**How Does Science Differ from Other Disciplines?**

**Introduction**

The primary motivation for developing resources to help you with your science writing stems from the fact that science differs from other disciplines. As a result, you need to use different skills to communicate scientific information effectively.

Science is often used to explain or predict outcomes that either have affected, or will affect, society. It is a very complex social activity involving many different people, and it affects us all, every day. Many governmental decisions are made based on scientific predictions, which involve specialist researchers as well as contributing citizens, yet a common goal is to follow objective measures to remove bias from such decisions.

Much of science is based on inquiry through the development of hypotheses and repeatable experiments to test these hypotheses. Data are then gathered and analyzed before conclusions and interpretations are made. However, while this path is typically followed to build knowledge, there are other routes (such as observational studies that seek to isolate patterns from large data sets, rather than imply cause-effect relationships supported by data derived from controlled experiments).

Science can be thought of as a discipline that requires a degree of evidence to build knowledge around phenomena, but it also blends logic with imagination. As a result, science is dynamic and creative, and scientists often disagree about experimental designs, results analyses and interpretations. Although scientists typically follow the scientific method of inquiry, there are many different objective and unbiased ways to do this for any given experiment, and we rarely know which is the best.

Furthermore, the vast majority of conclusions are based on measures of probability; researchers decide on a level of uncertainty that they are happy to accept before concluding one way or another what their data show.

**Specific Resources to Help Build Science Writing Skills**

The above point about science being uncertain (based on probability) is very important because general audiences may hold the misconception that science is about proof, and that scientists perform experiments to prove hypotheses or theories as though they were mathematical equations, which they rarely are (especially in biology where variation is seen everywhere). You must take care when communicating to such audiences to explain the uncertainty attached to what you are saying (see our dedicated resource ‘Communicating Uncertainty’).

Additionally, science is a discipline that uses a lot of technical jargon, to the extent that astronomers might not understand what chemists or evolutionary biologists are talking about when they are using terms that are well known in their own circles. Dealing with jargon appropriately is therefore a very important part of being a good science communicator (see our dedicated resource ‘Editing, Succinctness and Jargon’).

Linking in to this idea is the importance of tailoring your content to the needs of the audience you are addressing. For example, if you are writing a journalistic article or a blog post about the latest genetic breakthroughs showing the importance of random mutations for boosting diversity in populations, you must minimize your use of jargon wherever possible, and use everyday comparisons and descriptions to help contextualize technical concepts (for more information on this, see our resource ‘Comparisons and Descriptions’). Conversely, if you were writing about the same breakthrough to form part of a review article targeted at a science journal, you could afford to be considerably more technical in your writing.

Bearing the needs of your audience in mind, you can start to think about science-specific style. Although any piece of work you produce should flow smoothly from sentence to sentence (see our resources about Organizing Paragraphs and Basic Grammar and Mechanics), you should aim to write short, succinct sentences that are easy to interpret (see our resource about writing with Clarity and Using Simple Language); your primary goal should always be to communicate your material in a way that can be understood, rather than to write prose that could rival that of Emily Bronte or JRR Tolkien.

Not so long ago, scientists tended to write things more in the passive voice than the active voice, but conventional wisdom now encourages us to write in the active voice more often than not. The main reason for this is that it encourages writers to use strong verbs and construct shorter, simpler sentences. For our comprehensive guide on the two styles of voice, see our resource on ‘Active vs. Passive Voice’.

Another aspect of science writing that sets it apart from most other disciplines is the need to incorporate lots of numbers and units into such writing. Whether you are writing up your lab notebook or giving a PowerPoint presentation to your peers, you are likely to need to include specific facts and figures in this form. There are a number of rules to follow to make sure you do this effectively, and we have a dedicated resource to help.

Following on from this, it is important to know how to produce effective tables and figures to help display patterns and important information in a more visually engaging way than in simple text form; after all, many people find it easier to visualize patterns than interpret them from text, and these patterns can be relatively complex in science (a picture really can be worth 1,000 words). There are lots of little tips and explanations to help out in our dedicated guide ‘Producing Effective Tables and Figures’ (for example, you can read why pie charts are normally bad choices to display data).

Most disciplines require you to support your work (and opinions) by citing relevant sources that you have used to build the quality of your content. However, the citation style between science and other disciplines is very different (it can even be different within sub-divisions of science), so learning the intricacies is very important. We have dedicated resources to help you search for content material effectively, identify different types of sources, and then integrate and cite these effectively in your writing.

Many people are worried about committing plagiarism without meaning to (by failing to cite material correctly, or by choosing not to cite certain information, for example), but we have a resource (Avoiding Plagiarism) to help make sure you never fall into this trap. Included here are tips to help you decide whether you need to cite certain information based on certain characteristics (target audience, how specific the information is, and whether it is factual or an opinion).

We would also encourage anyone to develop and use a writing outline when writing about scientific information (especially when writing a report that follows the IMRAD structure – Introduction, Methods, Results and Discussion – associated with science), and have put together a useful guide for that purpose: Writing Outlines.