

# What are research projects?

Mr. Mauricio Gonzalez

What are research projects?

# Do Now

- Take a look at the scientific method stick.
- What comes to your mind as the strings are pulled?

What are research projects?

# What you experienced...

- ...is called curiosity
- ...is a problem
- ...is something to be solved
- ...*is the birth of science*

What are research projects?

# H.W.

- Read NYHS Research Program Syllabus with your parents.
- Buy class materials.
- Get a professional e-mail address.
  - Once you have your e-mail send it to my e-mail address:
    - [mgonzalez@nyharborschool.org](mailto:mgonzalez@nyharborschool.org)
    - Include the following in the subject box:
      - Your name (first and last as they appear in official documents), grade, and the words “professional e-mail.”
  - This will count as a grade.

**What are research projects?**

# Objective

- I can distinguish between the different types of research projects.

What are research projects?

# Have you ever worked on a project?

- If you have you've done *research*.
- In research you explain things.
- These “things” are called “problems” or **scientific problems**.



What are research projects?

# Have you ever worked on a project?

- Apply facts and skills you've learned from all academic subjects and *common sense*.
- Often research uses the **Scientific Method**.
- In this class you will create a research project.



# How is a project completed?

## Project Overview:

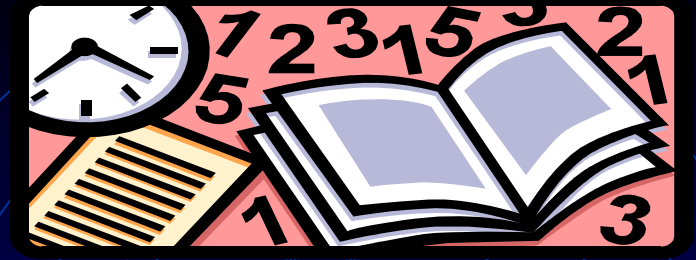
01. Formulate or create a project (outline)
02. Perform project (record data & repeat)
03. Write research paper (analyze + compare)
04. Prepare and present project to others



What are research projects?

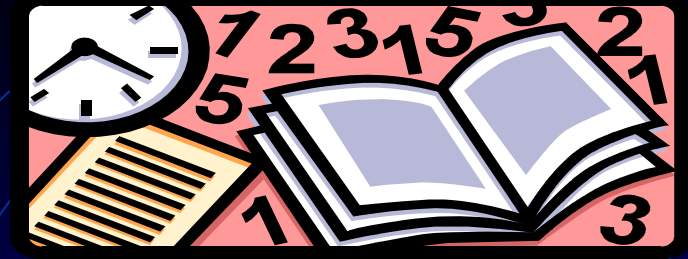


# When is it due?



- Keep track of project with a **chronogram**.
- Use the due dates in the course syllabus.
- Due dates will change.
- Typically, the *last draft* of your written report is due the week before Christmas break + poster board presentations in late February.

# Final Draft due?



- There will be no exceptions when final versions are due. \* NO EXCEPTIONS \*

Figure 05b. Detailed chronogram of major due dates – A CAS 110 + 210



Item	September				October				November				December				January		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	...2
Mentor Search	X	X	X	X	X	o	o	o	o	o	o	o							
Formulation	X	X	X	X	X	o	o	o	o	o	o	o	o	o	o	o	o	o	o
IRB – Results	X	X	X	X	X	o	o	o	o	o	o	o	o	o	o	o	o	o	o
5 article presentation			X	X	X	X	X												
Analysis of results	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1 <sup>st</sup> draft						X													
2 <sup>nd</sup> draft									X										
3 <sup>rd</sup> draft												X							
4 <sup>th</sup> (Final) draft															X				
Poster board drafts												X					X		
Final presentation																			X



What are research projects?

# What are the different types of research projects?

1. Experiments (use controls + replicates)
2. Observational projects (field work without controls)
3. Design projects (engineering / software)
4. Secondary research projects



What are research projects?

# 01 . What is an experiment?

- In an experiment you attempt to solve a scientific problem by testing a hypothesis.
- You try to control as many variables as possible and change only one at a time to see if it is the cause of change.

# 01 . What is an experiment?

- For example, what is the best solid substrate to use for germinating and growing chive seeds?



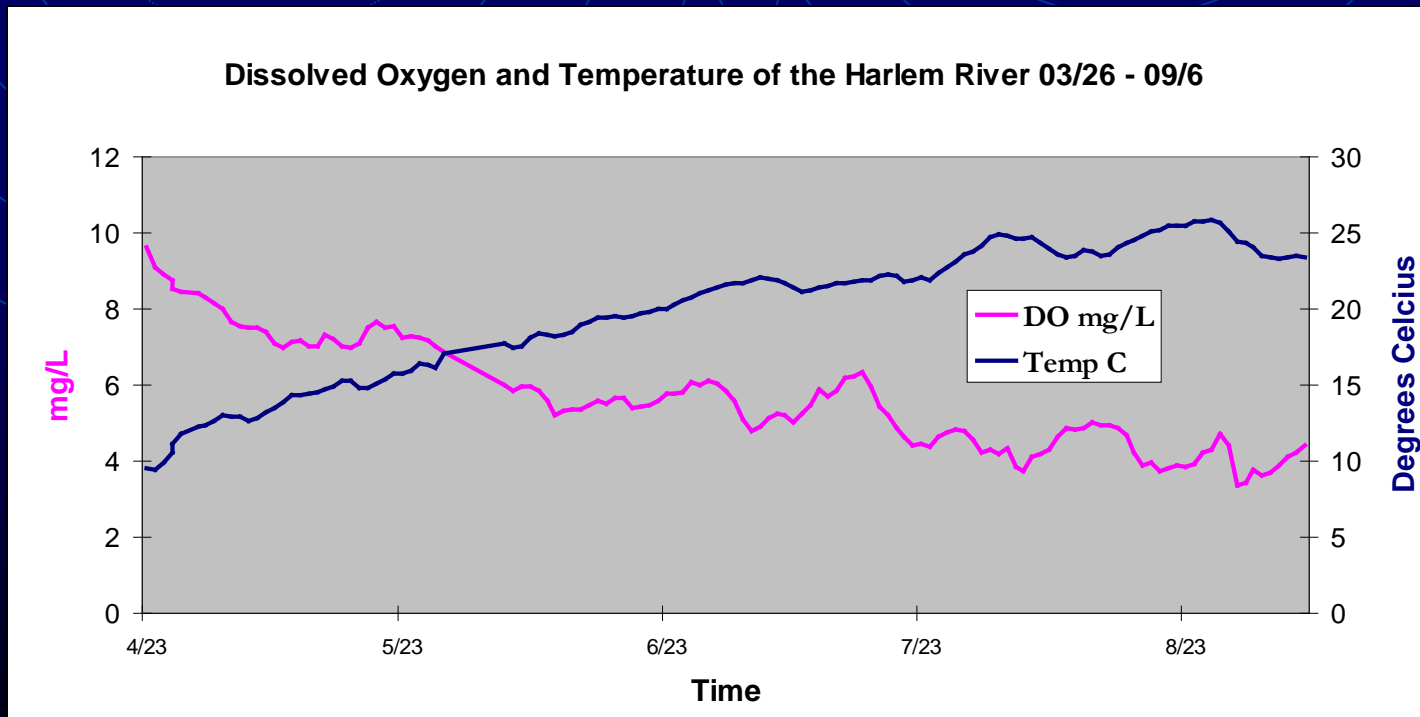
What are research projects?

## 02 . What is an observational project?

- Field work projects are observational.
- You often cannot control conditions in the environment.
- You therefore get data of interest and try to find patterns in it.

## 02 . What is an observational project?

- For example, how are water oxygen levels and water temperature related in the Harlem River throughout the year?





# Combining Lab and Field Work

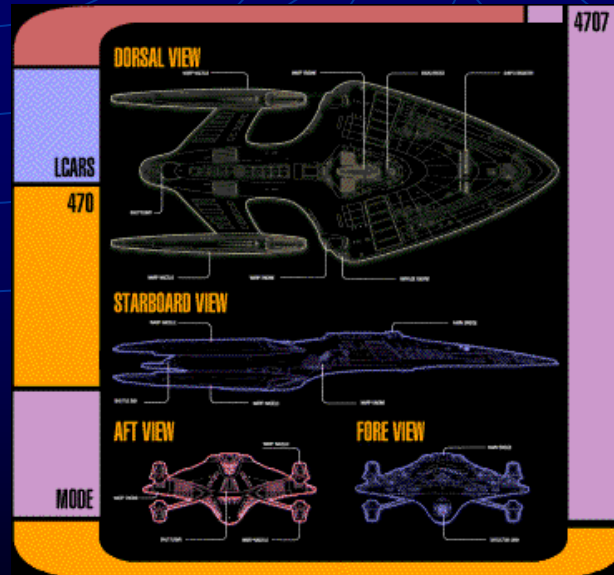
Example: Compare the DNA of aquatic organisms found in different NYC parks (*e.g.* Central Park, Highbridge Park, Prospect Park, NYBG), *etc.*

What are research projects?

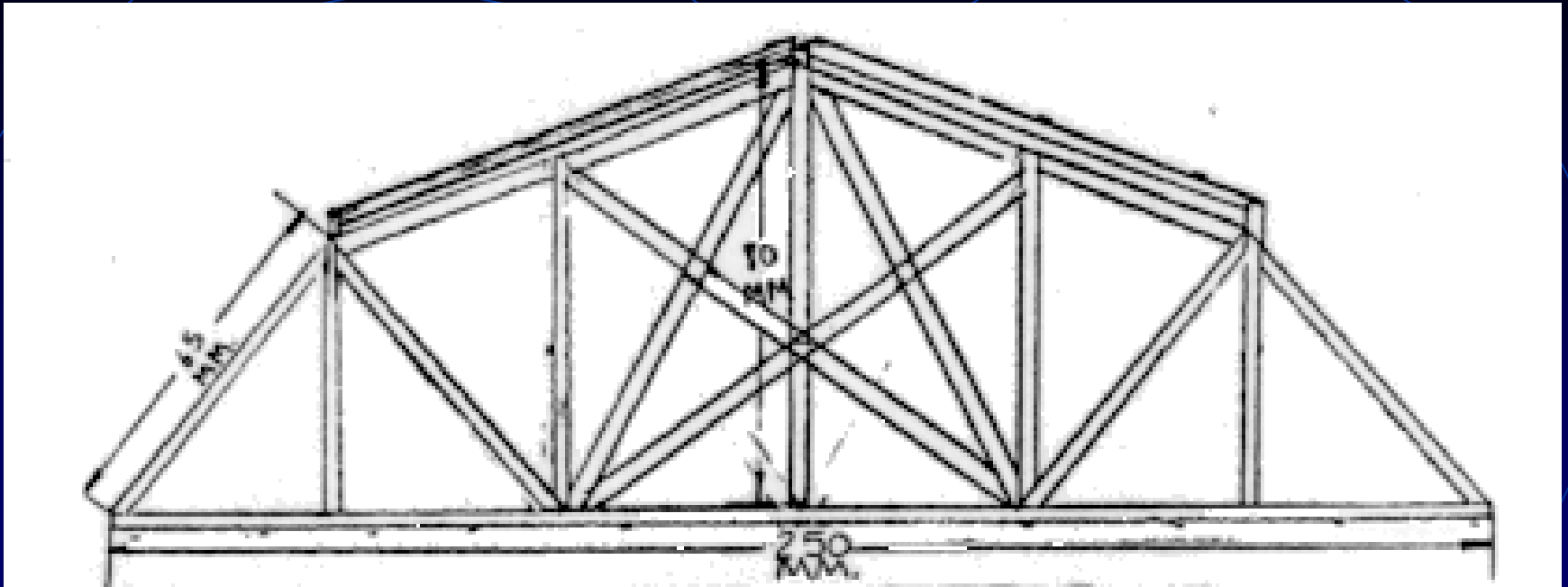


# 03 . What is a design project?

- Create a plan for a model and build a prototype of an object which you have improved or invented.
- Or design software



What are research projects?



## Design a bridge

Is this blue print a plan to build an actual bridge or a prototype?

What are research projects?

# Research Tools

- There are many types of tools.
- Tools help you set up your project and collect valuable data.



## 04 . What is a secondary research project?

- When you look up information about a topic that has been thoroughly studied by other scientists.
- You cannot observe it yourself for technical reasons (electron microscope, black holes) or because it is too dangerous (Ebola virus, volcanoes).
- A paper with a long bibliography which summarizes what is currently known and what research still needs to be done is written.

# H.W.

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    - Include the following in the subject box:
      - Your name (first and last as they appear in official documents), grade, and the words “professional e-mail.”
  - This will be graded.
- Due 11.09.16 (extended due date)

What are research projects?

# Admin.

- Create any pattern on the sheet (5 min.).
- Take attendance.
- Check Professional e-mails.
- Collect contact sheets.

What are research projects?