Project: Newton's Laws of Motion

Background: Sir Isaac Newton lived during the 1600s. Like all scientists, he made observations about the world around him. Some of his observations were about motion. His observations have been supported by more data over time, and we now call these Newton's Laws of Motion. His laws of motion explain rest, constant motion, accelerated motion, and describe how balanced and unbalanced forces act to cause these states of motion.

Newton's 1st Law: ***An object in motion will stay in motion and an object at rest will stay at rest unless acted on by an unbalanced force.***

- An object will not change its motion unless a force acts on it
  - An object that is not moving remains at rest until something pushes or pulls it.
  - An object that is moving remains moving until something pushes or pulls it.
- All objects resist having their motion changed.
  - This tendency to resist a change in motion is called inertia.
  - The more mass an object has, the greater its inertia.

Newton's 2nd Law: The force of an object is equal to its mass times its acceleration.

- A change in motion occurs only if a net force is exerted on an object.
  - A net force changes the velocity of the object, and causes it to accelerate.
  - If a net force acts upon an object, the change in velocity will be in the direction of the net force.
- The acceleration of an object depends on its mass.
  - The more mass an object has or the more inertia it has, the harder it is to accelerate.
  - More mass means less acceleration if the force acting on the object is the same.

Newton's 3rd Law: For every action there is an equal and opposite reaction.

- When one object exerts a force on a second object, the second object exerts an equal force in the opposite direction on the first object.
  - The force exerted by the first object is the action force.
  - The force exerted by the second object is the reaction force.

What to do:

1. Illustrate an example of **each** of the three laws of motion. You may do this by making a:
   a. Poster
   b. PowerPoint
   c. Video
   d. Demonstrations (You must include a written mini lesson plan of what you will do and say for each law for me to grade. You also must provide your own supplies.)
   e. Have a different idea? Run it by me first!
2. Images may be hand drawn, cut from magazines or from the Internet.
3. You must include an explanation ***IN YOUR OWN WORDS*** of how the illustration demonstrates or describes the law of motion. Put the explanation next to the illustration so it is clear which illustration goes with each description.
4. Make sure your project is colorful, neat, and interesting!
5. Use the checklist to make sure you have completed every aspect of the project.

How you will be evaluated:

- This counts as a 100-point test grade
- The rubric on the following page will be used to evaluate your work.

Newton's Laws of Motion Project Rubric

	Excellent *(20 points)*	Satisfactory *(19-16 points)*	Needs Improvement *(15-10 points)*	Unacceptable *(9-0 points)*
Newton's 1st Law Visual and Description	• All information in the description is accurate. • The illustration accurately represents the law. • No errors in illustration or explanation. • All information is complete.	• All information in the description is accurate. • The illustration accurately represents the law. • No errors in illustration or explanation. • Information is mostly complete.	• Information in the description is partially accurate. • The illustration partially represents the law. • Some errors in illustration or explanation. • Information is somewhat complete.	• Information in the description is inaccurate. • The illustration inaccurately represents the law. • Major errors in illustration or explanation. • Information is incomplete.
Newton's 2nd Law Visual and Description	• All information in the description is accurate. • The illustration accurately represents the law. • No errors in illustration or explanation. • All information is complete.	• All information in the description is accurate. • The illustration accurately represents the law. • No errors in illustration or explanation. • Information is mostly complete.	• Information in the description is partially accurate. • The illustration partially represents the law. • Some errors in illustration or explanation. • Information is somewhat complete.	• Information in the description is inaccurate. • The illustration inaccurately represents the law. • Major errors in illustration or explanation. • Information is incomplete.
Newton's 3rd Law Visual and Description	• All information in the description is accurate. • The illustration accurately represents the law. • No errors in illustration or explanation. • All information is complete.	• All information in the description is accurate. • The illustration accurately represents the law. • No errors in illustration or explanation. • Information is mostly complete.	• Information in the description is partially accurate. • The illustration partially represents the law. • Some errors in illustration or explanation. • Information is somewhat complete.	• Information in the description is inaccurate. • The illustration inaccurately represents the law. • Major errors in illustration or explanation. • Information is incomplete.
Presentation	• Student demonstrates thorough understanding of the content in their presentation. • Time is effectively used. • Information is clear.	• Student demonstrates an understanding of the content in their presentation. • Time is effectively used. • Information is clear.	• Student does not demonstrate complete understanding of all of the content. • Time is somewhat effectively used. • Information is not completely clear.	• Student does not demonstrate a complete understanding of all of the content. • Time is not effectively used. • Information is not clear.
Overall Appearance of Project	• Project demonstrates excellent student effort and time put into its completion. • Project is neat and organized. • Overall project demonstrates creativity and a thorough understanding of the laws.	• Project demonstrates satisfactory student effort and time put into its completion. • Project is neat and organized. • Overall project demonstrates creativity and an understanding of the laws.	• Project demonstrates a lack of student effort and time put into its completion. • Project is somewhat neat and organized. • Overall project somewhat demonstrates creativity and not a full understanding of the laws.	• Project demonstrates unsatisfactory student effort and time put into its completion. • Project is not neat and organized. • Overall project does not demonstrate creativity or an understanding of the laws.

Additional Comments:

Total Points Earned:_____/100

Newton's Laws of Motion Project Checklist

Use the list to make sure you have completed every aspect of the project. You may also use the rubric I will be using as a reference too. It's a good idea to practice your presentation as well so you feel comfortable and don't exceed the time limit.

Newton's 1st Law Visual and Description:

☐ Accurate description of Newton's 1st law in own words
☐ Visual/illustration accurately represents the law
☐ There are no errors in the illustration or explanation
☐ The law is completely explained.
☐ Visual and description are clearly labeled with the appropriate law and located together

Newton's 2nd Law Visual and Description:

☐ Accurate description of Newton's 2nd law in own words
☐ Visual/illustration accurately represents the law
☐ There are no errors in the illustration or explanation
☐ The law is completely explained.
☐ Visual and description are clearly labeled with the appropriate law and located together

Newton's 3rd Law Visual and Description:

☐ Accurate description of Newton's 3rd law in own words
☐ Visual/illustration accurately represents the law
☐ There are no errors in the illustration or explanation
☐ The law is completely explained.
☐ Visual and description are clearly labeled with the appropriate law and located together

Presentation:

☐ Can thoroughly explain each law and the connection between the description and the visual you chose
☐ Presentation is no longer than 5 minutes
☐ Presentation of the information is clear so that the class can understand the content and what you are saying
☐ **If using a video,** the camera is stable, sound is clear and understandable, and transitions are smooth.
☐ **If demonstrating for the class,** must provide all supplies needed and demonstrations have clearly been practiced beforehand.
☐ **If using a video or PowerPoint,** make sure it is saved in a format that can be displayed to the class. You may want to come by BEFORE the project is due to make sure it will open and work correctly on my computer. You do not want late points taken off because your project can't be accessed/opened on the day it is due!

Overall Description of Project:

☐ Effort and time put into the completion of the project should be evident
☐ Project is neat
☐ Information is clearly organized
☐ Project demonstrates creativity
☐ Project demonstrates a complete understanding of all of the laws