

Chapter 2

Making the most of lectures

➔ Introduction

Lectures are a prominent and important feature of all undergraduate bioscience courses, therefore being able to make the most of them is an important skill. The lectures you have as part of your course will be many and varied; your lecturers will have different styles and different levels of ability in lecturing, and the lecture content itself will be of more or less interest to you and more or less demanding. Regardless of these variables, however, you need to make the most of lectures. This chapter will help you understand how to make the most of lectures by firstly addressing the purpose of lectures and then giving advice on how to:

- prepare before lectures;
- listen and make notes during lectures;
- follow-up after lectures.

2.1 The purpose of lectures

Lectures can be a very valuable resource as they can synthesize the views of several researchers and textbooks or provide new, and even unpublished, information. Lectures are often liked by academics as a means of communication because they are a very efficient means (in theory at least) of transferring lots of information to large numbers of students all at once. How efficient a lecture actually is at communicating information will depend on at least two variables:

- how well the lecturer prepares and delivers the lecture;
- how well the audience is listening and making notes.

Clearly, you can't do much about the first of these variables (how well the lecturer prepares and delivers the lecture), at least not in the short term. However, do make sure you feed back to staff your thoughts on how you found a particular module, usually via

the end-of-module survey (if you think your feedback needs acting on more urgently, contact the module convenor directly). The second variable (listening and making notes) is clearly an area you can do something about; in fact, no one else can do it for you!

2.1.1 More than information transfer

Lectures are not merely about transferring information from the lecturer to the audience. In fact, we would argue that they are not even primarily about transferring information from the lecturer to the audience. If the purpose of a lecture was only to transfer information from the lecturer's brain to the students' notes, then lectures really have very little point because there are many more efficient ways of doing this; for instance preparing a handout, or suggesting particular chapters of a core text to read.

Lectures are of value because they add something in the communication of information that couldn't be achieved as well by other means. You will know this if you have ever tried to read a handout or a friend's notes from a lecture that you didn't attend; trying to understand the information out of context can often be very difficult. So if lectures aren't primarily about transferring information from the lecturer to the audience, what should they be about? The transfer of information is important; however, it is what you do with the information as you receive it, and afterwards, that really matters. This is where you, as a member of the audience, come in. It is perfectly possible, even sitting in a lecture that has been well prepared and is being well delivered, to disengage your brain and relegate yourself to being a mere passive recipient of the information.

As you will see later in the chapter, it is possible to not think about a lecture even while you are taking notes on it. The amount of notes you take isn't the measure of whether you have been paying attention; in fact, you might have a lot of notes because you haven't been paying attention! Doing something useful with the information as you receive it depends on processing the information effectively. This processing can't all take place within the lecture itself (even if you do listen actively and make notes appropriately), which is why this chapter covers preparation before lectures and follow-up after lectures, as well as what to do during lectures. Before we address these issues, it will be helpful to consider how lectures are different from what you may have experienced at school or college, prior to your undergraduate degree.

2.1.2 Differences between lectures and lessons

Lectures at undergraduate level will be different from lessons you had at school or college in a number of important ways. At the risk of generalizing, these differences probably include the following.

Class size

In years 12 and 13 at school you may well have been in a class of less than 30 students; at undergraduate level it's not unusual, especially in the first year, for class sizes to be up to 200–300 students (although typically, as you move through your course to the final year, the class sizes will get significantly smaller).

Anonymity

A bigger class makes individuals within the class more anonymous; it is easier in a larger class just to sit quietly and not really engage with the lecture content because you feel like no one will notice.

Relationship

Bigger class sizes mean that you are more remote from the lecturer, not only in terms of physical space but also in terms of relationship. The chances are that, in your first year of study, you probably won't get to know the lecturer very well and they probably won't even know your name.

Completeness

In school your lessons probably covered everything you needed about your syllabus; at undergraduate level, lectures don't tell you everything you need to know and so need to be supplemented with additional reading (more on this one later).

2.2 Prepare before lectures

You are already on a busy course with a lot of timetabled teaching hours—made up of lectures, tutorials, and practical classes—is preparing for lectures really necessary? We think it is. Before you discount this as something only for extremely keen and diligent students, bear this in mind: preparing for lectures doesn't have to take long and can actually save you a lot of time. It doesn't have to take long because you are not trying to cover all the material the lecture is going to cover (that's what the lecture is for), instead you are just giving yourself a framework to help you understand it better. It can save you a lot of time because if you have a framework to help you understand the lecture, you can process the information more quickly, thus making the listening easier, the note-making more selective, and the follow-up more focused. In order to know how to prepare for lectures, though, you first need to know some basic information about your course.

2.2.1 Know your course

In this context, by 'know your course', we mean finding out how your lectures relate to the course as a whole. This will involve finding out answers to questions such as:

- Do the practicals prepare you for the lectures or do they follow-up on material covered in the lectures?
- Are there opportunities to discuss the lectures in your tutorials?
- Is there any recommended pre-reading, if so, what is it?

Answers to these questions should be available in your module handbook, or alternatively from your tutor. Additionally you will need to know the title of each lecture, or group of lectures, within any given module; this too should be in the module handbook which may also contain further details about what each lecture will cover.

2.2.2 Reading before the lecture

We have already noted that preparing for lectures doesn't have to take long because you are not trying to cover all the material the lecture is going to cover, but are just giving yourself a framework to help you understand it better. A framework will help you understand the lecture because it gives you somewhere to place information, and so relate it to other information, rather than trying to understand it in isolation (which is always very difficult).

The framework can be quick to create because you only need to understand basic structure and terminology, rather than detail. A good way of achieving this is by looking up the relevant chapter in the core text for the module (this is where you need to know the title of each lecture) and scanning through it to familiarize yourself with the main themes. This doesn't require you to read the whole chapter, or read it in detail, just scan through all or some of the following:

- the chapter overview (if there is one);
- the chapter headings and subheadings;
- the introduction to the chapter;
- the conclusion or summary to the chapter;
- figures, diagrams, or tables (which often summarize a lot of information succinctly);
- also, look out for terminology that you are unfamiliar with and try and find out what it means.

Core texts are not the only source of information for pre-reading, however; your own notes will be useful too. Assuming you are not on the first lecture of a module, your notes from previous lectures in the module will be an important source of information. Again, you don't have to read all the notes in detail, just scan through them to remind yourself of what was covered previously, but, when you come to a section that you don't understand, spend more time on it and check up on the topic in a textbook or other reference source, or ask your friends.

If you have prepared for a lecture it makes listening and note-making much easier; which are the subjects of our next two sections.

2.3 Listen actively during lectures

This section is deliberately titled ‘listen actively’ because there is a difference between just listening and listening actively. Listening actively suggests that you are alert, attentive, and ready to engage with the content of the lecture, as opposed to just being there. Clearly, the quality of the lecture (how well it is prepared and delivered) will have an effect on how easy it is for you to listen, but listening actively means that you are willing to work hard at listening regardless of the quality of the lecture. Additionally, we have already identified that preparing for a lecture makes listening actively much easier, because you have a framework within which to place new information and you will at least recognize the terminology used.

2.3.1 Identify your priority

There will be some lectures when it will be difficult both to listen and to make notes, either because of the complexity or newness of information being communicated, or simply because of the amount. In such situations you will need to identify what your priority is; is it to listen or is it to make notes? Deciding which your priority is will depend on whether you are more concerned with trying to **understand the information** or **collect information**. If your priority is understanding the information then you will need to:

- focus on listening;
- make only brief keyword notes;
- follow-up the lecture by making detailed notes.

If, however, your priority is collecting information, then you will need to:

- focus on making notes;
- make more detailed notes;
- follow-up the lecture by reviewing your understanding of the content.

When making a decision about your priority, also consider what resources are available to you after the lecture. It is usually relatively easy to get hold of appropriate textbooks or perhaps borrow a friend’s notes, and you may well also have access to lecture handouts; however, it is much more difficult actually to experience the lecture again. Even if you can listen to a recording it is rarely as good as actually being there. This would suggest that active listening, and therefore understanding, should be more important than making notes. Remember, however, you don’t necessarily have to keep to the same strategy all the way through a given lecture; you could switch between the two depending on the material (more on this in section 2.4).

2.3.2 Listen for structure

Making notes is always easier if you have an awareness of the structure of the lecture. Being aware of structure enables you to be more selective, and therefore more focused, in your note-making because it gives you an indication of what the important bits are. That's not to say that the other bits are unimportant, it's just a recognition that in terms of understanding there are certain elements of a lecture that are helpful to grasp in order to understand the rest of it.

Sometimes the structure of a lecture is very clear, other times it is less clear. It is important, therefore, to know what the structural clues might be. The most obvious and probably the most common way of making the structure of a lecture clear is for the lecturer to outline what the structure is going to be at the beginning of the lecture, either as a list of headings or as a potted summary of the content. If a lecturer does outline the structure, make sure that you make a note of it straightaway (this applies equally whether your priority is focusing on understanding or collecting information), as it will give you a sense of direction and help you to anticipate points or take up the thread of information again should you get lost.

Additionally, during a lecture the lecturer will probably give you some cues, or 'verbal signposts', these include statements such as:

- 'I shall now discuss ...'
- 'My next point is ...'
- 'Finally ...'
- 'In conclusion ...'
- 'To summarize ...'

These signposts identify a new point or stage in the lecture and you should show this in your notes accordingly. Other signposts include: pausing to indicate a new point or summarizing what has been said prior to moving on.

There are other, more subtle, verbal signposts which can help you structure your notes; you will need to listen for these. Examples include:

- 'On the other hand ...'
- 'Others have argued ...'
- 'Turning now to ...'
- 'Alternatively ...'

Other words and phrases indicate that an illustration is about to be given:

- 'An example of this is ...'
- 'This can be seen when ...'
- 'Evidence for this can be found in ...'

Your ability to listen actively, and in particular to listen for structure, will improve with experience. As you improve you will be better able to spot digressions or additional examples and adjust your note-making accordingly, which brings us on to the next section.

2.4 Make notes appropriately during lectures

We commented earlier (section 2.1.1) that the amount of notes you take isn't the measure of whether you have been paying attention; in fact, you might have a lot of notes because you haven't been paying attention. We therefore need to draw a distinction between making notes and taking notes. We have deliberately referred to making notes so far, as opposed to taking notes, because we think there is an important difference. If you take something you are just the recipient of it, so in the case of lectures you just sit there and write down what the lecturer is saying (or worse, just walk away with the handout).

On the other hand, if you make something you are involved somehow in the creation of it and you bring something of yourself to it, so in the case of lectures you create notes that are unique to you and are produced by you engaging thoughtfully with the content of the lecture. Making notes, therefore, is an active activity whereas taking notes is usually a passive activity. As you can see, there's quite a difference. That's not to say that making notes won't involve you writing down word-for-word what a lecturer is saying on occasions; the important thing is that you make notes appropriately. As we have already seen in section 2.3.1, this will depend a lot on what your priority is; whether it's to understand the information (and so you focus on listening) or to collect information (and so you focus on note-making). In reality, although it is difficult to focus on both listening and making notes at the same time, it is not that you just do one or the other during any given lecture; rather the two go hand-in-hand. You will be constantly switching between listening and making notes all the way through a lecture, but how much you do of each should reflect your priority, as described in section 2.3.1 above.

2.4.1 Know why you are making notes

We have already encouraged you to think about what your priority might be when in lectures, and understanding information and collecting information are two key reasons for making notes. However, there are other reasons too. Making notes appropriately in lectures can also help you to:

- concentrate better;
- remember the content better (in the short-term at least);
- think about questions you want to ask;
- highlight areas of interest.

Note-making, therefore, isn't just about having something to refer to later; it is part of the learning process itself. This is another reason why borrowing a friend's notes is a poor substitute for actually being there and experiencing the lecture for yourself, because so much takes place in the lecture, and in your head, that even really good notes can't really capture the whole event.

2.4.2 Know how to make notes

The ability to make good notes is a skill that develops with practice, so don't expect to be an expert at it straight away. Clearly you will have made notes before at school or college, but making notes in lectures in an undergraduate setting is different for a number of reasons, as highlighted in section 2.1.2. So improving your note-making skills comes partly through practice, but there are some important principles to bear in mind too; these include:

- using structure in your notes;
- using your own words;
- using fewer words;
- using abbreviations;
- using space;
- using colour and image;
- using handouts;
- organizing your notes.

We will address each of these principles in turn.

Use structure in your notes

Notes that are lacking in structure will be much more difficult to understand, especially after the lecture, than notes that have a good structure. Imagine you were looking at some lecture notes a few days after a lecture that looked like the ones in Figure 2.1. Notes like these are difficult to understand partly because they are lacking in structure.

Alternatively, the notes represented in Figure 2.2 have better structure and so should be much easier to understand. The main purpose of structure is to make clear which information is important. It is crucial to note that identifying important information is much easier during the lecture because lecturers will use their tone of voice, pace, and many other devices to provide emphasis to the material, thus giving you an indication of what aspects of the information are most important. After the lecture, however, it is very difficult to recall this kind of detail.

To give your notes structure, you should:

- use headings to order information;
- give each point a new line;

FIGURE 2.1 Poorly structured lecture notes.

Respiration - Prof Smith 22 Feb

Inspiration - depends on contraction of diaphragm - flattens - and of external intercostals. Cause increase in thoracic vol., reduces pressure, draws air in.

Expiration - passive process - elastic recoil of lung tissue. Air flow is tidal, air in lung is not the same composition as air outside - has more CO_2 , less O_2 'cos some remains in lung at end of expiration - even if forced. Inspiration has to do work - overcome elastic tension of lung tissue and surface tension of fluid lining lungs. ?role of surfactant??

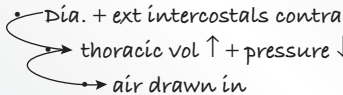
Gas exchange - occurs in terminal bronchioles and alveoli. O_2 dissolves in fluid and diffuses across lung wall to blood vessels - down concentration gradient. O_2 poorly soluble so needs large surface area for dissolving. CO_2 is better, goes in opposite direction. Need short diffusion path.

FIGURE 2.2 Well-structured lecture notes.

Respiration - Prof Smith 22 Feb

Inspiration*

- Dia. + ext intercostals contract



- thoracic vol ↑ + pressure ↓
- air drawn in

* has to do work - overcome elastic tension of lung tissue and surface tension of fluid lining lungs. ?role of surfactant??

Expiration

- passive process - elastic recoil of lung tissue
- air flow is tidal
- air in lung is not the same composition as air outside - ↑ CO_2 , ↓ O_2 (some remains in lung at end of exp.)

Gas exchange

- occurs in terminal bronchioles + alveoli
- O_2 dissolves in fluid and diffuses across lung wall to blood vessel - down concentration gradient
- O_2 poorly soluble so needs large surface area for dissolving
- CO_2 is better, goes in opposite direction. Need short diffusion path.

- highlight examples and illustrations in an appropriate fashion;
- use diagrams to summarize information;
- make clear when sections of your notes are digressions from the main points.

Use your own words

One of the reasons why it is important to try to use your own words, when making notes in lectures, is because it will help you (or perhaps force you) to understand the content of the lecture better. If you are trying to put information in your own words, then you must process it as you hear it in order to express it in your own words. It also helps you to make notes, as opposed merely to take notes (as explained above). You may have experienced occasions in lectures when you have been able to write down what the lecturer is saying without actually thinking about what is being said—this illustrates how passive the process of note-taking can actually be. How much you try to put information into your own words will depend to a certain extent on your priority; but whether your priority is to understand or collect information, putting that information in your own words will help you understand it better. This doesn't mean that you have to put absolutely everything in your own words; for example, there are two particular occasions when it is important to record the precise wording:

- when you are recording a quotation that the lecturer is referring to—in which case make this clear in your notes by using quotation marks;
- when you don't understand what the lecturer's words mean—in which case make this clear in your notes by adding a question mark in the margin (for example) as a reminder to follow-up the point later.

Know how much to write down

There are two potential problems related to how much information you write down; writing down too much information or not writing down enough. How much you write down will again depend on your priority (understanding information or collecting information), but it is also influenced by your own level of confidence. Under-confidence tends to lead to writing down too much, whereas over-confidence tends to lead to not writing down enough; neither is ideal. Among first-year undergraduates probably the more common tendency is to write down too much information, but, whichever your tendency, the following suggestions will help:

- remember that lots of notes don't necessarily equal good notes;
- look and listen for the important points—these are often the structural parts;
- use keywords to represent points or ideas concisely;
- add brief details of any examples or evidence that support a point.

Use abbreviations

Using abbreviations can be a real time-saver (as you will know from text messaging). Use standard abbreviations, subject-specific abbreviations, and your own abbreviations

for common words. The important thing is to be consistent and to ensure that your notes are still comprehensible; don't use so many abbreviations that your notes turn into a short-hand transcript—these can be very difficult to decipher when your memory of the lecture has faded.

Use space

It can be tempting, in an effort to save paper, to try to cram as much information onto a page as possible, but this will create difficulties for you both during and after the lecture. Notes that are densely packed are difficult to review and difficult to make additions to at a later stage. It is therefore helpful to use space in your lecture notes to make them easier to review and easier to supplement with additional material. To create space make sure you put each point on a new line (this also helps represent structure) and leave gaps for additions or corrections, especially if you think you may have missed or don't understand something.

Use colour and image

We have already identified in the section on *Use structure in your notes* the value of highlighting important points by using structure, but this can be further enhanced by using colour and image too, as shown in Figure 2.3. It can be useful to highlight in colour key points and to use images or diagrams as a quick way of summarizing a concept or idea. Sometimes such images or diagrams will be used by the lecturer, in which case, if it is useful, copy it down (although see the points below in *Use slides and handouts effectively*). On other occasions you will think of ways to represent visually something that is only communicated verbally; this can also be a very helpful thing to do, but make sure you record sufficient information to be able to understand the concept or idea at a later stage.

Use slides and handouts effectively

Slides and handouts are a very valuable source of information. Not all lectures will have handouts but most will have slides. Assuming that copies of the slides are available to you (either before or after the lecture) then the principles of using them effectively are similar.

- Put your name on the handout—everyone's will be identical (initially at least), and you will want to know which one is yours.
- Put a date and lecture title on the handout (if there isn't one on it already) so you know which set of lecture notes it belongs to later.
- When making notes, think about what is contained in the handouts or slides and don't copy down in your notes things that are already in the handouts. This will enable you to listen more actively and so focus on understanding.
- Make notes on the handouts themselves—highlight important points, add comments, write down any questions you have.

FIGURE 2.3 Using colour and image in notes.

Respiration - Prof Smith 22 Feb

Inspiration*

- Dia. + ext intercostals contract
- thoracic vol \uparrow + pressure \downarrow
- air drawn in

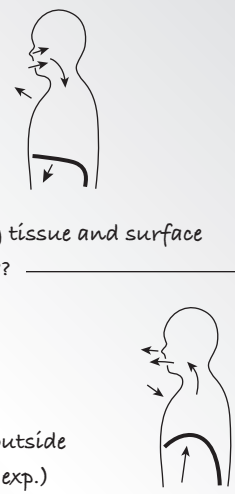
* has to do work - overcome elastic tension of lung tissue and surface tension of fluid lining lungs. ?role of surfactant?? → ?

Expiration

- passive process - elastic recoil of lung tissue
- air flow is tidal
- air in lung is not the same composition as air outside
 - \uparrow CO_2 , \downarrow O_2 (some remains in lung at end of exp.)

Gas exchange

- occurs in terminal bronchioles + alveoli
- O_2 dissolves in fluid and diffuses across lung wall to blood vessel - down concentration gradient
- O_2 poorly soluble so needs large surface area for dissolving
- CO_2 is better, goes in opposite direction. Need short diffusion path.



- Don't fall into the trap of thinking that because you've got a handout or slides that you don't need to listen much—listening actively during the lecture and making appropriate notes (on your handouts and in your own notes) will save you a lot of time later and also make it easier to understand the material.
- File your handouts in an organized fashion (which brings us neatly onto the penultimate point in this section).

Organize your notes

It is important that you organize your notes effectively, as this will make it much easier for you when you follow-up the lecture at a later stage or use the notes for background reading for an essay, or when revising for exams. The simplest, and in our experience the most effective, method is to use A4 paper for taking notes and to store your notes in a ring binder, along with the relevant handouts. To make ordering your notes easier, begin notes for each lecture on a new piece of paper and give them a clear heading of the lecture title, date and name of the lecturer. Also add page numbers so you can order the pages easily. To store your notes and handouts in a ring binder you will need to hole-punch them—do this before they get lost!

Compare your notes with other people's

Finally in this section, compare your notes with other people's. Remember, we said earlier that the ability to make good notes is a skill that develops with practice; it is also a skill that develops as you see how other people do it. Comparing notes can be a helpful exercise because it can help you to:

- identify and fill in any gaps that you might have in your notes;
- discuss the content of the lecture and clarify your understanding;
- identify how the lecture relates to the rest of the module.

2.4.3 Know the common problems and how to address them

We have addressed the ways to help you to make appropriate notes, but there will always be times when, for a variety of reasons, concentration dips and you begin to get left behind in the lecture. The trick here is not to despair and give up!

Failing concentration

You are much less likely to find your concentration straying when you use an active approach to note-making. By using your own words, and by using space, colour, and image, note-making will become a busy but interesting activity. If you do miss some points because your attention strays, then just leave a space in your notes and check it out with the lecturer or another student later.

Being left behind

You may find that information is being delivered too fast for you to write down. If points pass you by, then leave a space and compare your notes with another student's. Doing some background reading for the lecture will help you to keep up as the information won't be entirely unfamiliar to you. Sometimes you can get lost because you don't understand the material that is being delivered. This may be the case for the occasional point or even for a large section of the lecture. Rather than giving up on the lecture, write a series of questions that you can try to follow-up later.

2.5 Follow-up after lectures

At school or college, lessons usually cover everything a student needs to know about their syllabus, but at undergraduate level lectures don't tell you everything you need to know and so need to be supplemented with additional reading. It is vitally important that you are aware of this because when you are revising for exams, if you only revise the lecture material your knowledge of a subject will be inadequate. We will deal with this more in Chapter 13, *Getting the most out of revision*.

2.5.1 Know what kind of follow-up is required

In terms of the information covered, lectures are commonly used either to offer a broad overview of a subject (in which case your job is to fill in the detail) or to deliver detailed information on a subject (in which case your job is to fill in the background). There are therefore two issues to consider when identifying what sort of follow-up a lecture requires: does the subject require more depth (because the lecture gave an overview) or does the subject more breadth (because the lecture gave detail)?

2.5.2 Ask questions

Don't be afraid to ask a lecturer for clarification either during the lecture or afterwards. This can take a bit of courage, especially putting your hand up and asking a question in a room full of people, but it is very unlikely that you are the only person in the room thinking that particular question. Also, lecturers will often welcome such questions as they provide a bit of stimulus for them as well as indicating that people in the room are paying attention. Additionally, use tutorials to clarify or discuss material from the lectures.

2.5.3 Review your notes

Review your notes as soon as possible after a lecture, and make the most of your review by:

- highlighting points which seem particularly important or central;
- adding any details which you can remember from the lecture;
- showing links between points;
- correcting any mistakes;
- adding questions to highlight areas you don't understand or need further information on.

* Chapter summary

Making the most of lectures is an important skill for undergraduates. There is much you can do to improve your ability to listen and make notes; this includes things you can do before, during and after lectures. The things you can do include:

- be prepared: get to know the course structure and do pre-lecture reading;
- be organized: have a system for storing notes and take a selection of pens and pencils to the lecture;
- listen for structure: watch out for signposts that help you follow the lecture;

- be brief: try using key words and phrases as much as possible so the emphasis is on listening and understanding;
- let note-making be an active process: summarize in your own words, make good use of space, colour, symbols, and images;
- leave gaps: if you miss a point, don't get further behind by panicking about it, just leave a space and check it out with another student after the lecture;
- actively review your notes after the lecture, making additions and corrections as you read.