IB Math Studies Internal Assessment

**IB Math Studies Project Assessment Criteria**

**\*from the mathematical studies SL: internal assessment-teacher support material from the IBO\***

**Criterion A: Introduction**

|  |  |
| --- | --- |
| **Achievement level** | **Descriptor** |
| 0 | The student does not produce a clear statement of task. |
| 1 | The student produces a clear statement of the task. |
| 2 | The student produces a title, a clear statement of the task and a clear description of the plan. |

**Criterion B: Information/measurement**

|  |  |
| --- | --- |
| **Achievement level** | **Descriptor** |
| 0 | The student does not collect relevant information or generate relevant measurements. |
| 1 | The student collects relevant information or generates relevant measurements. |
| 2 | The relevant information collected, or set of measurements generated by the student, is organized in a form appropriate for analysis or is sufficient in both quality and quantity. |
| 3 | The relevant information collected, or set of measurements generated by the student, is organized in a  form appropriate for analysis and is sufficient in both quality and quantity. |

**Criterion C: Mathematical Processes**

|  |  |
| --- | --- |
| **Achievement level** | **Descriptor** |
| 0 | The student does not attempt to carry out any mathematical processes. |
| 1 | The student carries out simple mathematical processes. |
| 2 | The simple mathematical processes are mostly or completely correct, or the student makes an attempt to use at least one sophisticated process. |
| 3 | The student carries out at least one sophisticated process, and all the processes used are mostly or completely accurate. |
| 4 | The student carries out at least one sophisticated process; the process used are mostly or completely accurate and all the processes used are relevant. |
| 5 | The student accurately carries out a number of relevant sophisticated processes. |

**Criterion D: Interpretation of results**

|  |  |
| --- | --- |
| **Achievement level** | **Descriptor** |
| 0 | The student does not produce any interpretations or conclusions. |
| 1 | The student produces at least one interpretation or conclusion. |
| 2 | The student produces at least one interpretation and/or conclusion that is consistent with the mathematical processes used. |
| 3 | The student produces a comprehensive discussion of interpretations and conclusions that are consistent with the mathematical processes used. |

**Criterion E: Validity**

|  |  |
| --- | --- |
| **Achievement level** | **Descriptor** |
| 0 | The student does not comment on the mathematical processes used or the interpretations/conclusions made. |
| 1 | The student has made an attempt to comment on either the mathematical processes used or the interpretations/conclusions made. |
| 2 | The student has made a serious attempt to comment on both the mathematical processes used and the interpretations/conclusions made. |

**Criterion F: Structure and Communication**

|  |  |
| --- | --- |
| **Achievement level** | **Descriptor** |
| 0 | The student has made no attempt to structure the project. |
| 1 | The student has made some attempt to structure the project or has used appropriate notation and terminology. |
| 2 | The student has made some attempt to structure the project and has used appropriate notation and terminology. |
| 3 | The student has produced a project that is well structured and communicated in a coherent manner. |

**Criterion G: Commitment**

|  |  |
| --- | --- |
| **Achievement level** | **Descriptor** |
| 0 | The student showed little or no commitment. |
| 1 | The student showed satisfactory commitment. |
| 2 | The student showed full commitment. |

Example Statements of Task:

The interest in music has always been high, I have found, and as I am interested in music, that is what I have based my project on. I have narrowed it to students at my school, meaning grades nine to twelve. I will use a survey to collect data from the students. This survey will be somewhat biased, as there will be some people who do not want to take it, and there is no way of being sure that the student who complete the survey are completely random. The areas in music that will be examined are the grade/age of the student, whether or not they play an instrument and how many, If they don't play an instrument whether or not they have an interest in playing, and if no interest whether or not they like music at all. v This will be a survey to find out if music is somehow in everybody, or if there are actually people who just do not like music. Conclusions reached in the survey will not apply to the general public, only to Saint John High School. Saint John High School students, however, could be expected to have similar results as other students in the same age range and scholastic level.

These days it seems that everyone has a cell phone. Be it the 16 year old who wants to keep in touch with his friends, 24 hours a day, or a fifty-year-old who just wants it for security's sake. This is why I decided to focus on the cell phone industry, and compare the cost of a basic service across Canada. I decided to look at Canada, knowing that a high percentage of the population has a cell phone. I also decided to focus on four provinces representing the regions of Canada: New Brunswick (Atlantic), Ontario (Central), Manitoba (Prairies) and British Columbia (West Coast). Two leading mobile communication providers will be chosen for each province. One basic plan will be chosen from each company. The plan will not involve a long-term contract, but will be based on monthly charges per airtime usage. For each plan, the prices per minute of airtime will be found and then used to calculate the cost of 200 minutes of airtime per month for all the companies. To try to understand the wide range of prices across the country, an economic indicator such as the Annual Personal Disposable Income will be introduced. The price per year of each plan will be expressed as a percentage of the Annual Personal Disposable Income for each province. The results will be displayed on separate table, charts and graphs.

For my project I have chosen to investigate the effect, if any, that the number of extracurricular activities has upon a high school students grades. I will interview as many students as possible with the minimum being 20 students in order to achieve a substantial base of information. These students will all be in the full International Baccalaureate program to ensure that the level of difficulty in coursework is the same. The effect of involvement in activities can be anything from sports teams to chess clubs as long as there is a level of dedication and time required to participate in them. The object is to see whether over involvement or under involvement has any drastic effect on a student's grade due to the time taken away from their studies. The data collected will be the number of activities currently involved in throughout the first term coupled with the total number of hours during an average week they would spend participating in them combined. An example of this would be that a student may be a member of the chess club, soccer team, yearbook, and swimming giving them a total of 4 activities and an estimate 10 hours a week away from studies. The student's grade average will then be taken up to this point in the semester. Since the data is being collected at the end of the term just prior to the mid-year exams the grade will give a good indication as to what the students actual mark is and would be by the end of the term. This data will then be graphed to show the effects and correlations that may become apparent between the grades and activities. The students will be asked to accurately fill out a table in which they will state the number of activities they have participated in since the beginning of the year, the number of hours per week spend on these activities in total, and their current grade mean. A sample table of the format the subjects will be asked to follow is found below.

I will investigate the probability of winning with certain hands of poker, namely the "Texas Hold 'em" variation. The test will simulate "heads up" poker, or, when there are only 2 people playing. First, the players will be dealt 2 cards, with only one of the players visible. Then, the probability of winning will be determined after the third community card, or the flop has been laid. After the probability has been calculated the last 2 community cards, the turn and the river will be placed and the opponent's cards revealed. After the observations are taken, the first player's cards and the flop will remain unchanged while the rest of the deck is shuffled and new cards are given to the opponent and the last 2 cards again dealt. The odds will remain the same as the visible cards and the first 3 used for the calculations will remain unchanged. This will be repeated ten times before totally new cards will be dealt. After the tests are complete, the calculations will be repeated with the same cards but with the opponent's hand visible and thus the probability recalculated for each hand. After all the calculations are complete, graphs will be drawn to display the differences in percentage that the first player will win. Conclusions will then be drawn as to why certain hands have better chances of beatings others.

The purpose of this project is to analyze in which months the most people are born, what the average number of births in a month out of the grade 11 and 12's in Saint John High School is and to discover the probability of the number of birthday matches among students in grade 11 and 12 at Saint John High School. The number of births in the seasons of spring, summer, fall and winter will also be studied. The assumptions need to be made that there are 365 possible birth dates, not including the odd leap year. Also there is an equal chance of being born on any given date in the 3 65 days. A list of student's birthdays will be used from the office, with a total of 547 students. The students used will be in both grade 11 and 12. Twins and triplets are included in the study as having the same birthday. The number of birthdays in each month will be tallied and produced in data tables and then as graphs. The same will be done with people sharing the same birthday. The probability for the number of birthdays being shared will be used by a formula. The mean for each month will be calculated as well as the mean number of birthdays in a month.

For my math project it has been decided to do an analysis of the purchases made at New York Fries in the theater where I work. New York Fries (or NYF) makes a relatively large number of sales in a day and yet it is unknown to whom we sell the most fries, what we sell most often or even what times of day would be the busiest and therefore needing the largest amount of fries made. To accomplish this I will record the time of day each purchase is made, the relative age of the buyer (Child, youth, adult or Senior) (this will determine to which group they most likely belong), what they purchased, how much it cost and the number in the group and if they are family. This data will be analyzed using mathematical methods such as finding a mean, drawing graphs, analyzing mass data and the concept of outliers will be used in analysis. Conclusions will be drawn as to who buys must often from NYF, how much they spend and at what time do they normally make their purchases. As well as this the weather conditions will be recorded and see if this has a limiting effect on the number of patrons in a day, their age or how much they spend.

Investigating the effect of extracurricular activities and part time jobs on high school students marks. Background:

While attending a secondary school, one must learn to balance all sort of responsibilities. These responsibilities may include extracurricular activities including athletics, musicals and perhaps a part time job to earn some extra money. However, while taking part in these other activities, one must keep their marks in school up as much as possible.

Objective:

By doing a survey, I will compare the relationship between the amount of time given to extracurricular activities and/or part time job to that individual's average while attending school These results will be classified into two groups, male and female. From here, the data collected will be graphed using three different graphs for each gender: 1. Average in School vs. Number of Hours Spent at Work and/or Extracurricular Activities per Week: 2. Average in School vs. Number of Hours Spent on Homework per Week; 3. The Combined Data i.e. "graphs 1 and 2 placed on same axes to make it easier to visualize). The expected result for this survey will be that the majority of the data will be situated around the middle with a moderate number of extracurricular hours and a moderate number of homework hours.

Sleep is as important as food and air. Quantity and quality are very important. Most people need between 7.5 to 8.5 hours of uninterrupted sleep. If you need to press the snooze alarm in the morning you are not getting the sleep you need. This could be due to not enough time in bed, external disturbances, or a sleep disorder. About 120 million Americans suffer from sleep disorders including narcolepsy, sleep apnea, restless less syndrome, the insomnias and simple sleep deprivation. Most of these people are unaware. Evidence is mounting that taking a power nap during the day appears to enhance information processing and learning. New experiments by a group at Harvard University show that a midday sleep reverses information overload and shows a 20 percent improvement in learning a motor skill While the so-called "super-achievers" are out on their coffee breaks, researchers say real achievers have discovered a much more effective method—the power nap. Comell psychologist Dr. James Maas writes that a 20-minute nap in the afternoon actually provides more rest than sleeping an extra 20 minutes in the morning. He also writes that napping should be considered a part of one's "daily exercise routine." Due to all of the sleeping problems that people have, and the frequent razzing that I receive about taking naps, I have decided to focus on sleeping habits of people. Since younger children tend to have different sleeping habits than adults, I decided to split up the categories into different age categories. The age categories that I'm going to split these into are from 10-14, 15-19, 20-30, and 31+. I will questions five females and five males from each age category. I have gathered my data primarily through fellow students, and their younger and older siblings, as well as parents for the older age category. I am going to ask them various questions that discuss their sleeping habits. This includes whether they nap anytime throughout the day, what their sleeping environment is like, as well as many others. Through my research, I hope to find out which age category tends to have the best sleeping habits. The best sleeping habits will be judged on the age category that has the most answers that correspond with what experts in the field of sleeping say.

The National Hockey League will be holding its annual Super Skills Competition on February 7 in Saint Paul Minnesota, I will be examining many parts of this competition and drawing relevant conclusions to these. There are two teams in this competition, the Eastern Conference, and the Western Conference. The first thing I am going to analyze the hardest shot competition. There has been a lot power. I will examine the sticks used by the players and see if there is any relation between (be sticks used by the players and the force of their shots- The next event I will be analyzing is the shooting accuracy. Again this will be examining the sticks used by the players. I am trying to see if there is any relation to the type of stick and the accuracy of your shot. In addition I am going to find out what the probability of scoring a goal in the break away competition. A lot of the time in breakaway's the advantage is said to be given to the shooter, but I believe that the advantage lies with the goalie so I am going to test that. In the fastest skater events I am going to see if a certain brand of skates produces more winners than another brand. Each company claims that their skates will improve performance. I would like to see if there is a type of skate that makes players skate faster. In the shooting events I am going to compare shooting right handed to shooting left handed. For all the events I am going to see if players from a particular country do better at certain events then players from other country. Also, I am going to try and determine if players of a particular size excel in one event.

I am going to look at Asthma with eight different age groups ranging from twelve years old to over seventy-five years old. Asthma is "a condition often of allergic origin that is marked bv continuous or paroxysmal labored breathing accompanied by wheezing, by a sense of constriction in the chest, and often by attacks of coughing or gasping."] The purpose of this project is to examine the effect of age and gender on asthma. The graphs are going to be done by age group and by gender. I will also be looking at if there is an increase or decrease in asthma rates over in the seven year time frame that is being looked at To analyze the data I will be using graphs, pie charts, means, standard deviation and percentages.