Lab Framework

Text: CORD

Unit number and title: Unit 2: Estimating Answers: MENTOS MADNESS

Short Description: Students will perform estimation on the height of a column of Mentos (Mint)-activated soda water. After a set of observations, they will predict the minimum and maximum height a sequence of 3 more will achieve and confirm/disconfirm the prediction.

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Lab Title

Unit 2 Estimating Answers: MENTOS MADNESS

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**

  To use a ruler or tape measure to measure distance.
  Predict future results from past performance.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)

  Read ruler number scales
  Estimate fractions between ruler markings
  Determine averages

- **Vocabulary**

  Prediction
  Average
  To hold constant
  To control for

- **Materials List**

  Safety glasses for each person present
  Three cases of 24 cans of soda each (total 72 of same size and brand)
  Metric rulers
  Calculator
  Supply of mint flavor Mentos candy
  Paper towels
  Ice chests and ice

- **State Standards addressed** Math:

8.5.A Analyze a problem situation to determine the question(s) to be answered.

8.5.D Represent a problem situation, describe the process used to solve the problem, and verify the reasonableness of the solution.

8.5.F Apply a previously used problem-solving strategy in a new context.

8.5.G Extract and organize mathematical information from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.

- **Leadership Skills/ SCAN Skills/Workplace Skills**

Sociability
A. Demonstrates understanding, friendliness, adaptability, empathy, and politeness in a new and on-going group settings

C. Relates well to others

E. And takes an interest in what others say and do

Self-Management
D. Exhibits self-control and responds to feedback unemotionally and non-defensively

- **Set-up information**
  Sufficient safety glasses for all persons present!
  Maintain cans of soda at a constant temperature in ice chest
  Sufficient calculators for each group
  Some extra paper and pencils
  Dual English/metric rulers for each 4 students

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required)**
  All persons present must wear safety glasses!
  First student observes soda height when candy dropped in
  Second student records height readings made by first student
  Third student opens soda can and drops 1 mint Mentos flavor candy in when first student gives the signal
  Forth student reads out instructions and keeps group on task
  (Switch roles after 4 sodas done)

- **Teacher Assessment of student learning** (scoring guide, rubric)
  Student worksheet given to each student, and all fill-in individually after finishing

- **Summary of learning** (to be finished after student completes lab)
  -discuss real world application of learning from lab
  Was the height of the soda spurt consistent (and predictable)?
  -opportunity for students to share/present learning
  See if the other groups got similar answers.

- **Optional activities**

Write on the whiteboard the height each group found after 16 sodas were used; how close are the distances found? What could throw the measurements and computations off? Find the average for each group.

- **Career Applications**

Skill	Potential application
To be able to observe consistently.	Scientist, technician, consultant
Design experiments and make changes as needed.	Scientist, technician, consultant

LAB TITLE: Mentos Madness

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**

  Being able to make reliable and accurate observations assists to make scientific prediction. Science careers can be rewarding in many ways.

- **Grouping instructions and roles**

  Each stunt takes a role for 4 cans, and everyone then rotates duties until they have played each of the 4 roles.

- **Procedures** – steps to follow/instructions
  1. *Everyone must wear safety glasses during the procedure!*
  2. Put the soda cans in an ice chest with plenty of ice and remove 1 can just before the "drop."
  3. Tape or nail in the tape measure outside so that the 0 end is at the lip of the can.
  4. The first student positions herself 12 inches away from the can and prepares to estimate the height the soda will rise to.
  5. She tells the second student to pull a can from the chest, position it, open the can.
  6. She gives the verbal signal "DROP" when she is ready to observe. The second student will drop the candy in the can at the signal.
  7. Soda height is reported to student three.
  8. Student 4 supervises and tells when everyone should change roles after each fourth can is used.
  9. After 16 cans are used up, take a break and everyone should fill-in their individual recording forms.
  10. Do the averages and make a prediction of the next 4 soda DROPS.
  11. Do your next rotation and finish the DROPs. Again enter all recorded information into individual record sheets.
  12. See if the new DROPs conformed to our prediction of soda height!
  13. Share results with other groups.

- **Outcome instructions**
  1. You have now seen how careful measurement can make even estimated heights reliable ways to predict future results.

- **Assessment instructions** (peer-teacher)

Students should assist each other and share information and suggestions.

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Lab Data Collection

Student: _____ Date: _____

Unit: Unit 2

Lab Title: Mentos Madness?

Criteria: Write the problem/objective in statement form

Data Collection: Record the heights achieved by the Mint Mentos-soda mixture.

DROP #	Height achieved
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
1-16 Total	
*****	**********
Next 1	
Next 2	
Next 3	
Next 4	
Next 1-4 Total	

Calculations:

Divide the 1-16 total by 16 to get the average height.
Are the range of heightvery different from each other or were they similar?
Predict what the height will be for each of the next 4 DROPS.

Summary Statement:

Write a short paragraph telling what you learned today about estimation, averages and prediction.

Other Assessment(s)

None.