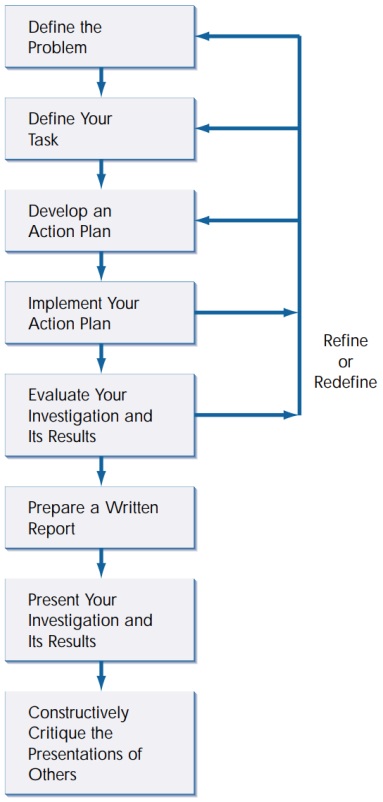
Overview:

This chapter is intended to assist you in developing and carrying out a culminating project. You will need to apply the skills and knowledge you have gained throughout the course to investigate a problem.

This chapter will serve as a framework for developing and presenting your culminating project. It will provide techniques, organisational ideas, suggestions, and timelines to ensure that your final project is a successful and rewarding experience.
As you progress through your project, you may find that you need to refine or even re-define your task. This could be due to a lack of data for your original problem. If your original problem is too large or has too much data to analyse, you may need to refine or redefine your task. Even after you've implemented your plan, you may need to refine or redefine your task based on the findings of your original research.



Source: MHR Mathematics of Data ManagementNumber 2:

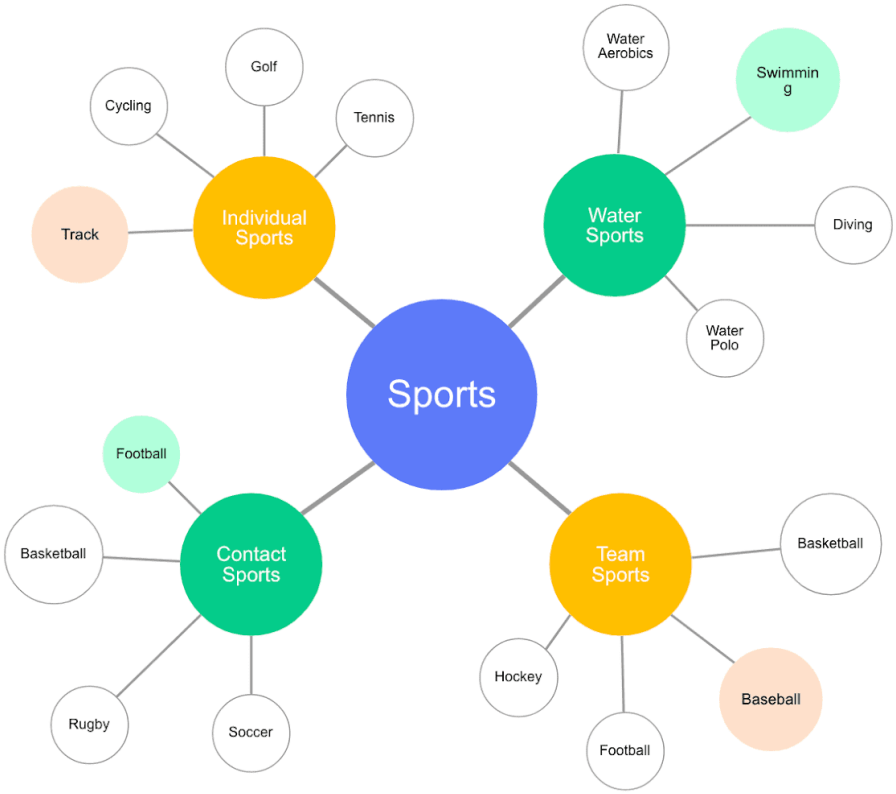
Defining the Problem

Your first task is to choose a problem for your project.

Some possible ideas are:

- a sport or hobby that you enjoy
- an interesting article
- an issue you learned in another course
- an issue generated through brainstorming with others
- an issue from the internet

A useful way to generate and organize related topics is called a **mind map**.



Source: https://cacoo.com/blog/mind-map-examples-to-get-your-team-inspired/

(Links to an external site.)

After you've narrowed down your topic, you'll need to pose a problem to investigate.

The problem should satisfy **ALL** of the following:

- involve the collection of a large amount of data
- involve the organization of a large amount of data
- involve the analysis of a large amount of data
- allow the use of technology
- allow the use of diagrams

The problem should satisfy *some* of the following:

- One-variable statistics tools
- Two-variable statistics tools
- Permutations and combinations
- Probability
- Probability distributions
- Simulations
- Hypothesis testing

Defining your Task

Once you've identified a problem that needs to be investigated, you must clearly define your task. Creating a hypothesis or thesis statement is usually part of this definition. You will then develop and carry out a plan of action to test your hypothesis.

Suppose that you want to investigate the effect of playing video games on math grades. A hypothesis here can be "The increase in the time spent playing video games results in lower math grades."

You'll notice that in the examples, you're not stating that your hypothesis is correct right away. You're taking a stand, which you'll put to the test by collecting and analysing data. Your hypothesis will guide your action plan and determine what data you need to collect.

Developing and Implementing an Action Plan

You need to develop an action plan which is a logical series of specific steps that must be completed in order to test your hypothesis. Typical steps of an action plan are:

1. State your hypothesis.
2. Determine what data needs to be collected.
3. Decide how to organize that data.
4. Decide how to illustrate the data.
5. Determine what analysis needs to be done on that data.
6. Draw a conclusion.
7. Evaluate your investigation.
8. Write a report of your investigation and its results.
9. Develop the presentation of your investigation.

Develop your Action Plan:

Develop a detailed action plan for your culminating project. Submit for teacher review before moving forward.

Evaluating Your Project

After completing your analysis and drawing a conclusion, now it is time to evaluate your results.

It is critical that you assess the quality of your investigation and its outcomes. Otherwise, you risk reaching incorrect conclusions. Inadequate data, for example, may lead to biassed results.

The following must be included in your evaluation:

- reflection on your conclusion
- reflection on your investigation methodology
- reflection on what you learned from this project

Reporting Your Project

Now it is time for you to submit a clear, well-organized, and fully justified section of your investigation and its findings.

Your report should include:

- title of your project
- statement of your hypothesis
- background of your problem
- procedure and use of technology
- data such as graphs, charts and tables with sources
- Data summary in tables, graphs, and summary statistics
- Data analysis, including calculations and graphs
- Results
- Conclusions
- Evaluation of your findings and investigation

- Footnote or endnote, bibliography

Presenting Your Project

Project Presentation

You are also to submit a video presentation of your project. The presentation should be 5-7 minutes in length and should outline your investigation and its findings, as well as provide a critical assessment of your methodology and conclusions.