**SNC1D: U3-L14 Date:**

**Physics Unit Review**

**Static Electricity:** Static charges accumulate on surfaces and remain there until given a path to escape

|  |  |
| --- | --- |
| **Key Concepts** | **Summary** |
| • Static electric charges  • Law of attraction and law of repulsion  • Conductors and insulators  • Charging by friction  • Charging by contact and induction  • Using and reducing static charges | • Objects that gain electrons become negatively charged. Objects that lose electrons become positively charged.  • Objects with like charges repel each other. Objects with unlike charges attract each other.  • When an object is charged by contact, it takes the same charge as the charging object.  • When an object is charged by induction, it takes the opposite charge to the charging object.  • Charged objects attract neutral objects through the process of induction.  • The principles of electrostatics are used in applications such as photocopying, spray painting, and filtering air. |

**Key Terms**

|  |  |  |  |
| --- | --- | --- | --- |
| • charging by contact  • conduction  • conductivity  • conductor  • coulomb (C)  • electric charge | • electrical discharge  • electron  • electron affinity  • electroscope  • electrostatics  • friction | • grounding  • induction  • insulator  • law of attraction  • law of repulsion | • lightning rod  • neutron  • nucleus  • proton  • static charge  • static electricity |

**Current Electricity**: Current electricity is the continuous flow of electrons in a closed circuit.

|  |  |
| --- | --- |
| **Key Concepts** | **Summary** |
| • Current electricity  • Electrical circuits  • Potential difference  • Electric current  • Direct current  • Alternating current  • Resistance  • Series circuits and parallel circuits  • Ohm’s law (V = IR)  • Electrical safety | • Electrical circuits provide a complete path for electrons to flow.  • Current electricity is the flow of electrons through a conductor in a circuit.  • Potential difference or voltage (V ) is the difference in electric potential energy between two points in a circuit.  • Electric current (I ) is a measure of the amount of electric charge that passes by a point in an electric circuit each second.  • In direct current, electrons flow in one direction. In alternating current, electrons flow back and forth at regular intervals called cycles.  • Resistance (R) is the degree to which a substance opposes the flow of electric current through it.  • Series circuits provide one path for electrons to flow. Parallel circuits provide more than one path for electrons to flow.  • Ohm’s law states that as long as temperature stays the same, V = IR |

**Key Terms**

|  |  |  |  |
| --- | --- | --- | --- |
| • alternating current (AC)  • ammeter  • ampere (A)  • battery  • circuit breaker  • circuit diagram  • current electricity  • direct current (DC)  • dry cell | • electrical circuit  • electrical load  • electric current (l )  • electrochemical cell,  • electrode  • electrolyte  • fuel cell  • fuse | • ground fault circuit  interrupter  • ohm (Ω)  • ohmmeter  • Ohm’s law  • parallel circuit  • potential difference  • potential energy  • resistance (R) | • resistor  • series circuit  • short circuit  • switch  • transistor  • volt (V)  • voltage (V )  • voltmeter  • wet cell |

**Electricity sources and consumption:** We can reduce our electrical energy consumption and use renewable energy resources.

|  |  |
| --- | --- |
| **Key Concepts** | **Summary** |
| • Generating electricity  • Renewable and non-renewable  sources of energy  • Advantages and disadvantages of  energy sources  • Percent efficiency =  **(Eout / Ein) x 100%** | • Non-renewable sources used for generating electricity include fossil fuels and nuclear energy.  • Renewable sources used for generating electricity include water, sunlight, wind, tides, and geothermal energy.  • There are both costs and benefits from producing electricity from renewable and non-renewable sources.  • Electrical savings can be achieved through the design of technological devices and practices in the home. |

**Key Terms**

|  |  |  |  |
| --- | --- | --- | --- |
| • biomass  • efficiency  • EnerGuide  • energy grid  • Energy Star | • fossil fuels  • generators  • geothermal energy,  • hydroelectricity  • kilowatt-hour (kW•h) | • non-renewable energy  sources  • renewable energy  sources | • thermoelectric  generating plant  • thermonuclear  • turbine |

Questions:

Static Eelectricity Current Electricity

|  |  |
| --- | --- |
| **1.** (a) What are the possible interactions between two charged objects?  (b) How do a charged object and a neutral object interact?  **2.** Explain the role of friction in creating a charged object.  **3.** (a) Two neutral objects, A and B, were rubbed together, resulting in object A being charged positively. What is now the charge on B?  (b) How do you know?  (c) Which object, A or B, is likely higher on the electrostatic series?  (d) How do you know?  **13.** Would a negatively charged balloon stick to  a metal wall as easily as to a wooden wall?  Explain why it would or would not.  **14.** You have an unknown material that becomes charged when you rub it with silk. You also have a negative ebonite rod and a positive glass rod. How can you determine the charge of the unknown object?  **15.** If lightning hits a car, the effect is minimal. Explain why. | **1.** (a) Is the circuit above a series circuit or a parallel circuit?  (b) List all the parts of the circuit above.  (c) What is the voltage at V1 in the circuit  above?  (d) What is the current at A1 in the circuit above?  **3.** How is a parallel circuit different from a series circuit?  **4.** (a) What happens to all light bulbs in a series circuit when one burns out?  (b) How does the situation change when the lights are hooked up in parallel? |

Electricity Sources and Reduction in use More Questions

|  |  |
| --- | --- |
| **1.** (a) List two non-renewable sources of energy.  (b) Name an advantage and a disadvantage of using each source.  **2.** (a) List four renewable sources of energy.  (b) Name an advantage and a disadvantage of using each source. **6.** Suppose you bake a potato in a toaster oven that uses 1.2 kW. The oven is turned on for  25 min. How many kilowatt hours did it use?  **7.** (a) If a motor uses 22 000 J while converting it to 13 400 J of useful energy, what is its percent efficiency?  (b) If a diesel truck produces 47.5 kJ of useful output energy from 125 kJ of diesel fuel, what is its percent efficiency?  **13.** A group of Ontario farmers form a cooperative group and build a factory that turns corn into a fuel for generators and cars. Would this energy source be renewable or non-renewable? Explain | **8.** Object C is rubbed on object D. The leaves of a negatively charged electroscope temporarily move closer together when object D is brought near.  (a) What charge does object D have?  (b) What charge does object C have?  **14.** (a) Name one device that would function better if static electricity were eliminated.  (b) Name one device that would not function as well if static electricity were eliminated  **20.** (a) Use circuit symbols to draw a series circuit with a battery, connecting wires, and two light bulbs.  (b) Draw a parallel circuit using the same components as (a).  (c) Describe the difference in current flowing in the two circuits (a) and (b).  (d) What will happen to the brightness of the bulbs in circuit (a) if one of the bulbs is unscrewed?  (e) What will happen to the brightness of  the bulbs in circuit (b) if one of the light bulbs is unscrewed?  **37.** What information does an EnerGuide label provide?  **38.** What does an Energy Star label indicate? |