M & M Lab

Math Concept(s): Exponential Decay

Source / Text: Handout

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Attach the following documents:

Lab Instructions:

1. Hand out zip lock bags of M&Ms to kids in groups of 3-4. Classroom discussion

- 2. Pour M&M's out of the bags and record the number with of M&M's that are blank, place all M&M's with the M facing up back into the bag. Move the blank M&Ms off to the side.
- 3. Pour M&M's out of the bag again and record the number that are blank again, placing those with the M facing up off to the side. Repeat this process until all M&Ms are poured out and end up with the blank side up.

Student Handout(s)

Student worksheet to organize and record data.

Rubric and/or Assessment Tool:

Classroom discussion about the information that was recorded throughout the experiment and the function that it represents.

Score the worksheet and data that was recorded on the worksheet.

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

This model that we have created of is a representation of exponential decay, specifically it represents half-life, a scientific means of determining the age of carbon artifacts.

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

This is a lab that can be used at the beginning of the exponents section or it can be used once multiple different functions have been taught.

Lab Plan

Lab Title: M & M Lab

Prerequisite skills:

- Students must be able to create a table from data.
- 2. Students must be able to graph data onto a coordinate plane

Lab objective:

1. Accurately record the number of M&Ms being poured out of a zip lock bag.

- 2. Compare the number of pours with the number of Ms that are face up on a graph.
- 3. Determine the time of function that this procedure created.

Standards:

Mathematics K–12 Learning Standards:

• FB-F.1.a

Standards for Mathematical Practice:

- MP1, MP2, MP3, MP6 & MP7
- K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):
 - There is a reflect and record section at the end of the worksheet that I hand out that will require the students to document some of their thoughts.

Leadership/21st Century Skills:

Health/Safety Literacy Envir	ncial/Economic/Business/Entrepreneurial Lite ronmental Literacy	racy Civic Literacy	
21st Century Skills (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA &	LIFE & CAREER SKILLS	Productivity and
Creativity and Innovation	TECHNOLOGY SKILLS	Flexibility and Adaptability	<u>Accountability</u>
☑ Think Creatively	Information Literacy	□ Adapt to Change	Manage Projects
☑ Work Creatively with Others	Access and Evaluate Information	☑ Be Flexible	☑ Produce Results
☐ Implement Innovations	□ Use and manage Information	Initiative and Self-Direction	Leadership and
Critical Thinking and Problem Solving	Media Literacy		Responsibility
☐ Reason Effectively	☐ Analyze Media	☐ Work Independently	☐ Guide and Lead
□ Use Systems Thinking	☐ Create Media Products	□ Be Self-Directed Learners	Others
☐ Make Judgments and Decisions	Information, Communications and	Social and Cross-Cultural	☐ Be Responsible to
⊠ Solve Problems	Technology (ICT Literacy)	☐ Interact Effectively with Others	Others
Communication and Collaboration	☐ Apply Technology Effectively	Work Effectively in Diverse Teams	
☐ Communicate Clearly			
☐ Collaborate with Others			

Council

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

Materials

- Bags of M & Ms 50 per bag
- Graph paper

Set-Up Required:

Move desks into groups of two

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Leader is the person who pours and separates the M&Ms the only one I talk too
- Recorder fills out the table on the handout

Cooperative Learning:

- This is a classroom project that two people work on in a small group Expectations:
 - Groups will need to record data accurately graph them in detail

Timeline:

This lab will take about 20 minutes and will be followed by a classroom discussion of the data recorded and the ratios that were found.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

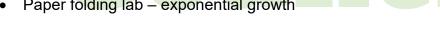
- How do scientists use carbon dating to determine the age of artifacts?
- Can you think of anything else that increases or decreases exponentially?

Career Applications

- Archeologist
- Game biologist
- Mathematician

Optional or Extension Activities

Paper folding lab – exponential growth



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