

AP Capstone Research Summer Assignment

PART I: Researching the Real World

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In your first year in the AP Capstone program, you completed quite a bit of research by finding and reading articles written on the topics you were investigating. In a few cases, these articles reported on experiments. Next year, you will spend an exorbitant amount of time becoming an expert on a topic of your choice. The more time and effort you spend learning about an issue, the more interesting it generally becomes, and the easier it is to learn even more about it. As you move forward during the next school year, you will incorporate your own experiments and original data collection into your work.

This summer, your assignment is to design and collect data for two (2) separate experiments. You must record the steps of your procedure and provide proof that you personally collected the data. The best proof you can provide is a photograph (such as a selfie or two at your experimental site, or a video) showing your work in progress. Although we encourage you to enlist friends to help, you may not collaborate with another student on an experiment and hand it in with both of your names on it—do two together if you wish, and individually receive credit for one of the experiments. Each person must complete two experiments total.

Part I of your assignment is to measure a natural phenomenon and analyze its influence on/relationship with other factors in the environment. You are not necessarily completing a manipulative experiment, but you are taking advantage of the fact that events in the real world occur under different conditions. You must measure something in the physical world, **NOT** in cyberspace, and you are not permitted to do a questionnaire/survey. Instead, you must measure behavior, artifacts, or natural processes. Although questionnaires/surveys and interviews are acceptable methods to use at times, we want you complete outdoor research for this assignment. Feel free to observe and record animal behavior, plant distributions, human behavior, traffic patterns, even the presence or absence of certain architectural details in different neighborhoods.

Here are several examples of the kinds of experiments that you might do. (Please note that none of these examples are available as an option for you—think of your own!)

Example One

Question:	How steady is the pace at which the tide changes at Sandy Hook?
Process:	<p>Place a meter stick into the wet sand one day at the beach. Choose a spot where the waves just barely reach the stick. Record the height of the water at the stick every tenth wave for an hour.</p> <p style="text-align: center;">OR</p> <p>Place a stone in the sand and measure with a ruler the extent of the wave beyond the ruler or in front of the ruler. In this way you will be able to measure whether the tide is going in or going out (or if it changed during your experiment). You will also be able to compute the speed at which the tide was moving. Be sure to take several photos or videos of the wave as it washes past the stick, one of which also includes you.</p>

Example Two

Question:	How has the cause of death, and the average length of life, changed in Morris County over the past three hundred years?
Process:	<p>Visit three different historical graveyards on Morris County. (There are many of these scattered around next to our older churches.) Record the information on the headstones that are legible. Make a data table that includes the name, date of birth, date of death, cause of death if given, and gender. Be sure to also record the number of headstones that are unreadable. Note that later on, when you analyze your data, you will be able to directly address your question. Take several photos or videos of the headstones and of yourself.</p>

Example Three

Question:	Do young people use and physically handle their cellphones in different ways than older people?
Process:	<p>Sit on a bench at the mall in a place where you have a good view of everyone walking by. Record whether each person has a phone was in his/her hand, and if was being used, and if so, for texting or for talking. Include also the gender of the person and estimate the age of the person by generations (such as "under 20" and "over 30"). Take several example photos of the people you observe—perhaps one typical "under 20" and one "over 30." Photograph or video yourself at your observation location.</p>

Example Four

Question:	Do people buy more hot dogs on hot days?
Process:	Let's imagine that you work as a checker at ShopRite four days a week, and you do a 5-hour shift each time. Tally the number of hot dog packages that people buy at your register on four separate days. Also record the weather and the day's high temperature for those days (you can look that up later). Try to pick days of different weather to do your counts. At some point, have a friend come by and photograph or video you at ShopRite.

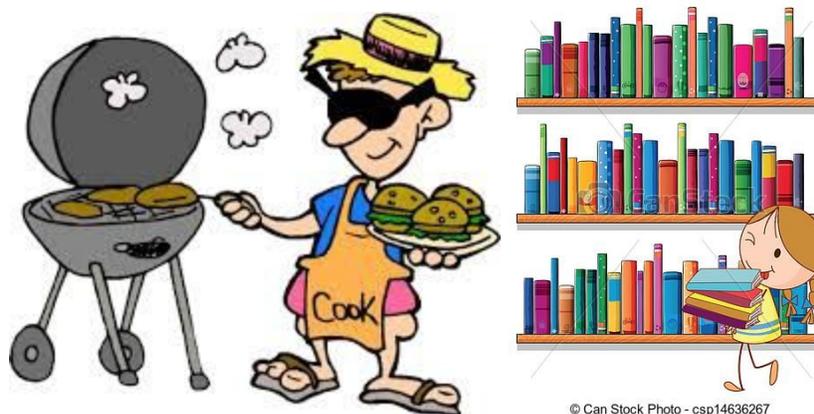
Example Five

Question:	Do science books become obsolete faster than cookbooks?
Process:	Visit the public library. Select 40 books of each type (one at a time from the shelves) and write down the date of publication. Photograph or video yourself at the library with an example of the oldest cookbook and the oldest science book you saw. You don't need to check out the books—you can just check the inside of the front for the publication dates.



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Planning Your Experiments

Your experiment questions DO NOT need to relate to the topics you might research next year. We do not expect you to have decided what your subjects will be this soon. If you do have special interests, however, go for it!

You are not expected to do any library/Internet research for this project. All of your work will be of a practical nature, as seen in the examples. Take full advantage of your normal summer routine—Are you a lifeguard? Do you work at a summer camp? Does your family spend the summer at the beach or in Maine? Will you be traveling? There will be opportunities for you to collect data somewhere along the way.

You will be required to do **2 different experiments**. For each experiment, please complete the following:

1. Research Questions Sign-up

- Every research question and experiment method must be unique and cannot be shared with other students. Describe your question and experiment method in a group spreadsheet for the class that Miss Thomas and Mr. Hoesly will initiate (tinyurl.com/summerassignsheet). Check others' entries to make sure yours is truly unique or it will not count for credit!

2. Procedure Write-up

- Write a detailed summary of the procedure that you followed as you collected your data. This should provide enough information to allow another person to replicate your procedure and duplicate the data collection protocol. Be careful about doing anything that requires subjective judgment—the more cut-and-dried the observations or measurements, the better. Make sure your procedure is very

explicit, clear, and written in the style of a report—do not write it as a set of commands.

3. Record

- In order to verify your experiment, you will be required to photograph or take a video of YOU doing the experiment. Enlist a friend or family member to help you out! Photos or videos must depict you to be at the scene of the experiment and show evidence of the materials, methods and you DOING the experiment.

4. Data Table – 40+ observations

- Create a neat, fully detailed data table with ALL the information you collected in an Excel or Google spreadsheet. Do not worry about graphing it or doing any calculations yet since we will do this in class next September. Keep related information together. For example, you may want to compare the person's gender AND age with cell phone use later on, so save all your original data notes. Do not compute averages, throw away outlier data points, or do anything except record, save, and organize your data.
- In all work of this kind, the number of observations is crucial to the value of the experiment. You learn nothing by watching water hit a stick one time, or noting that one person bought a hot dog. Quantity is everything! Although some data types are easier to collect than others, we will require an absolute minimum of 40 observations. That means 40 people walking by you in the mall with phones in their hands, or 40 waves, or 40 shoppers through your checkout line, or 40 headstones minimum. Consult the grading rubric to see how you will be graded.

4. Reflection

- Each of your two experiments requires a ½- to one-page reflection statement in which you describe what you learned from doing this experiment. What might you do differently when repeating the experiment? How might the methods be improved? What was the most challenging aspect of the experiment? Was the experiment a good test of the starting question?

Due Date

Bring your written procedure, data tables, reflections, and photo or video recordings to class next September.

Grading/Planning Rubric for Summer Experiments

Category	Exemplary - 5	Excellent - 4	Developing - 3.5	Limited - 3
<i>Inventiveness of question investigated</i>	Unique question that does not have an obvious answer. Question has relevance to a larger phenomenon.	Question of some interest; answer or dependence on different conditions may not be obvious.	Question is clear but possibly too simple to make data collection a valuable use of time.	A slight variation on one of the examples given here.
<i>Question meets requirements stated in assignment</i>	Objective, operationally stated, and clear question about a specific phenomenon.	Clear and nontrivial question that can be addressed by the data collection methods being used.	Question is unclear or poorly connected to the data collection methods used but appears to be objective and appropriate. May be overly general.	Trivial, obvious, or unclear/too subjective for measurement.
<i>Clarity and appropriateness of method used in measurement</i>	Measurement method is valid for stated purpose, clever and/or very clean in method. Very little likelihood of errors in data collection.	Measurement method may be overly complex or difficult to keep objective.	Measurement method is only tangentially related to the stated question; subject to inherent flaws in collection	Measurement method is not related to the stated question; inherently unreliable

<i>Written procedure description</i>	Explicit, complete, concise, written in the past tense. Describes all aspects of the experiment clearly enough that a reader could repeat the experiment.	Complete and clear. Easily related to the data table. Obviously thought through in advance.	Basically clear but may not be entirely explicit on all steps. Possibly too short or too long and wordy.	Data table does not match procedure. Procedure is vague, or given as commands, or is too sketchy to be replicated. Vital steps are left out.
<i>Data table completeness and organization</i>	Data table has a clean layout. All categories are labeled. Several characteristics were recorded (e.g. age and gender and location). Different categories are clearly labeled. Data is recorded on an Excel or Google spreadsheet.	Same as the previous box, except that data table may be neatly hand drawn or typed, but is not in a spreadsheet. Video/picture is submitted.	Data table may be messy or poorly organized, but all data is present. Video/picture is missing.	Data table is messy, incomplete, unreadable, or makes it difficult to locate information. Unable to cross-check related information. Video/picture is missing.
<i>Number of observations recorded</i>	Number of observations exceeds 40 in each of the conditions or segments of the experiment.	More than 40 observations made	40 data points collected overall	Fewer than 40 observations made
<i>Recording/Evidence of completion</i>	Evidence of research in progress, location, materials and methods are expertly recorded either in photographs or video recording. Student is clearly present and actively conducting the experiment. Student has original handwritten data sheets as well as summary table.	Evidence of research in progress, location, materials and methods are appropriately recorded either in photographs or video recording. Student is present and actively conducting the experiment. Student has kept all original handwritten data tallies, so data table and analysis can be continued and expanded.	Evidence of experiment, location, materials and methods are recorded either in photographs or video recording but not all stages of the process are clearly documented and/or Student is present but not actively conducting the experiment and/or Handwritten data tallies are missing.	More than one element is missing from evidence of experiment, location, and methods and/or all steps are not clear and/or student is not present and/or not actively conducting the experiment. No particular proof that indicates that the student did not just sit in a room and make up some numbers.

<i>Reflection statement</i>	Well-written, grammatically correct, and typed. The process of the experiment reflects clear and personal observations about problems or successes. Insightful observations about validity and measurement.	Well-written, typed, and grammatically correct. Clearly personal observations based upon experience doing the experiment. Author engages with questions of what makes an experiment work.	Typed personal reflection that describes the author's experiences but does not offer insights about the nature of the process.	Absent or trivial/limited to statements of opinion or personal feelings. Does not engage with the issues of constructing valid research or making accurate measurements.
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Total _____/40 points
(per experiment)

Grading: A: 40-36 B: 35-32 C: 31-28 D: 27-24 F: 23 and below

AP Capstone Research Summer Assignment PART II: You Guessed It... Annotated Bibliographies

Part II of your summer assignment will be to continue to work on narrowing down a well-thought out topic/question/issue and complete **5 annotated bibliography entries** on reputable and credible sources.

You **do not** need to print or annotate the articles in any official way, but you should save them for your own future reference as they will only help you more with your research paper and presentation.

As a reminder, here are the 4 components you need:

- MLA citation

- One paragraph (6 sentences) **summary/overview** of the source. (Consider Task 3A, questions 1, 2, and 3.) *What is it about? What is the credibility of the author(s)? What is the context of the research? How do you know it is valid? What methodology was used to conduct the research? Why?*
- One paragraph (6 sentences) **analyzing** the content of the source. (Consider Task 3A, question 3, and the application to your topic.) Include two pieces of evidence (with in-text citations) you would likely use in your paper. One piece of evidence should address: *Why/how does this source relate to your topic? The other piece of evidence should address how this source addresses (or does not address) the “gap in the field”?* What is the method used and why?
- At the bottom, please list out 5-6 keywords, separated by commas, that you would use to describe the source.

These annotated bibliographies will be due with PART I on the first day of school.

H.A.G.S, yo. Fo sheezy.

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