

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:

1. 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:

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

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

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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