**S90 Checklist Electricity Unit**

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| **I. What is Electricity? How do we Design Electrical Circuits?** |
| **1. What is electrical discharge? Give 2 examples. Why can’t we use static electricity to power our machines?** |
| **2. Electricity if the movement of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through wires.** |
| **3a. What is the difference between a series and a parallel circuit? When do we use series circuits? Parallel circuits?****3b. Study your circuit diagrams!** **3c. What is the definition and circuit symbol for the following:• resistor****• switch****• battery** **• motor****• circuit breaker****• transistor****3d. Which way do the electrons flow in a battery (+) to (-) or (-) to (+) (choose one).**3e. **If we compare an electric circuit to traffic, match the following:**

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| **1. road construction site** | **A. electrons** |
| **2. stop sign** | **B. wires** |
| **3. vehicles** | **C. resistors** |
| **4. roads** | **D. switch**  |

3f. **If we compare an electric circuit to water turning a water wheel to lift 2  elephants – match the following**

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| **Water pressure of the reservoir** | **Resistance (ohms)** |
| **Flow rate of water running from reservoir through pipe to the water wheel** | **Battery/****Voltage (volts)** |
| **Valve and pipe** | **switch** |
| **Valve** | **Current (amps)** |

3g. What is **voltage (V)?** What device do we use to measure V.3h. What is **current (I)?** What device do we use to measure current in **amps**?  **milliamps**? |
| **II. How is Electricity Measured?** |
| **4a.** To measure voltage, the voltmeter wires must be **part of the circuit/go outside the circuit (choose one).****4b. What is resistance? D**oes a conductor (copper wire) have a **low or high resistance (choose one)?** Does an insulator have a **low or high resistance (choose one).****4c. Are loads (bulbs, motors, etc) resistors?****4d. What is the unit for resistance?****4d. What is the equation for Ohm’s Law? What does each letter in the equation represent? What units are they measured in?****4e. Rearrange Ohm’s law to calculate for V. Rearrange Ohm’s law to calculate for I.****4f. What is power? What is the formula for power? What does each letter in the equation represent? What units are they measured in?****4g. Rearrange the Power Equation to calculate I. Rearrange the Power Equation to calculate V.****4h. What is efficiency? What is the formula for efficiency? What does each letter in the equation represent? What units are they measured in?****4i) Why aren’t machines and electric circuits 100% efficient?****4j)** Energy output is always **higher/lower (choose one) than** Energy input**.** Because of this Efficiency is always **less than/more than (choose one)** 100%. |
| **III. How do we Design Batteries?** |
| **5a) Describe how a battery (electrochemical cell) works.****5b) Define electrode. Why are there 2 in a battery? Why must they be 2 different metals?****5c) Define electrolyte. What is the electrolyte’s job in a battery?**

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| **IV. Energy Inputs and Outputs in Electrical Systems: MRS CHEN p. 294 - 297** |

**6a) What is energy?6b) What are the energy transfers in MRS CHEN?6c) What are the energy transfers in the light bulbs?6d) What is the energy transfer in photovoltaic cells (solar power)?6e) What are the energy transfers in the piezoelectric effect? Give 2 examples.6f) What is the energy transfer in a thermocouple? How does a thermocouple work? What  is a thermopile?** |
| **IV. Electromagnets, Motors, Efficiency?** |
| **7a) What is an electric generator?****7b) What are the 2 main parts of an electric generator?****7c) What is an electromagnet?****7d) What 2 things make an electromagnet stronger?****7e) What is an electric motor?****7f) What is AC current?****7g) What is DC current?****7h) What is the job of the armature? Split ring commutator? Brushes? Magnets? Leads?****7i) Which part of a motor is really an electromagnet?** |
| **V. How is Electricity Generated? Is this OK?** |
| **8a) How is most electricity generated in Canada? In Alberta?****8b) Which electrical energy sources are considered renewable? Nonrenewable?****8c) What are the advantages and disadvantages of the electrical energy sources used in Canada?****8d) How does a turbine generate electricity?****8e) What are step up and step down transformers used for?****8f) Why is cogeneration an environmentally sound practice?** |