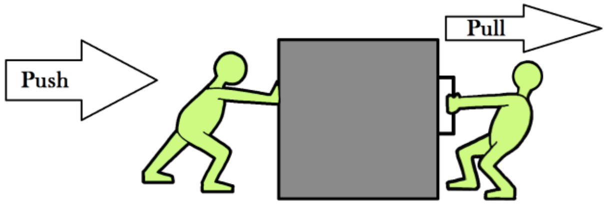
National 4 Physics



Pupil Progress Checks

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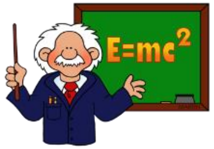
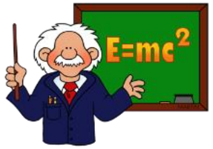


National 4 Unit 1a – Generation of Electricity- Pupil Progress Check

	Learning Outcomes	✓☺	?😐	✗☹
1	I can classify different methods of electricity generation as renewable or non-renewable			
2	I can state that fossil fuels are burned in thermal power stations to generate electricity			
3	I can describe how thermal power stations work and represent their energy changes as a flow diagram			
4	I can *describe advantages and disadvantages of burning fossil fuels to generate electricity*			
5	I can state that biomass is burned in power stations to generate electricity			
6	I can state some examples of biomass – sawdust, wood chips, sewage pellets			
7	I can describe advantages and disadvantages of burning biomass to generate electricity			
8	I can describe how biomass power stations work and represent their energy changes as a flow diagram			
9	I can describe how a nuclear power stations generates electricity and represent the energy changes as a flow diagram.			
10	I can describe advantages and disadvantages of using nuclear power stations to generate electricity.			
11	I can present an informed opinion on whether Scotland should build more nuclear power stations			
12	I can compare output data on renewable electricity generating methods in Scotland			
13	I can state that Scotland is a net exporter of electricity, and explain what this means.			

14	I can state that wind power is the fastest growing renewable sector in Scotland			
15	I can describe advantages and disadvantages of using wind power generators (turbines) to generate electricity.			
16	I can identify factors that affect the power output of wind power generators			
17	I can state that a process is completely efficient (100%) if all the energy produced is turned into electricity.			
18	I can carry out calculations to work out % efficiency of power stations given the energy in and the energy out.			
19	I can carry out calculations to work out % efficiency of power stations given the power in and power out.			
20	I can state that energy is measured in J, kJ or MJ and convert from one unit to another			
21	I can state that energy is measured in W, kW or MW and convert from one unit to another			
22	I can state that the more energy changes that occur to produce electricity, the less efficient the process is.			
23	I can carry out energy efficiency calculations for electrical devices.			
24	I can state that electricity is transmitted from power stations to homes via the National Grid			
25	I can state that energy is transferred though overhead cables or wires (usually)			
26	I can state that the current in the wires causes heat energy to be produced which wastes energy			
27	I can state that transformers are used to reduce the amount of energy wasted as heat in distribution.			
28	I can state that a transformer can change low voltage electricity to high voltage (440kW) electricity for distribution in overhead cables.			
29	I can state that transformers can change high voltage electricity into low voltage			

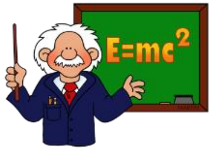
	electricity (230V) for use in homes.			
30	I can describe how transformers work.			
31	I can carry out calculations to calculate output voltage given input voltage and number of coils within primary and secondary coils in a transformer.			



National 4 Unit 1b – Magnetism- Pupil Progress Check

	Learning Outcomes	✓☺	?😐	✗☹
1	I can state that the 3 metallic elements are cobalt, iron and nickel			
2	I can state that a bar magnet has a north pole and a south pole and explain what this means			
3	I can carry out an experiment to investigate the magnetic field around a bar magnet.			
4	I can state that the magnetic field is the area around the magnet which can influence magnetic materials			
5	I can carry out an experiment to investigate the field around 2 attracting magnets			
6	I can carry out an experiment to investigate the field around 2 repelling magnets			
7	I can state that like poles repel and opposite poles attract.			
8	I can state that when a current passes through a wire a magnetic field is generated.			
9	I can carry out an experiment to make an electromagnet			
10	I can investigate the effect of number of coils on an electromagnet			
11	I can state that 3 factors that affect the strength of an electromagnet are voltage, number of coils and the presence of an iron core.			
12	I can state that the iron core becomes permanently magnetised.			
13	I can carry out an experiment to make a temporary magnet.			
14	I can compare advantages and disadvantages of magnets and electromagnets.			
15	I can describe some everyday applications of magnets and electromagnets.			
16	I can define a supermagnet as a magnet made out of the metals Fe,Nd and B.			

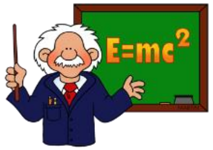
17	I can describe an everyday application of a supermagnet.			
18	I can describe how to use a magnet to generate an alternating current (a.c.)			
19	I can state that the size of the current is affected by how quickly the magnet is moved, the number of coils and the strength of the magnetic field.			



National 4 Unit 1c – Electrical Circuits Pupil Progress Check

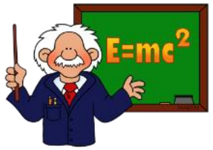
	Learning Outcomes	✓☺	?😐	✗☹
1	I can draw the circuit symbols for a cell, battery, resistor, voltmeter, ammeter, switch and variable resistor			
2	I can describe a series circuit as one where there is only one pathway for the charge to flow.			
3	I can describe a parallel circuit as one where there are multiple pathways (branches) for the charge to flow.			
4	I can state that the cell provides the energy for the circuit.			
5	I can set up a series circuit and use an ammeter to measure current in different positions.			
6	I can measure current (I) in different positions of a parallel circuit.			
7	I can state that the current in a series circuit is the same throughout.			
8	I can state that the current in the branches of a parallel circuit add up to the initial current.			
9	I can solve problems to work out the current in different positions in series and parallel circuits.			
10	I can measure the supply voltage (Vs) of a cell/battery using a voltmeter.			
11	I know that a voltmeter must be connected in parallel to the component.			
12	I can measure the voltage across different components in a series circuit.			

13	I can measure the voltage across different components in a parallel circuit.			
14	I can state that the voltage across the different components in a series circuit adds up the supply voltage. $V_s = V_1 + V_2 + V_3$			
15	I can state that experimental results are not perfect because some energy is needed to overcome resistance in the wires.			
16	I can state that the voltage across the different components in branches of a parallel circuit = the supply voltage. $V_s = V_1 = V_2 = V_3$			
17	I can solve problems to work out the voltages across different components in simple series and parallel circuits.			
18	I can describe everyday examples of series circuits such as kettles, Christmas tree lights and heating system circuits.			
19	I can describe everyday examples of parallel circuits such as house lighting and car lights.			



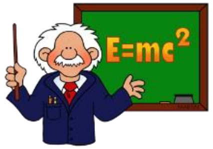
National 4 Unit 1d – Electrical Power Pupil Progress Check

	Learning Outcomes	✓☺	?😐	✗☹
1	I can state that the power of an electrical appliance is measured in Watts (W)			
2	I can define power as how quickly an appliance converts energy.			
3	I can state the relationship that links power, energy and time. $P = E/t$			
4	I can solve numerical problems to calculate power, energy or time given the other two.			
5	I can state that energy used by an appliance can be measured using a Joulemeter.			
6	I can state that electrical appliances that are used for heating have high power ratings and are hence more expensive to use.			
7	I can identify the energy changes occurring in a particular appliance.			
8	I can identify the useful energy output and the waste energy output.			
9	I can calculate % energy efficiency using the relationship useful output/total input x 100			
10	I can describe ways of reducing energy bills within the home.			
11	I can calculate running costs of appliances given the power rating and the cost per unit of electricity.			
12	I can carry out a research task to compare different types of light bulbs to include how they work and their advantages and disadvantages.			



National 4 Unit 1e – Electronic Circuits Pupil Progress Check

	Learning Outcomes	✓☺	?😐	✗☹
1	I can draw circuit symbols for variable resistor, resistor, fuse, LDR, LED, thermistor, microphone, loudspeaker, relay, buzzer and transistor.			
2	I can state the function of each of the electronic components.			
3	I can classify them as input, output or processing components.			
4	I can state that thermistors are used as sensors in circuits that monitor and control temperature such as heating systems and incubators.			
5	I can state that LDR are used as sensors in circuits that are triggered by changes in light such as street lighting.			
6	I can state that logic gates are processing components found in microchips.			
7	I can draw circuit symbols for AND, NOT and OR gates.			
8	I can draw truth tables for each type of logic gate.			
9	I can state that digital inputs only have two setting, 1 or 0, High or Low, On or Off.			
10	I can select and connect the correct gate to solve practical electronic problems.			
11	I can describe an everyday example of where each type of gate is used.			
12	I can draw logic diagrams for electronic circuits.			
13	I can construct truth tables for electronic circuits			



National 4 Unit 1f – Gas Laws and The Kinetic Model Pupil Progress Check

	Learning Outcomes	✓☺	?😐	✗☹
1	I can describe the particle arrangements in solids, liquids and gases.			
2	I can describe the motion of particles in solids, liquids and gases			
3	I can state that the model of how particles are arranged and how they move in solids, liquids and gases is called the Kinetic Model. (Kinetic Theory)			
4	I can state that pressure occurs when a force is applied to a surface			
5	I can carry out an experiment to determine the pressure that I exert on the floor using the relationship Pressure = Force/Area.			
6	I can use the Pressure = Force/Area relationship to solve numerical problems.			
7	I can state that gas pressure is caused by collisions between gas particles and the sides of the container and each other.			
8	I can state that for a gas in a fixed volume, if temperature increases, pressure increases.			
9	I can state that for a gas at a fixed temperature, if the volume decreases, the pressure increases.			
10	I can explain why an increase in temperature causes an increase in pressure using kinetic theory ideas.			
11	I can explain why a decrease in volume causes an increase in pressure using particle ideas.			
12	I can describe how changes in pressure affect weather balloons.			