

## Physics: Electronics

### Whole unit overview

Learning Outcomes		Suggested Teaching Activities	Resources
4.6 (a)	<p>Describe the production and detection of cathode rays.</p> <p>Describe their deflection in electric fields and magnetic fields.</p> <p>State that the particles emitted in thermionic emission are electrons.</p>	<p>Use a demonstration diode to show thermionic emission.</p> <p>Use a deflection tube and Helmholtz coils to demonstrate deflection of cathode rays in magnetic and electric fields.</p>	
4.6 (b)	<p>Describe in outline the basic structure, and action, of a cathode-ray oscilloscope (detailed circuits are <i>not</i> required).</p> <p>Use and describe the use of a cathode-ray oscilloscope to display waveforms.</p>	<p>Lead on from the deflection tube (see above) to the c.r.o. and demonstrate its use (e.g. in displaying frequency and amplitude of sound waves, as in Waves unit).</p>	<p>This site enables students to control a wave on an oscilloscope screen.</p> <p><a href="http://www.phy.ntnu.edu.tw/~hwang/oscilloscope/oscilloscope.html">http://www.phy.ntnu.edu.tw/~hwang/oscilloscope/oscilloscope.html</a></p>
4.3 (c)	<p>Describe the action of a variable potential divider (potentiometer).</p> <p>Describe the action of thermistors and light dependent resistors and show understanding of their use as input transducers.</p> <p>Describe the action of a capacitor as an energy store and show understanding of its use in time delay circuits.</p> <p>Describe the action of a relay and show understanding of its use in switching circuits.</p>	<p>A series of straightforward circuits should be used here so that students become familiar with the various components. The circuits could model the action of temperature sensors, light sensors, alarms, etc.</p>	<p>Students interested in electronics and related fields may like to design their own robots on line.</p> <p><a href="http://www.mos.org/exhibits/robot">http://www.mos.org/exhibits/robot</a></p> <p>This site gives instructions on how to build a relay.</p> <p><a href="http://www.schoolnet.ca/general/electric-club/e/page22.html">http://www.schoolnet.ca/general/electric-club/e/page22.html</a></p>

	<p>Describe the action of a diode and show understanding of its use as a rectifier.</p> <p>Describe the action of a transistor as an electrically operated switch and show understanding of its use in switching circuits.</p> <p>Recognise and show understanding of circuits operating as light sensitive switches and temperature operated alarms (using a relay or a transistor).</p>		
<p>4.3</p> <p>(d)</p>	<p>Explain and use the terms digital and analogue.</p> <p>State that logic gates are circuits containing transistors and other components.</p> <p>Describe the action on NOT, AND, OR, NAND and NOR gates.</p> <p>Design and understand simple digital circuits combining several logic gates.</p> <p>State and use the symbols for logic gates (the American ANSII 32.14 symbols will be used).</p>		