



**Kings Langley School**

Unlocking Potential for Life

# **I can do statements**

## **KS4 - Year 10**

### **Physics**



<b>P1 Energy stores and transfers</b>	<b>Check 1</b>	<b>Check 2</b>	<b>Check 3</b>	<b>Check 4</b>
I can describe a wide range of energy stores in different contexts.				
I can describe changes in energy stores in terms of the process that causes the change.				
I can use quantitative descriptions of changes in energy stores.				
I can apply the law of conservation of energy in straightforward situations.				
I can describe changes in energy stores explaining why energy ceases to be useful.				
I can describe the energy changes in a range of experiments and account for energy dissipation to the surroundings.				
I can describe the action of frictional forces on objects and the associated heating effect.				
I can use the equation for work done to calculate distances or size of forces.				
I can use repeat values to measure the work done by a force experimentally.				
I can describe the effect of different gravitational field strength on the gravitational potential energy store changes of a system.				
I can calculate the gravitational potential energy store of a system using the mass gravitational field strength, and height.				
I can describe energy changes that involve a heating effect as opposed to movement of an object.				
I can calculate the kinetic energy store of an object.				
I can calculate the elastic potential energy store of a stretched spring.				
I can investigate the relationship between the energy stored in a spring and the kinetic energy store of an object launched from it.				
I can analyse energy transfers to identify useful and less useful energy transfers.				
I can describe energy dissipation and how this reduces the capacity of a system.				
I can investigate the factors that affect frictional forces.				
I can calculate the efficiency of a range of energy transfers.				

I can use the law of conservation of energy to explain why efficiency can never be greater than 100%.				
I can describe the processes that waste energy in electrical devices.				
I can rank electrical devices in terms of their power.				
I can compare mains-powered and battery-powered devices.				
I can investigate the efficiency of a motor.				
I can calculate the energy transferred by an electrical device.				
I can calculate the efficiency of a device from power ratings.				
I can find the wasted power of a device.				

<b>P2 Energy transfer by heating</b>	<b>Check 1</b>	<b>Check 2</b>	<b>Check 3</b>	<b>Check 4</b>
I can analyse temperature change data to compare the thermal conductivity of materials.				
I can describe the changes in the behaviour of the particles in a material as the temperature of the material increases.				
I can apply understanding of thermal conductivity in reducing energy dissipation through the choice of appropriate insulating materials.				
I can calculate the energy required to change the temperature of an object.				
I can measure the specific heat capacity of a material				
I can compare home improvement features in terms of payback time.				

<b>P3 Energy resources</b>	<b>Check 1</b>	<b>Check 2</b>	<b>Check 3</b>	<b>Check 4</b>
I can outline the operation of a fossil fuel burning power station.				
I can outline the operation of a nuclear power station.				
I can explain why biofuels are considered carbon neutral.				
I can describe the operation of a wind farm.				
I can describe the operation of a hydroelectric system.				
I can suggest the most appropriate energy resource to use in a range of scenarios.				
I can compare and contrast the operation of solar cells (photovoltaic cells) with solar heating panels.				
I can describe the operation of a solar power tower.				
I can describe the operation of a geothermal power plant.				
I can describe the effects of acid rain and climate change.				
I can describe techniques to reduce the harmful products of burning fossil fuels.				
I can compare a wide range of energy resources in terms of advantages and disadvantages.				
I can use base load and start-up time data to explain why some power stations are in constant operation whereas others may be switched on and off.				

<b>P4 Electric circuits</b>	<b>Check 1</b>	<b>Check 2</b>	<b>Check 3</b>	<b>Check 4</b>
I can describe the operation of a variable resistor and a diode and their effects on current.				
I can calculate the charge transferred by a steady current in a given time.				
I can construct an electrical circuit and accurately measure the current.				
I can calculate the potential difference.				
I can calculate the resistance of a component.				
I can measure the effect of changing the length of a wire on its resistance in a controlled experiment.				
I can describe the resistance characteristics of a filament lamp.				
I can describe the characteristics of a diode and light-emitting diode.				
I can investigate the resistance characteristics of a thermistor and a LDR.				
I can find the potential difference across a component in a circuit by using the p.d. rule.				
I can calculate the current in a series circuit containing more than one resistor.				
I can investigate the resistance of series circuits with several components.				
I can measure the p.d. across parallel circuits and explain any discrepancies.				
I can describe the effect on the resistance in a circuit of adding a resistor in parallel.				
I can investigate the effect of adding resistors in parallel on the size of the current in a circuit.				

<b>P5 Electricity in the home</b>	<b>Check 1</b>	<b>Check 2</b>	<b>Check 3</b>	<b>Check 4</b>
I can describe the characteristics of the UK mains supply.				
I can compare a.c. traces in terms of period and amplitude (voltage).				
I can operate a cathode ray oscilloscope to display an a.c. trace.				
I can discuss the choices of materials used in cables and plugs in terms of their physical and electrical properties.				
I can describe why a short circuit inside a device presents a hazard.				
I can identify a variety of electrical hazards associated with plugs and sockets.				
I can calculate the power of systems.				
I can calculate the power of electrical devices.				
I can select an appropriate fuse for a device.				
I can calculate the charge transferred by a current in a given time.				
I can calculate the energy transferred by a charge passing through a potential difference.				
I can apply the law of conservation of energy in a circuit.				
I can calculate energy transfer in kilowatt-hours.				
I can convert between efficiencies stated in percentages and those stated in decimal forms.				
I can calculate the power rating of a device from the energy transferred and the time of operation.				

<b>P6 Molecules and matter</b>	<b>Check 1</b>	<b>Check 2</b>	<b>Check 3</b>	<b>Check 4</b>
I can explain why some materials will float on water.				
I can calculate the density of materials.				
I can measure the density of a solid and a liquid.				
I can describe the arrangement of the particles in a solid, liquid, and gas.				
I can explain the behaviour of a material in terms of the arrangement of particles within it.				
I can describe the changes in behaviour of the particles in a material during changes of state.				
I can state that the melting and boiling points of a pure substance are fixed.				
I can use the term 'latent heat' to describe the energy gained by a substance during heating for which there is no change in temperature.				
I can find the melting or boiling point of a substance by using a graphical technique.				
I can describe how the internal energy of an object can be increased by heating.				
I can describe how the behaviour of particles changes as the energy of a system increases.				
I can describe the energy changes by heating between objects within the same system.				
I can describe the changes in particle bonding during changes of state.				
I can calculate the latent heat of fusion and latent heat of vaporisation for a substance.				
I can measure the latent heat of fusion for water.				
I can describe the behaviour of particles in a gas as the gas is heated.				
I can outline Brownian motion and how this provides evidence for the particle nature of matter.				
I can describe the relationship between an increase in the temperature of a fixed volume of a gas and the increase in pressure of the gas.				

<b>P7 Radioactivity</b>	<b>Check 1</b>	<b>Check 2</b>	<b>Check 3</b>	<b>Check 4</b>
I can describe some safety precautions used when dealing with radioactive materials.				
I can describe how a Geiger counter can be used to detect radiation.				
I can identify natural and man-made sources of background radiation.				
I can describe the plum pudding model of the atom.				
I can describe the evidence provided by the Rutherford scattering experiment.				
I can describe the properties of protons, neutrons, and electrons.				
I can calculate the number of neutrons in an isotope by using nuclear notation.				
I can describe the differences between isotopes.				
I can complete decay equations for alpha and beta decay.				
I can describe how the penetrating powers of radiation can be measured.				
I can describe the path of radiation types through a magnetic field.				
I can describe the process of ionisation.				
I can find the ratio of a sample remaining after a given number of half-lives.				
I can state that all atoms of a particular isotope have an identical chance to decay in a fixed time.				
I can plot a graph showing the decay of a sample and use it to determine half-life.				