




Power & Energy

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Power and Energy

Content	Skills	Learning Targets	Standards	Assessment	Resources & Technology
<p>CEQ: WHAT IS POWER AND ENERGY?</p> <p>UEQ: <i>What is this course about?</i></p> <p>A: Course Introduction A1. Class Outline A2. Grading procedure A3. Power and Energy impact on society. </p> <p>UEQ: • <i>What is Power shop safety?</i></p> <p>B: Course Safety B1. Personal safety B2. Shop/machine safety</p> <p>UEQ: • <i>What hand tools are</i></p>	<p>A: Course Introduction A1-A2. Identify course content and grading. A3. Identify how power and energy impact the society.</p> <p>B: Course Safety B1-B2. Recognize potential hazards. B1-B2. Identify personal and machine/tool safety. B2. Discuss shop safety.</p>	<p>A: Course Introduction A1-A2. I can recall from my notebook all course content and grading procedure. A3. I can list 3 ways power and energy impact the society..</p> <p>B: Course Safety B1-B2. I can recognize potential hazards. B1-B2. I can identify personal and machine/tool safety. B2. I can discuss shop safety.</p>		<p>A: Course Introduction A1. Guided class discussion with observer notes. A3. Each student will list 3 examples of how power and energy impact our lives.</p>	

<p><i>used in the Power and Energy lab?</i></p> <p>C.Hand tools C1. Files C2. Hacksaw C3. Hammers C4. Wrenches C5.Socket set C6. Specialty small engine tools</p>  <p>UEQ: What is Work, Energy, and Power?</p> <p>D. General Definitions D1. Work D2. Energy D3. Power</p>  <p>UEQ: What is Electricity Safety?</p>	<p>C.Hand tools C1-C6. Identify tools by name and use. C1-C6. Apply safety rules for hand tools C1-C6. Demonstrate proper care and use of all hand tools for all subsequent lab projects.</p> <p>D. General Definitions D1. Explain what work is. D2. Explain what energy is . D3. Explain what power is. D1-D3. Relate the use of electricity to do work and create power, horsepower. D1-D3. Calculate the efficiency of an electrical circuit.</p>	<p>C.Hand tools C1-C6.I can identify and list 10 tools by name and use. C1-C6. I can work safely with hand tools. C1-C6. I can demonstrate proper care and use of all hand tools for all subsequent lab projects.</p> <p>D. General Definitions D1. I can list 5 examples for work . D2. I can list 5 examples for energy. D3. I can list 5 examples for power. D1-D3. I can relate the use of electricity to do work and create power, horsepower. D1-D3. I can calculate the efficiency of an</p>		<p>B: Course Safety B1. CFA-T rue/False test. Must pass w 95%. Prior to working in the lab, each student will have 3 chances to pass.</p> <p>C.Hand tools C1-C6 CF A-Hand tool identificat ion quiz</p>	
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<p>E. Electrical Safety</p> <p>E1. General Safety Rules</p> <p>E2. Electrical Safety Rules</p> <p>F. Voltage, Current, and Resistance</p> <p>F1. Voltage</p> <p>F2. Current</p> <p>F3. Resistance</p> <p>F4. Ohm's law</p> <p>G. Sources of Electricity</p> <p>G1. Chemicals</p> <p>G2. Magnetism</p>	<p>E. Electrical Safety</p> <p>E1. Identify and record safe working conditions.</p> <p>E2. Explain how electrical shock can be avoided.</p> <p>F. Voltage, Current, and Resistance</p> <p>F1. Accurately measure voltage with a D.C. voltmeter and the EVOM.</p> <p>F2. Accurately measure current with a D.C. ammeter and a EVOM.</p> <p>F3. Accurately measure resistance with an ohmmeter.</p> <p>F4. Solve electrical circuit calculations utilizing</p>	<p>electrical circuit.</p> <p>E. Electrical Safety</p> <p>E1. I can identify and record safe working conditions.</p> <p>E2. I can list 5 ways to avoid electrical shock.</p> <p>F. Voltage, Current, and Resistance</p> <p>F1. I can accurately measure voltage with a D.C. voltmeter and the EVOM.</p> <p>F2. I can accurately measure current with a D.C. ammeter and a EVOM.</p> <p>F3. I can accurately measure resistance with an</p>		<p>D. General Definitions</p> <p>D1.-D3. C SA- ower and Energy activity/discussion</p> <p>E. Electrical</p>	
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<p>G3. Heat G4. Solar Cells G5. Power Supplies</p> <p>H. Transporting Electricity</p> <p>H1. Conductors H2. Insulators</p> <p>I. Basic Electrical Circuits</p> <p>I1. Closed Circuit I2. Open Circuit I3. Switched Circuits</p> <ul style="list-style-type: none"> •Single pole switching •Switch looping •Three-way 	<p>Ohm's law.</p> <p>G. Sources of Electricity</p> <p>G1. Explain how "potential energy" is converted through chemicals</p> <p>G2. Explain how electricity is generated through magnetism.</p> <p>G3. Describe how heat is utilized to generate electricity.</p> <p>G4. Explain how solar cells generate electricity.</p> <p>G5. Identify multiple alternate energy power supplies.</p> <p>H. Transporting Electricity</p>	<p>ohmmeter.</p> <p>F4. I can solve electrical circuit calculations utilizing Ohm's law.</p> <p>G. Sources of Electricity</p> <p>G1. I can list 3 ways "potential energy" is converted through chemicals.</p> <p>G2. I can explain how electricity is generated through magnetism.</p> <p>G3. I can list 5 ways heat is utilized to generate electricity.</p> <p>G4.I can explain how solar cells generate electricity.</p> <p>G5. Il can list 5 alternate energy power supplies.</p>		<p>Safety</p> <p>E1. Evaluation: Teacher</p> <p>E2. Post test</p> <p>F. Voltage, Current, and Resistance</p> <p>F1. CSA-Lab activity - voltage</p> <p>F2. CSA-Lab activity - current</p>	
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<p>switching <ul style="list-style-type: none"> •Four-way switching •Grounding for safety •Outlets •Lamp fixtures </p> <p>J. Electric Motors J1. Brush motors J2 Brushless motors</p>	<p>H1. Identify qualities of an electrical conductor. H2. Identify qualities of an insulator</p> <p>I. Basic Electrical Circuits I1-I3. Identify the parts of a basic circuit including the source, load, and conductors. I1. Identify what makes a short circuit I2. Identify what makes an open circuit</p> <p>I3. Identify a basic series circuit design I3. Compute values for voltage, amperage I3. resistance and power in a given circuit. I3. Find unknown values in a circuit I3. Design a series circuit. I3. Identify a basic</p>	<p>H. Transporting Electricity</p> <p>H1 I can list 6 qualities of an electrical conductor. H2. I can list 6 qualities of an insulator</p> <p>I. Basic Electrical Circuits I1-I3. I can list 5 parts of a basic circuit including the source, load, and conductors. I1. I can identify what makes a short circuit I2. I can identify what makes an open circuit</p> <p>I3. I can diagram a basic series circuit design I3. I can compute values for voltage, amperage, resistance and power in a given circuit. I3. I can find unknown</p>		<p>F3. CSA-Lab activity - resistance</p> <p>F4. CSA-Activity sheet</p> <p>G. Sources of Electricity G1-G5. Class discussion G1-G5. CSA-Energy activity</p>	
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	<p>series circuit design I3. Compute values for voltage, amperage, resistance and power in a given circuit. I3. Design a parallel circuit.</p> <p><i>J. Electric Motors</i> J1-J2. Explain the basic operation and construction of a DC motor J1- J2. Explain Counterelectromotive force and how it relates to the operation of the DC motor. J1-J2. Describe the basic types of DC motors used. J1-J2. Construct a simple motor .</p>	<p>values in a circuit I3. I can construct a series circuit. I3. I can diagram a basic parallel circuit design I3. I can construct a parallel circuit.</p> <p><i>J. Electric Motors</i> J1-J2. I can explain the basic operation and construction of a DC motor J1- J2. I can explain Counterelectromotive force and how it relates to the operation of the DC motor. J1-J2. I can describe the basic types of DC motors used. J1-J2. I can build a simple motor.</p>		<p>H. Transporting Electricity</p> <p>H1-H2. CSA-Wiring activity H1-H2. class discussion</p> <p>I. Basic Electrical Circuits I1- I3. CFA-Wire six</p>	
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				<p>different electrical circuits using correct grounding on each box. I1- I3.CSA- Wiring diagram and calculatio n wksht</p>	
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October 2014

Power and Energy

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<p>UEQ: What are safety concerns when working with small gasoline engines?</p> <p>A. Tool / Safety A1. Fire Triangle A2. Safe use of tools A3. Safe use of equipment A4. Safe storage of gasoline</p> <p>UEQ: What are small gasoline engines?</p> <p>B. Purpose</p>	<p>A: Tools/Safety A1. List and explain the parts of the fire triangle A2-A4 List the 7 safety hazards and how to avoid them. A2.- A4 List safety equipment that you wear and where they can be found in our lab.</p>	<p>A: Tools/Safety A1.I can list and explain the parts of the fire triangle A2-A4 I can list 7 safety hazards and how to avoid them. A2.- A4 I can list safety equipment that you wear and where they can be found in our lab.</p>	<p>A: Tools/Safety A1-A4. Observation of proper use A2. Tool quiz A1-A4.Class Discussion</p> <p>B.Purpose</p>	<p>A: Tools/Safety</p> <p>B: Purpose B1. Engine construction & Principles of Operation</p>

<p>UEQ: <i>What are the basic components of small gasoline engines ?</i> C.:Engine Components C1. Engine parts</p> <p>UEQ: <i>How does a 4-stroke engine operate compared to a 2-stroke engine?</i></p> <p>D. Four Stroke Principles D1. Engine operation</p> <p>E.Two Stroke Principles E1. Engine operation</p> <p>UEQ: <i>How does the engine</i></p>	<p>B.Purpose B1. List 10 applications where Small Gasoline Engines (SGEs) are used in home and industry.</p> <p>C. Engine Components C1. Identify basic engine parts.</p> <p>D. Four Stroke Principles D1. Identify each main stroke in 4-stroke cycle.</p> <p>E. Two Stroke Principles E1. Identify each main stroke in 2-stroke cycle.</p>	<p>B.Purpose B1. I can list 10 applications where Small Gasoline Engines (SGEs) are used in home and industry.</p> <p>C. Engine Components C1.I can list 8 basic engine parts.</p> <p>D. Four Stroke Principles D1. I can identify and list the main stroke in 4-stroke cycle engine.</p> <p>E. Two Stroke Principles E1. I I can identify and list the main strokes in</p>	<p>B1. Class Discussion</p> <p>C. Engine Components C1. CFA-Engine parts quiz</p> <p>D. Four Stroke Principles D1. CSA-Engine stroke quiz D1. Teacher observation</p> <p>E. Two Stroke Principles E1. CSA-Engine stroke quiz E1. Teacher observation</p>	<p>(PPT)</p> <p>C. Engine Components C1.. 2 & 4 Cycle engines (PPT) C1. Engine construction & Principles of Operation (PPT)</p> <p>D. Four Stroke Principles D1.. 2 & 4 Cycle engines (PPT) D1. Engine construction & Principles of Operation (PPT)</p> <p>E. Two Stroke Principles E1.. 2 & 4 Cycle engines (PPT) E1. Engine</p>
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<p><i>recieve and utilize fuel?</i></p> <p>F. Fuel Systems F1. Carburation F2. Fuel injection</p> <p>UEQ: <i>What are the different types of lubricating systems?</i></p> <p>G. Lubrication G1. Motor Oil G2. Purpose of lubrication system G3. Types of lubricating systems</p>	<p>F. Fuel Systems F1. Identify different styles of carburators. F1-F2. List and identify the three types of fuel systems F1-F2. List and identify all parts of the fuel system. F1. Assemble and disassemble the three types of carbs. F1. Identify parts of a gravity fed craburetor. F1. Explain the advantages of a pump type carb. F1. List advantages and disadvantages of a suction style carb.</p>	<p>2-stroke cycle engine.</p> <p>F. Fuel Systems F1. I can list 3 different styles of carburators. F1-F2 I can list and identify the three types of fuel systems F1-F2.I can list and identify 10 parts of the fuel system. F1. I can assemble and disassemble the three types of carbs. F1. I can identify parts of a gravity fed craburetor. F1. I can list 3 advantages of a pump type carb. F1.I can list 3 advantages and disadvantages of a suction style carb.</p>	<p>F. Fuel Systems F1 CSA- Fuel activity disassemble F1. CSA-Fuel activity internals ID F1. CSA- Fuel activity troubleshooting</p> <p>G. Lubrication G1-G3. CSA- ngine disassembly discussion G1-G3 CSA-lubrication activity</p>	<p>construction & Principles of Operation (PPT)</p> <p>F. Fuel Systems F1. Carburation (PPT)</p> <p>G. Lubrication Engine Lubrication (PPT)</p>
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<p>UEQ: <i>How does ignition happen with no battery power?</i> H. Ignition H1. Ignition point systems H2. Ignition pointless systems H3. Magnatron H4. Permanant magnet</p> <p>UEQ: <i>Can you disassemble and reassemble a 4-stroke motor?</i></p> <p>I: Engine Lab I1. Disassemble 4-stroke engine I2. Inspect and measure components I3. Reassemble 4-stroke engine </p>	<p>G. Lubrication G1. Describe the differences in motor oils. G2. Identify the purposes of lubrication system in small engines. G3. Identify the different types of lubricating systems in small engines.</p> <p>H. Ignition H1.-H4. Labels parts of ignition system H3. Name advantages of the magnatron system. H1 Properly set point gap. H4. Properly adjust magneto air gap.</p>	<p>G. Lubricationn G1. I can list 5 differences in motor oils. G2. I can list 5 purposes of lubrication system in small engines. G3. I can list 3 different types of lubricating systems in small engines.</p> <p>H. Ignition H1.-H4. I can labels parts of ignition system H3. I can list 5 advantages of the magnatron system. H1I can properly set point gap. H4. I can properly adjust magneto air gap.</p>	<p>H. Ignition H1 CSA- Point gap adjusted to manufacturers speciffication. H2-H4. CSA- agneto air gap adjusted to manufacturers speciffication.</p> <p>I: Engine Lab I1-I3. CSA- Engine was completely disassembled and</p>	<p>H. Ignition H1 . Ignition(PPT)</p>
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	<p>I: Engine Lab</p> <p>I1. Manually take apart engine following manufacturers recommendations.</p> <p>I2. Visually inspect each part and measure necessary components to verify they are within manufacturers specifications.</p> <p>I2-I3. Manually reassemble engine following manufacturers recommendations.</p> <p>I3. Troubleshoot engine reassembly issues if they arise.</p>	<p>I: Engine Lab</p> <p>I1. I can disassemble a SMG according technical manuals.</p> <p>I1. I can reassemble a SMG according to technical manuals.</p> <p>I2. I can inspect and measure parts as needed and verify they are acceptable according to manufacturerer's Specifications.</p> <p>I3. I can troubleshoot any issues pertaining to assembly and reassembly to make a SMG run.</p>	<p>reassembled.</p> <p>I1-I4. CFA- Engine must run when student has completed lab.</p>	
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November 2014
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Content	Skills	Learning Targets	Assessment	Resources & Technology
<p>UEQ: What is Hydraulics and Pnuematics?</p>				

<p>A.Hydraulics</p> <p>A1. Differences A2. Components A3. Circuits A4. Uses</p> <p>B.Pneumatics</p> <p>B1. Differences B2. Components B3. Circuits B4. Uses</p> 	<p>A.Hydraulics</p> <p>A1, List the differences between hydraulic and pneumatic systems. A2. Identify all parts of a hydraulic system. A3. Identify hydraulic symbols and diagram multiple circuits. A4. List multiple uses for hydraulics. A1-A4. Create an invention that incorporates hydraulic</p> <p>B.Pneumatics</p> <p>B1, List the differences between hydraulic and pneumatic systems. B2. Identify all parts of a pneumatic system. B3. Identify pneumatic symbols and diagram multiple circuits. B4. List multiple uses for pneumatics .</p>	<p>A.Hydraulics</p> <p>A1, I can list 5 differences between hydraulic and pneumatic systems. A2. I can list 8 parts of a hydraulic system. A3. I can identify hydraulic symbols and diagram multiple circuits. A4. I can list 10 uses for hydraulics. A1-A4. I can create an invention that incorporates hydraulic</p> <p>B.Pneumatics</p> <p>B1, I can list 5 differences between hydraulic and pneumatic systems. B2. I can list 8 parts of a hydraulic system. B3. I can identify pneumatic symbols and diagram</p>	<p>A.Hydraulics</p> <p>A1-A4. CFA-Backhoe project</p> <p>B.Pneumatics</p> <p>A1-A4. CFA-Backhoe project</p>	
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	B1-B4. Create a invention that incorporates pneumatics.	multiple circuits. B4. I can list 10 uses for pneumatics. B1-B4. I can create an invention that incorporates pneumatics.		
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