Name_____ 10 points

Engineering Lab: Building a Roller Coaster

INTRODUCTION:

Engineering Goals: (1) Keep marble on track for the entire "ride" (2) Include at least one loop in your Roller coaster. (3) Marble must stop before the "safety line".

Planning question:

1.) Where do you think the tallest hill should be on the roller coaster track and why?

MATERIALS AND METHOD: Individual Design

2.) Design and Draw a model of your roller coaster. Include labels. Include measurements of heights of all hills and loops, and distance between all components. Include total length of track. You will have 12 ft. of track.

Scientific sketch of model of roller coaster, include labels and measurements.

Name_____ 10 points

FINAL GROUP DESIGN:

As a group you must now decide what you want your final design to look like. This will be the design that you will be building your first day in the lab. Each group member needs to sketch this design on their paper below. Make sure to include labels and approximate measurements. You may not use chairs, or any other materials other than those on the Price List to build your Roller coaster.

Scientific sketch of model of roller coaster, include labels and measurements.

Name_____ 10 points

DAILY REFLECTIONS.

Day 1 Reflections:

1) Design Modifications: Answer the following questions each day.

A.) What design problems did your team encounter today?

B.) What solution(s) did your team use to resolve the problem?

Day 2 Reflections:

1) Design Modifications: Answer the following questions each day.

A.) What design problems did your team encounter today?

B.) What solution(s) did your team use to resolve the problem?

Name_____ 10 points

GROUP PROPOSAL

This proposal must be approved by Miss Mac before your group can begin working.

Job Title	Student Name	Qualifications for Job
Recorder: This student will be in charge of recording all modifications to the design and recording all the measurements for the parts of the Roller coaster.		
Measurer: This student will be in charge of measuring the parts of the Roller coaster to ensure it follows the design made by the group and they will take measurements of any modifications to the design.		
Accountant: This student will keep a spreadsheet of all the materials that have been used while building the Roller coaster. They will ensure that the group does not spend more than their budget allows.		

Why will this group make a good Engineering Team?

_____

_____

_____

Name_____ 10 points

ACCOUNTANT SPREAD SHEET- DAY 1

Material Used	Equation/Work Shown	Amount Spent	Money Remaining (Beginning Budget: $55.00)

Name_____ 10 points

ACCOUNTANT SPREAD SHEET- DAY 2

Material Used	Equation/Work Shown	Amount Spent	Money Remaining (Beginning Budget: $55.00)

Name_____ 10 points

PRICE LIST

Directions: Use the pricing information to write an equation for each material to calculate the total cost for purchasing the material.

Pricing Information for Material	Equation x-each piece/item
Marble-$2.50 per day	**Cost = $2.50x**
Wide Masking Tape- $0.75 per decimeter. There is also a $2.00 service charge.	**Cost= $0.75x + $2.00**
Narrow Masking Tape- $0.50 per decimeter. There is also a $1.50 service charge.	**Cost= $0.50x + $1.50**
Strip of Sandpaper- $0.75 per strip	**Cost = $0.75x**
Foam Tubing- 6ft (Track)-$5.50 per piece per day. (You must use 2 pieces, but you can buy a 3rd piece if your group chooses to.)	**Cost = $5.50x**
Foam Tubing- 3ft (Track)-$3.25 per piece per day. (You aren't required to use this, but you can if your group chooses to.)	**Cost = $3.25x**
Meter Stick- $2.25 per day	**Cost = $2.25x**
Ruler- $1.50 per day	**Cost = $1.50x**
Cup to "catch" marble (required)- $0.75 per day	**Cost = $0.75x**

Name_____ 10 points

RECORDS SHEET- Day 1

You may measure in centimeters or inches.

Design Feature	Measurement		
	Length	Width	Height
EXAMPLE: First Hill	EXAMPLE: 18 cm long		EXAMPLE: 10 cm tall

Name_____ 10 points

RECORDS SHEET- Day 2

You may measure in centimeters or inches.

Design Feature	Measurement		
	Length	Width	Height
EXAMPLE: First Hill	EXAMPLE: 18 cm long		EXAMPLE: 10 cm tall

Name_____ 10 points

Roller coaster Project Scoring Guide

Item	Description	Points Possible	Pts Received
Marble Completes 3 Runs without falling off or getting stuck.	All or nothing	10	
Roller coaster is at least 5 feet long & includes at least 1 loop.	All or nothing	10	
Marble only pushes cup two feet from the end of the Roller coaster (safety element).	Pushes Cup 2 ft. or Less: 10 points Pushes Cup 2- 3 ft. : 7 points Pushes Cup more than 3 ft. : 4 point	10	
Roller coaster is designed only using approved materials.	All or nothing	10	
Introduction Sheet: Individual Roller coaster Design	Excellent & Complete Work: 10 points Minor Errors or Minor Omissions: 7 points Major Flaws or Mostly Incomplete: 4 points	10	
Final Group Design	Excellent & Complete Work: 10 points Minor Errors or Minor Omissions: 7 points Major Flaws or Mostly Incomplete: 4 points	10	
Daily Reflections	Excellent & Complete Work: 10 points Minor Errors or Minor Omissions: 7 points Major Flaws or Mostly Incomplete: 4 points	10	
Accountant Spread Sheet	Excellent & Complete Work: 10 points Minor Errors or Minor Omissions: 7 points Major Flaws or Mostly Incomplete: 4 points	10	
Records Sheet	Excellent & Complete Work: 10 points Minor Errors or Minor Omissions: 7 points Major Flaws or Mostly Incomplete: 4 points	10	
Cooperation & Effort	Excellent Cooperation & Effort: 10 points Minor Issues & Occasional “Visits” by Miss Mac: 7 points Inappropriate Behavior & Major Disagreements: 4 points	10	
Total points		100	