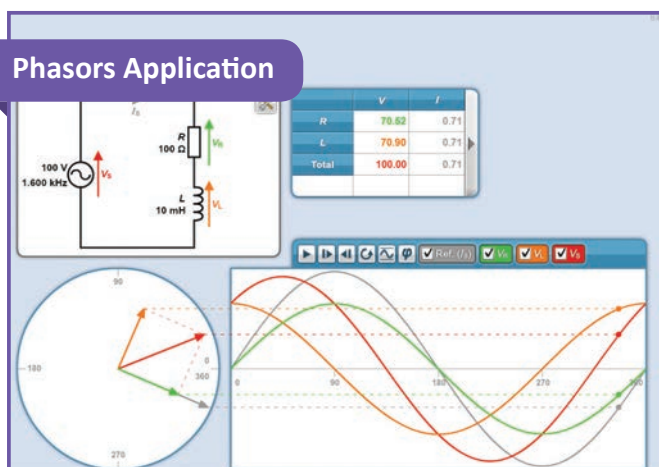
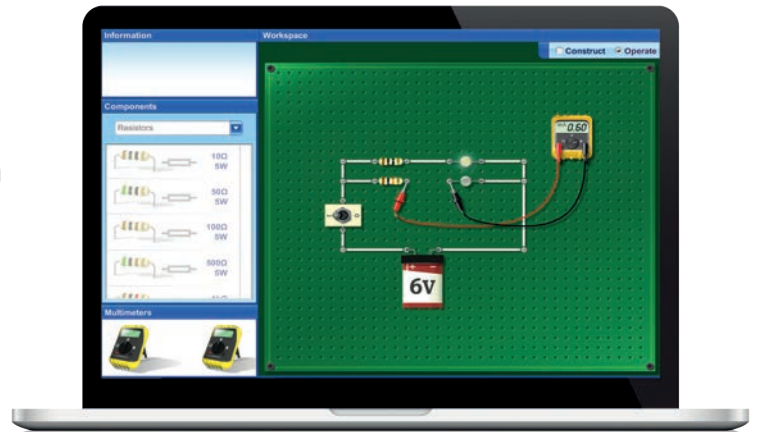


Basic Electronics Pack Electronics

**Learn where you want -
when you want...**

Online lessons that include that include
theory presentations, exciting investigation
activities and assessment quizzes.

Basic Electronics Pack - Lesson Examples:



The DC Motor

Characteristics of a DC Permanent Magnet Motor

DC motors were the first types of motor developed and have been popular because of the ease with which they can be controlled.

The simplest type of DC motor is the permanent magnet motor. The stator magnetic field is generated by permanent magnets making these motors very popular in small sizes and powers.

When a mechanical load is applied to the output shaft of a DC permanent magnet motor, it causes the motor speed to change. The level of input voltage that is applied to run the motor also affects its speed. The motor can stall if the load is too great or the voltage is too low.

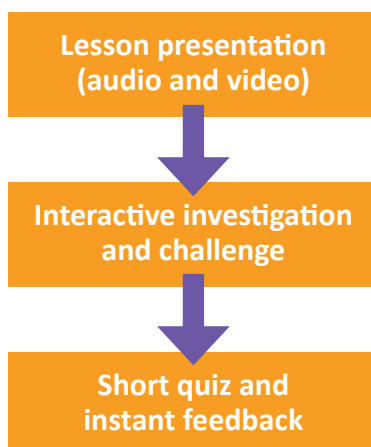
Use the Motor Explorer application to obtain the characteristics of a DC permanent magnet motor and plot a graph showing how the speed of the motor changes as the load and voltage are changed.

Motor Explorer Application

1. Select the **DC Permanent Magnet Motor** and place it on the test bed. Switch on the power and start the motor. The motor is running at full speed with no load.
2. Set the 'Voltage' control to 48 V. This is the input voltage to the motor. Set the 'Load' control to each value in the table. For each value, record the motor speed. The speed for zero load has already been recorded.

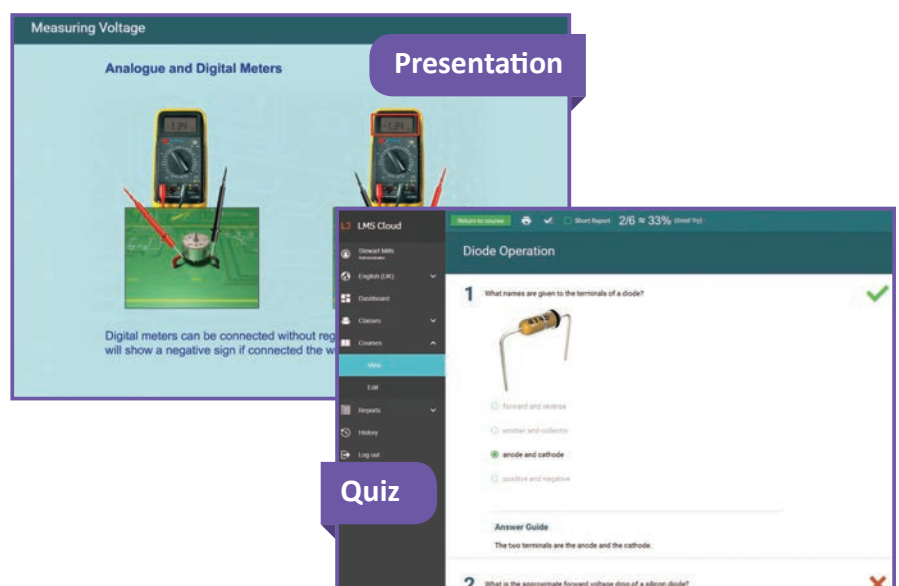
Motor Load in Nm	Motor Speed in rpm @ 48 V	Motor Speed in rpm @ 36 V
0	4865	3641
0.5		
1.0		

Our tried and tested online learning
sequence has been successful
around the world:



Measuring Voltage

Analogue and Digital Meters



Digital meters can be connected without regard to polarity. Analogue meters will show a negative sign if connected the wrong way round.

Presentation

Diode Operation

1. What names are given to the terminals of a diode?

Forward and reverse
anode and cathode
anode and cathode
positive and negative

Answer Guide
The two terminals are the anode and the cathode.

Quiz

2. What is the approximate forward voltage drop of a silicon diode?

DC Principles

- Electrical Principles
- Measuring Voltage
- Relationship between Voltage, Current and Resistance
- Applications of Ohm's Law
- Electrical Power
- Kirchhoff's First Law
- Resistors
- Color Code and Tolerance
- Resistors in Series
- Parallel Resistor Circuits
- Capacitors
- Charging and Discharging a Capacitor
- Calculating Total Capacitance
- Self Inductance of Inductors
- Handling Measurement Errors
- Extending the Range of a Voltmeter
- Measuring Current and Extending Ammeter Range
- Calculating the Extension of the Range of an Ammeter

AC Principles

- Introduction to Alternating Current
- Alternating Current Equations
- Calculating the Effective Values of Alternating Voltages and Currents
- Measuring with an Oscilloscope
- Amplitude and Timebase Settings of an Oscilloscope
- Capacitors in AC Circuits
- RC Circuits
- Inductors in AC Circuits
- RL Circuits
- RLC Circuits

Electromagnetic Principles

- Magnetic Principles
- Magnetism and Electromagnetism
- Electromagnetism
- Electromagnetic Induction
- Transformers
- The DC Motor
- Characteristics of the DC Motor
- The Induction Motor
- Characteristics of an Induction Motor
- Speed Control of Induction Motors
- The Single-phase AC Motor
- Starting a Single-Phase AC Motor

Three-Phase Electricity

- Generation of Three-phase AC
- Representation of Three-phase AC
- Phase Difference and Power
- Graphical Representation of Phase Difference and Power
- Star Connection
- Star Calculations
- Delta Connection
- Delta Calculations