Scarsdale Science Research Program

Course Overview

"The whole of science is nothing more than a refinement of everyday thinking."
Albert Einstein in Physics and Reality

This course is designed to provide students with an understanding of research methodology in science. The class is directed to students who wish to pursue excellence and progress into advanced areas of original research.

Meetings: The course meets twice a week as a group and the individual meets once every two weeks one on one with the teacher. Each meeting will be graded according to the **student grading sheet**.

Sophomore Year: During this year, the student is required to narrow and focus his/her topic. The student will gain skills in online research using our libraries' many databases such a pro-quest and science direct. Through the early part of the year the student will move from simpler "popular" science articles to more complicated journal articles all the time narrowing the his/her topic and keeping track of scientists whose research might interest the him/her. The student will begin to dissect these journal articles helping the student learn not only the material but more about the scientific process. Sophomores will work on their presentation skills by presenting a journal article of their choice.

During this year the student needs to locate a research facility and mentor where he/she will be doing his/her research. While most of our students do their research at local universities some research occurs in the school, students' backyard or the local community. It is important that no matter where the student does the research that the student has a professional helping him/her design and implement his/her plan. **The student must have a mentor by the end of the sophomore year.**

Sophomore Summer: During this summer the student begins working on his/her research with their mentor.

Junior Year: This is the year of intense laboratory research. The student should be actively communicating with the his/her mentor and working on the research project. Some will finish one project and begin another while others students will refine and keep researching their current one. The student will continue to read journal articles in his/her area as well as prepare for many regional and national competitions. The student will write a formal paper that is journal quality about his/her research.

Junior Summer: Research, research and more research. This is a huge summer, as the student will need to finish his/her project and analysis of data as well as finish putting together the student paper.

Senior Year: The research is completed. The student will write up and present the research project at many competitions. The student will mentor the sophomores in their first year of the course.

Competitions: Part of doing science is then communicating it to the community at large. If the student cannot make the science seem important or fit into the greater picture then getting funding for it is difficult. The student will get practice presenting his/her work and ideas both in class and at competitions. Each year we require the student to enter various competitions.

Science Symposium: All the students as a class will be planning a symposium where each student gives either a poster or a power point presentation on his/her research to parents, faculty and other members of the community. This is a mandatory part of the course. All students must attend the symposium. It will be around May or June in the evening. The student will hear a lot more about this in January.

Role of mentors:

Mentors are key to our program, and students need to find one by the end of their sophomore year, so they can begin their research the summer prior to their junior year. Our hope is that the student-mentor relationship continues for a second summer, as well, and that the student can build upon their first project.

The role of mentors in our program is to help the student pose a question in their area of interest, develop a hypothesis, and design an appropriate methodology for data collection taking into account the time constraints of the student, as well as his/her abilities. Most of the data collecting needs to be done over the summer, especially for a laboratory study.

Lastly the mentor would need to help guide the student with the analysis of data. This may be done by email, if the mentor is not local. It is our goal that the results will be written up and presented at various Science competitions, both local and regional. Since this is intended to be an independent project, we would hope that the mentor could guide the student, by recommending appropriate articles from scientific journals, teaching the student techniques he/she will need and providing some guidance in data analysis.

We would also hope that the mentor could read over the student's papers and write a letter of recommendation for him/her, supporting the work at the end of the project. I hope this answers your questions. If you need more information, I am available to speak with you and can be reached either by phone at (914) 721-2671 or by email, if that is easier for you (dprendergast@scarsdaleschools.org). Thank you very much for your time and your consideration.