

Simple Machines with Fantastic Physics

An Elementary/Middle School Physics Course based on The New Way Things Work by David Macauley

TERM 1	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	
The New Way Things Work	<i>The Way Things Work: The Mechanics of Movement</i>												
	Introduction	The Inclined Plane (p. 14-21)	Levers	The Wheel and Axle	Gears and Belts	Cams and Cranks	Pulleys	Screws	Rotating Wheels	Springs	Friction		
K'Nex Kit Levers and Pulleys			* Seesaw * Balance * Wheelbarrow * Hockey Stick * Scissors				* Flag Pole * Sailboat * Block and Tackle						
K'Nex Kit Gears					* Crank Fan * Car Window * Blender * Phonograph * Eggbeater * Stationary Bike * Chainsaw							Catch up work or projects	
K'Nex Kit Wheels, Axles and Inclined Planes		* Steep Ramp * Long Ramp * Splitting Wedge		* Well * Paddleboat * Steering Wheel				* Screw					
Additional projects									* Gyroscope toy	* Springs scavenger hunt (stapler, click pen, wind up toy car)	Scientific American * Explore Friction by Launching Stuff * Phone Book Friction		
Can You Feel the Force?	* Greece Is the Word	* The Dark Ages	* Into the Light	* Galileo's World	* Newton's Universe	* What is a Force?	* It's the Law!	* Can You Do Physics On a Bike?	* What causes friction?	* How fast can you go?	* G Force		* Energy
Usborne Energy, Forces & Motion	* Energy, Forces and motion	* Energy	* Forces	* Dynamics	* Motion	* Simple Machines	* Work and Power	* Engines	* Motion	* Friction	* Gravity		
Physics Fun	The Way Things Work board game												

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TERM 2	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24
The New Way Things Work	<i>The Way Things Work: Harnessing the Elements</i>						<i>The Way Things Work: Working With Waves</i>					
	Introduction	Floating	Flying	Pressure Power	Exploiting Heat	Nuclear Power	Introduction	Light and Images	Photography	Printing	Sound and Music	Tele-communication s
Additional Projects		* DIY Hot Air Balloon - instructions here	* Kite flying Scientific American * Build a Paper Rocket * The Aerodynamics of a Flying Frisbee	Scientific American * A Really Long Straw	Scientific American * Stretch It! How Does Temperature Affect a Rubber Band?	Scientific American Half Life Coins			* Youtube video: How does a camera work?		Scientific American * Sound Science: Do, Re, Mi with Straws	Scientific American Block Radio Waves
Can You Feel the Force?	* How can you make forces bigger?	* How do bicycles work?	* How fast can you fall?	* How do planes stay in gate air?	* Why do golf balls have dimples?	* What's the best shape for a car?	* Why do balls bounce?	* Can you lie on a bed of nails?	* What is matter made of?	* What's inside an atom?	* Why do balloons stick to the wall?	* Shocking experiments
Usborne: Energy, Forces & Motion		* Floating * Ships and boats	* Flight * Aircraft Design	Pressure	* Heat * Heat Transfer * Engines * Cars & Motorcycles	* Radioactivity * Nuclear Power						
Usborne: Light, Sound, & Electricity							* Light, sound and electricity	* Light and shadow * Color * Light behavior	* Lenses and mirrors * Optical instruments * Cameras		* Waves * Wave behavior * Sound * Musical Instruments * Sound reproduction	* TV and radio * Telecoms
Physics Fun	http://www.physicsgames.net/ or choose 3 - 4 activities from Physics Fun											

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TERM 3	Week 25	Week 26	Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36
The New Way Things Work	<i>The Way Things Work: Electricity and Automation</i>					<i>The New Way Things Work: The Digital Domain</i>						
	Introduction	Electricity	Magnetism	Sensors and Detectors	Computers	Making Bits	Storing Bits	Processing Bits	Sending Bits	Using Bits Digital Systems	Epilog	
Additional Projects	Scientific American Bend Water With Static Electricity	Scientific American Generate Electricity with a Lemon Battery	Scientific American Get the Iron Out of Your Breakfast Cereal	Scientific American Centripetal Force Using Marbles in Jello	* Scientific American Robotics exploration: Build An Artificial Hand YES, YOU CAN BUILD YOUR OWN COMPUTER FROM AN AFFORDABLE KIT! * Kano Computer building kit - This kit is totally prepped and packaged in a kid-user friendly way. Everything but a monitor is provided. * CanaKit - a more affordable version of the above kit. It does contain instructions but will probably need more supervision and assistance from older sibling/parent. You'll need to provide a monitor, keyboard, and mouse to complete this kit. * Both kits use the Raspberry Pi - read here for Raspberry Pi teaching resources							Catch up work or projects
Can You Feel the Force	* How do magnets work?	* Can you feel the heat?	* States of matter	* What shape is a raindrop?	* Can you walk on custard?	* How does a balloon burst?	* Is light made of particles?	* What color is light?	* Can you see rainbows in bubbles?	* When is light invisible?	* Why is the sky blue? * How fast is light?	* Can you travel at the speed of light?
Usborne: Light, Sound & Electricity	* Electromagnetic Waves	* Electricity	* Magnetism	* Electronics	* Digital Electronics * Computers * The Internet							
Physics Fun	Consider a subscription to Tinker Crate											