace the underlined words in extracts 1–5 below with *that* or *those*.**

1 The hormone increased the power output of healthy volunteers by 16 per cent after four weeks of taking the drug. Healthy volunteers who took the drug could also exercise 50 per cent longer than control subjects.
2 We compare photographic exposure from scattered light with light from direct light.
3 The target yield is the yield which can be produced in 'perfect' conditions.
4 Structures like the structures described in this paper are not known in glyptodonts recorded before the Great American Biotic Interchange (GABI).
5 The lithology of failed carbonate strata differs from the lithology of their basal shear surfaces.

9 a Think about some research you have done recently. Write:

- one or two sentences which provide the key background to the research
- a sentence which states your research question
- a sentence which presents your hypothesis
- two or three sentences outlining the main methods used
- one or two sentences presenting the key results
- a sentence which states the key implication of your findings

b Connect these sentences to form a draft of an abstract. Use the phrases in Exercises 8a and 8b to make it clear where each section of the abstract begins. Check your work for repetition of words or ideas.

Giving a title to your paper

10 a Read the titles of six research papers. In pairs, decide which titles you think are most helpful for the reader.

1 *Staphylococcus aureus* Host Cell Invasion
2 Increase in fruit size of a spontaneous mutant of 'Gala' apple (Malus x domestica Borkh.) is facilitated by altered cell production and enhanced cell size
3 Large colonial organisms many years ago
4 Does warming alter the metabolic balance of ecosystems?
5 Cat nap: A study of Mammalian Sleep Dynamics
6 Genetic Signatures of Exceptional Longevity in Humans

b Read seven suggestions for writing the title of a research paper. Which suggestions should you use to write a good title? Which suggestions don't give good advice?

a Make it about 50 words long
b Write it as a question
c Begin with a phrase like 'A study of ...' or 'An Investigation into ...'
d Include a joke or play on words
e Include important key words for internet search tools
f Include information such as the species studied, the treatment used, etc.
g Present the key result

c Mya is deciding on a title for his paper and has written four alternatives. In pairs, decide which title you think is best.

1 Is there life on Mars?
2 Are there any features on Mars that could provide protection against the harsh surface conditions?
3 An investigation into whether Mars's surface material could provide protection for organisms
4 Protection for *Acidithiobacillus ferrooxidans* and *Deinococcus radiodurans* exposed to simulated Mars environmental conditions by surface material

d ▶ 9.2 **Mya is discussing the choice of titles with his supervisor, Svenja. Listen to part of their conversation and answer the questions.**

1 Which title (1–4 from Exercise 10c) does Svenja think is best?
2 What problem does Mya think Svenja's preferred title might have?
3 What reason does Svenja give for choosing this title?

e ▶ 9.2 **Look at the three titles in Exercise 10c which Svenja thinks are unsuitable. Then listen again and make a note of:**

- at least one reason Svenja gives for rejecting the three unsuitable titles.
- at least one piece of advice Svenja gives Mya about writing a title.

f **Look back at your answers to Exercise 10a. Have you changed your mind about which titles are helpful to the reader? What exactly is wrong with the less effective titles? How could they be improved?**

11 **a** **Title 4 in Exercise 10c was based on the following sentence from Mya's paper. Read the sentence and then answer the questions below.**

> The data suggest that *Acidithiobacillus ferrooxidans* and *Deinococcus radiodurans* are protected from exposure to simulated Mars environmental conditions by the surface material.

In Mya's title number 4:

a which phrase has been removed from the sentence?
b why has 'from' in *are protected <u>from</u>* in the sentence become 'for' in *protection <u>for</u>* in the title?
c what has 'exposure' in the sentence become in the title?

b **Read the key result from four different papers. Then complete a suitable title for each paper (1–4) with a noun in each gap.**

1 The findings indicate that phosphorylation can be inhibited by modifying lysine and arginine in the myosin regulatory system.
Title: _____ of lysine and arginine in the myosin regulatory system inhibits phosphorylation
2 We demonstrate that the size distribution of organic pollutants in the air varies from season to season.
Title: Seasonal _____ of the size distribution of organic pollutants in the air
3 The study provides strong evidence that multiple sperm factors are required to activate mouse oocytes.
Title: _____ of mouse oocytes requires multiple sperm factors
4 We found that the multi-functional biochip made it possible to simultaneously detect the tumour suppressor FHIT gene and protein.
Title: Simultaneous _____ of the tumour suppressor FHIT gene and protein using the multi-functional biochip

12 **Look at the sentences you wrote in Exercise 9a. Use the key results to write a title for a paper on your work.**

Contacting journals

13 **a** **In pairs, answer the following questions.**

1 Have you ever published a paper?
2 What advice would you give to someone who wanted to get an article published?

b **Below are eight extracts from an article which gives advice on publishing your research. Match the headings (1–8) to the extracts (A–H).**

1 Write your cover letter
2 Choose your journal carefully
3 Submitting your paper
4 Follow the guidelines
5 What to do if your paper is accepted
6 Reacting to a journal's response
7 What happens next
8 What to do if your paper is rejected

A _____
Talk to other researchers in your field. They will be able to suggest journals for your work and will know whether the journal has any rules that make it particularly easy.

B _____
Read the journal's instructions for authors before you submit. These are usually available on the journal's website. Look at the format of the journal's papers.

C _____
Different journals have different rules about the number of copies to submit and whether to submit electronically or in hard copy. Make sure your manuscript is submitted correctly.

D _____
Keep your cover letter short as the editor who will read it probably receives many papers.

E _____
The journal will probably contact you to say they have received your article. If you do not hear anything, send the editor a short email asking for an acknowledgement of receipt and a reference number. When your paper has been read, the editor will write to you with a decision.

F _____
The editor's letter will clearly explain how you should revise your paper before resubmitting it. If any points are not clear, write back to the editor asking for an explanation.

G _____
If the journal rejects your paper, discuss this with a colleague. It might be better to submit your paper to another journal. Do not send angry or abusive letters (!).

H _____
Ask the editor about the journal's rules about copyright and any other conditions. Finally, thank all those who have helped you, letting them know when and where the research will be published.

14 **Turn to page 88. Read the letter which Mya has sent to a journal with his paper and answer the questions.**

15 **Using the corrected letter from exercises a and b on page 88 as a model, write a cover letter to a journal to accompany the manuscript submission of a research paper you have written (or plan to write).**