**Science 9: Electrical Properties**

1. What is the difference between a positive charge and a negative charge?
2. Describe the Laws of Electric Charge.
3. Explain the difference between conductors, semi – conductors and super conductors. How are they different from insulators?
4. List and give examples of the four basic elements or types of components in a simple circuit.
5. Illustrate the electrical circuit component.

Wire Cell Battery Lamp

Switch Resistor Motor Variable Resistor

Ammeter Voltmeter

1. Illustrate how an ammeter, a galvanometer, and a voltmeter are included in a schematic drawing.
2. What do each of the above electrical devices measure?
3. According to Ohm, what is the relationship between current, voltage and resistance and how can it be calculated?
4. Illustrate a series circuit and a parallel circuit using the following:

Power Source – 4 cells Loads – 3 resistors (e.g buzzer, 2 lamps) As many switches as you think you require.

1. What are the factors that affect resistance of wire, and how does each factor affect resistance?
2. Complete the table that shows energy conversions related to electricity.

|  |  |  |
| --- | --- | --- |
| **Device** | **Type of Energy Used** | **Type of energy converted to**  |
| Thermopile |  |  |
| Piezoelectric crystal |  |  |
| LED |  |  |
| Photovoltaic Cell |  |  |

1. What process/device enables a solar cell to transform the Sun’s energy into useable electricity?
2. What did Galvani discover and what importance did it have for science?
3. What is the difference between a Wet Cell and a Dry Cell?
4. Explain the difference between a primary cell and a secondary cell. Give two examples of each and what devices would use them.
5. How is an electromagnet constructed?
6. What is the difference between AC and DC current?
7. How does an AC Motor differ from a DC Motor?
8. Illustrate and label with explanations, how power is transmitted from the generating power station to your home.



1. Describe what a service panel in your house is and what function it serves.
2. Explain the difference between a fuse and a circuit breaker.
3. What are transistors used as and in what devices are they commonly found?
4. What is the Power (watts and kilowatts) of a hair dryer that requires 8A of current on a 240 V circuit?
5. An 850 W oven requires a 7A current. What is the voltage?
6. A flashlight uses 2 1.5 V D – cells to light a bulb that can work on a current up to 0.5A. What is the maximum power of the bulb?
7. You go around your house and find out there are 35, (60W), lights in your house. If they all are on for about 5 hours every day. What does it cost your parents for 1 year?
8. Your stereo is on 4 hours every day. It operates on 120V, using 4A of current. How much does it cost your parents for 1 year if the cost of electricity is $0.11 per kWh?
9. Explain what this illustration means, and how does it help the consumer?



1. Calculate the efficiency of an 800W kettle that takes 6 min to boil water. To heat the water to boiling point, it takes 20 000 J of energy.
2. What are four simple rules to follow, to protect yourself against fatal electrical shock, from electrical hazards?
3. What consequences – affecting Land and Air – result from the use of Fossil Fuels to generate electricity?
4. How can gravity produce electricity?
5. How is electricity generated in Nuclear Reactors?
6. What is thermal pollution?
7. What are four alternative sources to coal burning to generate electricity?