



THOMAS
MACLAREN
SCHOOL
PROJECT WEEK

Dear _____,

Your Project topic this year is _____.

Your Project advisor is: Ms. Maslow Mr. Lilley

Attached is all the information you need to have a successful Project Week.

1. Specific guidelines for your Project (report & diorama guidelines)
2. Recommendations for time management (all students must show they have worked at least 30 hours on a Project; how that time is used depends upon the Grade/Project)
3. Guidelines about proper citations
4. Your timesheet that you must fill out each day and return with your Project

You must work at least 30 hours on the Project.

We hope you learn a great deal and enjoy yourself, too!



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Project Week Requirements
10th Grade Mathematics Project

You will be responsible for completing a mathematics project exploring an area of mathematics you have not studied before. You will complete a number of guided explorations given to you to help immerse you in the topic. The explorations will start out with specific instructions and become more and more directed by you. Your experience doing the guided explorations should help you decide how to proceed in the independent ones.

The intent is not for you to *research* this topic, but to *discover* it. Any information or resources you need to do this project are included in your two packets. If you run across questions that you cannot answer, you are free to ask your advisor. You should not use or look for any other outside resources to help you.

In general, this project should be your own work. However, if you ask for help from or work with any classmates, please only do that for the guided exploration section of the project. There should be absolutely no working together on the final, independent research section of the project. If you work with other people, please write down their names on the cover page of your project.

You will turn in your work, observations, and conclusions in a packet together. The organization and process of this will be described in the following pages.

You will meet with your advisor to review any necessary background mathematics.

Your advisor will be available by email before and during project week to answer any other questions you might have.



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MATH PROJECT INSTRUCTIONS

1. Materials needed:

- graphing paper (one pack of loose paper or one unused notebook)
- compass and ruler (Taxicab Geometry only)
- pencils and eraser

2. Schedule: Decide when you will do the various sections of the project, using the time management guidelines provided.

3. Preliminary work: Understand the introductions provided in the first few pages of your packet.

- For Taxicab Geometry, it is essential to understand the definitions of the conic sections and to understand the new and old definitions for the distance formula.
- For Graph Theory, it is essential to understand the basic definitions and the set notation used to describe a graph.

4. Organization:

- You should do all your work on grid paper. You may work either in a new notebook or on loose paper.

Parts of the project will be problem-based and will have instructions that you should follow exactly. For these parts:

- Write all problems in order. Label each new section on your paper as it appears in the packet and then clearly label the number of each problem you are working on. You do not need to rewrite the question for each problem, though you may if that is your preference.
- Show all of your work. The reader should be able to follow the process of what you are doing, even without the packet in front of them.
- For the most part, for each problem you do should include a picture or graph. Do not try to do the problems in your head. For Taxicab in particular: Create a new graph/picture for each problem unless the instructions advise you to put multiple problems on the same graph/picture. You will want to be able to look back and visualize what you have done for each problem.
- If asked to make a conclusion or describe a result, do so in a complete manner. Do not ramble, but also, do not give answers that are brief at the expense of clarity. Feel free to use both pictorial and written responses in any such conclusion, though for the most part, a solely pictorial response would not suffice.

In other sections, you will have the freedom to decide how to pursue a question. For these parts:

- If you are asked to make a plan for something, be sure to write out clearly what you intend to do. This is important for you, so you can look back and remember what you intended at the beginning, but also for the reader, so they can see your full thought process. Once you make a plan, it is quite acceptable to change your mind and then do something different. Write that down as well.
- If you are asked to make any conclusions, be sure to include explanations as to why you are saying what you are. Even if you are not sure if you are correct in your conclusions, you can explain how you arrived at the idea.

- If you are asked to give a written response at any point, you may handwrite that responses on the grid paper you are working on, but respond in complete sentences.
- You will not do everything right the first time. You may work for a long time on one particular problem only to realize that you were doing it wrong or that there is a better way. This is ok. That time is not wasted. Trial and error is part of discovery. You will not get far if you are not willing to try and then discard something.
- If you do work that ends up being wrong or you end up not using, leave it on the page. Do not erase it or throw it away. It is part of the process. Make a note next to it briefly saying that you are trying again, you messed something up, etc.

5. Troubleshooting:

You will not always know exactly how to proceed in a problem. At some point in the week, you WILL get stuck. When you are stuck, the most important thing to do is SOMETHING, rather than nothing.

- Write down what you know.
- Draw a picture that you think describes the situation.
- Rewrite the question in your own words.
- Look back – have you done anything similar in previous problems?
- Pretend you understand the problem and start solving. Often times if you start solving even when you know it is not right, you will end up seeing why it is wrong, which can lead you to what is in fact right.
- Write down why you do not understand the question – i.e. try to articulate what the confusion is. This can help direct your next thoughts.
- If you truly cannot find a way forward, your advisor is always available by email.

Mathematicians learn by making and then evaluating their mistakes. You do not get to be the exception to this rule.

6. Final product: You should organize your work in order and staple or clip your paper together if you worked on loose leaf. Please include

- A cover page at the beginning. It may be typed or written by hand.
- Your time sheet at the end.

Remember: both creativity and messiness are at the heart of mathematical exploration and discovery. Do not be afraid of either!



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**Project Week Time Management Guidelines
High School Math**

Overall Time to be Logged for Project during Project Week: 30 hours

_____ : **Project Week Due Date**

Suggested Use of Time during Project Week

The following is a general guideline, but should be adjusted based on individual needs.

Taxicab Geometry:

- 10 hours Section I Structured Practice
- 10 hours Section II Building Independence
- 10 hours Section III Independent Exploration

Graph Theory:

- 5 hours Section I Introduction
- 5 hours Section II Planar Graphs
- 5 hours Section III Coloring
- 5 hours Section IV Paths
- 10 hours Section V Independent Exploration

