Physics: Electricity 1

Whole unit overview

Learning Outcomes		Suggested Teaching Activities	Resources
4.2 (b)	State that current is related to the flow of charge. Use and describe the use of an ammeter.	Use simple circuits to measure current.	This site contains a series of useful pages relating to electricity and magnetism. These are relevant to most of this unit. http://www.galaxy.net/~k12/electric/index.shtml
	Show understanding that a current is a rate of flow of charge and recall and use the equation $I = Q/t$. Distinguish between the direction of flow of electrons and conventional current.	A Van de Graaf generator can be used with a microammeter to show that current is a flow of charge.	For some interesting information about static electricity from the Theater of Electricity, including a video of how the Van de Graaf works http://www.mos.org/exhibits?online_exhibits.html click on Theater of Electricity, then video gallery, click on How the Van de Graaf generator works. Any mention of the Van de Graaf generator and students are asking about lightning – try this site also about the work of Benjamin Franklin; click on Franklin's Kite.
4.2 (c)	State that the e.m.f. of a source of electrical energy is measured in volts.		
	Show understanding that e.m.f. is defined in terms of energy supplied by a source in driving charge round a complete circuit.	An analogy with water being pumped round a closed system (e.g. central heating) can be useful here to enable the students to have a mental picture which helps them to distinguish between current (the water) and e.m.f. (the energy from the water pump).	A good introductory lesson on current and e.m.f. http://www.mos.org/sln/toe/tennisballs.html

4.2 (d)	State that the potential difference across a circuit component is measured in volts. Use and describe the use of a voltmeter.	Continue the circuit work, measuring potential differences with a voltmeter.	
4.2 (e)	State that resistance = pd/current and understand qualitatively how changes in p.d. or resistance affect current. Recall and use the equation $R = V/I$. Describe an experiment to determine resistance using a voltmeter and an ammeter. Relate (without calculation) the resistance of a wire to its length and to its diameter.	Extend the circuit work using an ammeter and a voltmeter to measure I and V and so calculate resistance of a resistor. By using samples of nichrome or constantan wire of different lengths and diameters suitable resistance comparisons can be made.	Why not create a vocabulary quiz at this stage to test knowledge in a different way?
	Recall and use quantitatively the proportionality between resistance and the length and the inverse proportionality between resistance and cross-sectional area of a wire.	Extend the experimental resistance work to give quantitative results.	
4.2 (f)	Recall and use the equation $P = IV$ and $E = Ivt$.		