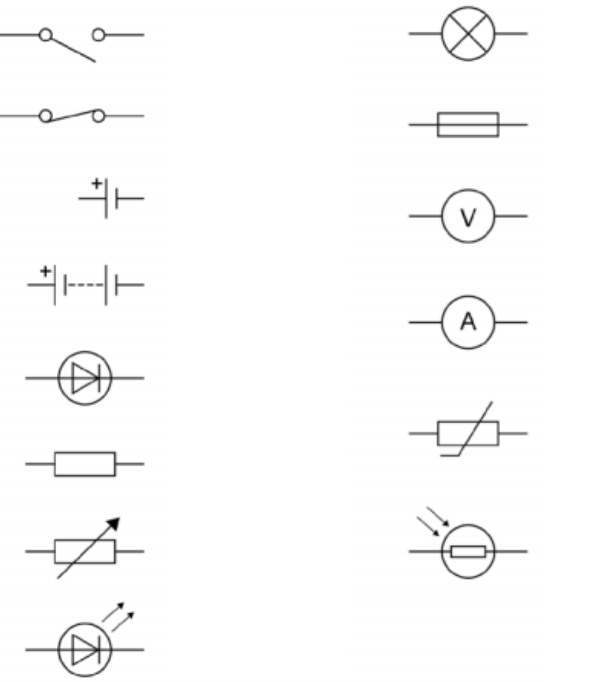
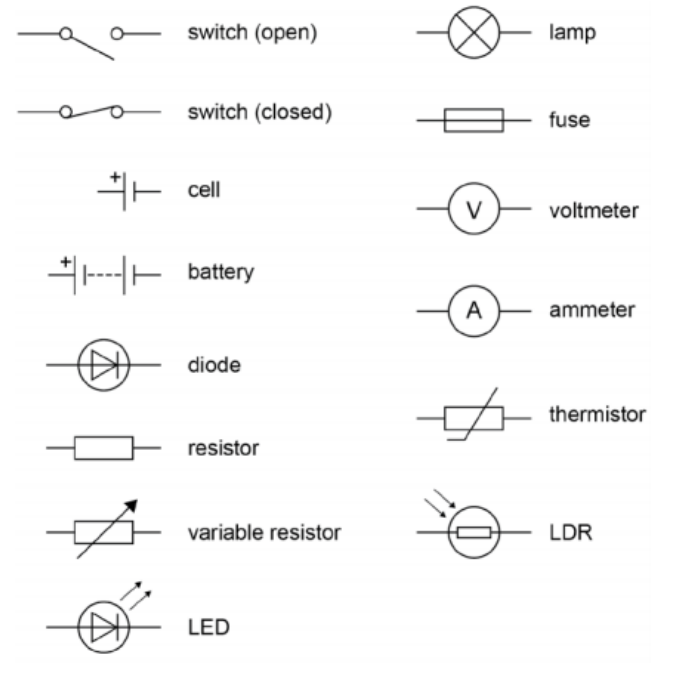
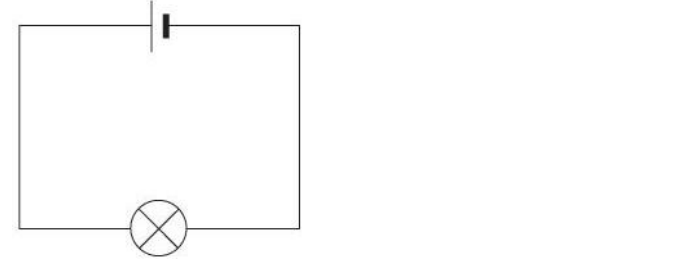
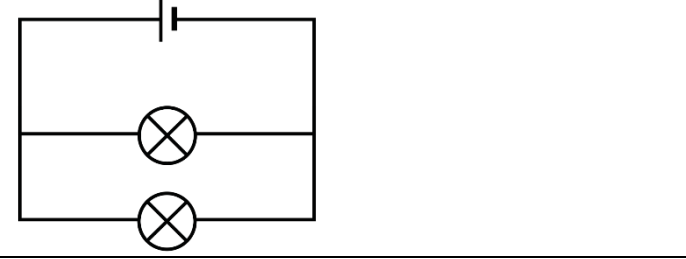
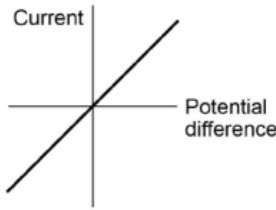
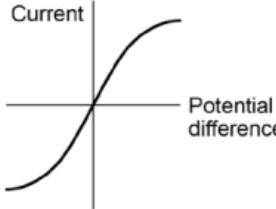
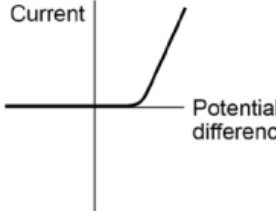
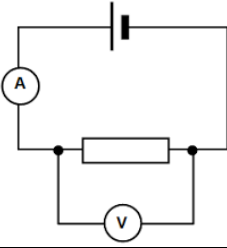
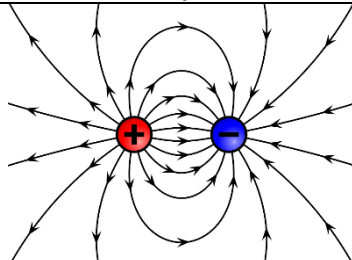


<p>1</p>	<p>Label these circuit symbols:</p> 	
<p>2</p>	<p>Draw a series circuit containing a cell and a bulb.</p>	
<p>3</p>	<p>Draw a parallel circuit containing a cell and two bulbs.</p>	
<p>4</p>	<p>What is needed for electrical charge to flow through a closed circuit?</p>	<p>A source of potential difference.</p>
<p>5</p>	<p>What is electric current?</p>	<p>The rate of flow of electrical charge.</p>
<p>6</p>	<p>In most circuits, what is the charge that flows to carry the current.</p>	<p>Electrons</p>
<p>7</p>	<p>What is the word equation for flow of charge?</p>	<p>charge flow = current x time</p>
<p>8</p>	<p>What is the symbol equation for flow of charge?</p>	<p>$Q = I t$</p>
<p>9</p>	<p>What is the unit of charge?</p>	<p>Coulombs, C</p>
<p>10</p>	<p>What is the unit of current?</p>	<p>Amperes, A</p>
<p>11</p>	<p>At any point in a single closed loop, the current...</p>	<p>is the same.</p>
<p>12</p>	<p>The current through any component depends on...</p>	<p>the resistance (R) of the component and the potential difference (V) across it.</p>
<p>13</p>	<p>What is the definition of resistance?</p>	<p>The amount that a component or circuit opposes the flow of current.</p>
<p>14</p>	<p>What is the unit of resistance?</p>	<p>Ohms, Ω</p>
<p>15</p>	<p>What is the alternative term for potential difference, that means the same thing?</p>	<p>Voltage</p>
<p>16</p>	<p>What is the word equation for potential difference?</p>	<p>potential difference = current x resistance</p>

17	What is the symbol equation for potential difference?	$V = I R$
18	What is the unit of potential difference?	Volts, V
19	What is a series circuit?	A circuit where all of the components are connected in one loop.
20	What is a parallel circuit?	A circuit where there is more than one loop of components.
21	What piece of equipment is used to measure current?	Ammeter
22	How should it be connected into a circuit?	In series
23	What piece of equipment is used to measure potential difference?	Voltmeter
24	How should it be connected into a circuit?	In parallel with the component that you are measuring the potential difference across.
25	In the required practical on measuring resistance, what is the dependent variable?	Resistance
26	For some resistors, the resistance always remains constant. In others, it can change as...	the current changes.
27	At a constant temperature, the current through an ohmic conductor is...	directly proportional to the potential difference across the resistor.
28	What does the I-V graph for an ohmic conductor look like?	 <p>A graph with 'Current' on the vertical axis and 'Potential difference' on the horizontal axis. A straight line passes through the origin (0,0) with a positive slope, indicating a direct proportionality between current and potential difference.</p>
29	What does it mean that a component is "ohmic"?	Resistance remains constant as current changes.
30	What happens to the resistance of a filament lamp as temperature of the filament increases?	It increases.
31	What does the I-V graph for a filament lamp look like?	 <p>A graph with 'Current' on the vertical axis and 'Potential difference' on the horizontal axis. The curve starts at the origin (0,0) and initially follows a straight line, but then curves downwards (away from the origin) as potential difference increases, indicating that resistance increases with temperature.</p>
32	Describe the current flow through a diode.	It can only flow in one direction. There is a very high resistance in the reverse direction.
33	What does the I-V graph for a diode look like?	 <p>A graph with 'Current' on the vertical axis and 'Potential difference' on the horizontal axis. The curve lies on the horizontal axis (zero current) for negative potential differences and then rises steeply for positive potential differences, showing that current only flows in one direction.</p>
34	What is a thermistor?	A resistor that decreases its resistance as temperature increases.
35	When would a thermistor be useful?	Thermostats – to make things change with temperature
36	What is an LDR?	A Light Dependent Resistor decreases its resistance as light intensity increases.
37	When would an LDR be useful?	Light sensors - to switch on lights when it gets dark
38	To measure the resistance of a component, what measurements should be made?	Measurements of the current through the component and the potential difference across it.

39	Draw a circuit to show how the resistance of a resistor could be measured?	
40	In the required practical on investigating I-V characteristics of components, what is the independent variable?	The component that is being measured.
41	In a series circuit, what can be said about the current, potential difference and resistance?	The current is the same through each component. The total potential difference of the power supply is shared between the components. The total resistance is the sum of the individual resistances.
42	What is the equation for the total resistance of a series circuit?	$R_{\text{tot}} = R_1 + R_2 \dots$
43	In the branches of a parallel circuit, what can be said about the current, potential difference and resistance?	The total current splits between the "branches" of the parallel circuit. The potential difference across each branch is the same. The total resistance of two resistors in parallel is less than the resistance of the lowest of the resistors.
44	Why does adding resistors in parallel decrease the total resistance?	There are more routes for electrons to take between the branches, so it is easier for current to flow.
45	What is DC?	Direct Current (DC) is when current always flows in one direction. It is the current found in circuits powered by a cell or battery.
46	What is AC?	Alternating Current (AC) is when the direction of current flow rapidly changes, giving an alternating potential difference. It is how mains electricity is supplied in the UK.
47	What the frequency of the AC domestic electricity supply in the UK?	50 Hz
48	What is the potential difference of the domestic electricity supply in the UK?	230 V
49	How many wire-cores make up the wire of most electrical appliances?	3
50	Why is each wire wrapped in a plastic coating?	As a safety feature. The plastic acts as an insulator from the electricity in case anyone were to touch it. The colours also indicate which wire is inside it.
51	What does the colour coding on each wire identify it as?	Brown - live wire. Blue - neutral wire. Green and yellow stripes - earth wire.
52	What does the live wire do, and what is its potential difference?	It carries the alternating potential difference from the power supply. The potential difference between the live wire and earth is around 230 V.
53	What does the neutral wire do, and what is its potential difference?	It completes the circuit, and is close to earth potential (0 V).
54	What does the earth wire do, and what is its potential difference?	It is a safety wire to stop the casing of the appliance from becoming live, so is at 0 V and only carries a current if there is a fault.
55	When is a live wire dangerous?	They are always dangerous when a current is flowing, but it may still be dangerous even if a switch is open.
56	Why would it be dangerous to provide a connection between the live wire and the earth wire?	It could cause a spark.

57	What is the power transfer in a circuit related to?	The potential difference across the circuit, the current through it and the energy changes over time.
58	What two word equations relate power, potential difference, current and resistance?	power = potential difference x current power = (current) ² x resistance
59	What two symbol equations relate power, potential difference, current and resistance?	$P = V I$ $P = I^2 R$
60	What is the unit of power?	Watts, W
61	What does the amount of energy an appliance transfers depend on?	The power of the appliance and how long it is switched on for.
62	What does work have to do with electric circuits?	Work is done when charge flows in a circuit.
63	What two word equations relate energy transferred, power, time, charge and potential difference?	energy transferred = power x time energy transferred = charge x potential difference
64	What two symbol equations relate these quantities?	$E = P t$ $E = Q V$
65	What are the units of energy?	Joules, J
66	What is the National Grid?	The National Grid is a system of cables and transformers linking power stations to consumers.
67	What is a transformer?	A device which alters the potential difference and current of electricity in the cables.
68	What does a step-up transformer do?	They are used to increase the potential difference from the power station to the transmission cables to reduce energy loss in transportation.
69	What does a step-down transformer do?	They are used to decrease, to a much lower value, the potential difference for safe domestic use.
70	Why is static electricity called "static"?	It is related to "static" (or still) electrons which build up on materials.
71	What type of charge do electrons have?	Negative charge
72	How is static electricity produced?	When certain insulating materials are rubbed against each other they become charged. Negatively charged electrons are rubbed off one material and on to the other. The material that gains electrons becomes negatively charged. The material that loses electrons is left with an equal positive charge.
73	What happens when electrically charged objects are brought close together?	When two electrically charged objects are brought close together they exert a force on each other.
74	What happens to two objects with the same type of charge?	They repel each other.
75	What happens to two objects with different types of charge?	They are attracted to each other.
76	What is an electric field?	A charged object creates an electric field around itself, which is strongest close to the object. The further away from the charged object, the weaker the field.
77	What happens if another charged object is placed in the field?	A second charged object placed in the field experiences a force. The force gets stronger as the distance between the objects decreases.
78	What does the electric field pattern look like for a positive charge near a negative charge?	 A diagram showing the electric field between a positive charge (red circle with a plus sign) and a negative charge (blue circle with a minus sign). The field lines are represented by arrows that originate from the positive charge and terminate at the negative charge. The lines are most densely packed between the two charges, indicating a strong attractive force, and become more spread out as they move away from the charges.

84	State the rule for current in a series circuit	the current is the same at every point in the circuit and in every component
85	State the rule for potential difference in a series circuit	the total potential difference of the power supply is shared between components
86	State the rule for resistance in a series circuit	the more resistors, the greater the resistance. $R_T = R_1 + R_2$
87	State the rule for current in a parallel circuit	the total current through the whole circuit is the sum of the currents through the separate components
88	State the rule for potential difference in a parallel circuit	the potential difference across each branch in the circuit is the same
89	State the rule for resistance in a parallel circuit	adding more resistors in parallel decreases resistance
90	What colour is the live wire in a three core cable?	brown
91	What colour is the neutral wire in a three core cable?	blue
92	What colour is the earth wire in a three core cable?	green and yellow
93	The brown wire in a plug is the _____	live
94	The blue wire in a plug is the _____	neutral
95	The green and yellow wire in a plug is the _____	earth
96	The potential difference between the live wire and others in the plug is _____ V	230V
97	Current flows into an appliance through the _____ wire	live
98	Current flows out of an appliance through the _____ wire	neutral
99	The _____ wire is a safety feature of appliances	earth
100	Potential difference between the neutral wires and others in the plug should be _____ V	0V
101	Electric Current is....?	the flow of electric charge
102	Potential difference between two points in a circuit is....?	the work done when a coulomb of charge passes between the points.
103	In a circuit the potential difference causes	charge to flow
104	Resistance is....?	caused by anything which opposes the flow of electric charge
105	Particles which can be 'charges' in electric circuits are...	electrons or ions
122	Describe the I-V characteristic for a fixed resistor	Current and potential difference are directly proportional, resistance is constant
123	Describe the I-V characteristic of a filament lamp	Resistance is not constant, it increases as p.d. increases
124	Explain why resistance increases with increased p.d. in a filament lamp	temperature increases causing ions to vibrate and increasing collisions with electrons flowing through the filament
125	Describe the I-V characteristic of a diode	The current only flows through the diode in one direction, there is a very high resistance in the reverse direction.
126	Current which regularly changes direction is called...	alternating current
127	An example of alternating current is...?	mains electricity
128	Current which flows in one direction is...?	direct current
129	An example of direct current is...	batteries
130	What is the potential difference of mains electricity in the UK?	230V

131	What is the frequency of the alternating current in UK mains electricity?	50Hz
132	The national grid consists of...?	Cables and transformers
133	Are power stations part of the national grid?	no
134	What does a step up transformer do?	Increases p.d.
135	What does a step down transformer do?	reduces p.d. to 230 V
136	Why are transformers used?	reduce current so that less heat is lost in cables, increases efficiency