Prince George's County Public Schools

The Science and Technology Program

of the

Prince George's County Public Schools

The Science and Technology Internship Program

A Guide for Mentors

SCIENCE AND TECHNOLOGY INTERNSHIP PROGRAM

Program Overview

In 1976, Prince George's County Public Schools initiated the Science and Technology Program. Admittance to this program is competitive. Students receive advanced curriculum in science, mathematics, engineering technology and computer science. The Science and Technology Program is housed in Science and Technology Centers located in C.H.Flowers, Eleanor Roosevelt and Oxon Hill High Schools.

Science and Technology Program senior students are offered a formal internship program in science and technology. Internships are structured to offer students – interested in possible careers in science/technology – a nine month work research/application experience in the areas of Biological/Physical Sciences, Engineering, Mathematics and Computer Science.

INTERNSHIP PROGRAM STURCTURE

The Science and Technology Internship Program includes the following elements:

- The flexibility for students and mentors to select a morning or afternoon internship in an area of interest related to biology, computer science, engineering, or physical science.
- A formal program that permits students to meet with a mentor three to four days a week from September – May.
- An opportunity for students to participate in professionally guided experimental research projects with nationally recognized businesses and government agencies.
- An expectation that students will learn the importance of teamwork and the value of "giving back" to the community through student service to the mentor and the organization sponsoring the internship.
- A specific curriculum taught concurrently that focuses on the basic principles of research.
- A team approach to offering students weekly faculty support for completing the research project, exploring career fields, and applying to college.

A SCHOOL-COMMUNITY PARTNERSHIP

The Science and Technology Internship Program is only possible due to the partnership local businesses and government agencies have formed with the Science and Technology Centers. This Partnership allows the scientific community to become an extension of the classroom and offers students educational opportunities in a career setting. The staff and Students of the Science and Technology Centers are pleased to recognize the many professionals who generously contribute their time, talent, and experience by serving as mentors.

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RESEARCH PRACTICUM GUIDELINES

All students in the Science and Technology Program are required to complete the course, Research Practicum. Students enrolled in the Internship Program work with a mentor three to four days a week during the school year to complete the requirements for the course. Each Monday, students are scheduled to meet with a Research Practicum teacher on campus. During this time students will be introduced to research design, statistics, techniques for surveying related literature, and computer programs for word processing, graphing, and statistical analysis of data. Research Practicum teachers review research proposals and serve as a coach for all aspects of the course.

SELECTING A PROJECT

An essential component of the internship program is the selection of a research project. Students look to the mentor for guidance in selecting an appropriate project. Many mentors suggest a project that is part of the facility's ongoing research. Other mentors help students design a special project. The project selected must meet the following guidelines:

The RP Project must follow either the format for experimental design or a design and developmental design. Projects in the Biological Science or Physical Sciences must use the experimental design methodology. Engineering and Computer Science projects may use either the experimental design or a product/solution design and development protocols.

- **Experimental Design must:**
  - Contain a dependent and independent variable, must be part of the design (observational studies are permitted only if the student researcher is on an internship with an approved research mentor).
  - Includes a hypothesis, which can be tested statistically.
  - Focus involves changing the independent variable, and then measuring the dependent variable.
  - Include a statically analysis of data.
    - Select a statistical test for **significance.**
    - Statistically analyze data for correlation between the independent and dependent variables (This means that you will determine if a plot of the independent variable vs. the dependent variable yields a linear relationship).
- **Product/Solution Design and Development must**:
  - Be a problem that requires a quantitatively descriptive engineering or computer science solution that is a:
    - Refinement of a current solution
    - Development of a new solution
    - Analysis of possible solutions
  - Statistically evaluate the solutions for
    - Product design quality control
    - Product marketability

Note:

- *Observational studies are permitted with the approval of the Research Practicum teacher.*
- *If statistical analysis is inappropriate for the research project, the mentor is asked to suggest a method for evaluating data.*
- *Surveys and historical studies are not permitted.*

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RESEARCH PROJECT PROPOSAL
Research projects must be approved by the Research Practicum teacher or the Science and Technology Coordinator. A copy of the **Research Project Approval Form** is located at the end of this packet. Students are responsible for completing the form and obtaining approval.

WRITING THE RESEARCH PAPER
Students are required to detail their project and research findings in a formal five chapter paper. Listed below are the chapters to be included in the paper**. If you are new to the program and would like to see papers from the past, just tell your student and he/she can borrow them from the RP Teacher**. Students will receive detailed instructions for each chapter and weekly technical support from the Research Practicum teacher. Final papers are due in early May.

Chapter 1: **The Problem and Its Setting**

Chapter 2: **The Review of Related Literature**

Chapter 3: **Methodology/System Model**

Chapter 4: **The Findings**

Chapter 5: **Summary, Conclusions, and Recommendations**

PROJECT PRESENTATION
Students are required to present research projects using three different formats during the year:

- **Science Fair:**
  Scheduled for mid-February, students are required to present project information using a typical backboard presentation. Research Practicum teachers will notify students of size limitations and layout rules. **Students are asked to at least have preliminary data at this time, but are not required to have completed the project.** Any students who finish in the top three at the CHFHS Science Fair will go on to the County Science Fair in April and should have a completed project by that time. **Science fair approval forms are required and can be found at** http://www.sciserv.org/isef/document/index.asp.

- **Research Practicum Symposium:**
  Scheduled for late April, students are required to present their completed data and project using a poster format. This event will be non-competitive. Students will receive instructions for constructing the poster from the Research Practicum Teacher.

- **Power Point Presentation:**
  Every student will be required to make a Power Point presentation to his/her classmates. The presentation should contain information about the completed project and also information about the mentor, the lab, and any others that he/she has worked with. **This last part is best accomplished with pictures so we encourage you to allow your student to take frequent pictures during work hours. It might be easiest just to have them keep a disposable camera at the lab.**

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EXPECTATIONS FOR THE MENTORS

THE ROLE OF THE MENTOR

Mentors may be individual researchers or members of research team. Because mentors often have multiple responsibilities in addition to research activities, some implement a collaborative approach to mentorship. Colleagues and graduate students may provide a variety of research opportunities and perspectives that enrich the mentorship experience. The role of the mentor is highly individualized. There are, however, common characteristics of all successful mentors:

- Involvement in a research project that interests the students.
- Willingness to serve as a role model in teaching the rituals, language, and expectations of the mentor's career field.
- Time available to guide the student's research, and to introduce the student to professional standards and processes acceptable to the discipline.
- Commitment to developing the student's research knowledge and abilities.
- Enthusiasm

ATTENDANCE

Students are required to keep a record of daily attendance at the internship site. The intern will notify the mentor in advance of an absence. The parent will also notify Mr. Rountree of the same. Mentors are asked to e-mail Mr. Rountree when an intern is not present at scheduled times. (james.rountree@pgcps.org) or 301-636-8000 (ext. 251)

Students are held to a high standard of attendance and understand that they are expected to attend the internship as scheduled. A time sheet has already been provided and is to be filled out every scheduled day. The mentor or lab designee is asked to initial the time sheet daily. The students will turn in the time sheet during the middle and at the end of each quarter. **A school calendar for 2007-2008 has been included as an attachment.**

EVALUATION

During the middle and at the end of grading periods one, two, and three, mentors will receive a short evaluation to complete. A copy is included in this packet. This evaluation is used to provide feedback to the Internship Program Team and to assist the school in documenting attendance. Students frequently use these evaluations when applying to colleges. **Please go over the evaluation with your student before sending it to the school.** In the fourth quarter, mentors are asked to write a formal letter of recommendation that becomes part of the student's portfolio. Should you have a concern about your student's performance, please contact Mr. Rountree or the Science and Technology Coordinator, Dr. Wheatley (vwheatley@pgcps.org or 301-636-8015).

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EXPECTATIONS FOR STUDENT INTERNS

TRANSPORTATION

It is the student's responsibility to provide transportation to and from the internship. Students are encourage to plan alternative means of transportation should the primary transportation source become temporarily unavailable.

ATTENDANCE AND DEPENDABILITY

Students are expected to maintain excellent internship and class attendance. Students will promptly attend the internship at scheduled times, even when the school schedule is altered for academic or extracurricular purposes. **Students are required to call the mentor before the scheduled internship time in the event of an absence of any kind. In the event of inclement weather, the internship program will always follow the Prince George's County School guidelines for closings and students at their internships are asked to call their parents for guidance in going home early.**

Note: *In the event of absence, students scheduled for morning internships are required to have a parent contact the school* ***between 8:00 – 9:30 AM at 301-636-8015***

Students scheduled for afternoon internships are required to provide the RP Teacher with an absence note upon returning from an absence.

Students who become ill at their internship are asked to call their parents to get permission to come home and then have their parents call the school at the number above.

All student interns are required to wear their Internship ID at all times in school and at the lab.

STUDENT SERVICE

A component of the internship program includes student service to the mentor and internship sponsor. Responsibilities will vary with the internship. Student service provides the student with an opportunity to learn teamwork, career related skills, and the value of "giving back" to the community.

DRESS

Appropriate dress varies with each internship. Students should obtain information related to dress prior to starting the internship. Frequently, the mentor and her colleagues' attire is the best example of appropriate dress.

PAPER WORK RELATED TO THE INTERNSHIP

Each internship requires different documentation and approval forms. Students are required to check with the mentor and the internship sponsor to insure that all forms are completed and submitted promptly. Students are required to copy of all documentation and place it in the portfolio.

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ASSIGNMENT DUE DATES

Summer 2007	Chapter 1 and 2 preparations (due 1st day of school) • Research Proposal development • Literature Search and Review
School Year	
Quarter 1	Assignment Due (day 1) • Topic Selection/Proposal • Procedures (Experimental and Statistical) • Mentor contact and Log • Ten References Summaries (.5 page each) Chapter 1 Development -The Problem and its Setting • Annotated Bibliography (20 references, may include 10 from summer) • Assignment/Statistics Problems/Progress Checks • Test: Descriptive Statistics
Quarter 2	Chapter 2 Development: Background/Review of Literature Chapter 3 Development: Methodology/Procedures • Experimental • Statistical Science/Engineering Fair Forms/Protocols Assignments/Statistics Problems/Progress Checks Test: Statistics (Inferential)/Appropriate Graphing
Quarter 3	Chapter 4 Development: The Findings Maryland Jr. Science and Humanities Symposium Science and Engineering Fair Classroom Presentation Chapter 5 Development: (Rough)
Conclusions/Recommendations	
Quarter 4	Chapter 5 (Final) conclusions/Recommendations Prince George's Area Science and Engineering Fair Final Paper Submitted Present in RP Symposium and Poster Session AP Exam Review Sessions & Science/Technology and Society Project

Enclosures

- PGCPS 2007/08 School Calendar
- Student Attendance Form
- Student (trainee) Evaluation Form
- Mentor Information Form
- RP Proposal Form
- Log Book Format
- Portfolio and Notebook Criteria