National 4 and 5 Physics Unit 2- Electricity and Energy LOs

Name_____ Teacher_____

✓	**I am confident that I understand this and I can apply this to problems**
?	**I have some understanding but I need to revise this some more**
✘	**I don't know this or I need help because I don't understand it**

National 4 outcomes are in lighter font. **National 5 outcomes are in bold**

2.1 Practical Electricity	Covered (✓)	How well can you do this?
1. Can I describe how electrons are arranged in a conductor and insulator?		✘ ? ✓
2. What is meant by the electric current in an electrical circuit?		✘ ? ✓
3. Can I describe a series circuit?		✘ ? ✓
4. What is the unit of current?		✘ ? ✓
5. Can I describe how to measure current?		✘ ? ✓
6. Can I describe the current at different points in a series circuit?		✘ ? ✓
7. Can I describe a parallel circuit?		✘ ? ✓

National 4 and 5 Physics Unit 2- Electricity and Energy LOs

	Covered (✓)	How well can you do this?
8. Can I describe the current at different points in a parallel circuit?		× ? ✓
9. What is meant by the voltage in an electrical circuit?		× ? ✓
10. What is the unit of voltage?		× ? ✓
11. Can I describe how to measure voltage?		× ? ✓
12. Can I describe the voltage across different components in a series circuit?		× ? ✓
13. Can I describe the voltage across different branches in a parallel circuit?		× ? ✓
14. Can I describe two practical uses of series and parallel circuits?		× ? ✓
15. What is meant by resistance in an electrical circuit?		× ? ✓
16. Can I describe how resistance is measured in an electrical circuit?		× ? ✓
17. What is the unit of electrical resistance?		× ? ✓

National 4 and 5 Physics Unit 2- Electricity and Energy LOs

	Covered (✓)	How well can you do this?
18. Can I describe the factors that affect resistance?		✗ ? ✓
19. Can I describe what happens to the current in a circuit with changes to resistance?		✗ ? ✓
20. Can I carry out calculations involving the relationship between resistance, voltage and current?		✗ ? ✓
21. Can I describe two practical applications of a variable resistance?		✗ ? ✓
22. Can I define electric current in terms of electric charge and time?		✗ ? ✓
23. Can I carry out calculations involving the relationship between charge, current and time?		✗ ? ✓

	Covered (✓)	How well can you do this?
24. Can I explain the difference between alternating and direct current?		✗ ? ✓
25. Can I describe the effect of an electric field on a negative charge?		✗ ? ✓
26. What is meant by the potential difference between two parallel charged plates?		✗ ? ✓
27. Can I define potential difference in terms of energy and charge?		✗ ? ✓
28. Can I carry out calculations involving current and voltage in complex circuits?		✗ ? ✓
29. Can I carry out calculations involving resistors in series and parallel?		✗ ? ✓
30. Can I describe an experiment to determine the relationship between current, potential difference and resistance?		✗ ? ✓
31. Can I carry out calculations involving the relationship between potential difference, current and resistance?		✗ ? ✓

	Covered (✓)	How well can you do this?
32. Can I carry out calculations to find resistance using V/I graphs?		✗ ? ✓
33. Can I describe how the resistance of a conductor changes with increases in temperature?		✗ ? ✓

National 4 and 5 Physics Unit 2- Electricity and Energy LOs

2.2 Electrical Power	Covered (✓)	How well can you do this?
1. Can I describe energy transformations that take place in electrical appliances?		✗ ? ✓
2. What are the units of energy?		✗ ? ✓
3. What is meant by electrical power of an appliance?		✗ ? ✓
4. What are the units of electrical power?		✗ ? ✓
5. Can I list the approximate power ratings of different household appliances?		✗ ? ✓
6. Can I describe the factors that affect the electrical energy used by an appliance?		✗ ? ✓
7. Can I carry out calculations using the relationship between energy, power and time?		✗ ? ✓
8. Can I carry out calculations for the energy consumption of an appliance using energy, power and time?		✗ ? ✓
9. What is the electrical energy transformed each second in terms of power, current and potential difference?		✗ ? ✓

	Covered (✓)	How well can you do this?
10. Can I explain the equivalence of power in terms of potential difference, current and resistance?		✗ ? ✓
11. Can I carry out calculations involving current, potential difference and resistance?		✗ ? ✓

2.3 Practical Electronic Circuits	Covered (✓)	How well can you do this?
1. Can I state the three parts of an electronic system?		✗ ? ✓
2. Can I identify from a block diagram the three parts of an electronic system?		✗ ? ✓
3. What type of devices are a thermistor, LDR and switch?		✗ ? ✓
4. Can I state the energy change in a microphone?		✗ ? ✓
5. Can I describe what happens to the resistance of a thermistor with changes in temperature?		✗ ? ✓
6. Can I describe what happens to the resistance of an LDR with changes in light levels?		✗ ? ✓
7. Can I identify appropriate input devices for given applications?		✗ ? ✓
8. What is the energy change in an output device?		✗ ? ✓

National 4 and 5 Physics Unit 2- Electricity and Energy LOs

	Covered (✓)	How well can you do this?
9. What type of devices are a loudspeaker, buzzer, lamp, LED and electric motor?		✗ ? ✓
10. Can I describe the energy change for a range of output devices?		✗ ? ✓
11. Can I identify appropriate output devices for a given application?		✗ ? ✓
12. Can I draw and identify the symbol for AND, OR and NOT gates?		✗ ? ✓
13. Can I describe the logic state of high and low voltages?		✗ ? ✓
14. Can I construct a truth table to show the output for all possible combinations of inputs for a NOT gate?		✗ ? ✓
15. Can I construct a truth table to show the output for all possible combinations of inputs for a AND gate?		✗ ? ✓
16. Can I construct a truth table to show the output for all possible combinations of inputs for a OR gate?		✗ ? ✓

	Covered (✓)	How well can you do this?
17. Can I describe how different combinations of digital logic gates are used for control in simple situations?		✗ ? ✓
18. Can I draw and identify the circuit symbols for a range of Electronic components including: cell, battery, lamp, switch, resistor, variable, resistor, voltmeter, ammeter, LED, motor, loudspeaker, photovoltaic cell, fuse, diode, capacitor, thermistor, LDR.		✗ ? ✓
19. Can I give examples of their use in practical situations?		✗ ? ✓
20. Can I describe how a potential divider circuit is constructed?		✗ ? ✓

	Covered (✓)	How well can you do this?
21. Can I carry out calculations involving potential difference, and resistance in potential divider circuits?		✗ ? ✓
22. Can I state the function of a transistor?		✗ ? ✓
23. Can I describe the two states of a transistor in a simple circuit?		✗ ? ✓
24. Can I draw and identify the symbol for an NPN transistor?		✗ ? ✓
25. Can I explain the operation of a simple transistor switching circuit?		✗ ? ✓

2.4 Electromagnetism	Covered (✓)	How well can you do this?
1. Can I describe the affect of a current passing through a conductor?		✗ ? ✓
2. Can I give two practical applications of this affect?		✗ ? ✓
3. Can I describe what happens *to the voltage* when a coil of wire is moved within a magnetic field?		✗ ? ✓
4. Can I describe the factors that affect the size of an induced voltage when a wire is moved within a magnetic field?		✗ ? ✓
5. Can I explain how electricity is produced using an a.c. generator?		✗ ? ✓

2.5 Generation of Electricity	Covered (✓)	How well can you do this?
1. Can I describe our main sources of energy?		✗ ? ✓
2. What is meant by the term finite when talking about fossil fuels ?		✗ ? ✓
3. What are the main sources of renewable and non-renewable energy?		✗ ? ✓
4. Can I explain the advantages and disadvantages of renewable and non-renewable sources of energy?		✗ ? ✓
5. What is a transformer used for in an electrical circuit ?		✗ ? ✓
6. Can I describe the structure of a transformer?		✗ ? ✓
7. Can I carry out calculations involving the relationship between V_s, V_p, N_s and N_p ?		✗ ? ✓
8. Can I describe the transmission of electrical energy by the National Grid?		✗ ? ✓
9. Can I explain the advantages and disadvantages of different methods of energy distribution?		✗ ? ✓

National 4 and 5 Physics Unit 2- Electricity and Energy LOs

	Covered (✓)	How well can you do this?
10. What is the relationship between (a) %efficiency, input power and output power and (b) % efficiency, input energy and output energy?		✗ ? ✓
11. What is the key factor in the generation, distribution and use of energy?		✗ ? ✓
12. Can I make a reasoned argument for using different methods of electricity generation in a future sustainable energy supply?		✗ ? ✓

2.6 Heat	Covered (✓)	How well can you do this?
1. Can I explain the difference between heat energy and temperature?		× ? ✓
2. What is meant by the temperature of a substance?		× ? ✓
3. What is meant by the term 'change of state'?		× ? ✓
4. What happens to the temperature of a substance when it changes state?		× ? ✓
5. What happens to the energy of a substance when it changes state?		× ? ✓
6. What is meant by the specific heat capacity of a substance?		× ? ✓
7. Can I show by calculation that the same mass of different materials requires different quantities of energy to raise their temperature of unit mass by 1 degree Celsius?		× ? ✓

National 4 and 5 Physics Unit 2- Electricity and Energy LOs

	Covered (✓)	How well can you do this?
9.Can I carry out calculations involving the relationship between energy transferred, specific heat capacity, mass and change in temperature?		× ? ✓
10.What is meant by the term specific latent heat of fusion?		× ? ✓
11.What is meant by the term specific latent heat of vaporisation?		× ? ✓
12.Can I carry out calculations based on the principle of conservation of energy involving energy, work and power?		× ? ✓

National 4 and 5 Physics Unit 2- Electricity and Energy LOs

2.7 Conservation of energy	Covered (✓)	How well can you do this?
1. Can I state the Principle of Conversation of Energy?		✗ ? ✓
2. What is the unit of energy?		✗ ? ✓
3. Can I give two examples of energy transformations?		✗ ? ✓
4. Can I describe three ways in which energy is lost during energy transformations?		✗ ? ✓
5. What is the name of the energy change when one form of energy is transformed into another?		✗ ? ✓
6. What is the symbol for work done?		✗ ? ✓
7. Can I carry out calculations involving the relationship between work done, force and displacement and S?		✗ ? ✓
8. What is meant by gravitational potential energy?		✗ ? ✓
9. What is the symbol for and unit of potential energy?		✗ ? ✓

National 4 and 5 Physics Unit 2- Electricity and Energy LOs

	Covered (✓)	How well can you do this?
10. Can I carry out calculations involving the relationship between change in potential energy, mass, gravitational field strength and height.		✗ ? ✓
11. What kind of energy does a moving object have?		✗ ? ✓
12. What is the symbol for and unit of kinetic energy?		✗ ? ✓
13. Can I carry out calculations involving the relationship between change in kinetic energy, mass and velocity.?		✗ ? ✓
14. Can I carry out calculations involving energy transformations, using the principle of Conservation of Energy?		✗ ? ✓

2.8 Gas Laws	Covered (✓)	How well can you do this?
1. Can I describe applications of the kinetic model of a gas in terms of p, V and temperature?		× ? ✓
2. Can I describe the particles of a gas in terms of kinetic theory?		× ? ✓
3. Can I describe the three states of matter in terms of the arrangement and movement of particles within them?		× ? ✓
4. What is meant by the term pressure?		× ? ✓
5. What are the units of pressure?		× ? ✓
6. Can I carry out calculations involving the relationship between pressure, force and area?		× ? ✓
7. Can I describe the relationship between p and V at constant temperature for a fixed mass of gas (Boyle's law) and explain this in terms of the kinetic theory of gases?		× ? ✓
8. Can I describe the relationship between p and T at constant volume for a fixed mass of gas (Gay Lussac's law) and explain this in terms of the kinetic theory of gases?		× ? ✓

	Covered (✓)	How well can you do this?
9. Can I describe the relationship between V and T at constant pressure for a fixed mass of gas (Charles' law) and explain this in terms of the kinetic theory of gases?		× ? ✓
10. What is meant by the term absolute zero?		× ? ✓
11. Can I describe the relationship between the Kelvin temperature scale and the degree Celsius temperature scale?		× ? ✓
12. Can I carry out calculations using the relationship between pressure, volume and temperature *given in the general gas equation*?		× ? ✓