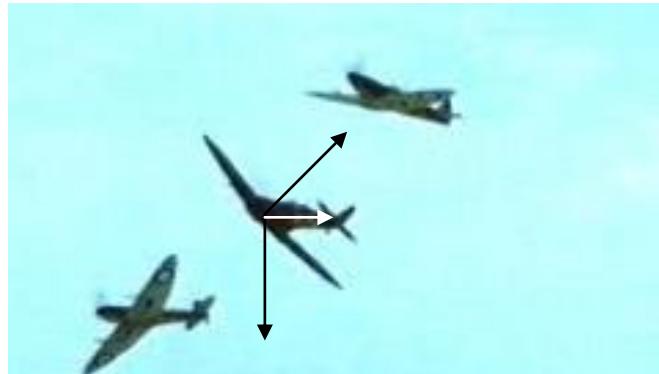


Notes for the use of the Movie Clips DVD

Intro: This is a series of very short clips from several of the movies used to make the DVD. It was designed to be shown on the first day of class for the year, when the students are most motivated to learn.

Banking planes (*Pearl Harbour*, conical pendula / banked corners):

Several instances of planes banking to the left or right. If the clip is shown on a TV or projected onto a white board, you can pause the clip when you get a good view of a plane and draw the weight, lift and centripetal forces over the picture:



Bomb projectile (*Pearl Harbour*, projectile motion): A bomb falls from a Japanese Zero, but what's wrong with this picture? After studying projectile motion, your students should be able to identify that the bomb should not drop directly towards the ship as shown. This is obviously a CGI sequence.

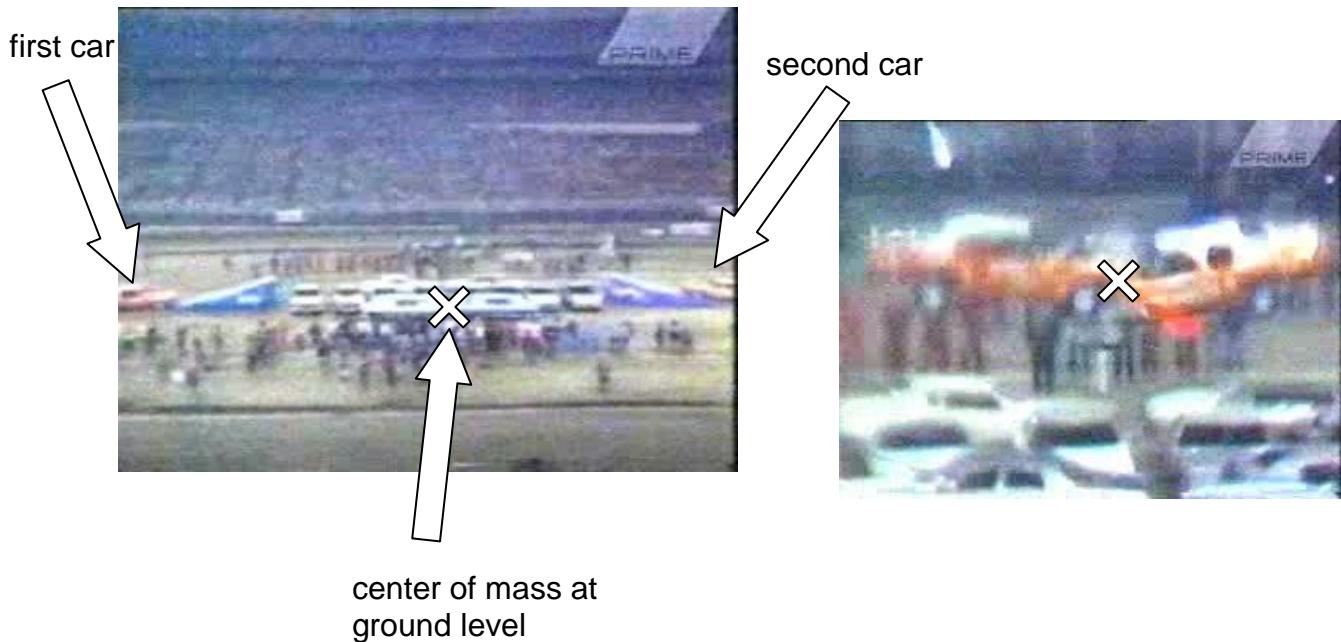
Bus Cornering (Speed, center of mass, stability): As the bus rounds the corner, its center of mass tries to keep going in a straight line (at a tangent to the circle) but the friction on the wheels pulls it into the corner; as long as the center of mass stays above the wheel base the bus will not tip. Why do the passengers have to move to one side?

Bus Jump (Speed, projectile motion): Most kids should pick up that a bus that leaves a horizontal road shouldn't end up at the same height over a distance of 50 feet!

Ferris Wheel (*The Notebook*, forces at an angle): A nice shot of Noah hanging by two hands from the frame of a Ferris Wheel. Pause the clip and trace Noah's weight force acting from his navel and the two tension forces in his arms.

Jetski Projectile (some stunt show on *Prime*, projectiles): A stupid woman flings herself off a 100 foot waterfall, providing us with some cool projectile footage.

Midair collision (*Prime* stunt show, center of mass of two bodies / inelastic collisions): Two cars in a mid-air head-on collision. Their common center of mass remains right between them as they fly through the air, but when the upthrust from the ramps provides an unbalanced external force, the center of mass rises up to meet them.



Parachute Jump (*Bridget Jones' Diary*, balanced forces): Before Bridget opens her parachute, the forces on her are unbalanced, but after the 'chute is open, you can pause and draw.

Pirate Fall (*Pirates of the Caribbean*, mechanical resonance / rotational motion / motion under gravity): A goldmine of physics, all in one scene!

Pirate Pendulum (*Pirates of the Caribbean*, mechanical resonance / pendulum):

Not a simple pendulum because the amplitude is too large, but a nice demonstration of mechanical resonance.

Relative Velocity (*The Fast and the Furious*, relative velocity): Brian can only make the jump safely if the relative velocity of the truck and the car is zero.

The Faster You Go (*LTSA advertisement*, kinematics, kinetic energy):

Actually, the numbers used in this ad are wrong, but a nice introduction to the usefulness of kinematic equations.

Diffraction At The Beach (*home video*, diffraction / interference): A clip I shot while on holiday at Ahipara in the Far North.

Doppler Shift (*Pearl Harbour*, Doppler shift): Lovely examples of the change in pitch of the aircrafts' engines as they fly overhead, especially the second one in the shot.

Seismic Charges (*Star Wars*, transmission of sound): What's wrong with this picture?

Mr Fusion (*Back To The Future*, fusion power): How much energy is available from a banana peel, half a can of beer and an apple core if they are completely converted to energy?

Radiocarbon Dating (*Numbers*, radiocarbon dating): Professor Charlie Epps shows off again, providing a simple but linear explanation of carbon-14 dating.

This Sucker's Electrical (*Back To The Future*, alpha radioactivity / radiation shielding): Why is it safe if everything's lead-lined? What is the breakdown product of plutonium if it's an alpha-emitter?

What The Hell is a Gigawatt (*Back To The Future*, power output / binding energy / metric multiples): Students can help explain to Marty what a gigawatt is.

Proton Chain (*downloaded from somewhere and edited with captions*, fusion chain in the Sun): shows the steps in the fusion of hydrogen to helium.

I hope it helps make physics more accessible to your students! Enjoy. If you have any questions or other suggestions for the next edition of the DVD, please email me at callisto@infogen.net.nz

Cheers,
Jeremy