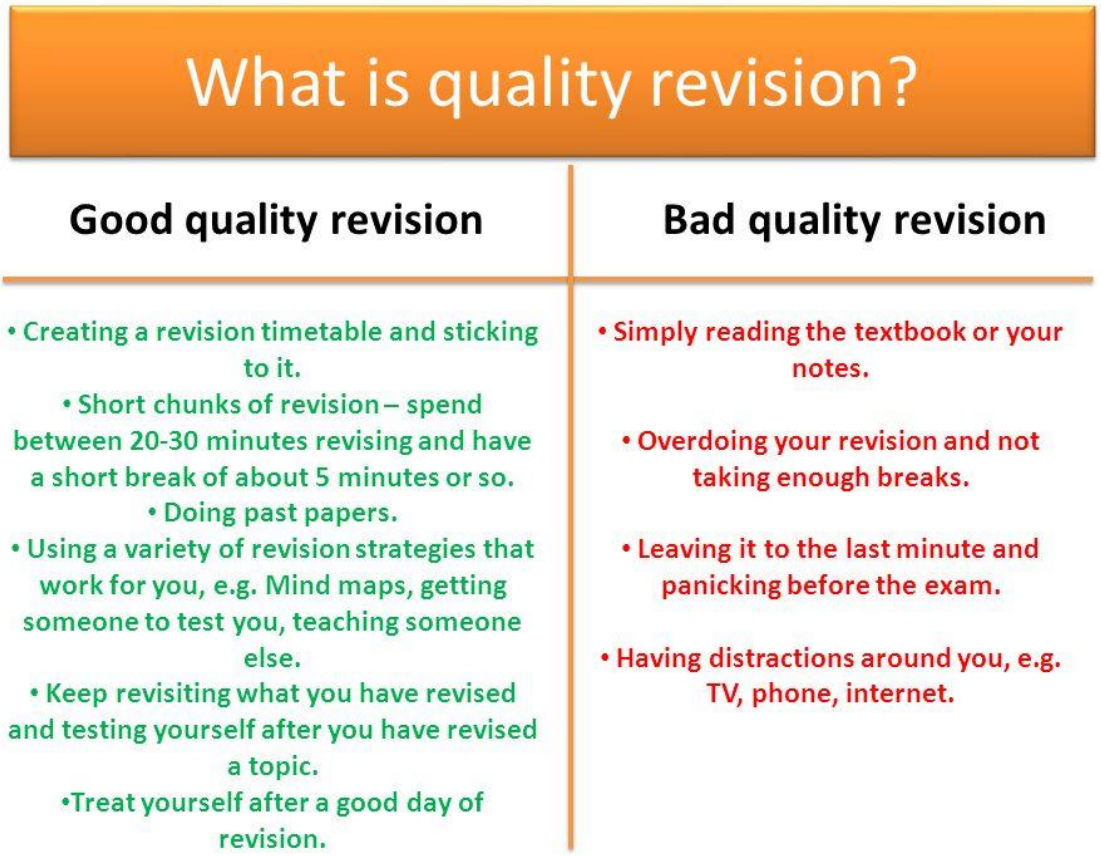
GCSE Physics – Summer Exam 2018 Revision Guide (3rd Years)



Energy	
Energy Stores and Shifts	Energy stores shift (transfer) energy when something in the system changes, such as changing the speed of a moving object or heating water. Can you describe simple shifts and how they can happen (the process)? Can you use bar graphs to show this?
	You must use the energy stores listed in your notes when describing changes.
Kinetic Energy	How can you work out the kinetic energy of a moving object? Learn and use the equation! What is E_k?
	What are all the units for the kinetic energy equation?
Elastic Energy	How can you calculate the elastic energy of a moving object? Be able to use the equation! What is E_e?
	What are all the units for the elastic energy equation?
Gravitational Potential Energy	How can you work out the gravitational potential energy of a moving object? Learn and use the equation! What is E_p?
	What are all the units for the gravitational potential energy equation?
Grav < - > Kinetic	Do you understand how falling objects shift energy from E_p to E_k and how this speeds a falling object up? Can you rearrange the equations?
	A rising, slowing, object shifts E_k to E_p – can you work out how high?
Work Done	Can you recall and use the Work Done equation? Units for work?
Power	How do we define power and what are the relevant units?
	Can you recall and use the two versions of the power equation?

Specific Heat Capacity (SHC)	You must be able to define what SHC is and what affects the amount of thermal energy absorbed or released by an object when its temperature is changed.
	You must be able to use and rearrange the SHC equation.
Heat Transfer	You must explain what Conduction, Convection and Infrared (IR) radiation are and how each transfers heat (thermal) energy in systems.
	What is similar between Conduction and Convection? What is different?
	What are the key properties of IR radiation? How do different surfaces and colours respond to IR?
	What makes a good insulator? How might you improve household insulation? Can you work out payback time?
Efficiency Calculations	Can you recall and use the two equations to calculate efficiency from energy and/or power?
	Can you convert between number and percentage (%) values of efficiency?
Energy and Power	Do you know the correct units for each, and can you explain one in terms of the other (power is energy transfer per time)?
	Can you recall and use the equations linking energy (or work), power and time?
Improving Efficiency	Can you identify how to make a process more efficient, such as by reducing friction or improving the useful output energy?
	Can you apply this to improving household energy efficiency?
Power Generation	Can you explain what fossil fuels are and (briefly) how we use them to generate electricity?
	What are all the advantages and disadvantages with using fossil fuels in this way?
	Can you describe in detail the different kinds of renewable energy available to generate electricity? Can you list advantages and disadvantages for each method?
	Can you explain, briefly, how nuclear fuels are currently used to generate electricity, and the advantages and disadvantages of using them?
	Can you describe what else we might use the various fuels for, apart from power generation?

Electricity	
Circuit Symbols	Can you both draw out and identify the standard circuit symbols, as we have drawn in our books?
	Can you construct simple loop circuits using the correct symbols from a written description?
	What are the symbols for ammeters and voltmeters; how must these devices be connected; and what do they measure?
Current and Charge	What is electric charge?
	How do electric charges interact (i.e. if both are same or different to each other?)
	What is an electric current?
	How are current, charge and time linked? (*hint: see equations!*).
	What are the units for charge and current?
Ohm's Law	Can you describe what potential difference (voltage) and resistance are?
	What are Ohmic and non-Ohmic components?
	How do potential difference, current and resistance relate to each other in an Ohmic component and what are their units? (h*int – Ohm's Law, see equations).*
	What is a short circuit and why is it dangerous?

Investigating Ohm's Law	How would you experimentally find if a component follows Ohm's Law or not? (*Hint – think about the resistor practical we did).*
	What sort of graph might you plot for the results of 1. above, and why is it useful?
Components and I / V graphs	What is an I / V graph?
	Top Grade – what does the I / V graph gradient show?
	What are the characteristic I / V graphs for a resistor at constant temperature, filament bulb and diode?
	What behaviour(s) do the graphs in 3. above show?
	How does the resistance of a thermistor change with temperature?
	How does the resistance of a LDR (light-dependent resistor) change with light intensity?
Electric circuits	Why are electrical circuits represented by circuit diagrams? What symbols do we use for common components?
	What is the difference between a battery and a cell?
	How can we calculate the size of an electric current from charge (Q) and time (t)?
Resistance	What is Resistance and what is its unit?
	What is Ohm's law?
Current-potential difference (I/V) graphs	What happens to the resistance of a bulb as its temperature increases?
	How does current through a diode change with potential difference (voltage)?
	What happens to the resistance of a thermistor as temperature increases; and an LDR as light level increases?
Series circuits	What are the rules for current and potential difference in a **series** circuit?
	How can we find the total resistance of resistors in series?
	What can we say about the potential difference of several cells in series?
Parallel circuits	What are the rules for current and potential difference in a **parallel** circuit?
	How can we calculate current through a resistor in a parallel circuit?
	What happens to total resistance if we connect resistors in parallel?
AC / DC	What is meant by direct current DC and alternating current AC?
Electric Power and Energy	How are power and energy linked? What are their respective units?
	What are the versions of the power equations for electric circuits?
	How are energy, voltage and charge linked in a circuit?
Cables, plugs and Fuses	What is inside a mains cable and plug? How do plugs protect us?
	What colour are the live, neutral and earth wires?
	What does Earth do? What is special about 2-core (Earth-less) appliances?
	What do we use a fuse for? What fuse rating should be fitted to a device?
Static Electricity and Electric Fields	How can we give an object a static charge?
	What happens when different charges come near each other?
	What do electric field patterns look like around isolated charges?

You must learn the correct equations for each section from the equation formula sheet:

Equation Number	Word Equation	Symbol Equation
1	weight = mass × gravitational field strength	W = m g
2	**work done = force × distance along the line of action of the force**	**W = F s**
3	force applied to a spring = spring constant × extension	F = k e
4	moment of a force = force × distance normal to direction of force	M = F d
5	pressure = force normal to surface / area of that surface	P = F / A
6	**distance travelled = speed × time**	**s = v t**
7	acceleration = change in velocity / time taken	a = Δ v / t
8	resultant force = mass × acceleration	F = m a
9	momentum = mass × velocity	p = m v
10	**kinetic energy = 0.5 × mass × speed^2**	**Ek = 0.5 m v^2**
11	**gravitational potential energy = mass × gravitational field strength × height**	**Ep = m g h**
12	**power = energy transferred / time**	**P = E / t**
13	**power = work done / time**	**P = W / t**
14	**efficiency = useful energy output / total energy input**	
15	**efficiency = useful power output / total power input**	
16	wave speed = frequency × wavelength	v = f λ
17	**charge = current × time**	**Q = I t**
18	**potential difference = current × resistance**	**V = I R**
19	**power = potential difference × current**	**P = V I**
20	**power = current^2 × resistance**	**P = I^2 R**
21	**energy transferred = power × time**	**E = P t**
22	**energy transferred = charge flow × potential difference**	**E = Q V**
23	density = mass / volume	ρ = m / v

Resources – your class notes, CGP (or other) revision guides, BBC Bitesize, Youtube ("AQA GCSE Physics" plus topic as key words), Kerboodle.com. Check the AQA specification - http://filestore.aqa.org.uk/resources/physics/specifications/AQA-8463-SP-2016.PDF

We also have Kerboodle access, which has the OCR specification textbook on it – this is a useful backup resource but always check the AQA specification to make sure!