

**Bell Block School**  
**Mathematics Investigation- Honours Points Project**  
**Academic Badge**

**Project Guidelines:**

In this project, you will choose and **complete 4 out of 10 tasks** to investigate different areas of mathematics. You can present your findings in a variety of ways, such as written reports, posters, or digital presentations. Be sure to show your working, explain your reasoning, and present your results clearly.

Once you have completed your project and are ready to submit it to your teacher for signing off **please attach and complete this task checklist to your project** either digitally or printed. Your classroom teacher can print this for you if required.

**Task Checklist:**

Task Number and Name	Tasks Completed	Teacher Sign Off
<u>Task 1</u> The Fibonacci Sequence in Nature	•	
<u>Task 2</u> Rolling Dice: Exploring Probability	•	
<u>Task 3</u> Surface Area and Volume of 3D Shapes	•	
<u>Task 4</u> Identifying Number Patterns	•	
<u>Task 5</u> Data Representation and Analysis	•	
<u>Task 6</u> Calculating Averages from Data	•	
<u>Task 7</u> Exploring Symmetry	•	
<u>Task 8</u> Understanding Compound Interest	•	
<u>Task 9</u> Discovering the Golden Ratio:	•	
<u>Task 10</u> Exploring Geometry in Architecture:	•	
<b>4 Tasks Required to Complete Project</b>		

## Mathematics Investigation Project Guidelines:

- **Presentation:** You can present your findings using a written report, slideshow, poster, or video. Choose the format that works best for you.
- **Explanation:** For each task, make sure to explain your process and reasoning. If you used formulas, show your working. If you found patterns or solutions, explain how you discovered them.
- **Creativity:** Feel free to include pictures, diagrams, or videos to make your work more engaging. Be creative but make sure your work is clear and easy to understand.

## Mathematics Investigation Tasks:

### 1. The Fibonacci Sequence in Nature:

Learn about the Fibonacci sequence. Find examples in nature where this sequence appears (like flower petals, shells, etc.). Write a short explanation of the sequence and show how it works with the first 10 numbers. Present your findings with images of real-life examples.

### 2. Rolling Dice: Exploring Probability:

Roll a standard die 100 times. Record the results and calculate the probability of rolling each number. Compare the experimental results with the theoretical probability. Present your results using a bar chart.

### 3. Surface Area and Volume of 3D Shapes:

Choose three different 3D shapes (e.g., cube, sphere, cylinder). Calculate their surface area and volume using the correct formulas. Show how changing the dimensions (e.g., radius or height) affects the volume and surface area.

### 4. Identifying Number Patterns:

Identify a number pattern, such as square numbers, even numbers, or triangular numbers. Find the first 10 terms and explain the rule behind the pattern. Create a table or graph to show your findings.

### 5. Data Representation and Analysis:

Collect a dataset on any topic of your choice (e.g., daily temperatures, student heights, or the number of books read). Represent the data using different methods such as bar graphs, line graphs, and pie charts. Analyze the data and interpret what it tells you. Present your findings in a visual format, explaining trends or patterns you noticed.

### 6. Calculating Averages from Data:

Collect data from your class or family (e.g., ages, heights, test scores). Calculate the mean, median, mode, and range. Discuss what each of these measures of central tendency tells you about the data and present your findings in a report or chart.

### **7. Exploring Symmetry:**

Investigate symmetry in different objects or shapes. Find examples of reflection, rotation, and translation symmetry. Draw a diagram showing at least 3 different shapes that have symmetry, and explain how symmetry is used in design or nature.

### **8. Understanding Compound Interest:**

Create a simple scenario where you invest money at a given interest rate and calculate how much money you would have after 1 year, 5 years, and 10 years. Show the difference between simple interest and compound interest with examples.

### **9. Discovering the Golden Ratio:**

Learn about the Golden Ratio (approximately 1.618). Find examples of this ratio in nature, architecture, or art. Draw or create an object that follows the Golden Ratio (e.g., a rectangle or spiral) and explain its significance.

### **10. Exploring Geometry in Architecture:**

Investigate the geometry behind famous architectural structures, such as the Eiffel Tower, the Great Pyramids, or the Parthenon. Focus on the shapes and angles used in the design. Choose one structure to explore in detail, and explain how geometric principles like symmetry, angles, or ratios were used to create it. Create a model, drawing, or diagram to represent the shape and geometry of the structure.

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**Good luck with your investigations, and enjoy delving into the fascinating world of mathematics!** 🧩 📐 📊