WAMC Lab Template

Math Concept(s): Statistics and M&M's (candy-could be skittles or gummy bears)
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Attach the following documents:

Lab Instructions

Student Handout(s)

Rubric and/or Assessment Tool

Indicate "*SPECIFIC*" relationship to Science, Technology, or Engineering

Short Description (Be sure to include where in your instruction this lab takes place):

Students will count the number of M&M's in a sample that they are given. They will compare their data with three other people, identifying the mean, median and mode for numbers of each color of M&M. Once they have determined their own descriptive statistics the entire class will develop expected numbers of M&M's by color. They will then answer questions on the handout including creating a graph of the distribution.

Lab Plan

Lab Title: M&M statistics

Prerequisite skills: counting, graphing, ratios and fractions

Lab objective: TSWBAT

- Use appropriate vocabulary to describe statistics of M&M distribution
- Calculate expected values based on class aggregated stats
- Identify and create two different appropriate graphs of their collected data

Standards:

Mathematics K–12 Learning Standards:

- Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.
- Understand statistics as a process for making inferences about population parameters based on a random sample from that population

Standards for Mathematical Practice:

- **2.** Reason abstractly and quantitatively.

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- Translate quantitative or technical information
- expressed in words in a text into visual form
- (e.g., a table or chart) and translate information
- expressed visually or mathematically (e.g., in an
- equation) into word
-

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation
- ☐ Think Creatively
- ☐ Work Creatively with Others
- ☐ Implement Innovations

Critical Thinking and Problem Solving
- ☒ Reason Effectively
- ☐ Use Systems Thinking
- ☐ Make Judgments and Decisions
- ☐ Solve Problems

Communication and Collaboration
- ☒ Communicate Clearly
- ☐ Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy
- ☐ Access and Evaluate Information
- ☐ Use and manage Information

Media Literacy
- ☐ Analyze Media
- ☐ Create Media Products

Information, Communications and Technology (ICT Literacy)
- ☐ Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability
- ☐ Adapt to Change
- ☐ Be Flexible

Initiative and Self-Direction
- ☒ Manage Goals and Time
- ☐ Work Independently
- ☐ Be Self-Directed Learners

Social and Cross-Cultural
- ☐ Interact Effectively with Others
- ☐ Work Effectively in Diverse Teams

Productivity and Accountability
- ☐ Manage Projects
- ☒ Produce Results

Leadership and Responsibility
- ☐ Guide and Lead Others
- ☐ Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Class set of small packages of M&M's
- Butcher paper or computer lab access

Set-Up Required:

- Get materials
- Get data of actual percentages from M&M website
- Get lab reserved if needed
- Get student hand outs made

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- In creating their display the student groups needs to decide (via reasoning) the best graph methods and why those methods communicate most effectively their data collection results

Cooperative Learning:

- Students will work alone, in pairs, and then in groups of four to collect and describe their data.

Expectations:

- I expect that they will improve their understanding of descriptive statistics

Timeline:

- This activity should take two days.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Affirmative Action
- Genetics and hybridization for improved crops

Career Applications

- Agriculture

Optional or Extension Activities

- A discussion of normal distribution and standards of deviation based on class data.

Lab Instructions:
Before lab review writing of fractions and turning fractions into decimals.
Basically follow worksheet.
Give a few minutes (10?) for individual collection
Depending on size of class, having small groups combine data before whole class collection may make the activity easier.
Have someone combine data on board for whole class.

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				
Orange				
Yellow				
Green				
Blue				
Brown				
Total=				

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®?

Name _____ Date _____

"M&M's"® Candies Worksheet 2

Class Data

Colors:	Amount:	Fraction	Percent	Actual Percentage
Red				
Orange				
Yellow				
Green				
Blue				
Brown				
Total=				

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?

<u>Follow up questions</u>:

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. **Create another visual to represent the whole classes M&M's**

7. **What could we do to get our data closer to the actual percentage?**

8. **Come up with two more stats related questions related to the M&M's.**

RUBRIC

	4	3	2	1
Data Collection Individual	All data present and calculations appropriate	Partially missing data or incorrect calculations	Partially missing data and some incorrect calculations	Minimal work present
Data Collection Group	All data present and calculations appropriate	Partially missing data or incorrect calculations	Partially missing data and some incorrect calculations	Minimal work present
Graph	Correct and appropriate	Inappropriate for type of data	Poorly done	Incomplete
Written Answers	Complete and in complete sentences	Mostly complete and complete sentences	Partially complete	Barely started