Current Electricity Test Outline (Science 9)

TEST OVERVIEW AND STRUCTURE

- Problem-solving: drawing circuits to fit certain criteria and labelling the direction of current flow (e.g. wb pp. 131-132, 140; “Drawing Series and Parallel Circuit Diagrams”.
- Problem-solving: interpreting circuit diagrams and calculating current, voltage, resistance (e.g. Worksheets: “Electric Current Problems”, “Calculate the Current”, “Calculating Voltage in Series”, “Calculating Voltage in Parallel”, “Ohm’s Law Calculations”, “Ohm’s Law Problems”).
- Questions will be done first individually and then in pre-assigned groups.
- Test is open-book, open-notes, but will be timed. (Before the test, you should be familiar with your notes so that you can find information quickly. You will not be able to afford to waste time looking through all your notes.)

LEARNING MAP CRITERIA:

Relevance	Extending	Proficient	Developing	Emerging
Circuit Components, Circuit Diagrams ☑	Apply knowledge of circuits to real-life situations. Interpret real-life situations to make hypotheses about the connectivity of those circuits.	Draw a circuit diagram for a series or parallel circuit. Draw an ammeter or voltmeter to measure the current or potential difference in a given region of the circuit. Given a circuit diagram, construct the circuit. Convert the pictorial representation of a circuit into a circuit diagram.	Recognize and interpret the circuit symbols for: battery, lightbulb, resistor, wire, switch, ammeter, voltmeter. Define and give examples of: source, load, insulator, conductor.	
Current ☑	Analyze complex circuits and complete multi-step calculations involving current, charge, electrical potential, and resistance.	Convert between mA and A. Use I=Q/t formula and its variants.	Describe how the Law of Electric Charges relates to the direction of current flow. Label a circuit diagram with the direction of electron current flow. Use the $I_{total}=I_1 + I_2 +...$ and $I_{total}=I_1=I_2 ...$ formulas to determine current at any location along a series or parallel circuit.	Know the Law of Electric Charges (opposite charges attract; like charges repel)
Electrical Potential ☑		Use V=IR formula and its variants.	Know that electrical potential and voltage are measured in V. Know that the higher the voltage, the faster the current. Use the $V_{total}=V_1 + V_2 +...$ and $V_{total}=V_1=V_2 ...$ formulas to calculate voltage gain of cells in series or parallel. Use the $V_{total}=V_1 + V_2 +...$ and $V_{total}=V_1=V_2 ...$ formulas to calculate voltage loss of loads in series or parallel.	
Resistance ☑			Know that every load has a resistance. Know that the higher the resistance, the lower the current through a load.	

VOCABULARY:

(Disclaimer: This is not meant to be an exhaustive list. Vocabulary words may appear on the test that are not in this list.)

- Charge
- Current electricity
- Source
- Battery
- Conducting wire
- Electrochemical cell
- Positive terminal
- Negative terminal
- Load
- Lightbulb
- Resistor
- Switch
  - Open switch
  - Closed switch
- Ammeter
- Voltmeter
- Electron
- Series
- Parallel
- Insulator
- Conductor
- Current (I)
  - Amperes (A)
  - Milliamperes (mA)
- Charge (Q)
  - Coulombs (C)
- Time (t)
  - Seconds (s)
  - Minutes (min = 60s)
- Potential Energy, Voltage (V)
  - Volts (V)
  - Voltage Gain
  - Voltage Drop
- Resistance (R)
  - Ohms (Ω)

TESTABLE CALCULATIONS

- $I = \frac{Q}{t}$; $Q = I \times t$; $t = \frac{Q}{I}$
- Convert mA to A and A to mA
- $I_{total}=I_1 + I_2 +...$ (parallel)
- $I_{total}=I_1=I_2 ...$ (series)
- $V_{total}=V_1 + V_2 +...$ (series)
- $V_{total}=V_1=V_2 ...$ (parallel)
- $V = I \times R$; $R = \frac{V}{I}$; $I = \frac{V}{R}$

PRIMARY STUDY MATERIAL:

- Science Connections Textbook Topics 3.3 and 3.4
- Science Connections Workbook pages 126-132, 134-137, 138-141, 145-147
- Current Notes #1 (Introduction), #2 (Current), #3 (Potential), #4 (Resistance and Ohm's Law) and accompanying powerpoints and worksheets