Suggestions and expectations for your rollercoasters

1. Everyone must play a role in the research/ design of the project.
2. Everyone is responsible for your materials other than what I provide (either from home or purchased)
3. Nothing breakable may be used.
4. Your project needs to be able to be easily broken down and stored in the room between the practice day and demonstration day.

Roller Coaster Design Lab - IB Subject Year 1

Names: _____, _____, _____, _____

Over the next few days you will design a roller coaster. You will have 3 days in class to research and design your roller coaster, determine the materials needed, assign the parts to the group and draw out your design. This lab will be a test grade in addition to IB grades for criterions B and C. YOUR GROUP must show that you can work together, and you are ALL responsible for the design components and the execution of your design.
Your group is responsible for bringing and maintaining the materials needed- including materials needed to hold the components together as well as whatever objects you will be using to test and demonstrate your roller coaster. It will need to come apart to store easily between your "test day" and demonstration day since I will have many projects in the classroom

You may use any notes, your textbooks, in school technology, as well as research at home to help with the design. Your final work must include your roller coaster design, a list needed materials, a detailed drawing of your design and a procedure that others could follow to recreate your design. INCLUDE also any changes that you make to your team design throughout the process to ensure the effectiveness of your roller coaster!

Rubric for IB for Grading – Year 1

Criterion B: Inquiring and Designing

At the end of year 1, students should be able to:

i: Describe a problem or question to be tested by a scientific investigation
ii: Outline a testable hypothesis and explain it using scientific reasoning
iii: Describe how to manipulate the variables, and explain how data will be collected
iv: Design scientific investigations

Achievement Level	Level Descriptor	Task Specific Clarifications
0	The student does not reach a standard indicated by any of the descriptors below.	
1 - 2	The student is able to: i. **state** a problem or question to be tested by a scientific investigation, with **limited success** iii. **state** the variables iv. design **a method, with limited success**.	You were somewhat able to write a procedure for a roller coaster and test it (but with limited success). You included the variables of your experiment. You were also able to design a procedure that could be followed but with limited success.
3 - 4	The student is able to: i. **state** a problem or question to be tested by a scientific investigation iii. **outline** how to manipulate the variables, and **state** how **relevant data** will be collected iv. design a **safe method** in which he or she **selects materials and equipment**.	You were able to write a procedure for a roller coaster and test it (with some success). You included the variables of your experiment. You were also able to design a procedure that could be followed but with limited success using the selected materials.
5 - 6	The student is able to: i. **outline** a problem or question to be tested by a scientific investigation iii. **outline** how to manipulate the variables, and **outline** how s**ufficient, relevant data** will be collected iv. design **a complete and safe method** in which he or she **selects appropriate materials and equipment**.	You were able to write a procedure for a roller coaster and test it (but with some success). You included the variables of your experiment. You were also able to design a procedure that could be followed with some success. You were also able to design a complete that could be followed using selected materials.
7 - 8	The student is able to: i. **describe** a problem or question to be tested by a scientific investigation iii. **describe** how to manipulate the variables, and **describe** how **sufficient, relevant** data will be collected iv. design a **logical, complete and safe method** in which he or she **selects appropriate materials and equipment**.	You were able to write a procedure for a roller coaster and test it (with success). You included the variables of your experiment. You were also able to design a procedure that could be followed with success. You were also able to design a logical, and complete procedure that could be followed using selected materials.

Criterion C: Processing and Evaluating

At the end of year 1, students should be able to:

i: Present collected and transformed data
ii: Interpret data and describe results using scientific reasoning
iii: Discuss the validity of a hypothesis based on the outcome of the scientific investigation
iv: Discuss the validity of the method
v: Describe improvements or extensions to the method

Achievement Level	Level Descriptor	Task Specific Clarifications
0	The student does not reach a standard indicated by any of the descriptors below.	
1 - 2	The student is able to: i. **collect and present** data in numerical and/or visual forms ii. **accurately interpret** data iv. **state** the validity of the method **with limited reference** to a scientific investigation v. **state limited** improvements or extensions to the method.	You were able to collect, present, and accurately interpret your data. You could state the validity of your procedures with limited reference to scientific investigation. You state limited improvements to your method of experimentation for your roller coaster.
3 - 4	The student is able to: i. **correctly collect and present** data in numerical and/or visual forms ii. **accurately interpret** data and **describe** results iv. **state** the validity of the method based on the outcome of a scientific investigation v. **state** improvements or extensions to the method that would benefit the scientific investigation.	You were able to collect, present, and accurately interpret your data. You could state the validity of your procedures with some reference to scientific investigation. You state some improvements to your method of experimentation for your roller coaster.
5 - 6	The student is able to: i. **correctly collect, organize and present** data in numerical and/or visual forms ii. **accurately interpret** data and **describe** results **using scientific reasoning** iv. **outline** the validity of the method based on the outcome of a scientific investigation v. **outline** improvements or extensions to the method that would benefit the scientific investigation.	You were able to collect, present, and accurately interpret your data. You could state the validity of your procedures with reference to scientific investigation. You state many improvements to your method of experimentation for your roller coaster.
7 - 8	The student is able to: i. **correctly collect, organize, transform and present** data in numerical and/ or visual forms ii. **accurately interpret data** and **describe** results **using correct scientific reasoning** iv. **discuss** the validity of the method based on the outcome of a scientific investigation v. **describe** improvements or extensions to the method that would benefit the scientific investigation.	You were able to collect, present, and accurately interpret your data. You could state the validity of your procedures with many references to scientific investigation. You state many improvements to your method of experimentation for your roller coaster.

SCORE /8

Reflection:

(Guiding Questions: How could this lab be improved? What was the most interesting part about this lab? What was the least interesting part about this lab? What could you do on the next lab to improve the outcome of the final product?)

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Areas of Growth: (Teacher use only)

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