

THE PHYSICS OF... PROJECT

Many sports, activities hobbies, or technologies contain great examples of physics in action. In this project you will demonstrate and explain important physics concepts through a sport, activity, hobby or technology. You should:

- Identify and explain the physics involved.
- Reference several different topics in physics.
- Identify physics variables that are important to the activity, such as mass, angle, acceleration, etc.
- Describe how those variables play a role in the activity.
- Are the optimal values for those variables that maximize outcomes?

Your work should be presented in the form of a slide show, video, or a web-page and share it with Mr. Mont.

Topic	Variables	Concepts
Forces	Weight, Normal Force, Friction, Drag, Coefficient of Friction, mass, acceleration	1st Law, 2nd Law, 3rd Law
Motion	distance, position, change in position, speed, direction, velocity, acceleration, time	kinematics equations, free fall
Projectiles	Velocity, launch angle, range, maximum height, time	Independence of x and y, angle's effect on range maximum height and time
Circular Motion	angular velocity, tangential velocity, centripetal acceleration, centripetal force	angular vs tangential velocity, forces that provide centripetal force, centrifugal "force", g's of a turn
Center of Mass/ Rotation	position of center of mass, torque, rotational inertia, angular momentum	locating center of mass, toppling & stability, rotational variables depend on radius, center of mass and the laws of physics, conservation of angular momentum
Energy	Elastic PE, Gravitational PE, Kinetic E	conservation of energy, heat losses
Momentum	mass, velocity, time, force, impulse	conservation of momentum, elastic vs inelastic collisions

Grade	Span	Depth	Presentation
A	You identify variables and concepts from four or more different areas of physics	You explain how those variables and concepts affect the activity clearly and with detailed examples.	The information is presented in a clear, professional, error free, and appealing way. Graphic representations, diagrams, pictures or other multimedia reinforce ideas for effective communication. All references are cited.
B	You identify variables and concepts from three different areas of physics	You explain how those variables and concepts affect the activity clearly.	The information is presented in a clear, professional, and appealing way. Graphic representations, diagrams, pictures or other multimedia are included. All references are cited.
C	You identify variables and concepts from two different areas of physics	You give only brief descriptions of the variables and concepts involved.	The information is presented, but is not always clear. Graphic representations, diagrams and pictures are omitted or not very helpful for understanding. All sources are cited.
D	You identify variables and concepts from only one area of physics	You only list concepts or variables involved with little explanation.	Information is not clearly presented or is copied and pasted from sources. Sources are not cited.