



SCIENCE	FILM(S) REFERENCED	CONCEPTS
<a href="#">The Science Behind Pixar</a> (exhibit, lessons)	All Pixar films	<a href="#">Many</a>
<a href="#">Science of 3D Movies:</a> How do images on a flat screen pop out?		depth perception; stereoscopic vision; polarized light
Visible invisibility: <a href="#">the science of cinematography</a>	Saving Pvt Ryan Citizen Kane Vertigo Pulp Fiction Ben Hur Lawrence of Arabia A Space Odyssey Tangerine The Hateful Eight	exposure time chemicals resolution
<a href="#">The Future Science of Star Wars</a>	Star Wars	
<a href="#">The Science in "The Martian"</a>	The Martian	ion engines, orbital dynamics, interplanetary travel, chemistry, solar energy
<a href="#">The Physics of "Back To The Future"</a>	Back To The Future	special relativity photons general relativity
<a href="#">How Science Helps Create Realistic Explosions in Movies</a>	Avatar, Iron Man 3, Super 8, Man of Steel	wavelet turbulence
<a href="#">Physics Journal Recommends Teachers Use Interstellar</a>	Interstellar; Star Trek; Stargate	Wormholes; black holes
<a href="#">Stunts Makes A Believer of Physics Expert</a>	Fast & Furious 7	speed; terminal velocity; momentum
<a href="#">Neuroscientist Takes A Scientific Look at Art of Filmmaking</a>	Airplane, Chicago, Moulin Rouge	Brain Science
<a href="#">The Physics of Spiderman's Webs</a>	Spiderman	downward gravitational force; upward force; momentum; tension; velocity; kinematic equations;
<a href="#">Science Goes To The Movies</a>	Various	Varies

<a href="#">Great &amp; Realistic Physics Movies</a> related: <a href="#">Good &amp; Bad Examples from Movies</a> (video)	Gravity, Apollo 13, October Sky, The Abyss, IQ, Infinity, 2001: A Space Odyssey	
<a href="#">Science of Hollywood Stunts</a> (video)	The Firm; A Time to Kill; Spiderman; Mission Impossible;	solid, liquids, gas, steam, expansion, chemical reactions, metal, hydrocarbon, fluids, carbon, refraction, atoms, gravity, compression, pulleys, force, direction, load, friction, vectors, pressure, electrical circuits, magnet
<a href="#">Physics in Wall-E</a>	Wall E	Applied Physics, Gravity
<a href="#">Interstellar Film Technology &amp; Black Holes</a> <a href="#">The Surprising Science Behind Interstellar</a> <a href="#">Christopher Nolan/Kip Thorne Discuss Physics of Interstellar</a>	Interstellar	Black Holes, Worm Holes, Caustics, Relativity
<a href="#">Movie Magic Conjured by Science</a>	Toy Story, Harry Potter, Hellboy, Quantum of Solace, Chronicles of Narnia, Tron	Fluid Dynamics
<a href="#">Science of the Movies in 3D</a> (Video)	Terminator 2; Metalstorm, Journey to The Center of the Earth	Stereo, Depth, Polarization, Light Waves
<a href="#">How Movies Makers Use Science to Make Magic</a>	The Incredibles, Jurassic Park, Benjamin Button, Avengers, Pirates of the Carribbean, My Week With Marilyn, The Ten Commandments, Avatar	Visual effects, CG, third-degree polynomials, higher frame rates, 3D, linear perspective, aerial perspective, composition, X-Y graphing

TECHNOLOGY	FILM(S) REFERENCED	CONCEPTS
<a href="#">Motion Capture</a>	Dawn of the Planet of the Apes	MoCap; CG
<a href="#">Animal Kingdom</a>	Chronicles of Narnia	
<a href="#">How Does Green Screen Work?</a>		ChromaKey; luminance keying; compression

<a href="#">How Blue Screens Work</a>	ET, Star Wars, Return of the Jedi, Back to The Future	Traveling matte; Blue screen, CG; optical compositing, matte; diffusion
<a href="#">How do they create special effects</a>	The Matrix; Lost in Space	rotation; slow motion

ENGINEERING	FILM(S) REFERENCED	CONCEPTS
<a href="#">Lights, Camera, Engineers</a>	Avengers, Pearl Harbor	hydraulics, CG
<a href="#">The Arrrt of Engineering</a>	Pirates of the Caribbean	fluid animation
<a href="#">An Engineer's Dream Comes True: Working on Avatar (page 9)</a>	Avatar	3D
<a href="#">The Science &amp; Engineering of Sound</a> (video)		Vibration, compression, rarefaction, amplitude, frequency, longitudinal wave, harmonic content, logarithmic scale, decibel, dynamics, microphones

ARTS	FILM(S) REFERENCED	CONCEPTS
<a href="#">The Art of Designing Digital Sets</a>	Charlie and the Chocolate Factory, Catwoman, V for Vendetta, Harry Potter and the Order of the Phoenix, The Golden Compass, Gladiator, Lord of the Rings, Avatar	Various
<a href="#">How Film Composers Shape Our Feelings</a>	X-Men; Sunshine; Hoffa; Aliens; 12 Years A Slave; The Tree of Live; Gravity; Inception	Many
<a href="#">Animation adds STEAM to STEM</a>		
<a href="#">Observations on Film Art</a>	Many	Various
<a href="#">Visions of Light: The Art of Cinematography</a> (vide0)		Various

<a href="#">The Art of Movie Storyboards</a> (book)	Many	Various
<a href="#">Annual Art of Motion Picture Costume Design</a>	Various	Various
<a href="#">The Art of Foley</a>		Looping
<a href="#">Film Art Director</a>		Various

MATH	FILM(S) REFERENCED	CONCEPTS
<a href="#">What type of math is involved in Pixar animation?</a>	Inside/Out	Many (see article)
<a href="#">Math in Special Effects</a>	Music video	Algebra, Distance, Light Intensity, Exposure (photography)
<a href="#">Film Aspect Ratio video</a> Related	Captain America: Winter Solider; Citizen Kane; Ben Hur; A Serious Man; Oz: The Great And The Powerful; The Grand Budapest Hotel; Oliver; The Dark Knight	Aspect ratio
<a href="#">Jumping Out of Windows</a> (stunts)		measuring, multiplication, division, and remainders
<a href="#">Math in the Film Industry</a>		trigonometry, algebra, integral calculus, subdivision surfaces, division, geometry, and harmonic coordinates
<a href="#">How One Visual Effects Director Uses Math</a>	Harry Potter, Sweeny Todd, Prince of Persia, GI Joe	fluid modeling, gravity, viscosity, voxels, density, 3D geometry
<a href="#">A Math Breakdown of Cinematography of "There Will Be Blood"</a> Related article	There Will Be Blood	Geometry
<a href="#">Math Goes Movies</a>	Jurrasic Park, Lord of the Rings	polygons, triangles, ray tracing, vectors, caustics, precomputed radiance transfer, radiosity
<a href="#">Film Lighting &amp; Math</a>		multiplication, angles, measurements, division, skip counting
<a href="#">Geometry of Lenses</a> (Lesson plan)		geometry, areas, ratios, and square roots

<a href="#">Math Algorithm Claims to Predict Film's Success</a>		algorithm
<a href="#">Pixar combines math to make its movies</a> related <a href="#">video</a>	The Incredibles Ratatouille Finding Nemo	algebra, geometry , calculus
<a href="#">Pixar Sr. Scientist Explains Math of Movies</a> related <a href="#">video</a>	Cars 2, Brave, Geri's Game	arithmetic, algebra, geometry, polygons, calculus, combinatronics, light, fluid, gases, compression algorithm, parabolas
<a href="#">Ryan Kavanaugh Uses Math To Make Movies</a>	Batman, Zombieland, Charlie Wilson's War, Paul Blart: Mall Cop, Season of the Witch, The Perfect Getaway, Matrix, Waterworld, Jesse James, The Fighter, Evan Almighty, Bruce Almighty, Land of the Lost, Brothers, Somewhere in Time, Titanic	variables
<a href="#">Box Office Math</a> (lesson plan)		Calculations, measures, box plots (both modified and non-modified), histograms, and stem-and-leaf plots.
<a href="#">Independent Filmmakers Talk Math</a>		Calculations
<a href="#">The Croods &amp; Math</a>		Coding, effects tools, process control, fluid dynamics, Cloud computing
<a href="#">What is the average budget for a Hollywood movie?</a>	The Brothers McMullen, Avatar, Pirates of the Caribbean	

## [Science Lesson Plans Using The Movies](#) (Teach With Movies)