

## How to Write Scientific Paper Titles

The title of your paper is very important. It must convey to the reader the overall content of the project. The title should tell your audience whether or not they should read your paper. From a good title, I will probably be able to state the hypothesis being tested, and perhaps the results of the study. In this exercise we will work on the problem of deciding on an accurate, well-written, descriptive title for a scientific paper.

Your title should be specific enough to describe the contents of the paper. The title should be appropriate for the intended audience. The title usually describes the subject matter of the article, for example, "The Effect of Smoking on Academic Performance." There should be no doubt about general hypothesis being tested in this study. However, you may wish to summarize the results in your title, "Students Who Smoke Get Lower Grades." Each of these are very good titles for a scientific paper. You should, however, avoid literary or journalist sensationalism in your title. For example, "Smoking is Bad," tells me little about the content of the paper. "Nicotine Snuffs Grades," is even less useful.

*A note on format:* You should capitalize all word in your title except prepositions, articles and conjunctions. Numbers should be spelled out. Scientific names should be italicized. Look carefully at examples in the Reading Room and below.

### Exercises

1. Go to the "Reading Room" and download a copy of the paper by Davis and van Dyke, 1932, entitled "Oxygen Consumption of Fasting White Mice." This is an older paper that is quite easy to understand. Describe the results of this paper in a short paragraph. Answer this question: How well does the title describe the results of the paper?
2. Below you will find an abstract from one of the Bio3B projects. Which of the following title would be most appropriate for this work? Why?
  - a. Shedding Some Light on *E. Coli*
  - b. Light Emission by Transformed *Escherichia coli*
  - c. The Effect of Temperature on Light Emission by *Escherichia coli* Transformed to Express the pLUX Gene
  - d. There is a Significant Increase in the Light Emitted by *E coli* Transformed to Express the pLUX Gene at High Temperatures

**Bioluminescence is the biological transduction of energy into visible light. As long as ATP and O<sub>2</sub> are present, *luciferin* will generate light in the presence of *luciferase*. Temperature, which affects all enzyme mediated reactions, should affect the rate of the luciferin-luciferase reaction. In general, for every 10°C change in temperature, reaction rates will double. This experiment determined the amount of light emitted by pLUX in *Escherichia coli* at various temperatures. Five experimental conditions were used in this experiment (-15.5°C, 3.5°C, 21.5°C, 30.8°C, and 37.0°C). The light intensity showed a maximum at 37.0°C and minimum at -15.5°C. There were significant differences between all five temperatures (ANOVA, p=0.001).**

3. Read each of the following three abstracts. Write a title for each of these.

**Abstract 1**

The Venus flytrap (*Dionaea muscipula*) is a carnivorous plant that uses acid growth of cells to close the trap and catch its prey. Once caught, *Dionaea muscipula* digests and obtains nutrients not available in their habitat. The ideal habitat for a Venus flytrap is a bog with a pH range between 4 and 5. Since the plant is adapted to low pH environment and pH plays a role in the closure mechanism, we hypothesized that pH will effect the rate of closure of the “trap”. In this study, the stems of the Venus flytraps were placed in floral tubes and left to absorb three different pH solutions of 3, 5, and 7 for one hour. After absorption was complete, the traps were closed. Closure was captured with a video camera capturing at sixty frames per second. Analysis of the video showed that the speed of closure significantly increased as pH decreased (ANOVA). We suggest that increased hydrogen ions surrounding the trigger cells reduced the threshold to closure.

**Abstract 2**

Many studies claim various beneficial effects of red wine including enhancement of *Mus musculus* immune cells and increase in human oral health. The goal of this experiment was to look at the effect red wine on oral bacterial colonies. Colonies of oral bacteria were obtained and grown in both broth and nutrient agar solutions. Once purified, 50µl of the bacterial solution was spread onto 28 Petri dishes, and filter paper disks submerged in either water, ethanol or Merlot red wine were placed on the agar. After forty-eight hours of incubation at a temperature of 37°C we examined the plates for inhibition around the paper disks. Only one wine-soaked disk produced a small zone of inhibition. These results indicate that neither the merlot nor the ethanol inhibit oral bacteria *in vitro*.

**Abstract 3**

Recent food borne bacterial outbreaks have shown that leafy vegetables may become infected with *Escherichia coli* when exposed to contaminated water. This study investigated the ability of *E. coli* to colonize lettuce plant tissue internally through its root system. Iceberg and Romaine lettuce plants were grown in plastic pots that were placed in water inoculated with *E. coli* transformed to express green fluorescent protein and ampicillin resistance. *E. coli* concentration in the water was  $3.9 \times 10^5$  CFU · mL<sup>-1</sup>. Macerated lettuce samples were plated on Luria-Bertani agar containing ampicillin. Presence of *E. coli* was demonstrated by examination of the plates with UV light after 48 hours of incubation at 37°C. The results indicated that *E. coli* did not migrate through the roots and become entrapped within the lettuce plant tissue. The results of this study indicate that lettuce plants are not susceptible to internal infection when subjected to soil contaminated with low concentrations of *E. coli*. However, further research on the various routes of *E. coli* contamination in produce is necessary for the prevention of food borne infections.