**Lesson Title:** M&M Statistics

**Discipline Focus:** Mathematics

**Grade level:** 9th Grade

**Length of lesson:** One class period (45 minutes)

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| **Stage 1 – Desired Results** | |
| **Academic and Content Standard(s):**  **National Math Standards and Expectations:**  Data Analysis and Probability - **Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them**  **Minnesota Academic Standards for Mathematics 2007:**  Data Analysis and Probability – Data display and analysis  Benchmark Code: 9.4.1.1 - Describe a data set using data displays, including box-and-whisker plots; describe and compare data sets using summary statistics, including measures of center, location and spread. Measures of center and location include mean, median, quartile and percentile. Measures of spread include standard deviation, range and inter-quartile range. Know how to use calculators, spreadsheets or other technology to display data and calculate summary statistics.  Benchmark Code: 9.4.1.2 - Analyze the effects on summary statistics of changes in data sets. | |
| **Understanding (s)/goals:**  Students will understand:   * How to take a sample of a population. * How to find basic statistics of a sample. | **Essential Question(s):**   * When are statistics useful in the real world? * Why it is important to gather information and analyze data? |
| **Student objectives (outcomes):**  Students will be able to:   * Gather information about their sample, and record it in a chart. * Make predictions about a population. * Analyze data that they have gathered both as individuals and as a class. * Use statistics concept in order to answer questions about their sample population. | |

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| **Stage 2 – Assessment Evidence** | |
| **Performance Task(s):**   * Students will use M&M’s in order to create a variety of representations for the data. | **Other Evidence:**   * Students will have completed the charts. * Students will have answered the questions. * In class questioning. |
| **Stage 3 – Learning Plan** | |
| **Learning Activities:**  **Materials and Resources:**  M&M’s (1 fun size bag per student) Class note sheet  **Introductory Activities:**  (5-10 minutes)   1. Explain to students that they should predict the total number of M&Ms and the number of each color in the bag before they open the M&Ms. 2. Hand out a bag of M&M’s and the first worksheet to each student in the class. 3. Tell the students to record their predictions on the sheet.   **Developmental Activities:** (25 minutes)  Top of Form  Bottom of Form   1. Have students open their bags of M&M’s and record how many of each color there are in the bag. 2. Once they have finished recording the number, they can eat their M&M’s 3. Have students finish filling in the information for the first worksheet. 4. As students are doing this, draw a chart on the board and hand out the class information worksheet. 5. As students are finishing tallying their M&M’s, have them come to the board and write their individual totals on the board. 6. Ask students who have finished their charts to add up the individual totals in order to get class totals. 7. Once the students have completed the class data chart (as a group) ask them which set of data is probably more accurate and why. Once student have had a few minutes to think about this, write the actual percentages on the board. For example, Bl 24%, Br 13%, G 16%, O 20%, R 13%, Y 14%. 8. Have students compare both sets of data to these and ask which set of data was actually more accurate.   **Closing Activities:** (10-15 minutes)   1. Have students answer the follow-up questions, working in groups or alone. Encourage the students to talk about the questions to come to an answer. 2. As an introduction for the next class period, you could answer a few of the questions the students came up with as a class. | |

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| Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

"M&M's"® Candies Worksheet 1

**Without opening or touching** your bag of "M&M's"® Candies, estimate how many are inside and record below. Predict how many of each color you will have. (If your estimated total is 10 "M&M's"® Candies in your bag then your total prediction of "M&M's"® Candies colors should also add to 10.) Then open your bag and find your actual total and how many you have of each color. Record your results below.

|  |  |
| --- | --- |
| Estimated total= | Actual total= |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Colors:** | **Prediction:** | **Actual Amount:** | **Fraction** | **Percent** |
| Red | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |
| Orange | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |
| Yellow | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |
| Green | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |
| Blue | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |
| Brown | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |
| **Total=** | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |

**For your M&M's"® do the following:**

|  |  |  |
| --- | --- | --- |
| **Find the mode :** | **Find the median:** | **Find the mean:** |

**What do these statistics tell you about M&M’s**®**?**

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| --- | --- |
| Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

"M&M's"® Candies Worksheet 2

**Class Data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Colors:** | **Amount:** | **Fraction** | **Percent** | **Actual Percentage** |
| Red | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |  |
| Orange | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |  |
| Yellow | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |  |
| Green | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |  |
| Blue | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |  |
| Brown | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |  |
| **Total=** | http://score.kings.k12.ca.us/lessons/mandm/spacer.gif |  |  |  |

**For the classes M&M's**® **do the following:**

|  |  |  |
| --- | --- | --- |
| **Find the mode:** | **Find the median:** | **Find the mean:** |

**Compare this data to your individual data, what are some differences and similarities?**

**Follow up questions:**

1. **What is the ratio of green to red M&M's?**
2. **Is the information you gathered qualitative or quantitative? Why?**
3. **Which color had the maximum number of M&M's?**
4. **Which color had the minimum number of M&M's?**
5. **Create some kind of visual Representation of the M&M's in your bag.**
6. **What could we do to get our data closer to the actual percentage?**
7. **Come up with two more stats related questions related to the M&M’s.**