**Writing an Introduction Section**

Purpose

* Provide the reader with the necessary background information to understand your experiment.
* Justify your question and hypothesis.
  + The reader should be convinced that the question is worth addressing, either because it is a novel idea and/or because it has human application (economics, conservation, health, etc.)
  + The reader should be convinced that the hypothesis is testable and is reasonable given the background information.

Organizing the Introduction

* There are three main things that you should include in the introduction:
  + Background information.
    - You should include background material on both the species you’re using and the biological phenomenon you’re investigating (example: algae and photosynthesis).
    - You should address any previous research on your specific combination of species and phenomenon, or if no research has been done of the specific combination, tell that to the reader.
  + One or more research goals, also known as questions (typically just one).
  + One or more hypotheses for each question asked (typically just one).
    - Hypotheses should begin with the prediction, and then include a statement summarizing your rationale. It may be presented in two sentences.
* In general, the introduction should begin broad and gradually narrow its focus on the specific topic you are addressing in your manuscript.
  + For example, if you are investigating how the algae species *Picochlorum oklahomense* responds to different salt concentrations, you should begin by discussing the life history of *P. oklahomense*, then address how salt-tolerant algae species respond to varying salt concentrations, then you should state your question, the evidence you’re using to support your hypothesis, then finally the hypothesis itself.
* Make use of paragraphs to organize your ideas. For example, background information on the species, background information on the biological phenomenon, and the question and hypothesis could each have their own paragraphs.

Content

* When writing your introduction, only include background information that is relevant to the investigation.
  + For example, if you are testing the effect of different salt concentrations on *P. oklahomense* to determine the optimal conditions for biofuels production, you **should not** explain the history of its discovery or its metabolic processes that are unrelated to salt.
  + If you need to include more references, search for references that are relevant to your specific investigation. In the above example, references that discuss biofuels production or salt metabolism in salt-tolerant algae species are relevant.
* All the content in the introduction should have a purpose; either it should provide the information necessary for the reader to understand the question and why you’re asking it, or it should provide evidence that your hypothesis contains a reasonable prediction.
  + Background information on the study species should focus on characteristics relevant to the biological phenomenon.
    - For example, if you’re studying how temperature affects the metabolism of only larval mealworms (*Tenebrio molitor*), don’t focus on the mealworm life cycle.
  + Likewise, background information on the biological phenomenon should be relevant to the study species.
    - In the above example, you should not focus on how endotherm metabolism works, because *Tenebrio molitor* are ectotherms.
  + If you think that this off-topic background is interesting or worthy of research, you should bring it up *in the discussion*, not the introduction.
* You must explain to the reader how the background information you’ve provided relates to your question and hypothesis.
  + For most investigation, this should be only a few sentences, because the relationship between your background information and the question/hypothesis should be self-evident. More complex investigations require more explanation.
* Foolproof layout:
  + Broad background information.
  + Introduce the study species.
  + State what is already known, and what is missing.
  + Explicitly state what you are testing.
  + Finish with a causal hypothesis.