



**Goodheart-Willcox Publisher**

**Correlations to the Alabama Career Cluster  
Curriculum**

**Career and Technical Education - Comprehensive  
Course: Engineering Systems  
Grades 9-12**

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**Technology Education - Comprehensive  
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CONTENT STANDARD	CORRELATING PAGE NUMBERS
<b>Fluid Systems</b>	
Students will be able to:	
Describe applications for fluid systems and their components.	556, 558–559
Examples: Valves, cylinders, pressure regulators, orifices, pipes and tubing, filters	
Demonstrate basic scientific principles and laws of fluid systems including Bernoulli's principle, Pascal's law, and Boyle's law.	558–559
Examples: Bernoulli's principle—practical applications of airfoil design	495–496
Pascal's law—sources of resistance and change of velocity for changing pipe types and diameters	
Boyle's law—reasons for pop-off valves in pneumatic systems	558–559
<b>Thermal Systems</b>	
Categorize thermal transfer in terms of conduction, convection, and radiation.	550–553
Examples: Heating and cooling a house, cooking, interrupting of current by a circuit breaker	331–333, 544–545, 550–552
Explain control components and properties of materials used in thermal systems.	72, 111–114
Examples: Control components—thermostats, sensors, valves	40, 111–114
properties of materials—resistance value (R-value) of attic insulation	72

<b>Electrical Systems</b>	
Explain electrical theory at the atomic level, including sources of electromotive force.	74, 91–92, 419–420, 531
Compare relationships between alternating current (AC) and direct current (DC) systems.	419–420
Demonstrating the use of instruments to measure resistance, voltage, and current in AC and DC circuits	419–420
Describing the operation of typical AC and DC system components	419–420
Calculating voltage, current, resistance, and power in AC and DC circuits	419–420, 528–529
Propose solutions to given electrical systems problem statements utilizing fundamental digital electronics, including logic gates, Boolean logic, flip-flops, and other digital components.	114
Select electrical components for a given application including, but not limited to, temperature control, identification of presence and position of objects, motor control, and speed control.	40, 330, 478–479
<b>Mechanical Systems</b>	
Describe devices used to transfer, convert, change direction, transmit mechanical energy, and overcome friction.	92, 139–145, 471, 539–547, 556–558
Describe primary characteristics associated with mechanical systems, including physical quantities, motion, and energy.	34–35, 72, 74–75, 129–130, 526–534
Examples: Physical quantities—gravity, inertia, friction	471
Motion—linear, rotary, oscillating	129–130, 488, 539–547, 556–559
Energy—work, power, efficiency, mechanical advantage	527–529, 556–559, 695–696