

Roller Coaster Project

Deeper Learning Postcard



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Highlights

Vetted Project: Students designed and constructed and presented paper roller coasters hoping to have the coaster with the greatest timed "ride". A marble travelled through the twists and turns of the coasters. Groups presented the physics of their coasters as well as what was similar and unique about their coaster with respect to the other coasters. Mr. Elliott videoed the presentations. Fun was had by all!

Sustainability: Video for elementary school to view and select coasters sent to elementary school allowing students to interact with roller coasters.

Driving Question: Can I construct a paper roller coaster with the longest ride?

Teacher Reflection: Video coming soon!!! I realized the research paper was beneficial. Every group member was responsible for their own research and then there was a group component. Allowing about three weeks of random class time was sufficient. (The paper was showing signs of fatigue.) I need to emphasize that the box is a platform for the artists of the group. Calculating their average velocities and showing three centripetal acceleration locations was well received. Three colored pamphlets were supportive. (10 were not needed) I really appreciate Mr. Elliott giving my students his time with the video taping of the projects. The two test run growths worked out very well. Each coaster had a theme, the students seemed to enjoy their themes. Fun was had by all!

Lessons Learned: Limit the height to 1.7m. Limit time to build to about 6 sessions.

WANTS

I. Authenticity

Performing: The roller coaster was tested with the marble.

Performing

Speech or Spoken Word Performance

Demonstrating

Exhibit / Contest

Producing / Revising

Execute Multiple Drafts

Model or Prototype

Product

Test for Quality / Integrity

Presenting

Display Calculations & Trends

Utilize Visuals

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II. Media Produced

Digital Content

Video Content

Tactile

Building

III. Challenging Problems

Questions

Build a Better World

Topics: Physical World

Numbers & Shapes

Time & Dimensions

Topics: Humans in the World

Machines in Society

Topics: Of the Mind

Implications of Decisions

IV. Achieved Literacy Skills

Leadership: All groups were asked to dress similarly on presentation day.

Project / Work

Adapt to Ambiguity / Changing Priorities

Address Setbacks / Criticism

Adjust to Schedules / Contexts

Balance Various Roles / Responsibilities

Learn / Develop Expertise

Manage Time / Workload

Take Initiative for Personal Success

Leadership

Lead with Respect

Leverage Strengths of Others

Present a Professional Appearance

I. Parameters & Feasibility

Assessment Timeframe: Marble was timed from marked start to marked end on each coaster during presentation. The coasters were constantly tested over several class meetings.

of Project Members: 35 members per group.

Grade Level: High school students built the coasters, people of all ages enjoy tested the coasters.

Project Timeframe

3-4 Weeks

Assessment Timeframe

Timed Assessment

More than a Class Period

of Project Members

Small Group

Grade Level

Pre-K

Elementary (Grades K-5)

Middle School (Grades 6-8)

High School (Grades 9-12)

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Authentic Audience / Evaluators

Peers

Teachers & Administrators

Community Members

Special Test Accommodations

Presentation of Materials / Directions

Timing / Scheduling

II. Intended Learning Outcomes

Creativity: Students recognized that the paper card stock had limits.

Communication: Students created a pamphlet that described their coaster and listed the calculations that were presented.

Creativity

Design / Create

Improve / Refine

Recognize Limits

Communication

Business Presentation

Sales Pitch

Collaboration

Assume Shared Responsibility

Encourage Others

Exercise Flexibility

Ignore Distractions

Incorporate Feedback

Manage People / Team

Respond to Failure

Value Contributions Made by Others

Work with Diverse Teams

Critical Thinking

Assemble Parts of a Whole

Model with Math

Overcome Obstacles

Solve Problems Innovatively

Instilled Citizenship Values

Community Service

Strong Personal / Work Ethic

Student / School Governance

III. Success Skills & Depth of Knowledge

Cognitive: Research paper to paper coaster.

Cognitive Demand

Identifying / Remembering

Comprehending / Understanding

Applying

Analyzing

Evaluating

Creating

Social & Emotional Skills

Group-awareness

Group-management

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Learning Styles / Intelligences

Bodily / Kinesthetic

Logical / Mathematical

Assessment Structures / Resources

Portfolios Rubrics

IV. CTEs & Disciplines

CTEs: Researched existing coasters. Compared and contrasted existing roller coasters before building their own roller coaster.

Career & Technical

Architecture & Construction

Education

STEM Research & Applications

Engineering

Mechanical Engineering

Mathematics

Basic Math

Algebra & Trigonometry

Sciences

General Sciences

Physics