

# Because...

Bill Indge explains the value of using 'because'

**B**ecause can be a really useful word in an A-level unit test. Add it to a sentence and an otherwise inadequate response becomes worth a mark. Use it sloppily though, perhaps when 'and' might have been more appropriate, and you may fail to gain credit. With these points in mind, this *Upgrade* concentrates on just one word — *because*.

## Cos

Here's the deal. As an examiner, I will do everything I can for you when it comes to awarding marks. In return, I need something from you — answers that are legible and written in language that I can understand.

When you send a text message, you are limited in the time available, so it is sensible to abbreviate what you want to say — to write 'cos' instead of 'because'. You should not be doing this in an A-level answer though. Proper English is required.

Don't take this the wrong way. Standard biological abbreviations are quite acceptable (see Figure 1). There is

no need to write out messenger ribonucleic acid or ribulose biphosphate; mRNA and RuBP are fine. Similarly, once you have established what you are doing, for example by putting your abbreviation in parentheses after writing it out in full, you can substitute hb for haemoglobin or LIR for the light-independent reaction of photosynthesis. The context of your answer will make clear what you mean. The problems arise when you introduce abbreviations of your own invention, poorly written and with no explanation. 'Cos' falls into this category.

## Using because

The photograph in Figure 2 shows a common species of snail, *Cepaea nemoralis*. Shell colour in this species varies; it may be pink, brown or yellow.

Suppose you were asked to investigate, as a class exercise, the proportion of each colour of shell in a particular habitat. You will need to make decisions concerning scientific



**Figure 1** *Helicigona lapicida*, a snail that may be found crawling over limestone rocks after rain. The standard way of dealing with scientific names such as this is to write it in full the first time. Afterwards, it can be abbreviated with the genus identified by its first letter, *H. lapicida*

method. What size sample do you need? How will you select the snails that make up your sample? How will you make sure that you are not counting the same snail more than once? There are also environmental considerations. Will a class of students trample and damage the vegetation? Do you intend to remove the snails from their habitat? You cannot divorce scientific rigour from environmental and ethical considerations. In a similar way, drug trials have to consider ethical issues as well as scientific protocol, and investigations involving living animals should also look at the potential distress caused to the organism concerned.

Consideration of environmental, ethical and economic issues is an important part of all A-level biology courses and you should be prepared to answer questions that address these topics. Look at the part of the question and the accompanying mark scheme shown in Box 1. We will concentrate on Question 1 and look in particular at the part of the question that asks for a disadvantage of measuring the mass of the birds in the way described.

You may feel that starving the birds for 10 hours before slaughtering them involves an element of cruelty. It is quite acceptable to bring this idea into your answer. But look at the note that goes with the marking guidelines for this part of the question. 'Credit should not be awarded for unqualified statements about cruelty.' So although it is quite acceptable to start your answer with the idea of cruelty to help focus your response, you need some scientific justification for your statement. Hence by placing the word 'because' after your statement and adding a qualification, you change your answer from one that attracts no marks to one that does.



**Figure 2** A snail belonging to the species *Cepaea nemoralis*. Shells of this species may be pink, brown or yellow

### How science works

'How science works' is not just about carrying out practical work in the context of A-level biology; it is about the work of real scientists undertaking real investigations. It should be what makes studying this subject so fascinating. Unfortunately, the 'how science works' section of the specifications has become full of technical jargon. Students find themselves worrying about whether a particular approach illustrates precision or accuracy, validity or

## Box 1 Broiler chickens

Chickens intensively reared for meat are called broilers. Canadian scientists investigated some of the effects of rearing broilers at different densities. They kept broilers at four different densities. When these broilers reached maturity and were slaughtered, the scientists measured a number of different factors. Some of their results are shown in the table.

Some differences between broilers kept at different stocking densities

Feature	Stocking density/m <sup>2</sup> per bird			
	0.042	0.056	0.070	0.084
Mean mass per bird/kg	1.87	1.93	1.99	1.91
Meat produced/kg m <sup>-2</sup>	45.0	34.6	29.6	22.9
Percentage of birds with cellulitis resulting from infected scratches	0.98	0.47	0.20	0.15

1 The mass of a bird was measured in a standard way. It was measured after 10 hours without food. Give one advantage and one disadvantage of measuring the mass of the birds in this way. (2 marks)

2 In this investigation, stocking density is given as m<sup>2</sup> per bird. Describe the effect of the number of birds per m<sup>2</sup> on the total amount of meat produced per m<sup>2</sup>. (1 mark)

3 Suggest an explanation for the relationship between stocking density and the percentage of birds with cellulitis. (2 marks)

4 Use the table to give one advantage and one disadvantage of increasing the stocking density of broilers. (2 marks)

### Marking guidelines

1 *Advantage*

Allows data to be compared;

*Disadvantage*

May cause distress to birds because they are not fed for 10 hours; [2]

*Credit should not be awarded for unqualified statements about cruelty.*

2 The greater the number of birds per m<sup>2</sup> the greater the mass of meat produced per m<sup>2</sup>; [1]

*This question is designed to test understanding of the concept of stocking density. It is given in the table as m<sup>2</sup> per bird. The question requires candidates to describe the effect of the number of birds per m<sup>2</sup> on the total amount of meat produced per m<sup>2</sup>.*

3 The higher the stocking density, the more likely it is that birds will scratch each other;

These scratches may become infected and result in cellulitis; [2]

4 *Advantage*

Produces a greater total yield of meat/Higher meat yield per m<sup>2</sup>;

*Disadvantage*

Higher percentage of birds with cellulitis; [2]

## Box 2 *Arion ater*

Scientists investigated water loss from the slug, *Arion ater*. They used the following procedure.

- A total of 20 slugs were kept in separate cages made from cylinders of perforated metal.
- Ten of the slugs were provided with food in the form of a piece of cabbage and a petri dish of water; ten were provided only with food.
- During the investigation, the temperature of the laboratory was monitored. It remained between 15°C and 19°C.
- The slugs were weighed daily until the investigation was discontinued.

Figure 4 shows the results for two of the slugs that had been provided only with food.

- 1 Ten slugs received each treatment. Explain why it was necessary to repeat each treatment. (1 mark)
- 2 The scientists offered two suggestions to account for the loss of water from a slug. These were by:
  - a evaporation of water through the surface of the slug
  - b respiration or secretion of slimeWhich one of these suggestions do you think is more likely to be correct? Use the data in Figure 4 to explain your answer. (3 marks)
- 3 The laboratory temperature throughout the investigation fluctuated very little. Explain why this was important. (1 mark)

### Marking guidelines

- 1 Minimises the effects of anomalies/produces a more reliable mean; [1]  
*Credit should not be awarded for unqualified statements about reliability.*
- 2 a/evaporation; [1]  
(Because the graph shows that) mass continues to decrease when slug is dead;
- Respiration and secretion of mucus only occur in living slug; [3]
- 3 Because evaporation/loss in mass will be affected by temperature; [1]  
*Credit should not be awarded for unqualified statements about fair tests.*

reliability. Terms such as these are undoubtedly useful and they do have precise meanings, but it is far more important for you to be able to look critically at an investigation and pick out the features that make it a good one or those that result in it being flawed. Once again, the word 'because' comes into its own.

Let's look at a different mollusc, *Arion ater* — a slug instead of a snail (see Figure 3). Box 2 gives part of a question based on an investigation involving water loss in *Arion ater*. Question 1 is a simple enough question asking about the importance of repeats. There is another note in the marking guidelines: '*Credit should not be awarded for unqualified statements about reliability.*' Just writing that it makes the investigation 'more reliable' is clearly not going to gain credit. It is a good enough starting point but we need a little more; we need a 'because'. The marking guidelines show you the sort of answer that will gain you credit.

Question 3 makes a similar point. 'Fair test' will not earn any marks because '*Credit should not be awarded for unqualified statements about fair tests.*' Once more, you need the sort of 'because' that is outlined in the marking guidelines.

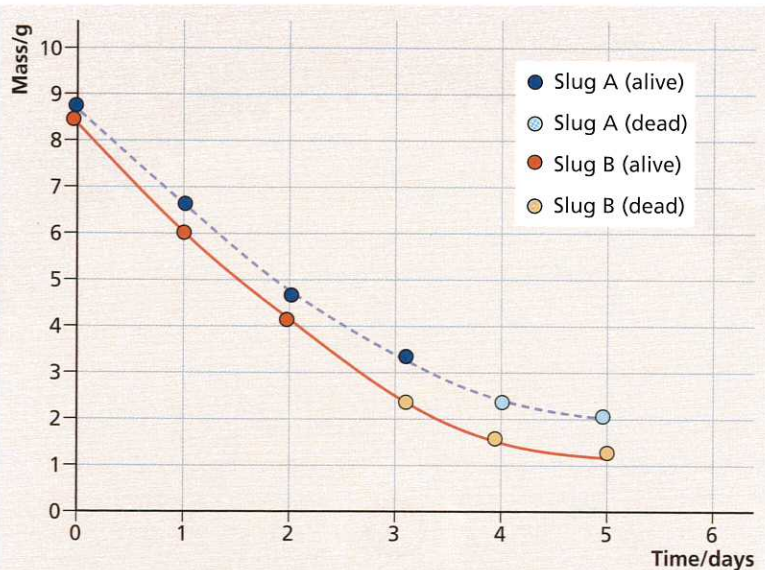
### Describe and explain

Somewhere in every question in a unit test there is what we call a command word, an instruction. If you are dealing with a graph or a table, then you will probably be required to describe or explain. Failure to do what is required when you are given one of these two commands accounts for a lot of lost marks and a lot of disappointed candidates.

'Describe' involves giving a written description of the data that have been presented (in a table or graph for example). With Question 2 in Box 1, you are asked to 'Describe the



**Figure 3** The large black slug, *Arion ater*, is common over much of the UK. The animal shown here is eating a fungus



**Figure 4** Graph showing change in mass of two slugs that had been provided with food but not water. Both of these animals died in the course of the investigation

response. Start your answer with the word 'Because' and you will be going along the right lines. In Question 2 in Box 2 you are asked which of two suggestions is more likely to be correct in accounting for the loss of water from a slug and then to use the data in Figure 4 to explain your answer. 'Because...' will certainly put you on the right track.

### Because, but and and

We started this column with a warning about using abbreviations, and we will end with one. Words like 'because', 'but' and 'and' are conjunctions. They are used to join phrases together.

'Because' means that there is a reason. You should only use 'because' where you could substitute the phrase 'for the reason that'.

'And' simply links two non-contrasting ideas.

'But' links two contrasting ideas.

So there we are. 'Because' is a great word. Use it correctly and it will lead you to a lot of marks, but do make sure that you use it correctly.

effect of the number of birds per  $m^2$  on the total amount of meat produced per  $m^2$ . You need a written description of that effect. The marking guidelines suggest that "The greater the number of birds per  $m^2$  the greater the mass of meat produced per  $m^2$ " would be adequate as an answer.

'Explain' requires a reason. A description is not required and will not gain credit. Seeing the word 'explain' should trigger an immediate

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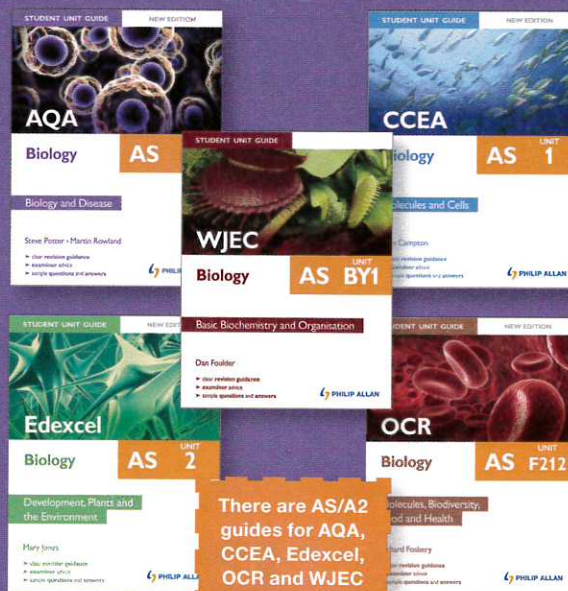
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