

Lab Template

Text: AMME Unit #6

Volume: _____

Chapter: _____

Unit number: _____

Title of unit: Working with Charts and Data

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Attach the Following Documents:

- 1. Lab Instructions**
- 2. Student Handout(s)**
- 3. Rubric and/or Assessment Tool**

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

Students will track and document the speed of the ball running down the ramp. The students will use multiple launching points on the ramp. Once they collect data they will then graph the data.

Let's Get the Ball Rolling

LAB PLAN

TEACHER: *(Teacher Prep/Lab Plan)*

⤴ **Lab Objective**

Student will work in groups and measure the speed of the ball as it runs down the ramp. Each student will have a job and each student will be responsible to collect and write down the data

⤴ **Statement of prerequisite skills needed** *(Vocabulary, Measurement Techniques, Formulas, etc.)* Students need to have a basic understanding of measuring time and distance. They should know how to collect data and create simple plots of data. They must have a basic understanding of physics

⤴ **State Standards addressed:** *(Highlight "Green" Standards, you may use your District's Power Standards if applicable)*

⤴ **Math:** A1.4.B Write and graph an equation for a line given the slope and the y-intercept, the slope and a point on the line, or two points on the line, and translate between form and linear forms

⤴ **Reading:** Students need to be capable of reading technical information to follow lab directions

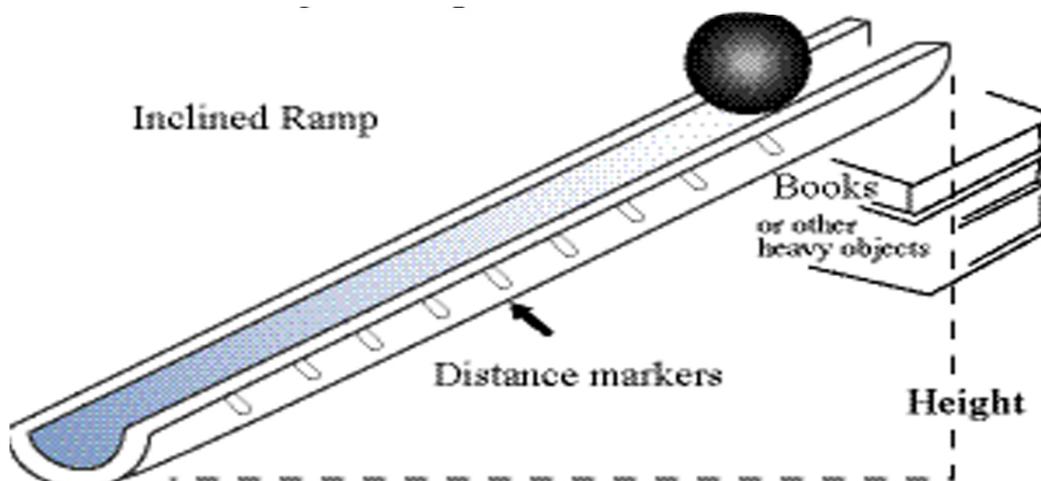
⤴ **Writing:** 3.1 Students write clearly and effectively

⤴ **Leadership:** Students will work together to interpret data about the group and brainstorm predictions about changes to data

- ⌘ **SCAN Skills/Workplace Skills:**
- ⌘ **Teacher Preparation:** *(What materials and set-up are required for this lesson?)*
 - ⌘ Materials: 1 Ramp, 1 Ball, 1 Ruler, 1 Marker,
 - ⌘ Set-Up Required: Students will take item and set up a ramp similar to the picture on the handout. If the ramp is not marked in 20 cm segments, then they will have to do so. Instructions are specified in the handout
- ⌘ **Lab Organizational Strategies:**
 - ⌘ Grouping/Leadership/Presentation Opportunities: Students will work in small groups to fill out data form, and then answer exercises together
 - ⌘ Cooperative Learning: The class will work together to explore the effect of linear transformations
 - ⌘ Expectations: Students need to be actively engaged in the lab for the effects to work for the whole class. Lack of participation is detrimental
 - ⌘ Time-line: This lab can be accomplished in two 50 minute or one block period
- ⌘ **Post Lab Follow-Up/Conclusions** *(to be covered after student completes lab)*
 - ⌘ Discuss real world application of learning from lab:
 - ⌘ Career Applications: Manufacturing data analysis, predictions
 - ⌘ Optional or Extension Activities: Make sure that all of the students are involved and please make sure that they have a little fun with the lab

Let's Get the Ball Rolling

In this lab you are going to roll a ball along a ramp and measure the time to travel different distances. Here is what your set will look like.



Activity

Groups will be comprised of 3-4 people. One person will roll the ball one person will catch the ball, and one will time the event. Here are the responsibilities for each person.

Starter

Will start the ball rolling down the ramp but must be careful not to push or hold the ball back. The best way is to hold a pencil in front of the ball and quickly pull it away. This person must also make sure it is started at one of the tape marks.

Starter _____

Catcher

The catcher's primary responsibility is to catch the ball at the bottom of the ramp and the secondary goal is to make sure that the ramp is aligned properly.

Catcher _____

Timer

Accurately time the ball from point of release to the point that it hits the bottom. Secondly you must determine the height of the ramp and decide if a run needs to be repeated.

Timer _____

Note: If you have more than three people per group, please make sure you share responsibilities equally.

Step 1

- 1) This physics experiment is a challenge for you to be as accurate as you can. If some data seems off feel free to reject it and try the run again.
- 2) Make sure, every member records their own data.
- 3) Starting from the bottom of the ramp, the ramp should be marked off in 20 cm sections. If it is not, feel free to mark them yourself.
- 4) You will attempt two trials with 4 runs per trial.
- 5) Ramp Set Up. Height of the ramp at the end = _____ cm (max 70cm) Keep the ramp at the same height for the first round.

- 6) Make sure the ramp doesn't have bend in it, if it does please try your best to fix the bend.
- 7) You'll choose 8 different distances. Select some long ones, some short ones and some medium ones. For each distance, you will roll the ball three times, record all three and then find the average time.

Trial 1			Trial 2		
Distance	Times	Average Time	Distance	Times	Average Time

Step 2

Each member will graph your results on a separate sheet of graph paper.

- 1) Label the axes as shown and use these same scales on yours.
 - a. If the distance was 0 cm, what would the time be
 - b. First plot that point (0 sec, 0 cm)
- 2) Now plot the other 8 points from the chart.
- 3) Draw a smoothing sweeping curve through most points.