

MDM4U
Culminating Task

TASK: Pose, research, collect, reflect and present information regarding a topic of your choice.

STEP 1: Define and Pose a Problem

Goal: Obtain a good research questions that explores a relationship between two variables

- Choose an idea/topic
- Ensure the chosen topic is relevant and appropriate
- Ensure the hypothesis is clearly stated and justified
- Ensure the population of interest is clearly defined
- Ensure sample size and sampling technique is identified.
- Ensure you include brief background information to introduce the research question.

STEP 2: Find and Collect Data

GOAL: To find useful, relevant, and effect information that will help answer your research question.

- use reliable sources
- obtain information from Statistics Canada or other reliable databases
- Analyse for any bias
- Ensure the sampling technique is described
- andjustified
- Ensure you have sufficient data to help illustrate your point. **(at least 20 points)**
- Ensure that you've effectively presented the raw data that you've collected in the report.

STEP 3: Graphing your Data

GOAL: To represent the data you've collected through some form of graphical format.

- Think about which information can be graphed
- Think about which information can be graphed together
- Think about which type of graph can best represent the data
- Ensure that the data are represented using appropriate charts and graphs

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STEP 4: Central Tendency & Measures of Spread

Goal: To assess the distribution of the data using measures of central tendency and spread

- Calculate the mean, median, and mode (show sample calculation for one data set!)
- Calculate standard deviation of the data sets
- Create a box and whisker plot for the both data sets
- Determine if there are any outliers (of the data sets chosen) using the 1.5IQR test (show sample calculation for one data set.)
- Describe/analyze the meaning behind the calculations and the box and whisker plots.
- Describe the impact of the outliers on the data
- Determine whether or not the data follow a pattern of normal distribution (DON'T DO THIS)

STEP 5: Searching for Patterns

GOAL: To find determine whether your data follow a specific patten or model, or whether a specific mathematical relationship exists among your variables.

- Perform a regression analysis of data to determine whether a linear correlation represents your data.
- Record and interpret the r value of your data
- Show how the line of best fit changes if you remove outliers from the data set.
- Show the steps of how to get $y = ax + b$, and r value.
- Interpolation, and extrapolation

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STEP 6: Analysing the Validity of Your Process and Results (evaluation)

GOAL: To assess your research method and the validity of your results and sources.

- Examine each of your statistical calculations. Do your results and conclusions support or refute your hypothesis?
- How strong is the evidence?
- Are there limitations to the evidence?
Discuss:
 - Bias
 - Cause and effect
 - Hidden variables and outliers
- How well does your sample represent the population
- What questions arose that might require further investigation
- What might you do differently if you were to complete a similar project in the future.

STEP 7: Conclusions

GOAL: To summarize the results of your research and answer your answer research question.

- Answer your research question in a clear and cohesive statement.
- Provide evidence from your secondary sources and primary sources to back up your conclusions.
- This portion of the report should be at least three quarters of a page.

STEP 8: Presentation

GOAL: Prepare a presentation of your research, data, and analysis.

- Presentation is 5 - 10 minutes long
- Present your research question
- Present the analysis of your data
- Present the conclusion of your project by providing sufficient evidence from your research.

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MARKING SCHEME

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PRESENTATION COMPONENT

- Presentation is 5 - 10 minute long – and includes effective visual aids. **C [5 marks]**
- Research question is stated and clear. **K/U [2 marks]**
- Analysis of data is stated, reflective, and clear. **A [3 marks]**
- Conclusion of data is stated, reflective, and clear. **T [3 marks]**
- **PRESENT ALL COMPONENTS OF YOUR RESEARCH REPORT (DETAILS ARE BELOW)–** Although you are submitting your report, your mark/grade will come from whether or not you presented the information during your presentation. The report is simply a hard copy of your presentation.

REPORT COMPONENT

THE REPORT IS TO COMPLIMENT YOUR PRESENTATION

You will be expected to submit your research through a report format, and it should be ORGANIZED in the following order (containing the specified information)

1) Introduction (Approximately one page)

- Brief introduction of your research question – explanation of topic and definitions (if necessary); the audience (me) should be able to understand what your research will be about based on your introduction **C [6 marks]**
- Hypothesis is stated clearly and is relevant to your research question. **K/U [2 marks]**
- Population, sample, and sampling technique of your research should be stated. **A [3 marks]**

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2) Research

- Summarize information obtained from data that was useful for your research project
C[5 marks]

- Include any data from secondary data that was beneficial for your research
I[4 marks]

- Include a summary (at least one page) of the information obtained from primary sources that was useful for your research question.
K/U[10 marks]

- Include the RESULTS (not the surveys themselves) obtained from the primary sources (this can be presented through charts, graphs, etc.)
A[10 marks]

3) Analysis

- Include ALL calculations obtained from STEPS 4-6 (see steps to ensure you have each item)
A[18 marks]

- Include a reflection of your calculations retrieved from STEPS 4-6 (the reflection should be the analysis of your calculations and “bias”, and its significance for your research project)
I[10 marks]

4) Conclusion (Approximately one page)

- Answer your research question in a clear and cohesive statement.
I[5 marks]

- Provide evidence from your secondary sources and primary sources to back up your conclusions.
A[5 marks]

5) Works Cited

- Include a works cited page that includes **all** the sources you used to help you with your research project.
C[2 marks]

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MDM4U - Culminating Task Rubric

Category	Level 1	Level 2	Level 3	Level 4
Knowledge ____/18	Hypothesis is irrelevant and unclear. Summary of the results of the primary resources is relevant, but unclear for the most part. Most of the raw data are missing. During the presentation, the research question is included, but unclear for the most part. During the presentation, the research question is unclearly stated.	Hypothesis is relevant to the research question, but unclear at certain parts. Summary of the results of the primary resources is relevant, and clear. Most of the raw data are included. During the presentation, the research question is included, but unclear for the most part.	Hypothesis is stated clearly and relevant to the research question. Summary of the results of the primary resources is relevant, clear, and detailed. All the raw data are included. During the presentation, the research question is clearly stated.	Hypothesis is clearly stated with an explanation, and thoroughly answers the question. Summary of the results of the primary resources is relevant, clear, detailed, and analytical. All the raw data and extra information (e.g. articles, data sets) are included. During the presentation, the research question is clearly stated with an interesting introduction.
Inquiry ____/22	Includes data from one secondary sources that are relevant, but not truly effective in answering the research question. Reflection of calculations is unreasonable. Conclusion answers the research question in an unclear manner. During the presentation, the conclusion of the data is stated, but unclear for the most part.	Includes data from one secondary sources that are relevant and effective in answering the research question. Reflection of calculations is fairly reasonable, but doesn't consider other aspects. Conclusion answers the research question in a clear manner. During the presentation, the conclusion of the data is stated and clear.	Includes data from two secondary sources that are relevant and fairly effective In answering the research question. Reflection of calculations is reasonable. Conclusion answers the research question in a clear and cohesive manner. During the presentation, the conclusion of the data is stated, reflective, and clear.	Includes data from more than two secondary sources that are relevant and effective in answering the research question. Reflection of calculations is reasonable and analytical. Conclusion answers the research question in a clear, cohesive, and analytical manner. During the presentation, the conclusion of the data is stated, reflective, clear and presented in a creative manner.

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<p>Communication</p> <p>____/18</p>	<p>Introduction includes only some of the key components required. Summary of secondary information is relevant, but unclear for the most part. Works Cited page is not in any proper format. Presentation exceeds/ is under the 5-15 min. time limit by 10 minutes</p>	<p>Introduction includes most of the key components required. Summary of secondary information is relevant. Works Cited page in a proper format (MLA/APA) with several errors. Presentation exceeds/ is under the 5-15 min. time limit by 5 minutes</p>	<p>Introduction includes all key components required. Summary of secondary information is relevant and clear. Works Cited page in a proper format (MLA/APA) with few errors. Presentation exceeds/ is under the 5-15 min. time limit by 2 minutes.</p>	<p>Introduction includes all key components required, with extra relevant information. Summary of secondary information is relevant, clear, and analytical. Works Cited page in a proper format (MLA/APA). Presentation is within 5-15 minutes.</p>
<p>Application</p> <p>____/39</p>	<p>Population and sample of data is stated, but unclear for the most part. Results of data are presented through irrelevant forms. Calculations are correct; calculations are done for one set of data. Conclusion is backed up by information obtained from neither primary nor secondary sources. During the presentation, analysis is reflective, but unclear for some parts.</p>	<p>Population and sample of data is stated, but unclear at certain parts. Results of data are presented through fairly relevant forms. Calculations are correct and organized; calculations are done for one set of data. Conclusion is backed up by information obtained from either primary or secondary sources. During the presentation, analysis is reflective.</p>	<p>Population and sample of data is clearly stated. Results of data are presented through relevant forms. Calculations are correct, organized, relevant; calculations are done two sets of data. Conclusion is backed up by information obtained from primary and secondary sources. During the presentation, analysis is reflective and clear.</p>	<p>Population and sample of data is clearly stated; with choices explained. Results of data are presented through a variety of relevant forms. Calculations are correct, organized, relevant; calculations are done for more than two sets of data. Conclusion is backed up by information obtained from primary and secondary sources, and is effectively used. During the presentation, analysis is reflective, clear, and creatively presented.</p>
<p>Comments:</p>			<p>Total: ____/</p>	