

## EXPLORATIONS

The Exploration is a long-term major project that invites you to investigate and explore areas of mathematics in which you have an interest. **The principal aim is for you to use your creativity and imagination, to be in the position of creating mathematics.** The final project, due in \_\_\_\_\_, must be of display quality. This is a very challenging and open-ended assignment designed to give you the maximum opportunity to use your talents. **It will require much time and preparation to produce a project of high quality. Do not procrastinate!**

You are to submit a project in which you explore or invent mathematics that is new to you.

You must **invent and solve a mathematical problem**. Make up a problem that you currently do not know how to do. This problem may arise from any area of mathematics, or any other subject. Consider geometry, algebra, number theory, statistics, probability, chaos theory, computer science and many more areas as a source of problems. The internet should only be used as a source of data, not for problems or solutions.

i) Make a Problem Statement that clearly states the problem you are trying to solve. If ideas are gained from an outside source, the Problem Statement must declare this and you must provide the source. Include your reasoning and the RUBRIC writing when writing up your solution(s).

ii) In the solution section, write up as many solutions to your problem as you can, **explaining your thinking and your major steps**. Use the Stuck / Aha / Check / Summary RUBRIC. Keep all your rough work; it must be available when I ask to see it. Any research done requires a reference list at the end the project, and a citation in the text at the place you use it.

iii) At the end of your solution, provide a recap of the problem and a brief summary of your solution. Also include the effect of the process on you as a mathematician and you as a student. This reflection should be of such depth that the Exploration Problem could be used in your Glenlawn Portfolio.

The criteria for the evaluation of your problem-solving skills in this section will come from the challenge of the problem, the evidence for persistence and innovation, the correctness of the solutions, the variety of solution methods and the level of extension or generalization of the problem. Consider that a worthy question that is partially answered may be worth as much or more as a lesser question answered completely. In order to display very good performance, strive to generalize your results (create formulas or rules) and connect your ideas to other areas of study.

Written work must be edited for both mathematics and English. In general, I expect that your work, except for diagrams, etc, will be typed, with 1 inch margins and 12 point font. Obvious exceptions include headings, titles etc. The Explorations project will be responsible for 80% of your problem solving work.

**Student name:** \_\_\_\_\_ **Slot:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Please print**

**Parent/Guardian signature:** \_\_\_\_\_

**Plagiarism: Zero for entire Project**

Standards Score:	Below Standard 0 1 2	Meeting standard 3 4	Above Standard: 5	Points = weight x standards score
<b>Communication:</b> Organization, mechanics, clear problem statement, reference list (if required.) <b>Weight:3</b>	No problem Statement. No reference list. Shows limited control of written conventions of mathematics or language. Errors detract significantly from impact and meaning <b>Plagiarism: Zero for entire Project.</b>	Demonstrates capable control of the written conventions of mathematics and language. [Errors may detract from the impact, but do not affect the meaning significantly.]	Demonstrates skillful control of the written conventions of mathematics and language. [Minor errors do not detract from impact or meaning.]	
<b>Challenge/ Innovation:</b> Overview of obstacles <b>Weight: 4</b>	Problem limited to direct application of a few previously rehearsed techniques.	Problem may rely on previously learned techniques, but these are applied in a new or creative fashion, or many prior techniques are required. Learning of some new material may be needed.	Problem is self-generated, and shows curiosity and insight into mathematics. Problem requires new mathematics, or new techniques, or integration with other subjects or novel combinations of existing knowledge.	
<b>Solutions: Mathematics in product or process.</b> <b>Weight: 8</b>	Solution is missing, or does not follow from work done. Little evidence given for persistence. Solution is incorrect with unworkable strategy. Rubric writing is developed to a limited extent.	If a solution is found, it follows clearly from work shown. The solution may be incorrect to some degree, but a workable strategy is used. Evidence of persistence/ Rubric writing. If no solution is found, clear estimates/ limits/ conjectures are made for any possible answer.	Clear and correct solution is found, that follows from the work displayed. Rubric Writing is clear and precise. Multiple solutions are given, or different techniques for solving the problem are discussed.	
<b>Extension/ Generalization</b> Change in attitudes, skills, knowledge <b>Weight: 5</b>	There is little or no attempt to extend or expand on the problem, or to find general rules, formulas or written descriptions.	Various cases of the problem may be attempted, with some success at describing rules/patterns/ equations.	Shows insight and understanding of the problem as successfully describes rules/ patterns/ formulas/ relationships	
<b>Total:</b>				