Active Physics Correlation with New Jersey

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E = Entire Chapter Coverage of concept.	C1	C2	C3	H1	H2	H3	M1	M2	M3	P1	P2	P3	S1	S2	S3	T1	T2	T3
STANDARD 5.1 (SCIENTIFIC PROCESSES) ALL STUDENTS WILL DEVELOP PROBLEM-SOLVING, DECISION-MAKING AND INQUIRY SKILLS, REFLECTED BY FORMULATING USABLE QUESTIONS AND HYPOTHESES, PLANNING EXPERIMENTS, CONDUCTING SYSTEMATIC OBSERVATIONS, INTERPRETING AND ANALYZING DATA, DRAWING CONCLUSIONS, AND COMMUNICATING RESULTS.																		
Descriptive Statement: Students best learn science by doing science. Science is not merely a collection of facts and theories but a process, a way of thinking about and investigating the world in which we live. This standard addresses those skills that are used by scientists as they discover and explain the physical universe - skills that are an essential and ongoing part of learning science.																		
By the end of **Grade 12**, students will:																		
A. Habits of Mind																		
1. When making decisions, evaluate conclusions, weigh evidence, and recognize that arguments may not have equal merit.			108-109 TE 224-228	2-3 TE 6-8	44-45 TE 108-110		2-3 TE 6-9	68-69 TE 136-140	130-131 TE 268-272			100-101 TE 200-203					60-61 TE 126-131	
2. Assess the risks and benefits associated with alternative solutions.			108-109 TE 224-228	2-3 TE 6-8	44-45 TE 108-110		2-3 TE 6-9	68-69 TE 136-140	130-131 TE 268-272			100-101 TE 200-203					60-61 TE 126-131	
3. Engage in collaboration, peer review, and accurate reporting of findings.	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
4. Explore cases that demonstrate the interdisciplinary nature of the scientific enterprise.							2-3 TE 6-9	68-69 TE 136-140	130-131 TE 268-272			100-101 TE 200-203						108-109 TE 228-233
B. Inquiry and Problem Solving																		
1. Select and use appropriate instrumentation to design and conduct investigations.	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2. Show that experimental results can lead to new questions and further investigations.																		
C. Safety																		
1. Understand, evaluate and practice safe procedures for conducting science investigations.	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

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STANDARD 5.4 (NATURE AND PROCESS OF TECHNOLOGY) ALL STUDENTS WILL UNDERSTAND THE INTERRELATIONSHIPS BETWEEN SCIENCE AND TECHNOLOGY AND DEVELOP A CONCEPTUAL UNDERSTANDING OF THE NATURE AND PROCESS OF TECHNOLOGY.																		
Descriptive Statement: This standard has three equally important strands:																		
Developing students' understanding of the interrelationship between science and technology.	24-29 TE 48-57	E	E	19-40 TE 44-93		E			142-170 TE 296-348								E	
Introducing students to and expanding their understanding of the nature of technology.	24-29 TE 48-57	E	E	19-40 TE 44-93		E			142-170 TE 296-348								E	
Introducing and developing students' abilities with technological design including experiences in predicting, decision making, critical thinking and ultimately, problem solving.		62-63 TE 128-132	108-109 TE 224-228	2-3 TE 6-8	44-45 TE 108-110												60-61 TE 126-131	
By the end of **Grade 12**, students will:																		
A. Science and Technology																		
1. Know that scientific inquiry is driven by the desire to understand the natural world and seeks to answer questions that may or may not directly influence humans, while technology is driven by the need to meet human needs and solve human problems.		E	E	E	E												E	
B. Nature of Technology																		
1. Assess the impacts of introducing a new technology in terms of alternative solutions, costs, tradeoffs, risks, benefits and environmental impact.		62-63 TE 128-132		2-3 TE 6-8	44-45 TE 108-110												60-61 TE 126-131	

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C. Technological Design																		
1. Plan, develop, and implement a proposal to solve an authentic, technological problem.		62-63 TE 128-132	108-109 TE 224-228	2-3 TE 6-8	44-45 TE 108-110												60-61 TE 126-131	
STANDARD 5.7 (PHYSICS) ALL STUDENTS WILL GAIN AN UNDERSTANDING OF NATURAL LAWS AS THEY APPLY TO MOTION, FORCES, AND ENERGY TRANSFORMATIONS.																		
Descriptive Statement: Basic principles of physics emerge in this standard, where the study of force and motion leads students to the concept of energy. All forms of energy are introduced and investigated, and principles of transformation and laws of conservation are developed.																		
By the end of **Grade 12**, students will:																		
A. Motion and Forces																		
1. Apply the mathematical relationship between the mass of an object, the net force exerted on it, and the resulting acceleration.											69-72, 79-93 TE 138-144, 156-181			61-67 TE 140-149			79-83 TE 164-172	
2. Explain that whenever one object exerts a force on another, an equal and opposite force is exerted on the first object.											94-96 TE 184-188			81-85 TE 172-180				
3. Recognize gravity as a universal force of attraction between masses and that the force is proportional to the masses and inversely proportional to the square of the distance between them.												108-114 TE 218-230						
4. Recognize that electrically charged bodies can attract or repel each other with a force that depends upon the size and nature of the charges and the distance between them and know that electric forces play an important role in explaining the structure and properties of matter.					52 X TE 130													

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5. Know that there are strong forces that hold the nucleus of an atom together and that significant amounts of energy can be released in nuclear reactions (fission, fusion, and nuclear decay) when these binding forces are disrupted.																		
6. Explain how electromagnetic, gravitational, and nuclear forces can be used to produce energy by causing chemical, physical, or nuclear changes and relate the amount of energy produced to the nature and relative strength of the force.																		
7. Demonstrate that moving electric charges can produce magnetic forces and moving magnets can produce electric forces.		74-84 TE 159-170				88-112 TE 202-246												
8. Recognize that magnetic and electrical forces are different aspects of a single electromagnetic force.		74-84 TE 159-170				88-112 TE 202-246												
B. Energy Transformations																		
1. Explain how the various forms of energy (heat, electricity, sound, light) move through materials and identify the factors that affect that movement.				24-28 TE 58-62														
2. Explain that while energy can be transformed from one form to another, the total energy of a closed system is constant.													44-48 TE 104-108	73-80 TE 161-168	134-139 TE 286-291			
3. Recognize that whenever mechanical energy is transformed, some heat is dissipated and is therefore unavailable for use.																		

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4. Explain the nature of electromagnetic radiation and compare the components of the electromagnetic spectrum from radio waves to gamma rays.			126-132 TE 266-274															