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# Studying in the Sciences

## About reading in science

Readings in science based courses contain a large number of facts and details, as well as many unfamiliar terms commonly derived from other languages. Such information requires understanding and learning on two levels; the **memory** of certain terms or facts and the **understanding of processes** and key **concepts**. Understanding the basics before you move on is critical for understanding the next step.

Many of the **fundamentals and concepts** you learn **need to be applied to new things** and used **to solve problems**. By noticing **patterns** and **relationships** in these fundamentals and concepts it will help you to apply your prior learning to new things without having to start over. For example, when studying human physiology there are many different body systems to learn about. If you learn and understand fundamental concepts about how, in general, body systems are organised from the cell to the organ, to the body system, these concept can be easily applied to the 11 or so various systems making the specific elements of each one much easier to learn and understand. For this reason, it is important to **recognise patterns** and relationships and **apply prior knowledge in new contexts**. Science text books are commonly written and organised in such patterns making these relationships easy to recognise.

In science, many details are expressed with **figures, charts and diagrams** making the organisation of the information easy to see. For this reason, it is important to not just brush over the figures and diagrams and focus only on the text. Additionally, studying materials presented in varying forms will **assist you to understanding and remember** the information presented.

It is highly unlikely that all your recommended readings are written by the person/people who wrote your unit, or that they bare written specifically for your unit. As such, there will be information in the readings that is not necessarily critical (or relevant) to the unit's content. The source reading will have been selected as it has relevant aspects you need to learn, but it is not intended that you have to learn every aspect of the source. You should plan how to read the source material. First, **identify how the reading is significant to your learning**; then, **read the materials with purpose**, making **connections between the reading's content** and the **content of your unit**. Finally, ensure your learning of the materials by **recalling** and **reviewing** the information.

Remember, just ticking off that you have read the relevant chapter (or other source) does not mean you have used the material in an effective way to help your learning. Invest time to get value out of the readings and build your knowledge. You need to keep on top of things early to understand the new material that comes up. Science is about learning fundamentals and concepts then applying this knowledge to learn new concepts or solve problems.

## What to do

As a general approach, find the links between the reading and the unit content. Plan your reading by finding the relevant sections in the reading and align this with content from lectures, tutorials, unit learning outcomes other learning activities. Read with purpose and implement strategies to help recall and make connections between the readings and other unit content.

Many of the following tips on what to do when reading in the sciences have been adapted from the Texas Woman's University (2013).

### A. Plan

Before reading, identify the relevance of the material.

#### Prior to class

##### **Step 1: Ask yourself: what is it that I need to learn from this reading/ what is the purpose of this material?**

- Look at associated class (lecture/ tutorials/ labs) outlines, notes and learning outcomes to get an idea of what is relevant
- Look at the unit's learning outcomes
- Other hints: notifications from unit assessor, discussion forums on unit's MySCU site, what is covered in assessments etc.

##### **Step 2: Scan/ preview the reading for relevance**

Briefly look over titles, subheadings, the first few sentences from each subheading, key words and terms, summaries, and figures and diagrams making connections with your unit for relevance.

When scanning the reading ask:

- What is this section of the reading about?
- How does this fit in with what we are learning in the unit?
- How important is this information? Are there parts I could just skim over and get the main ideas?
- What are the organisational patterns /relationships of the information?
- Is there unfamiliar terminology to learn / review?

#### During class

##### **Step 3: From the class content, make connections about what it is you need to know so you can focus on this in the reading.**

Because you have scanned and previewed readings you will have some background into understanding the materials being presented in class. Listen and look out for clues during class (and other learning activities) that will help you identify what to focus on and the depth you need to understand things when you read.

##### **Step 4: Write notes on one side of a notebook**

A way to try to connect the notes from class with the notes you will make from the readings is to leave the facing page to your class notes blank. This way, when you take notes from your readings, you can make clear connections with the class and reading materials by placing related information together.

### B. Read with purpose (the relevant sections):

#### Following class

As you review class notes, identify the additional information needed from the reading to clarify the concepts and information you are learning.

##### **Step 5: Skim the reading in more detail now focusing on the sections most important to your unit.**

For these sections, identify major ideas and details including tables and figures (where relevant). Try to understand the more important and frequently repeated terminology. Think about how the information is organised.

**Step 6: Read, in detail, the relevant reading material identified.**

Break the reading into logical sub-sections, covering one section at a time. As you read take relevant notes alongside and relating to the appropriate class notes (see step 4).

Make sure you pay attention to understanding relevant figures and diagrams. In science, figures and diagrams are frequently used to illustrate concepts and show connections.

## C. Recall

**Step 7: Recap on what you know once you have made notes from your reading**

After each subsection of the reading, recall what you know through ways such as repeating concepts to yourself in your own words, drawing diagrams or charts to summarise and explain the information. Where your recall of information is limited or understanding is unclear, revisit the material.

## D. Review

**Step 8: Over time, review and reflect on the information in various ways.**

Rather than just memorising ideas and concepts, try to connect and apply these to other situations. For example, if you have just learnt about the actions of a certain group of muscles and the peripheral nerve that supplies these muscles, rather than recalling the muscles' action, ask yourself what function would be lost or impaired if the nerve was damaged? This way you are applying the information rather than just trying to recall it. Likewise, try presenting the information in a mind or concept map to bring together and process information learnt to assist with deeper learning. (For more information on mind and concept maps see the ASD Quick guide – Brainstorming and Mind-mapping).

## E. New scientific terms

As you read you will come across many new scientific terms relevant to your area of study. There are many ways to help learn these new terms. Ways to do this include:

- Creating a glossary for new terms that you come across
- Recognise and learn roots, prefixes and suffixes that are common in your field. This will help you to decode many new terms you read
- Implement strategies to help memorise new terms such as connecting new material with what you already know, use new terms in a meaningful context and explain and teach the terms to others not in the field.

For further information on these strategies see the following Studying in the Sciences resources:

- Learning and recall of scientific and medical terms
- Learning and understanding scientific concepts

## Other related guides (ASD Quick Guides)

- Some tips on reading effectively
- Brainstorming and mind-mapping
- Taking notes

## References

Texas Woman's University. (2013). *Reading in the sciences*. Retrieved from <http://www.twu.edu/slrc/reading-in-the-sciences.asp>.