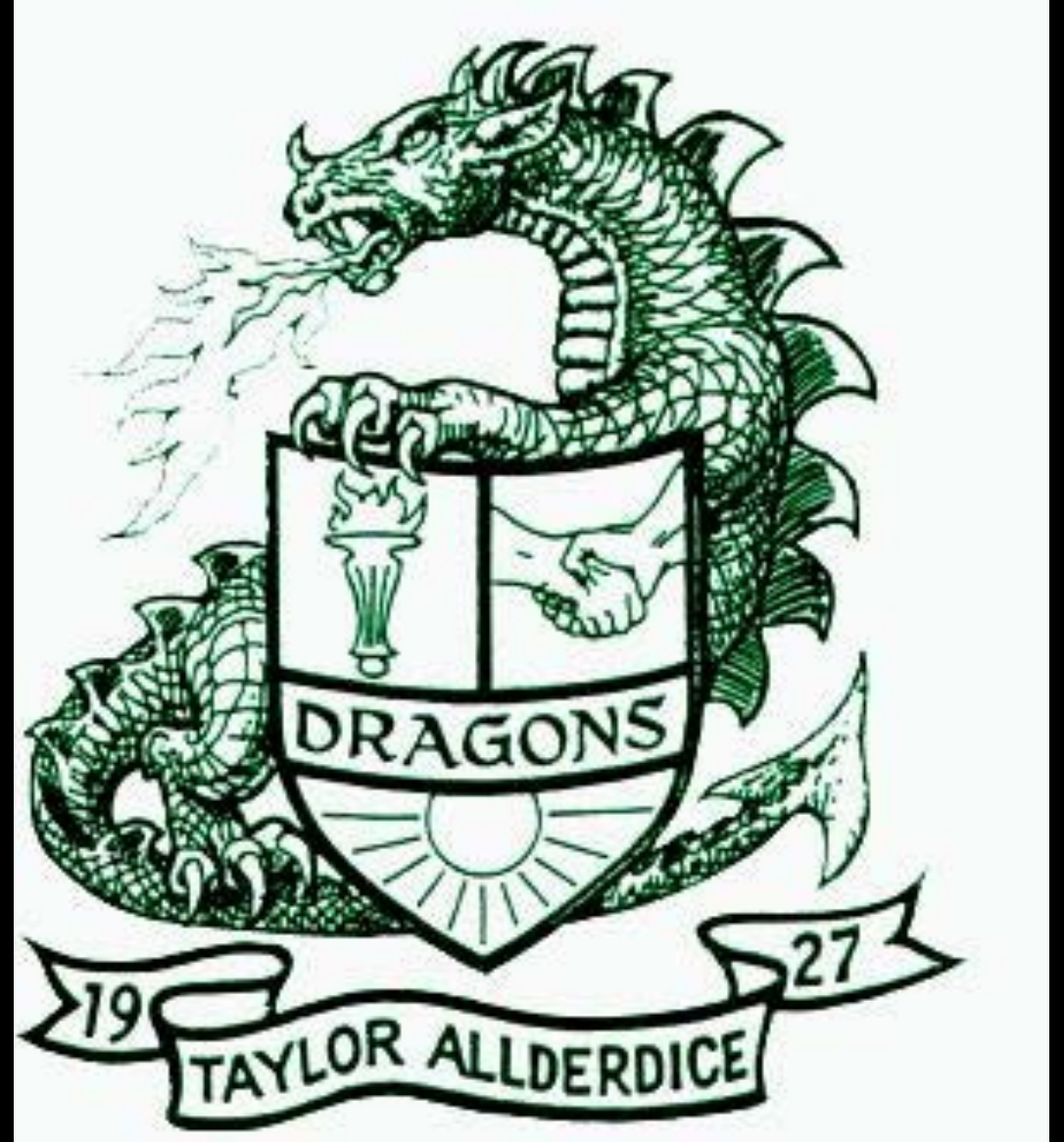


Janet R. Waldeck

Pittsburgh Alderdice





<http://www.city-data.com/picfilesc/picc11021.php>



www.nationalgeographic.com



Chicago Zoological Society



me

Microbiology – Analyzed drug susceptibility conveyed by plasmid DNA (Stephen Lerner)





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**AB Chemistry
with honors '83**

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Stanford – Graduate Research (Dick Zare)

**Spectroscopic Studies of gas phase
molecular reaction dynamics**



PhD Physical Chemistry '89

Stanford – Graduate Research (Dick Zare)

Spectroscopic Studies of gas phase
molecular reaction dynamics

U. Pitt – Post-Doc (Rob Coalson)

**Developed quantum mechanical
methods for tracking nuclear motion on
nonadiabatically coupled
multidimensional electronic states**



PhD Physical Chemistry



Post Doc

Stanford – Graduate Research (Dick Zare)

Spectroscopic Studies of gas phase
molecular reaction dynamics

U. Pitt – Post-Doc (Rob Coalson)

Developed quantum mechanical methods
for tracking nuclear motion on
nonadiabatically coupled
multidimensional electronic states

Weizmann Institute – Visiting Scientist
(Moshe Shapiro, host)

**Modeled the evolution in time of the
photodissociation of a molecule with a
coherent laser pulse**



PhD Physical Chemistry



Post Doc

**WEIZMANN
INSTITUTE
OF SCIENCE**



Visiting Scientist



U. Pitt:

**Initiated studies to examine experimentally
the excited and reactive electronic states of
SO₂ in a condensed phase environment**



U. Pitt:

Initiated studies to examine experimentally
the excited and reactive electronic states of
 SO_2 in a condensed phase environment

Lecturer:

U. Pitt



U. Pitt:

Initiated studies to examine experimentally
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Lecturer:

U. Pitt

Chatham College



U. Pitt:

Initiated studies to examine experimentally
the excited and reactive electronic states of
 SO_2 in a condensed phase environment

Lecturer:

U. Pitt

Chatham College

PSU – New Kensington



**PENN STATE
NEW KENSINGTON**

Biology

Chemistry

Physics

General Science

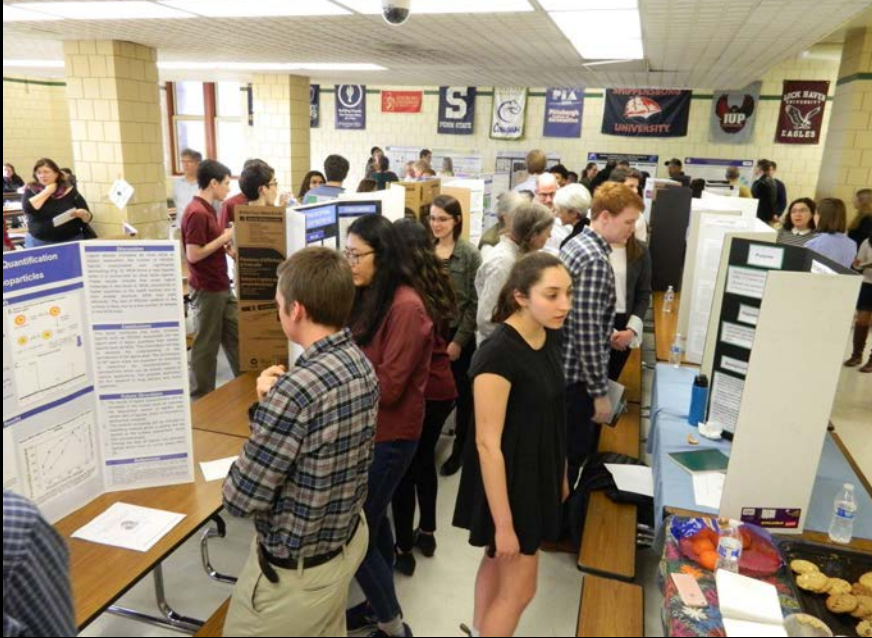
Science Fairs

Science Club

26 years

~ 140 students each year

Grades 7,8,9,10,11,12



High School Research



Workshops

**Professional
Groups**

**My Favorite
Resources**

Webinars



Research Workshops

**International Leading Science Teachers Program,
Weizmann Institute, Israel (July 2008)**

**Teaching Science Research in the High School,
Institute University at Albany (July 2013)**

**Advanced Placement Summer Institute, College
Board: HS Research (2016, 2017)**

Professional Groups

**SSP Research Teachers Conference
(2016 - panelist, 2018 - session leader)**



**Edmodo Group: High School Research Teachers
Conference**

**College Board Community: AP Capstone Research
Teachers**

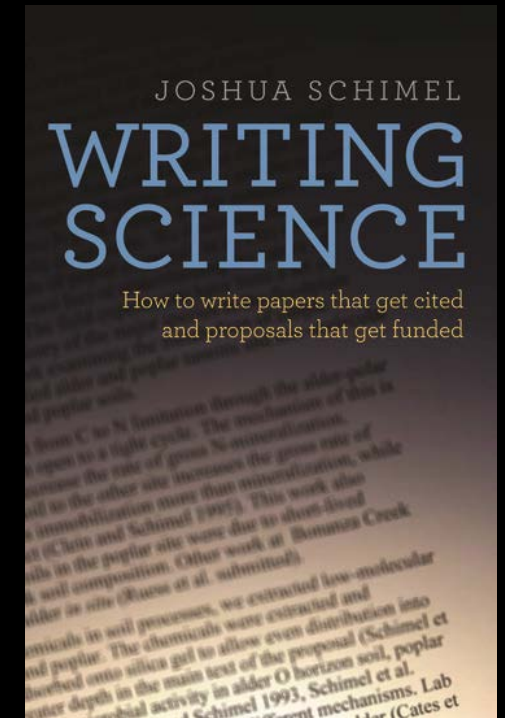
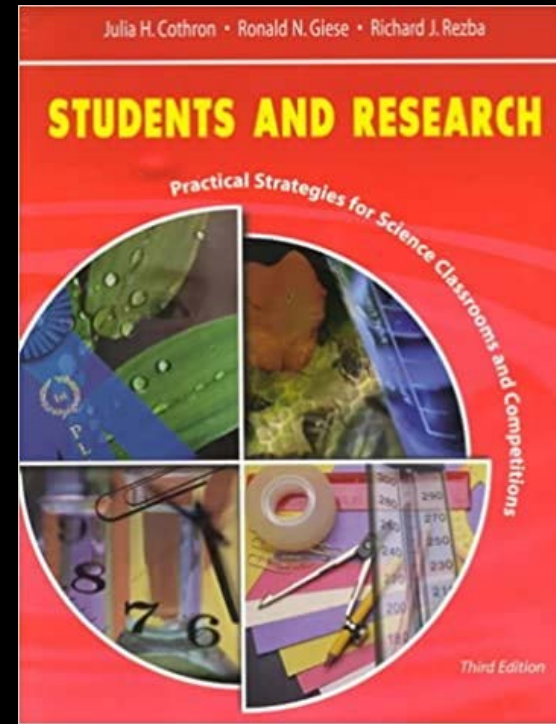
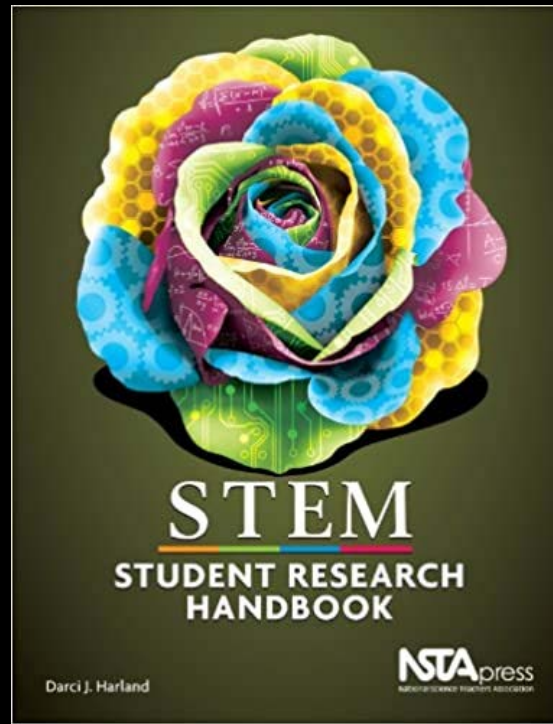
Society for Science & the Public

<https://www.societyforscience.org/outreach-and-equity/advocate-program/webinars/>

www.societyforscience.org



My Favorite Resources



STEM Student Research Handbook (NSTA, 2011) by Darci J. Harland

Students and Research (Kendall/Hunt, 2000) by Cothron, Giese & Rezba

Writing Science (Oxford, 2012) by Joshua Schimel

Why Research?

Why Research?

Students become part of a professional community

Why Research?

Students become part of a professional community

Students learn skills that will ensure success in careers

Students learn to ..

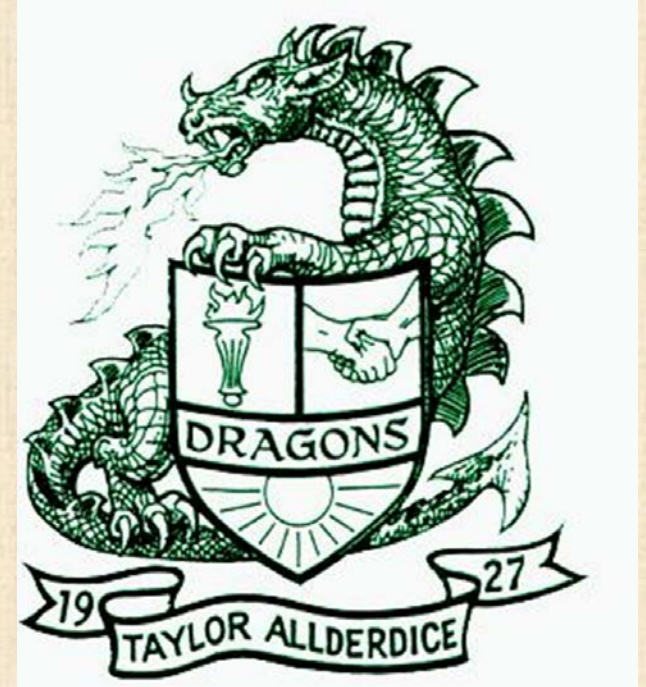
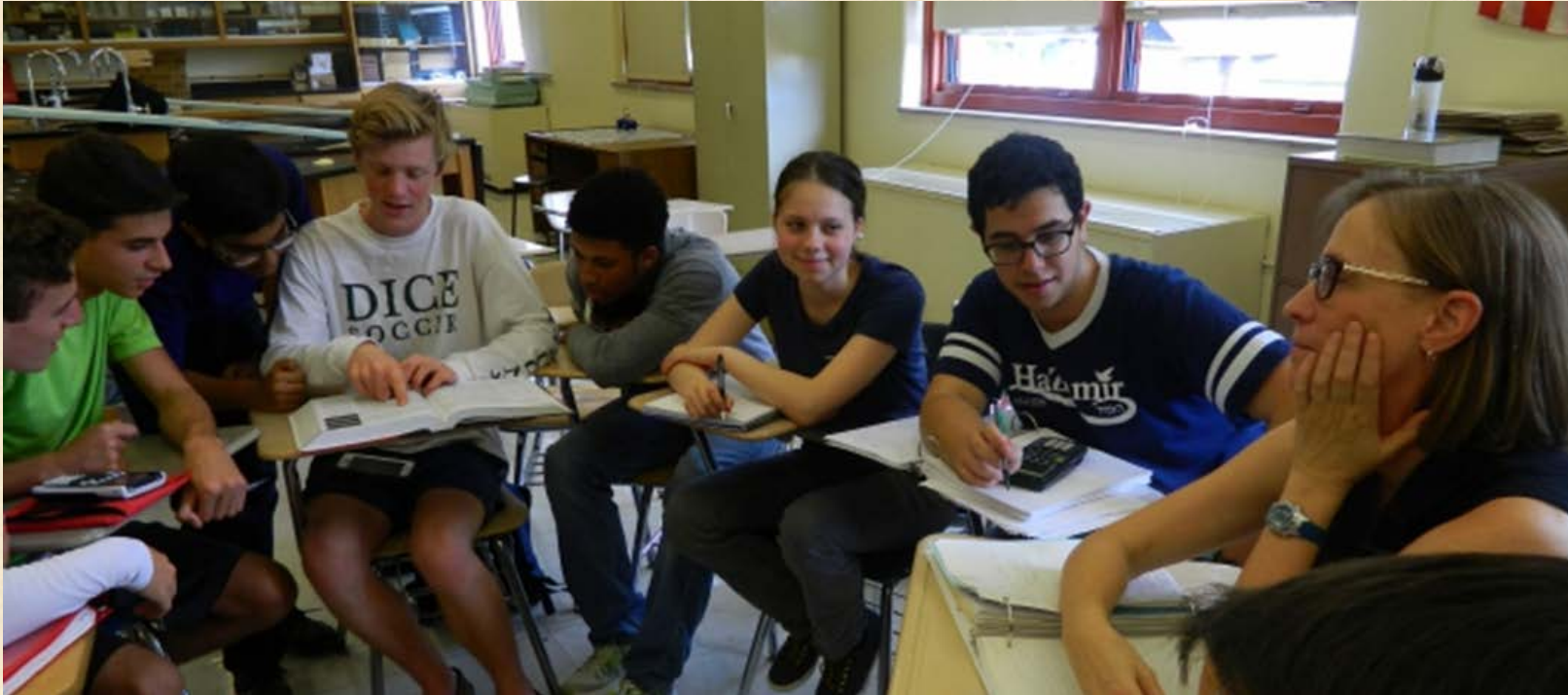
- Solve problems
- Select a topic and develop a question
- Become experts
- Perform on-line database searches
- Receive criticism
- Provide criticism
- Manage time
- Communicate ..

Skills valued by Fortune 500 Companies

- Ability to
 - work in a team structure
 - make decisions and solve problems
 - communicate with people
 - plan, organize & prioritize work
 - obtain and process information
 - analyze quantitative data
 - work with technical knowledge
 - create and edit written reports
 - sell and influence others
- Proficiency with computer software programs



Research Class at Pittsburgh Allderdice High School





Sem 1

Q3

Q4

The Interview*

- a. Written Application
- b. High School Transcript
- c. One-on-One 30-minute interview
- d. Involve another classroom teacher

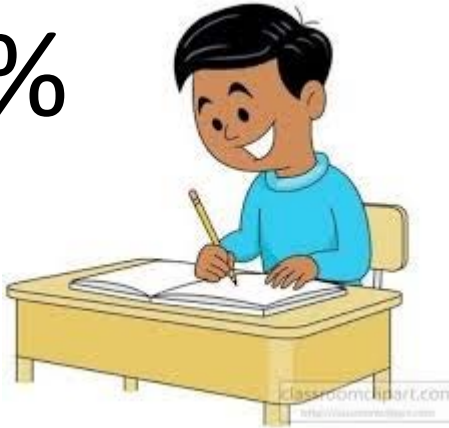


Sem 1

Q3

Q4

40%



60%



Research
Area



- half in summer programs
- half search for own mentor

Goal: Develop a Viable Research Question & Find Mentor*

Summer Opportunities in Pittsburgh

- [UPCI \(Hillman Cancer Institute\)](https://hillmanacademy.upmc.com/)

<https://hillmanacademy.upmc.com/> [7/13/2020]

- [Gene Team \(PITT\)](https://www.biology.pitt.edu/k-12-outreach/gene-team)

<https://www.biology.pitt.edu/k-12-outreach/gene-team> [7/13/2020]

- [Governor's School for the Sciences \(CMU\)](http://sciences.pa-gov-schools.org/)

<http://sciences.pa-gov-schools.org/> [7/13/2020]

- Weigand Summer Internship, McGowan Institute



Summer Opportunities Elsewhere

- [Research Science Institute](https://www.cee.org/research-science-institute)

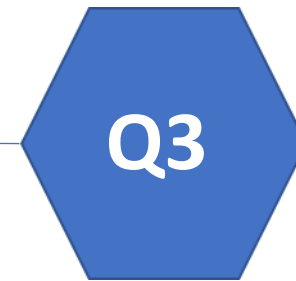
<https://www.cee.org/research-science-institute> [7/13/2020]



- [Summer Science Research Program, Rockefeller University](https://www.rockefeller.edu/outreach/lab-initiative/summer-science/)

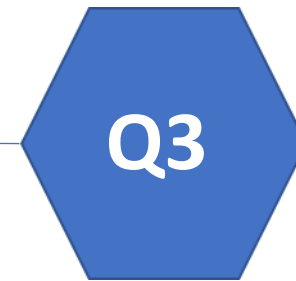
<https://www.rockefeller.edu/outreach/lab-initiative/summer-science/>
[7/13/2020]

- International Summer Science Institute, Weizmann Institute



Setting Expectations: Student

Weekly Update	Full-length Paper
Annotated Bibliographies	20-minute Power Point Presentation
Assignments: writing & presenting	Poster Presentation



Setting Expectations: Mentor

Obtain & Provide Clearances

Meet with Student Regularly

Help with IRB/SRC

Sign Contract & Sci Fair Forms



Setting Expectations: Parents

Meet with Teacher & Sign Contract

Serve on Panel for Proposal Power Point

Attend Annual Research Symposium

Serve on Panel for Final Presentation



Setting Expectations: Teacher

Meet with Student, Mentor, Parents and Principal

Maintain Folder with Clearances, Safety Certifications, Communication

Organize & Submit Student Forms for Venues & Competitions

Host Annual School District Research Symposium

Guide Students with Professional Communication & Interactions

Provide a Structured Curriculum to Support Student Progress with Writing & Presenting

Classroom Component to the Class



News Article
Presentation

??

Research
Question
Gallery
Walk

PBJ

PAARC

Develop a STEM Community

- Volunteer at Elementary & Middle school Science events
- Classroom visits – graduate students, community members
- Help plan a BSU meeting
- Start a symposium – celebrate, bring back alumni
- Guest Speakers- Alumni, connections



Think Long-Term

Always invest for the long term
-Warren Buffet



(Shutterstock, 2015)

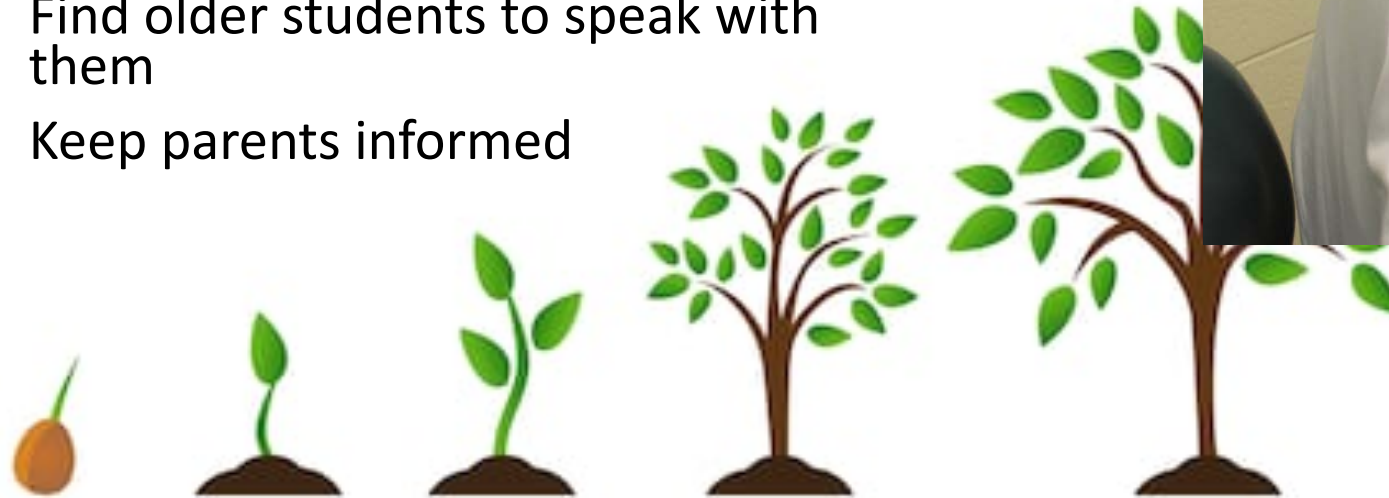
What skills do students need for success? How can you facilitate long-term change?

Community Building takes time

- Work with students over 3 year period
- Advise them on course choices
- Connect them with enrichment opportunities
- Connect them with summer programs
- Find older students to speak with them
- Keep parents informed



Summer Enrichment is key



What skills do students need for success? How can you facilitate long-term change?

Connect to Networks



Programs benefit from involvement

- Get to know program directors
- Volunteer at science fairs
- Advocate for your students
- Offer specific suggestions to enrich programs
- Write letters of support for program funding
- Universities gain access to potential students
- Advantageous Course Sequencing



Where to Showcase Student Work

- National History Day
- PJAS
- PRSEF
- JSHS
- High School Research Symposium
- [High School Research Journals](#)
- Professional meetings

Acknowledgements

Special appreciation is due to the following groups and individuals:

Carnegie Science Center
Society for Science & the Public
Pittsburgh Allderdice High School
My AMAZING Students

High School Research Journals

- http://www.mpsaz.org/rmhs/organizations/sciencefair/big_r/
- [Sigma Xi, Chronicle of the New Researcher](#)
- [The Concord Review](#)
- [The Columbia Junior Science Journal](#)
- [Journal of Emerging Investigators](#)
- [National High School Research Journal](#)
- [Journal of Experimental Secondary Science](#)

Caitlin Sullivan (SSP)

https://drive.google.com/file/d/1_v1HG9T-MNzFiDejoXDl4--WYEc5Sf_i/view

○ **Welcome to the Research course offered at
Pittsburgh Allderdice High School.**

In the **Seminar** portion, students will explore real-world issues through a variety of lenses and consider multiple points of view to develop deep understanding of complex issues as they make connections between these issues and their own lives. Students will read articles, research studies, and foundational and philosophical texts; listen to and view speeches, broadcasts, and personal accounts; and experience artistic and literary works to gain a rich appreciation and understanding of issues associated with their chosen field of study.

In the **Research** portion, students will design, plan, and conduct a yearlong research-based investigation on a topic of individual interest. Through this inquiry and investigation, students will demonstrate the ability to apply scholarly understanding to real-world problems and issues.

In this course, students are expected to pursue independent research and eventually to develop a relationship with a mentor in the community who will guide them through an authentic research process. To get to know you better, so that this process can be facilitated successfully, please complete the following set of questions:

1. Please attach a transcript of your high school grades.
2. List the five most rewarding enrichment experiences you have participated in during high school.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____

Describe a long term project that you completed.

The Interview

Contacting a Mentor

Harland, Darci J, STEM Student
Research Handbook (NSTA Press)

Name: _____ Due Date: _____ Date Accepted: _____

CONTACTING A MENTOR

Assignment: *Contact a STEM Professional that could serve as either a mentor or an advisor for your project*

You are expected to initiate contact with a professional in the topic you have chosen to study. This contact is done *after* you have used online resources to find and study journal articles on your topic. Then, prepare a statement of what you intend to study based on your bibliographic research. After discussing your ideas with your teacher (me), contact the professional (ideally an author of one of the journal articles studied) and schedule a meeting to discuss the paper and current research.

This contact is invaluable. A STEM professional can discuss with you possible hypotheses and can help you to devise an experiment to test a hypothesis. Respect this person's time. It is unusual for a university-level scientist to meet directly with high school students. Your initial contact should be by email. Please use the following guidelines to construct your first email message.

How to E-Mail a STEM Professional

What to include in your E-Mail:

- Formal opening that would be used in a business letter. "Dear Dr. Smith"
- How you found that person (what article or website of his/hers that you read)
- Who you are, and where you are from
- Your teacher's name/e-mail so that the scientist can verify what you say
- A clearly stated request*
- Your contact information
- Sincere thanks, acknowledging the person's expertise and making sure the person knows you value his/her time
- "Sincerely" and your full name

News Article Presentation

Adapted from: Teaching Science
Research in the High School Institute
University at Albany

Name: _____ Due Date: _____ Date Accepted: _____

News Article Class Presentation

1. Get six news articles on a theme that reflects your interest.
For Science topics, you could choose from the following web resources:
Science News for Students (www.sciencenewsforstudents.org)
Science Daily (www.sciencedaily.com)
or from popular press articles in *Scientific American* or *Discover Magazine*.
For topics other than science, you could choose from magazines such as *Atlantic Monthly*.

Note: You can use only 2 articles from any given resource.
2. Print a copy of each of the articles and type a short summary (a half page, double spaced and 12-pt font) of each.
3. The summary sheet should include a bibliographic citation for the article and your own interpretation of it (*no more than 75 words here*).
4. Staple the articles and summaries together.
5. In class you will give a 5-minute presentation of your articles. In this presentation you need to answer:
 - a. What is the overall area of research that these articles address?
 - b. Why is this area important?
 - c. Give a detailed summary of one of the articles.

Establishing Credibility (PAARC)

Once you have found a source to present in class, write a 1-page analysis which addresses the criteria described below:

Purpose: The reason the information exists

- What is the purpose of the information, and do the authors make this purpose clear?
- Do they inform, teach, sell, entertain or persuade?
- Is the information fact, opinion, or propaganda?
- Does the point of view appear objective and impartial?
- Are there political, ideological, cultural, religious, institutional, or personal biases?

Accuracy: The reliability, truthfulness, and correctness of the content

- Where does the information come from?
- Is the information supported by evidence?
- Has the information been reviewed or refereed?
- Can you verify any of the information in another source or from personal knowledge?
- Does the language or tone seem unbiased and free of emotion?
- Are there spelling, grammar, or typographical errors?

Authority: The source of the information

- Who is the author/publisher/source/sponsor?
- What are the author's credentials or organizational affiliations?
- Is the author qualified to write on the topic?
- Is there contact information, such as a publisher or email address?
- Does the URL reveal anything about the author or source? (e.g. .com, .edu, .gov, .org, .net)

Relevance: The importance of the information for your needs

- Does the information relate to your topic or answer your question?
- Who is the intended audience?
- Is the information at an appropriate level?
- Have you looked at a variety of sources before determining this is one you will use?
- Would you be comfortable citing this source in your research paper?

Establishing Credibility

Adapted from APSI

Research Question Gallery Walk

Research Question Gallery Walk

In Research, there are six criteria for effective research questions. Write your research question or goal and below, explain how it fulfills each of the criteria:

7. **Focused Topic** [a narrowed scope of interest]
8. **Purpose** [you will explore, explain or create]
9. **Variables** [components of a phenomenon that can be counted or measured, or connected to other variables via correlation studies]
10. **Context/Scope** [specified time, place, population, genre etc]
11. **Value** [a statement of importance, significance, or relevance to the body of knowledge of the discipline or to society at large]
12. **Feasibility** [a statement of how this topic of inquiry can be investigated using time and resources available to the researcher]

Writing a Procedure the PBJ Approach

Learning Observation Skills by Making Peanut Butter and Jelly Sandwiches

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Olga I. Garcia

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Keith B. Perry

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University of Iowa
14 MacLean Hall
Iowa City, IA 52242 USA
kbperry@cs.uiowa.edu

Abstract

In this report we describe our experience conducting a class activity where students learned and practiced observation skills. In the activity, students in small groups observed and were observed making peanut butter and jelly sandwiches. The groups then used their observations to sketch designs for a peanut butter and jelly maker that they presented to the class. We found that the activity helped students learn about the difficulties involved in observing and being observed. It also taught them about the value of observing users, even if they are performing tasks familiar to the observer. Having international students in the class brought an additional perspective to the activity which benefited everyone. These students discussed the difficulty of observing experts conduct tasks that are unfamiliar to the observer. In spite of the overall positive outcome, we discuss ways of improving the activity given our experience.

Keywords

Human-computer interaction, education, peanut butter and jelly sandwich, observation, think aloud, sketching, diversity.



UPCI Academy

UPMC HILLMAN
CANCER CENTER

Hillman Cancer Center Academy

A large group of diverse high school students, mostly of Asian descent, are posed in several rows outdoors. They are smiling and looking towards the camera. Some are wearing backpacks. The background shows some greenery and a building structure.

David Boone
Solomon Livshits

Our Mission

The University of Pittsburgh Cancer Institute (UPCI) Academy strives to provide **mentorship** and **authentic research** and career preparatory experiences to a diverse group of motivated high school students who are interested in pursuing higher education and careers in STEM fields, especially research and medicine.

PittBioOutreach


High School to College Summer Gene Team

[Dr. Becky Gonda](#)

Outreach Coordinator

Department of Biological Sciences

Pennsylvania Governor's School for the Sciences

A photograph showing several students in a computer lab, focused on their work at multiple computer monitors. A male student in the foreground is looking at a laptop, while others are working on desktop computers in the background. The scene is dimly lit, with light coming from the monitors and windows in the background.

Students working on their team projects in Wean Hall during the final week of the program



Proudly hosted by Carnegie Mellon University

Update (April 5, 2020): We will be running the PGSS program online this summer. Student applicants will still be notified at the expected time (April 6 - 10). Applications for TA/Counselor and RLD positions will be reviewed beginning next week, and selected candidates will be contacted for interviews shortly after.

The Pennsylvania Governor's School for the Sciences (PGSS) was established in order to provide a summer enrichment experience in the sciences and mathematics for talented Pennsylvania high school students and to encourage them to pursue careers in the fields of science, technology, engineering or mathematics. The program provides instruction in biological sciences, chemistry, physics, mathematics, and computer science, with emphasis on collaborative learning and team research.

Our Goals

PGSS is proud to offer talented students the opportunity to participate in true scientific research and specialized scientific study. These opportunities are rarely available at even the best high schools, where top students are unable to be challenged at a suitably high academic level. The program also seeks to maintain a pipeline of modern technological talent throughout the state of Pennsylvania, where cities such as Pittsburgh, Philadelphia, and State College are

Our Supporters

We gratefully acknowledge our co-sponsor, [PGSS Campaign, Inc.](#), alumni, parents, and friends of the Pennsylvania Governor's School for the Sciences who have generously provided funds to make this year's PGSS program possible. We also appreciate the support and assistance of the [Mellon College of Science](#) and [Carnegie Mellon University](#), both of whom have worked with the program since its inception in 1982.

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RESEARCH SCIENCE INSTITUTE

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[!\[\]\(4f6bf54ae7e4144a72d78316053e412d_img.jpg\) EMAIL CEE](#)

Each summer, 80 of the world's most accomplished high school students gather at the Massachusetts Institute of Technology (MIT) for the Research Science Institute (RSI). RSI is the first cost-free to students, summer science & engineering program to combine on-campus course work in scientific theory with off-campus work in science and technology research.

Participants experience the entire research cycle from start to finish. They read the most current literature in their field, draft and execute a detailed research plan, and deliver conference-style oral and written reports on their findings.

RSI scholars first participate in a week of intensive STEM classes with accomplished professors. The heart of RSI is the five week research internship where students conduct individual projects under the tutelage of mentors who are experienced scientists and researchers. During the final week of RSI, students prepare written and oral presentations on their research projects.

CONNECTIONS

[EVENTS CALENDAR](#)



NEWS & ANNOUNCEMENTS

[→ Tue | June 23, 2020 | 4:36 PM](#)

[RSI 2020 GOES VIRTUAL](#)

[→ Mon | June 15, 2020 | 2:08 PM](#)

[RSI ALUMNI NAMED U.S. PRESIDENTIAL SCHOLARS](#)

[→ Wed | May 20, 2020 | 4:42 PM](#)

[CEE'S ANNUAL CONGRESSIONAL LUNCHEON GOES VIRTUAL](#)

[→ Wed | February 12, 2020 | 12:22 PM](#)

[INDEX OF EXCELLENCE IN STEM EDUCATION](#)

Our
Scientists

Research

Education & Training
RockEDU Science Outreach

News

Events &
Lectures

About

Support Our
Science

 Phase II Restart: The University is now open for limited research operations; only authorized personnel will be admitted on campus. [More info here.](#)

Summer Science Research Program



RockEDU Science Outreach

OVERVIEW

LEARNING AT THE BENCH INITIATIVE

RockEDU Presents

LAB Jumpstart

LAB Experiences

[Summer Science Research Program](#)

FOR STUDENTS

FOR TEACHERS

VOLUNTEER WITH ROCKEDU



Frequently Asked Questions (FAQs)

[Click here to find answers to Frequently Asked Questions \(FAQs\).](#)

Applications for SSRP 2020 are CLOSED

The application period for SSRP 2020 ended on Monday, December 2 at midnight EST. All letters of recommendation must be submitted by Friday, December 6.