

Active Physics Correlation to Georgia's Quality Core Curriculum

Physics in the Georgia Quality Core Curriculum (QCC)	Communication			Home			Medicine			Predictions			Sports			Transportation			
	C1	C2	C3	H1	H2	H3	M1	M2	M3	P1	P2	P3	S1	S2	S3	T1	T2	T3	
Standard																			
Correlation key:																			
<p>“X” Coverage = Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept. “O” In-depth coverage = primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.</p>																			
Motion and Forces																			
Identifies, defines, gives examples and demonstrates forces.		X				X						O	O		O	O		O	O
Motion can be described by position, direction, speed.												O		O			O		
States and describes Newton's 3 laws of motion.												O			O			O	
Explains and applies Newton's three laws												O			O			O	
Defines speed as rates.												O		O			O		
Calculates speed, time, and distance and graphs data.												O		O			O		
Compare/contrasts speed, velocity, and acceleration.												O		O			O		
Measures speed, acceleration, and velocity.												O		O			O		
Defines inertia.												O			O			O	
Collects, graphs, and analyzes time, distance, displacement, and speed data.												O		O			O		
Identifies and measures forces (friction, gravity, etc.).		X				X						O	O		O	O		O	O
Investigates problems involving friction forces and coefficients of static/sliding friction														O	O				
Gives examples of effects of gravity.													O			O			O
Relates gravity to mass and distance.													O						
Predicts and records data on rate of fall.														O		O			
Distinguishes between mass and weight.															O				
Explains Newton's universal law of gravitation.															O				
Investigates gravitational force, mass, distance, G, and acceleration due to gravity.															O				

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Explains the relationship among force, unbalanced force, motion, & acceleration.												O			O			O
Defines weightlessness.																		O
Analyses action and reaction forces.												O			O			
Explains conservation of momentum.												O			O			
Distinguishes between vector and scalar quantities.																		
Solves motion vector problems.																		
Resolves problems using vectors.																		
Investigates systems producing torque producing forces.																		
Explains why objects thrown or shot follow a curved path.													O		O			
Compares straight line motion with circular motion.												O			O		O	
Analyzes factors that influence centripetal forces.												O			O		O	
Solves time, angular displacement, torque, and rotational inertia problems.																		
Solves angular velocity and angular acceleration problems.																		
Investigates and solves pendulum problems.															O			
Energy (Work, Power and Machines)																		
Describes the ability to cause change.		X			X	X						X	X		X			X
Demonstrates PE and KE.														O	O	O		
Calculates PE and KE.														O	O	O		
Describes how energy exists in many forms and can be converted.														O	O	O		
Describes how work is the transfer of energy.														O	O	O		
Describes how work and energy are related.														O	O	O		
Measures and/or calculates work and power.					O													
Describes how energy and power are related.					O													
Solves problems relating to work, power, momentum, and impulse.					O													O

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Experiments/solves problems relating to rotary work/power/angular momentum/impulse.																		
Calculates mechanical advantage.																		
Identifies and compares simple machines.																		
Identifies compound machines as combinations of simple ones.																		
Explains and illustrates how machines help people.																		
Observes/describes elastic and inelastic collisions.											O			O				
Calculates work done by simple machines.																		

Energy: Waves Light

Relationship between frequency, wavelength, and speed.	O		O				X		X									
Compares wave types: electromagnetic, mechanical, longitudinal, transverse.	O																	
Illustrates wave phenomena with ripple tanks, rope, etc.	O																	
Describes standing waves in terms of node and antinodes.	O																	
Refraction, Reflection, Diffraction.	O		O															
Separates light (diffracts) into a visible spectrum.			O															
Describes refraction/reflection.	O																	
Uses mirrors to control reflection.	O																	
Measure angle of incidence and reflection.	O																	
Observes refraction.	O																	
Uses wave and particle theory to describe transmission, absorption, reflection, refraction.																		
Interaction with lenses, mirrors, prisms, lasers, optical fibers.	O		O						O									
Investigates reflection with concave and convex mirrors.	O																	

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Investigates refraction, index of refraction, and angle of incidence.	O																	
Constructs ray diagrams (curved mirrors and lenses).	O		O					O										
Describes diffraction and interference patterns.			O									O						
Measures wave length using diffraction grating.			O															
Relates frequency and energy of EM spectrum.			O															
Labels the 8 sections of the EM spectrum.			O															
Relates color to frequency.	O		O						O									

Energy: Heat

Investigates sources of heat such as fire and electricity				O	O													
Identifies heat as a form of energy which is transferred from warmer to cooler				O														
Describes conduction, convection, and radiation				X														
Identifies and discusses alternate sources																		
Investigates characteristics/measurement of heat				O														
Demonstrates difference between heat and temperature																		
Shows how heat causes expansion and contraction																		
Identifies causes and effects of thermal pollution, solutions																		
Experimentally compares conductors and insulators in heat conductivity																		
Relates the effects of thermal energy to kinetic theory																		
Calculates heat needed to produce temperature change in a substance					O													
Describes heat and energy conservation					O													
Determines specific heat in the laboratory																		
Uses a calorimeter to determine heat gain/loss					O													

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Explains phase changes based on lab data and graphs																		
Relates laws of thermodynamics to heating/cooling																		
Relates PE and KE to their heat equivalents					O													

Energy: Waves Sound

Explains role of vibrations in sound production	O							O										
Demonstrates how vibrating rubber bands produce sound	O																	
Compares sounds made by different musical instruments/pitch and intensity	O																	
Describes/compares variation in sound (high/low) quiet/loud, etc.	O							O										
Produces sounds that vary in pitch and intensity	O							O										
Compares how sounds moves through air, water, rock, etc.	O																	
Investigates wave attributes and qualities of sound	O																	
Describes how we hear sound								O										
Describes various technological devices which amplify/clarify sound								O										
Discusses relationship between frequency and wavelength	O							O										
Compares and contrasts transverse and compressional waves	O																	
Investigates loudness/intensity/freq. using graphs/calculations								O										
Calculates sound wave velocity, wavelength, freq., and period										O								
Demonstrates/solves problems involving Doppler effect										O								O
Pitch, amplitude, loudness, and quality								O										
Explains relationship between speed of sound and temp/density																		

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Illustrates interference with drawings--harmonics, resonance													O					
Describes transmission of sound through a medium	O																	
Identifies relationship between--intensity/loudness, frequency/pitch							O											
Illustrates Doppler effect									O									O
Describes how instruments produces sounds of different quality	O																	
Ultrasound in medicine									O									

Energy: Electricity (Magnetism)

Differentiates--objects moved and not moved by a magnet		X				X							X					
Demonstrates use of compass					O								X					
Demonstrates N-S conventions in diagrams (flux lines)													X					
Quantitatively relates magnetic flux																		
Use left hand rule to describe magnetic field																		
Calculates strength of electromagnet		O				O												
Makes an electromagnet		O				O												
Describes properties of magnets		O				O							O					
Defines a magnetic field.													O					

Energy: Electricity

Tests a variety of materials to determine conductivity.																		
Distinguishes between conductors and insulators.																		
Describes characteristics and applications of super conductors.																		
Explains magnetic effects on a current in a wire.		O				O												
Describes/demonstrates how moving electrical charges produce magnetic forces and vice versa.		O				O												
Describes how a generator produces an electrical current.					O	O												
Demonstrates simple cell--chemical reaction.																		
Explains how a dry cell works.																		

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Evaluates different methods for generating electricity.																		
Diagrams and builds simple electrical circuits.					O													
Describes relationship between current and circuits.					O													
Distinguishes between static and current electricity.					O													
Demonstrates open- and closed-circuits.					O											X	X	
Relates electric potential to cells--series/parallel.					O													
Analyzes complex circuits using Ohm's law.																		
Measures/calculates current, voltage, and resistance.																		
Infers Ohm's law through investigation.																		
Compares/contrasts voltmeters and ammeters.																		
Distinguishes between alternating and direct current.																		
Identifies the function of circuit breakers and fuses.					O													
Calculates charge, electrostatic forces, distance, field intensity.																		
Analyzes effective voltage and effective current (AC).																		
Analyzes inductance, power angle, and impedance (AC).																		
Describes function of AC transformer and DC induction.																		
Explains functions of step-up and step-down transformers.																		
Describes function of an electric motor.						O												
Calculates energy in kilowatt-hours.					O													
Explains lightning in terms of static charge and induction.																		
Experiments with attraction/repulsion-unbalanced charge.																		
Energy: Nuclear																		
Describes how particle physics explains the energy/structure of atoms.																		

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Distinguishes major aspects of quantum theory.																			
Analyzes the development of quantum theory.																			
Calculates frequency/energy of light waves.																			
Explains the photoelectric effect.																			
Explains role of fundamental particles (mesons, quarks, tachyons, and baryons).																			
Calculates half-life for radioactive substances.											X								
Identifies three types of radiation.			O																
Distinguishes between natural and artificial radioactivity.																			
Diagrams the cyclotron and describes its operation Describes linear acceleration.																			
Differentiates fission/fusion.																			
Evaluates impact of technological developments.																			
Analyzes science/technology of particle physics--impact on life.																			
Describes areas of current research in particle physics.																			
Analyzes use of nuclear of technology--i.e., war, energy, etc.																			
Matter																			
Investigates/calculates Hooke's law, Young's modulus, and tensile strength.																			
Observes effects of pressure, surface tension, and capillary action in a liquid.																			
Develops gas laws (V, T, and P)																			