



It's a Wild Ride!

Preface

Get ready for a thrilling ride of adventure in your classes as we explore the underpinnings of roller coasters. This unit will provide a real-world application of how you use math, science, and language arts skills to deepen your understanding of how things operate in the real world.

You are given the task to design the ultimate ride for the Canyon Coaster Amusement Park. The park needs to increase their attendance or go bankrupt. They need a ride that will attract students like you, therefore, increasing their profits.

Continue reading for a complete description of your task.

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I. Requirements of the Project

You will work in a group to complete the following components of your project. Each of you will be assigned a specific job. It is your responsibility to complete the task for that job, making sure it supports the other job roles. Each group must produce a presentation to deliver to a committee from the Canyon Coaster Amusement Park. The presentation must include the following:

- Blueprint of the design.
- Artistic rendition of the ride
- Research that will persuade the committee to purchase your design
- Technical report highlighting the specific aspects of the ride.

II. Overview of Job Roles

You will be assigned a grade based on your chosen job. Although this is a group project, you will receive a grade for your work only. You may also earn bonus points based on how well your piece fits together with the other members of the group and how well you work together.

Architect Responsibilities

- Journal entries
 - sketches or
 - pictures
 - daily log
- Evidence of descriptive writing
- Realistic rendition of roller coaster including:
 - outside environment
 - theatrical or not
 - type of land it sets on and where
- Correct labeling of measurements for speed, distance, and time.
- Calculate slope of first drop
- Find the angle of descent for the first drop
- To Scale
- Graph motion
- Maquette model

Researcher Responsibilities

- Internet research documentation
- Creative research presentation to include in group's PowerPoint such as a magazine or newspaper
- Journal Entries
 - sketches
 - pictures,
 - daily log
- Evidence of research and writing skills.

Public Relations Director Responsibilities

- Evidence of persuasive writing skills
- Journal entries
 - sketches
 - pictures
 - daily log
- Presentation format of group
 - video, brochure, or multimedia presentation
- Presentation should include:
 - safety measures
 - unique features
 - highlight materials used and coaster specs
 - car design
 - some information from each of the other jobs

Engineer Responsibilities

- Evidence of technical writing skills
- Journal entries
 - sketches
 - pictures
 - daily log
- Technical report to include:
 - car and track design description
 - research on design elements and materials
 - mathematical configurations
 - safety measures-forces
- Correspondence with an outside source through:
 - interview
 - fax
 - email
 - online
- Maquette Model

III. Job Roles Work Schedule

	Architects	Engineers
	Math	Science
1 st Block	Blue Print <ul style="list-style-type: none"> Establish scale Draw continuous side view Draw top view 	Maquette: <ul style="list-style-type: none"> Label potential and kinetic energy of maquette Determine speed of each section based on force and motion principals
2 nd Block	<ul style="list-style-type: none"> Finish blueprint drawing Label track 	<ul style="list-style-type: none"> Research safety measures and designs. Take notes and make sketches
3 rd Block	<ul style="list-style-type: none"> Slope of first drop Angle of the first drop 	<ul style="list-style-type: none"> Research track material and design. Make sketches. Research car design. Create drawing of car design.

Researchers	Public Relations
Language Arts	All Classes
Research Planning Sheet: <ul style="list-style-type: none"> Database Select project format Start taking notes 	Storyboard: <ul style="list-style-type: none"> Brainstorm with other PR people Create the story board Review specific do's and don'ts when creating presentation
<ul style="list-style-type: none"> Read and take notes from sources Planning chart 	Script: <ul style="list-style-type: none"> Create background, main headings, graphics, video clips, etc. PowerPoint slides, or other display
<ul style="list-style-type: none"> Start working on project Begin outline and rough draft using AlphaSmart boards 	<ul style="list-style-type: none"> Finish visuals Start presentation script

	Architects	Engineers
	Math	Science
4 th Block	Artistic Rendering of Coaster: <ul style="list-style-type: none"> • 3-D view • Stay proportional (no giant people, etc.) 	<ul style="list-style-type: none"> • Prepare information to be put in the PowerPoint presentation.
5 th Block	<ul style="list-style-type: none"> • Finish artistic rendition • Graph motion • Check grade chart 	<ul style="list-style-type: none"> • Communicate with an outside source. • Check grade chart

Researchers	Public Relations
Language Arts	All Classes
<ul style="list-style-type: none"> • Continue writing draft • Revise and edit work 	<ul style="list-style-type: none"> • Write presentation script
<ul style="list-style-type: none"> • Final copy ready for group presentation • Check grade chart 	<ul style="list-style-type: none"> • Final touches for group presentation • Check grade chart

IV. Group Planning Sheet

Assign Job Roles:

Engineer: _____

Architect: _____

Public Relations: _____

Researcher: _____

Engineer

• Type of track: _____

• Type of passenger system: _____

• List specific design elements of ride:

Architect

• List special effects and features that are part of the ride.

• Time of ride: _____

• Top speed: _____

Architect and Engineer need to each make an identical maquette model

Public Relations

• Type of presentation format _____

• List the steps that you will take to produce this presentation

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Researcher

Based on your Internet scavenger hunt, choose a specific topic to create a research project.

• List some ideas you could research.

• How does this help sell your group's ride?

The name of your ride is: _____

Sketch a rough draft of the ride below, include as much detail as possible.

V. Researcher Tasks

Remember! You need to relate your research paper to the entire group project. (Example: discuss safety issues, location, main attractions at theme parks etc.) Support your topic/thesis by researching and finding evidence.

- Complete a Planning Sheet.
- You must find and document several sources for your paper.
 - Use the database
- Take notes from your sources on note cards or on the planning sheet.
- Make an outline and rough draft (using alpha-smart boards)
- Edit your paper! (Use Mrs. Whitesell or another adult.)
- Make a "Works Cited" page. (See examples.)
- Final Draft

Planning a Research Report

My report will be about: _____

Here are questions I want to answer in my report.

Research the answers to your questions. Write the information on note cards. Did you add or change any questions as you did your research? Write any new or different questions here.

Now write the main topics for your outline. Think about the best order for your main topics.

I. _____

 II. _____

 III. _____

 IV. _____

 V. _____

Finding and Documenting Sources

(Taking Notes)

- Use the database that was created during Science. (Internet)
- Use the Readers' Guide
- Use any other book sources that may help you. (Guinness Book of World Records, etc.)

As you read your research, any information should be written on note cards. (Get these from Mrs. Whitesell.)

Note Taking (using note cards)

Write down important details and quotations, along with the page numbers where this information can be found.

Summarize:

To summarize, _____ what you have read to a few important _____.

Paraphrase:

_____ what you have read using your _____.

Quote Directly:

Record the statement or idea _____ for _____.

Give each card a descriptive heading (a word or phrase to highlight the main idea of that note card.)

Make an Outline

Organize your note cards into their most logical order and use them to construct an outline. Then, search for any additional information that may be needed to develop your thesis.

Revise your first draft several times.

- Use the editing symbols that we have used in class.
- Have an adult check your work.
- Important questions to answer:
 - Do you have a clear, specific thesis statement?
 - Do you have evidence in your paper that supports your thesis statement?
 - Have you checked for spelling, grammar, and punctuation errors?

Document your sources.

- Put the works cited section together, listing all of the sources you have cited in your paper.
- Give credit in your paper for ideas and direct quotations that you have used from different sources.
- For specific details on citing your sources, see the blue, "Writing With Style Manual" in the back of the room.
- Make sure your Final draft is as complete and error free as possible!

Writing and Completing the Research Paper

Use your outline to type a rough draft. (Use the AlphaSmart boards)

WRITING TIPS

Use your own words as much as possible. Use direct quotations only when the wording in the quotation is exactly as you want it. Drop statements that you cannot support with facts and opinions.

Introduction: Say something interesting, surprising, or personal about your subject to gain your readers' attention. You should also identify the specific focus, or thesis of your research.

Body: Support or prove your thesis. You may want to consider giving important background information and interesting or surprising facts.

Conclusion: Should leave readers with a clear understanding of the importance of your research. Review important points you have made and draw a final conclusion.

Research Project Checklist

- ___ 1. Internet research using database
- ___ 2. Took notes and cited sources
- ___ 3. Created design layout
- ___ 4. Organized information to fit design layout
- ___ 5. Completed rough draft
- ___ 6. Had rough draft edited by parent, peer, or teacher
- ___ 7. Final copy
- ___ 8. Completed self-evaluation (next page)

Research Paper Rubric

	It's a Wild Ride!	It's a Fun Ride!	Still Waiting in Line
Sources: Uses internet research and traditional research (magazines, reference books, newspapers) Sites sources with a Works Cited page			
Writing Skills: Mature sense of audience and purpose. Logical, effective, and engaging details and examples. Inviting introduction.			
Conventions: Few, if any, errors in mechanics, usage, spelling, and sentence			
Creativity: Interesting information and appealing layout, design is neat and readable			
Purpose: Relates to overall project; helps to "sell" the ride.			

VI. Public Relations Tasks

You are the person that needs to really "sell" your ride. Use all of the information from your team members to develop a presentation.

- Begin by deciding on your presentation format.
 - (Powerpoint, digital scrapbook, web site etc.)
- Brainstorm with other PR people. Get some ideas on how to complete this job.
- Develop a story board
 - Plan a step by step of your presentation. You will need a verbal script of your presentation

Make your presentation appealing. Use graphics, images, catchy sayings, video clips etc. Anything that says, WOW!

- Plan the presentation.
 - Who will say what during the presentation? (Plan what each team member will be doing during the presentation. Use the chart below.)
- Practice the presentation.
 - Run through it several times, before the presentation day.

Plan presentation jobs:

Architect:

Engineer:

Researcher:

Public Relations:

Storyboard

Screen #1



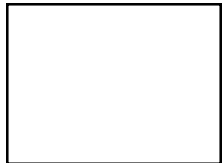
Screen #2



Screen #3



Screen #4



Screen #5



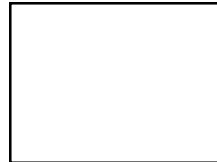
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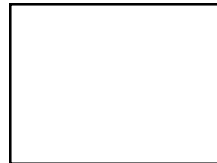
Screen #7



Screen #8



Screen #9



Screen #10



Public Relations Scoring Guide

	It's a Wild Ride!	It's a Fun Ride!	Still Waiting in Line
Presentation uses technology effectively			
Presentation uses persuasive techniques to sell the ride			
Presentation ties together all job roles into one complete project			
Presentation is creative and says, "WOW!"			

VII. Architect Tasks

- Make maquette model of group's roller coaster design.
- Blue Print
 - Establish the scale
 - Draw continuous side view using two dimensions
 - Draw top (include loading platform) using two dimensions
 - Design car
 - Label track
- Create a graph

Questions to consider:

- How long does it take your car to travel each section of the track.
 - (Take the length of each section of track and divide by the speed you estimate the car will be traveling during that section.)
- What is the overall length of the track?
- How long will your ride last?

Artistic Rendition

- 3-D View
- Add back-drop (setting)
- Maintain a scale perspective (no giant people, trees, etc.)

Chart for Segments of Track

Points	H	D	S	Time	T Time
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Architect Scoring Sheet

	It's a Wild Ride!	It's a Fun Ride!	Still Waiting in Line
Journal entries are complete			
The Blueprint			
Established an appropriate scale			
Continuous side view to scale			
Top view to scale			
Track is correctly labeled for speed, time, distance, and forces			
Car design			
The Artistic Rendition			
3-D view of track			
Added back-drop			
Maintained a scaled perspective			

VIII. Engineer Tasks

Check when finished:

- ___ Sketch design of roller coaster on paper
- ___ Make a Maquette model identical to Architect
- ___ Divide track into sections and number each segment
- ___ Determine the speed of each section based on force and motion principles. Use the computer stations to gather information. Record on chart.
- ___ Determine materials used for track—Use computer stations to gather information.
- ___ Determine car design.
- ___ Determine the distance for each section and record on chart.
- ___ Calculate for time and record on chart.
- ___ Calculate for acceleration and record on chart.
- ___ Readjust if necessary
- ___ Create a speed/distance graph and/or distance/time graph

Notes from computer station:

Notes on Safety, Car Design, and Track Materials:

Chart for Segments of Track

Points	F	M	PE	KE	A
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Engineer Scoring Guide

	It's a Wild Ride!	It's a Fun Ride!	Still Waiting in Line
Journal entries are complete and thorough			
Technical report: car and track design, research on materials and design, math calculations, safety design, evidence of Newton's Laws applied.			
Calculations are correct and charts and graphs represent calculations			
Speed, distance, time, and acceleration are included			
Evidence of communication with outside source			

IX. Journal Entries

Complete a journal entry after each block. State what you have accomplished. List any frustrations and breakthroughs you experienced. Share how you think your group is working.

First Block	
Second Block	
Third Block	
Fourth Block	

Fifth Block	
Team Block	
Extra Time or at Home	
Whole Group Presentation	

X. Committee Scorecard

	It's a Wild Ride!	It's a Fun Ride!	Still Waiting in line
Group "sells" their ride. Presentation is persuasive.			
All Project components are connected and relate to one another			
Ride is creative and unique			
Presentation is organized			
Maquette's blueprint, technical project, and research project are present			
The group achieves synergy!			