



Explore: How do you design, conduct, and document your air quality research project?



Name _____ Class _____ Date _____

Background: As you begin your exploration of the scientific process as it relates to your air quality investigation, you will find it is much easier to conduct your investigation and communicate your findings if you use a systematic process to record the progress of your investigation. You should also realize that having all of the information about your project in one place will make completing your project much simpler. Researchers that get an early start on their project and keep up with suggested deadlines will not have to worry about the mad rush to check out equipment and collect data as the final due date approaches.

Research Question – Write the research question and include a short discussion on why this question is relevant or interesting to you.

Due Date _____

INTRODUCTION - Background information about your topic including information about the type of air pollutant you are investigating; a brief summary of the exposure risks; have there been similar investigations conducted and what were their findings; and what you expect to learn from investigating this topic (include additional sheets if necessary).

Due Date _____

REFERENCES – A list of references you used to find background information for the INTRODUCTION and other references you used throughout your investigation. Include a short, one or two sentence, summary of information you used from each reference. These should be listed in alphabetical order by the author’s last name according to APA style.

Due Date _____

HYPOTHESIS - What do you think will happen, what do you think is the answer to the experimental question ... the experiment should be designed to test THIS! It may be easiest to write in an, *if.... then....* format.

WHY do you think this will happen?

Due Date _____

MATERIALS – A complete list of materials you will need to conduct your investigation.

Due Date _____

INDEPENDENT VARIABLE – This is the variable the researcher controls, the variable that is changing.

Due Date _____

DEPENDENT VARIABLE – This is the variable that is being measured in response to the change in the independent variable.

Due Date _____

CONTROLLED VARIABLES – These are variables the researcher must consider and should try to keep constant (or randomize for).

Due Date _____

SAMPLE SIZE - How many experimental trials will you run and approximately how many data points will be collected in each trial? This is largely determined by the statistical analysis method you will use to analyze your data.

Due Date _____

TIME – How long will each trial run? Why did you select this time interval?

Due Date _____

METHODS/PROCEDCURES – This is a comprehensive, stepwise description of how you will conduct your investigation. A key tenet of science is that results should be verifiable. Therefore, between the MATERIALS section and this section, your descriptions have to be clear enough that another researcher could repeat your experiment and obtain similar results. This section is often best completed as a numbered or bulleted list.

Due Date _____

RESULTS - Add tables, graphs, and/or charts showing the data your experiment(s) generated to this page. Be sure all graphs, tables, and charts are clearly titled and labeled including appropriate units. Add any discussion or explanation of the data to the next page.

Graphs, tables, and charts that are to be submitted digitally on this pdf must be constructed on another platform—Microsoft Word or Excel or Google docs or sheets. It is easiest to insert these constructed objects into a pdf when the pdf is opened in **Adobe Acrobat Reader**. To insert a graph/table/chart in this pdf, copy the constructed object from the original platform using the Copy function or the snipping tool. In Adobe Acrobat Reader, open the *Stamp* tool from the right side tool bar. The *Stamp* commands will now appear on the upper tool bar. Click on *Stamp*, then click on *Paste Clipboard Image as Stamp Tool* from the bottom of the opened menu. The cursor will now appear as a stamper. Move the stamper to the place on the page where the copied object is to be located and left click. The pasted object can be moved or re-sized by left clicking on the object.

RESULTS (continued) - Add any discussion or explanation of the data presented on the previous page here.

Due Date _____

Explain:

ANALYSIS OF DATA – Describe the methods you used to analyze your data and show the results of your data analysis.

Due Date _____

CONCLUSION - Explain the results of your experiment. The conclusion generally begins with a restatement of the hypothesis followed by a discussion of whether you accept or reject the hypothesis and why? Include a discussion of what you could have done differently that would have improved your investigation and what would be the next logical steps for study. Finally, how might the information you learned help to improve local air quality and related population health.

Due Date _____

Teacher Comments: