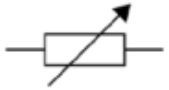
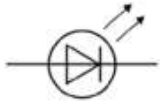
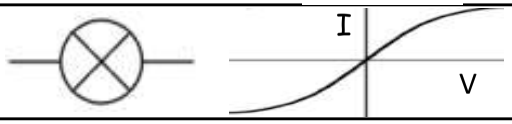
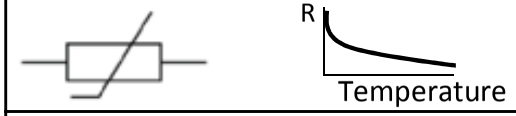
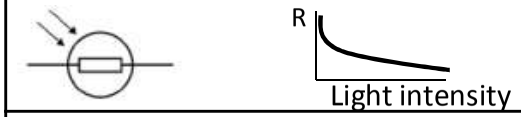
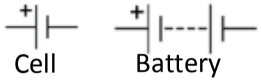
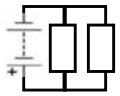
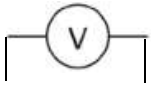
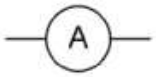
Key points to learn

1. Diode	
	Current only flows one way. Very high resistance in other direction.
2. Resistor (Ohmic conductor)	
	Resistance stays constant. Current proportional to pd.
3. Variable resistor	Resistance can be set by a human. Used in dimmer switches. 
4. LED	A diode that gives off light. 
5. Lamp	
	Resistance increases as the temperature increases.
6. Thermistor	
	Resistance decreases as the temperature increases.
	Used in thermostats.
7. LDR	
	Resistance decreases as the light intensity increases (gets brighter).
	Used in automatic lights.

Key points to learn

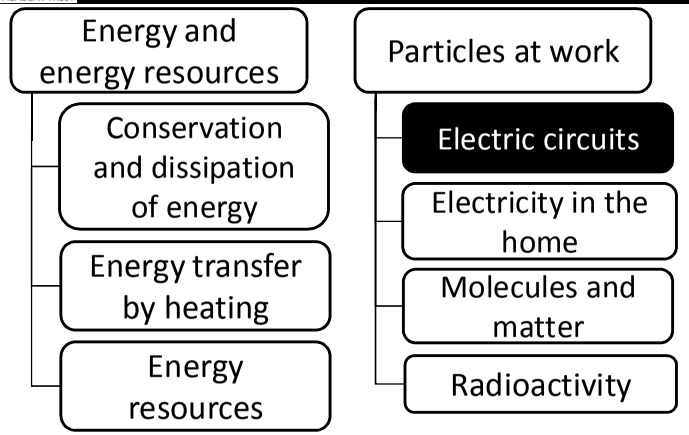
8. Cell and battery	Provides the potential difference (pd) and energy for a circuit. 
9. Current, I	Rate of flow of electrical charge. Measured in Amps (A)
10. Charge, Q	Measured in Coulombs (C)
11. Potential difference, V	pd. Energy transferred per unit charge. Measured in Volts (V)
12.Resistance R	Ability to slow current. Measured in Ohms (Ω)
13. Series circuit	Current has only one route.
	Current is the same all the way around. Potential difference is shared across components.
	Resistances are added together.
14. Parallel circuit	Current has different paths it could take. 
	Current is shared through each branch. Potential difference is the same across each branch.
	Total resistance is lower than the smallest single resistor.
15. Voltmeter	Measures pd across a component 
16. Ammeter	Measures current through a component 
17. Fuse	Resistor that melts if current is too high. 

Trilogy P4: Electric circuits

Collins revision guide: Electricity

Knowledge Organiser

Big picture (Physics Paper 1)



Background

Electrical power fills the modern world with light and sound, information and entertainment, remote sensing and control. Its use was identified and explored by scientists of the 19th century but it becomes more important every day.

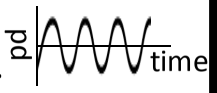
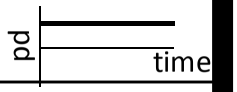
Maths skills

- **Q = I x t**
  Charge = Current x time
  [C] [A] [s]

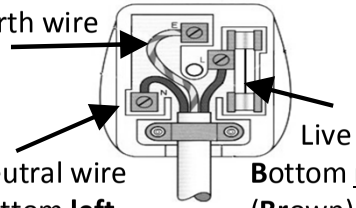
- **V = I x R**
  Potential difference = Current x Resistance
  [V] [A] [Ω]

(You need to be able to remember and use these)

Key points to learn

1. ac	Alternating current Found in mains
	Has an alternating potential difference (voltage) negative to positive. 
2. dc	Direct current Found in batteries 
	Has a constant potential difference (voltage)
3. UK mains	AC supply of 230Volts and frequency of 50Hz
4. Power, P	Energy [J] transferred in one second. Measured in Watts (W)
5. Potential difference, V	Also known as voltage. Measured in volts (V)
6. Energy transferred, E	Depends on the power of the appliance and the time it is on for. Also called work done.
7. Energy transfer diagram	Energy input → Useful energy + Wasted energy
8. Work done, E	Energy transferred when current flows in a circuit.
9. National grid	System of cables and transformers.
10. Step-up transformer	Increase potential difference so that less heat energy is wasted.
11. Step-down transformer	Decrease potential difference to make electric more easily used.

Key points to learn

12. Current, I	Measured in Amps (A)
13. Resistance, R	Measured in ohms (Ω)
14. Live wire	Brown. Connects to fuse.
	Carries the alternating potential difference from the supply.
	About 230V.
15. Neutral wire	Blue wire
	Completes the circuit.
	Around 0V
16. Earth wire	Green and yellow striped wire.
	Carries current safely to Earth if there is a fault.
	Normally 0V.
17.Electrical plug	Made of plastic as it is a good insulator.
	Earth wire  Neutral wire **B**ottom **left** (**Bl**ue) Live wire **B**ottom **r**ight (**Br**own) Through fuse

- P = V x I
  power [W] = potential difference [V] × current [A]
- P = I^2 × R
  power [W] = current^2 [A] × resistance [Ω]

Trilogy P5: Electricity in the home

Collins revision guide: Electricity

Knowledge Organiser

Big picture (Physics Paper 1)

- Energy and energy resources
  - Conservation and dissipation of energy
  - Energy transfer by heating
  - Energy resources
- Particles at work
  - Electric circuits
  - **Electricity in the home**
  - Molecules and matter
  - Radioactivity

Background

We use electricity in all aspects of modern life. But how is it moved from power stations to our homes and then to our devices? This topic answers that question as well as investigating how power companies measure our electricity usage.

Maths skills

- E = P x t
  Work done = Power x time
  [J] [W] [s]
  [kWh] [kW] [hr]

(You need to remember and be able to use all of the equations on this sheet.)

- E = Q x V
  Work done = Charge flow x potential difference
  [J] [C] [V]

Quick fire questions;

This worksheet is fully supported by a video tutorial; https://youtu.be/62RyyfKZoYg

1. Draw the symbol for a cell.
2. Draw the symbol for a battery.
3. What is the difference between a battery and a cell?
4. Draw the symbol for an ammeter.
5. How must an ammeter be placed in a circuit?
6. Draw the symbol for a voltmeter.
7. How must a voltmeter be placed in a circuit?
8. Draw the symbol for a lamp.
9. Draw the symbol for a diode.
10. Draw the symbol for a resistor.
11. Draw the symbol for a LED (light emitting diodes).
12. Draw the symbol for a variable resistor.
13. Draw the symbol for a LDR (light dependent resistor).
14. Draw the symbol for a fuse.
15. Draw the symbol for a thermistor.
16. Draw the symbol for an open switch.
17. Draw the symbol for a closed switch.
18. What is difference between series and parallel circuits?
19. Define charge.
20. Define current.
21. What is equation taking charge, current and time?
22. What are the units for charge?
23. What are the units for current?
24. What are the units for time?
25. Define potential difference.
26. Define resistance.
27. What is equation linking potential difference, current and resistance?
28. What are the units of potential difference?
29. What are the units for resistance?
30. Draw the current-potential different graphs for a conductor.
31. Draw the current-potential different graphs for lamp.
32. Draw the current-potential different graphs for a diode.
33. How does resistance of a thermistor change as temperature changes?
34. How does resistance of an LDR change as light intensity changes?
35. How does current behave in a series circuit?

36. How does potential difference behave in a series circuit?
37. How does resistance behave in a series circuit?
38. How does current behave in a parallel circuit?
39. How does potential difference behave in a parallel circuit?
40. How does resistance behave in a parallel circuit?
41. What is the voltage of mains electricity in the UK?
42. What is the frequency of mains electricity in the UK?
43. What is the difference between alternating and direct current?
44. What are the three wires inside a plug?
45. What are the safety features on a plug?
46. What is equation linking power, current and potential difference?
47. What are the units for power?
48. What is the equation linking power, current and resistance?
49. What is equation linking energy, power and time?
50. What are the units for energy?
51. What are the units for time?
52. What is equation linking energy, charge and potential difference?
53. What is the National Grid?
54. What does step up transformer do?
55. What does a step-down transformer do?