AQA Revision Pack

What you NEED to know

Primrose Kitten – YouTube Tutorials for Science and Maths.

Other books in this series

Previously published...

- Maths as Calculator skills for Science Students March 2016
- Maths (The Physics bits) for GCSE Core Science April 2016
- Maths (The Chemistry bits) for GCSE Core and Additional Science May 2016
- Maths (The Chemistry bits) for GCSE Triple Science May 2016

Coming soon…

- Maths (The Physics bits) for GCSE Additional Science
- Maths (The Physics bits) for GCSE Triple Science
- Summer Start for A-Level Chemistry
- Summer Start for A-Level Physics
- Maths for A-Level Chemistry

WOW – that is a long list! Chances are if you want a maths/science book I've written it or I am writing it.

For full book listings visit www.PrimroseKitten.com

First published 2016

Image credits, pixabay

Acknowledgements

Thank you to my husband for putting up with my spending every night writing this and for correcting all of my SPG mistakes. To my son for being the inspiration behind this project.

Contents

Dates 5

Revision Overview 6

Revision Timetable – Planning Tips 8

Revision Timetable –Weekday 9

Revision Timetable – Weekend 10

Exam paper summary 11

Biology 12

Important links and websites 12

5 most common mistakes in a biology exam 12

B1 – Core 16th May 2017 13

100 quick fire B1 Questions https://youtu.be/Oq-79mTaHHw 13

B1.1 Keeping healthy 16

B1.2 Nerves and hormones 19

B1.3 Use and abuse of drugs 21

B1.4. Interdependence and adaptation 23

B1.5 Energy and biomass in food chains 25

B1.6 Waste materials from plants and animals 26

B1.7 Genetic variation and its control 28

B1.8 Evolution 30

B2 – Additional 9th June 2017 32

80 Quick fire B2 Questions https://youtu.be/sWK842Eq80s 32

B2.1 Cells and simple cell transport 35

B2.2 Tissues, organs, organ systems 36

B2.3 Photosynthesis 37

B2.4 Organisms & their environment 38

B2.5 Proteins – functions and uses 39

B2.6 Aerobic & anaerobic respiration 40

B2.7 Cell division and inheritance 42

B2.8 Speciation 44

B3 – Biology or Further Additional 9th June 2017 45

B3.1 Movement in and out of cells 45
B3.2 Transport systems in plants & animals 47
B3.3 Homeostasis 49
B3.4 Humans and their environment 51
Chemistry 53
Important links and websites 53
5 most common mistakes in a chemistry exam https://youtu.be/ycw094CMUtE 53
Important tips 53
C1 – Core 18th May 2017 54
100 quick fire C1 Questions https://youtu.be/aG4pMWXwbF0 54
The 10 hardest questions in C1 https://youtu.be/JyQ2n8B7uPI 57
C1.1 Fundamental ideas 58
C1.2 Limestone and building Materials 59
C1.3 Metals and their uses 60
C1.4 Crude oil and fuels 62
C1.5 Obtaining useful substances from oils 64
C1.6 Plant oils and their uses 65
C1.7 Changes in the Earth and its atmosphere 66
C2 – Additional 14th June 2017 68
100 quick fire C2 Questions https://youtu.be/qWP2ky9mv6o 68
The 10 hardest questions in C2 https://youtu.be/bJyU6SDHV6Y 71
C2.1 Structure and Bonding 72
C2.2 Structure and Properties 73
C2.3 Quantitative chemistry and analysis 74
C2.4 Rates of reaction 76
C2.5 Exothermic/Endothermic Reactions 77
C2.6 Acids, bases and salts 78
C2.7 Electrolysis 79
C3 – Chemistry or Further Additional 14th June 2017 80
The 10 hardest questions in C3 https://youtu.be/TNcMxHNqoQw 80
C3.1 The periodic table 81

C3.2 Water 83
C3.3 Calculating & explaining energy change 85
C3.4 Further analysis & quantitative chemistry 87
C3.5 The production of ammonia 89
C3.6 Alcohols, carboxylic acids and esters 91
Physics 93
Important links and websites 93
5 most common mistakes in a physics exam https://youtu.be/Ie0BDQ8PEYQ 93
P1 – Core 24th May 2017 94
100 quick fire P1 Questions https://youtu.be/YtmBoMjRu2Y 94
The 10 hardest questions in P1 https://youtu.be/rLsbzZ11i7M 97
P1.1 Heat energy transfers 98
P1.2 Energy and efficiency 100
P1.3 Using electrical energy 101
P1.4 Generating electricity 102
P1.5 Waves 104
P2 – Additional 16th June 2017 106
130 quick fire P2 Questions https://youtu.be/RAPHlBM2lHQ 106
The 10 hardest questions in P2 https://youtu.be/ek_DtGRlZGA 110
P2.1 Forces and their effects 111
P2.2 Kinetic energy of moving objects 113
P2.3 Currents in electrical circuits 114
P2.4 Mains electricity and power 116
P2.5 Radioactive decay: uses and risks 117
P2.6 Nuclear fission and nuclear fusion 118
P3 – Physics or Further Additional 16th June 2017 119
80 quick fire P3 Questions 119
The 10 hardest questions in P3 https://youtu.be/PI0wMIkj9Ug 122
P3.1 Medical applications of physics 123
P3.2 Using physics to make things work 125
P3.3 Keeping things moving 127

Dates

B1 – Core	16th May 2017
C1 – Core	18th May 2017
P1 – Core	24th May 2017
B2 – Additional	9th June 2017
B3 – Biology or Further Additional	9th June 2017
C2 – Additional	14th June 2017
C3 – Chemistry or Further Additional	14th June 2017
P2 – Additional	16th June 2017
P3 – Physics or Further Additional	16th June 2017

Revision Overview

Topic	Reviewed once	Reviewed Twice	Reviewed Three times
Biology			
B1.1 Keeping healthy			
B1.2 Nerves and hormones			
B1.3 Use and abuse of drugs			
B1.4. Interdependence and adaptation			
B1.5 Energy and biomass in food chains			
B1.6 Waste materials from plants and animals			
B1.7 Genetic variation and its control			
B1.8 Evolution			
B2.1 Cells and simple cell transport			
B2.2 Tissues, organs, organ systems			
B2.3 Photosynthesis			
B2.4 Organisms & their environment			
B2.5 Proteins – functions and uses			
B2.6 Aerobic & anaerobic respiration			
B2.7 Cell division and inheritance			
B2.8 Speciation			
B3.1 Movement in and out of cells			
B3.2 Transport systems in plants & animals			
B3.3 Homeostasis			
B3.4 Humans and their environment			
Chemistry			
C1.1 Fundamental ideas			
C1.2 Limestone and building Materials			
C1.3 Metals and their uses			
C1.4 Crude oil and fuels			
C1.5 Obtaining useful substances from oils			
C1.6 Plant oils and their uses			
C1.7 Changes in the Earth and its atmosphere			
C2.1 Structure and Bonding			
C2.2 Structure and Properties			
C2.3 Quantitative chemistry and analysis			

C2.4 Rates of reaction			
C2.5 Exothermic/Endothermic Reactions			
C2.6 Acids, bases and salts			
C2.7 Electrolysis			
C3.1 The periodic table			
C3.2 Water			
C3.3 Calculating & explaining energy change			
C3.4 Further analysis & quantitative chemistry			
C3.5 The production of ammonia			
C3.6 Alcohols, carboxylic acids and esters			
Physics			
P1.1 Heat energy transfers			
P1.2 Energy and efficiency			
P1.3 Using electrical energy			
P1.4 Generating electricity			
P1.5 Waves			
P2.1 Forces and their effects			
P2.2 Kinetic energy of moving objects			
P2.3 Currents in electrical circuits			
P2.4 Mains electricity and power			
P2.5 Radioactive decay: uses and risks			
P2.6 Nuclear fission and nuclear fusion			
P3.1 Medical applications of physics			
P3.2 Using physics to make things work			
P3.3 Keeping things moving			

Revision Timetable – Planning Tips

1. Write your timetable in pencil (or make a version on the computer) so you can change things around if necessary.
2. Start by thinking about what activities you can't miss (dinner, clubs or TV programs) and put these into your timetable.
3. Plan in when you need to do your homework to get it in on time
4. On top of your homework time, aim for a minimum of 2 extra hours on a weekday and 4 hours each day over the weekend.
5. Plan to revise for 1 hour per subject each week (this is in addition to homework) fill in the table below to help you work out how much time you need to spend on revision
6. Fill in the timetable spreading out the subjects (e.g., don't' do a whole day of Maths, do a bit each day) put contrasting subjects next to each other, to give your brain a break (e.g. English and Physics)
7. Stick to the timetable, it will help ensure you cover each subject and spread out your revision.

Subject	Group	Priority	Number of hours each week
Maths	Core	High (+2 hours)	
English Language	Core	High (+2 hours)	
English Literature	Core	High (+2 hours)	
	A-level choice	High (+2 hours)	
	A-level choice	High (+2 hours)	
	A-level choice	High (+2 hours)	
	A-level choice	High (+2 hours)	
	Subject I struggle with	Medium (+1 hour)	
	Subject I struggle with	Medium (+1 hour)	
	Subject I struggle with	Medium (+1 hour)	
	Subject I struggle with	Medium (+1 hour)	

Revision Timetable –Weekday

Time	Monday	Tuesday	Wednesday	Thursday	Friday
4.00 - 4.25					
5-minute break					
4.30 – 4.55					
5-minute break					
5.00 – 5.25					
5-minute break					
5.30 – 5.55					
5-minute break					
6.00 – 6.25					
5-minute break					
6.30 – 6.55					
5-minute break					
7.00 – 7.25					
5-minute break					
7.30 – 7.55					
5-minute break					
8.00 – 8.25					
5-minute break					
8.30 – 9.00					

Revision Timetable – Weekend

Time	Saturday	Time	Sunday
5-minute break			
5-minute break			
5-minute break			
5-minute break			
5-minute break			
5-minute break			

Exam paper summary

Use this page to keep track of which exam papers you've done and which ones you need to improve on.

Year	B1	B2	B3	C1	C2	C3	P1	P2	P3
Specimen paper									
June 2012			x			x			x
January 2013			x			x			x
June 2013									
June 2014									
June 2015									

Biology

Important links and websites

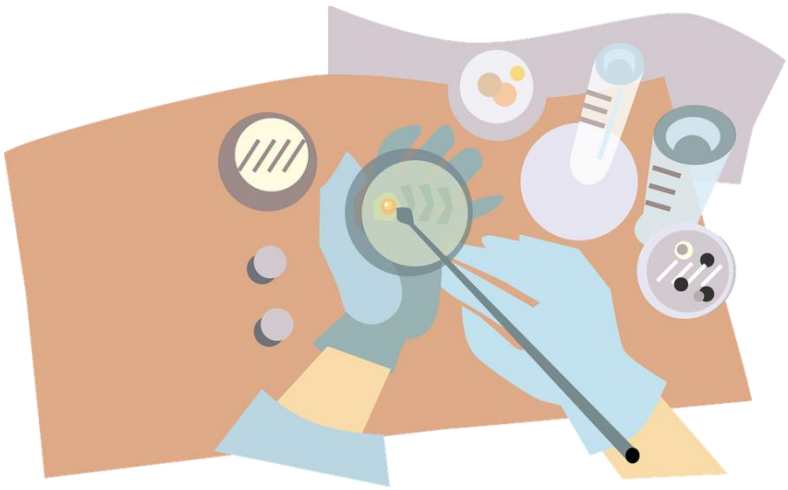
The whole of B1 in xxx minutes coming soon….

The whole of B2 in 49 minutes https://youtu.be/6bxmIxPFO4s

The whole of B3 in 37 minutes https://youtu.be/a_7J-mJrBj8

5 most common mistakes in a biology exam

1. Not referring to the graphs - if the exam question asks about a graph, make sure you refer to it in your answer. Most marks can be picked up by clearly talking about the graph
2. Ignoring the patterns and relationships – if there is a link between two things then tell the examiner about it, this is probably what they are looking for
3. Describe or explain – getting these two words confused is a common mistake in all exams but it happens more in biology than any other subject. Make sure you know what the difference is
4. Skipping levels – don't just focus on what is at the top and the bottom, remember all those important bits' in-between
5. Forgetting the practical's – loads of marks can be picked up by talking about the practical's you have done in class. Just clearly state all the details and risks



B1 – Core 16th May 2017

100 quick fire B1 Questions https://youtu.be/Oq-79mTaHHw

1. What are independent variables?
2. What are dependent variables?
3. What are control variables?
4. How do we measure the range?
5. How do we measure the interval?
6. Why do animals need to detect changes in their surroundings?
7. What is an adaptation?
8. Give 3 adaptations that are seen in animals
9. Give 3 adaptations that are seem in plants
10. What are antibiotics?
11. What do vaccines do?
12. What can thalidomide be used to treat?
13. What was thalidomide used to treat when it first came out?
14. What is asexual reproduction?
15. Give an example of asexual reproduction
16. What is sexual reproduction?
17. What is a carcinogen?
18. What is cholesterol?
19. Where is cholesterol made?
20. What is 'bad' cholesterol?
21. What does 'bad' cholesterol do?
22. What is 'good' cholesterol?
23. What are chromosomes?
24. How many chromosomes are in a human skin cell?
25. How many chromosomes are in a human sex cell?
26. What is DNA?
27. What happens to something when it is decomposing?
28. What are drugs?
29. Why do we have drug trials?
30. Why do we need to know about side-effect?

31. What is a stimulus?
32. What is an effector?
33. What is receptor?
34. What is reflex?
35. What is an embryo?
36. Where should an embryo be placed?
37. What is a foetus?
38. What do enzymes do?
39. What does evolve mean?
40. What has happened to a species when it is extinct?
41. What is a mutation?
42. What is natural selection?
43. What is the menstrual cycle?
44. What is FHS?
45. What does FSH do?
46. Where is FSH produced?
47. What is LH?
48. What does LH do?
49. Where is LH produced?
50. What does oestrogen do?
51. Where is oestrogen produced?
52. What to the ovaries do?
53. What does progesterone do?
54. Where is progesterone produced?
55. Give two ways you can use hormones to control fertility,
56. What is a gamete?
57. What do genes do?
58. What do glands do?
59. Where is the pituitary gland?
60. What does an herbicide do?
61. What do hormones do?
62. What is an infectious disease?
63. What is a pathogen?
64. What is a toxin?
65. What does insulin do?

66. Where is insulin produced?
67. When might someone become malnourished?
68. Why might someone be obese?
69. What is leprosy?
70. What is the metabolic rate?
71. What is MRSA?
72. What are neurons?
73. What is a synapse?
74. What is a predator?
75. What is the CNS?
76. What does the CNS consist of?
77. What is homeostasis?
78. What conditions need to be controlled by homeostasis?
79. What is a population?
80. What is a community?
81. What resources do animals and plants compete for?
82. Give an example of how a polar bear is adapted to its environment
83. Give an example of how a cactus is adapted to its environment
84. Who developed the theory of Natural Selection?
85. What is the theory of Natural Selection?
86. Who thought that characteristic developed over a lifetime could be passed on to offspring?
87. What is phototropism?
88. What is geotropisms
89. Where are auxins found?
90. What are extremophiles?
91. What is biomass?
92. Where does the energy at the start of a food chain come from?
93. In a food chain where can energy be wasted?
94. What is photosynthesis?
95. What is the equation for photosynthesis?
96. How does carbon get from animal or plants back into the ground?
97. How does carbon get from animal or plants back into the air?
98. What is decay?
99. How can we control the rate of decay?

100. Are you going to do amazing well in your exam?

B1.1 Keeping healthy

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe the main components of a balanced diet needed to keep the body healthy	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'malnourished' and give examples of how this might happen	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline some possible consequences of malnutrition (including Type 2 diabetes)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how a person's mass is affected by the energy content of the food they eat and the energy expended (used) by the body, and how exercise affects energy expended	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the metabolic rate (the rate at which chemical reactions in body cells are carried out) is affected by activity and by the proportion of muscle and fat in the body	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify inherited factors that can affect health (e.g. cholesterol level or metabolic rate)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the health of people who exercise regularly with those who take little exercise	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate information about the effect of food on health, when given data	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'pathogen'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how bacteria and viruses can make us feel ill and how viruses damage the body	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that the body has different ways of protecting itself against pathogens	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the role of white blood cells in defending us against pathogens by: ingesting pathogens; producing antibodies (which destroy	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

particular bacteria or viruses); producing antitoxins (which counteract the toxins released by the pathogens)			
I can explain the role of antibodies in the immune system, and how immunity can develop	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the spread of a particular pathogen can be reduced if a large proportion of the population is immune to it	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how Semmelweiss reduced the number of deaths from infectious diseases in his hospital by changing the behaviour of doctors	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the contribution of Semmelweiss in controlling infection to solving modern problems with the spread of infection in hospitals, when given data to work from	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how some medicines help to relieve the symptoms of infectious disease, but do not kill the pathogens (e.g. painkillers)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe penicillin as an antibiotic, and explain how specific antibiotics help to cure diseases caused by specific bacteria	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that it is difficult to develop drugs that kill viruses without also damaging body cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how the use of antibiotics has reduced deaths from infectious bacterial diseases	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how overuse and inappropriate use of antibiotics has increased the number of antibiotic resistant strains of bacteria (e.g. MRSA), due to mutation and natural selection	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the consequences of mutations of bacteria and viruses in relation to epidemics and pandemics	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain how this resistance arises due to survival and reproduction of antibiotic resistant strains of bacteria after non-resistant strains are killed by the antibiotic	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain why antibiotics are no longer used to treat non-serious infections	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that new antibiotics must be developed to treat antibiotic-resistant bacteria strains	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can describe what vaccines contain, and the effect of the vaccine on white blood cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how vaccination can make a person immune, so that their body responds the same way as if they had previously had the disease	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that the MMR vaccine protects children against measles, mumps and rubella	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the treatment of disease has changed as a result of increased understanding of the action of antibiotics and immunity	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the advantages and disadvantages of being vaccinated against a disease	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how uncontaminated cultures of microorganisms are prepared when investigating the action of disinfectants and antibiotics	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why school and college laboratories incubate cultures at no more than $25^{O}C$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why higher temperatures are used in industrial situations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B1.2 Nerves and hormones

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that the nervous system enables humans to react to their surroundings and coordinate their behaviour	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can give examples of receptors and the stimuli (changes to the environment) that they detect, including those in the eyes, ears, tongue and skin	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify the main parts of light receptor cells (nucleus, cytoplasm and cell membrane)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how information from receptors is carried to the brain, which coordinates the response	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the roles of sensory neurones, relay neurones, motor neurones, synapses and effectors in a reflex action, and state that reflex actions are automatic and rapid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the following internal conditions need to be controlled: the water content of the body; the ion content of the body; temperature; and blood sugar levels	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that hormones coordinate many processes in the body	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify where hormones are made and how they are transported to their target organs	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how hormones released by the pituitary gland and by the ovaries control the monthly release of an egg from a woman's ovaries and the changes in the thickness of the lining of the womb	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the roles of the following hormones in the menstrual cycle of a woman: follicle stimulating hormone (FSH, secreted by the pituitary gland), luteinising hormone (LH) and	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

oestrogen (secreted by the ovaries)			
I can describe how hormones that inhibit FSH production can be used in oral contraceptives	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why birth-control pills no longer contain large amounts of oestrogen	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how FSH and LH can be used in a 'fertility drug' to a woman whose FSH level is too low (e.g. in In Vitro Fertilisation, or IVF treatment)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the steps involved in IVF treatment	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the benefits of, and the problems that may arise from, the use of hormones to control fertility, including IVF, given data to work from	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how shoots and roots grow in response to light, moisture and gravity	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the role of auxin, a plant hormone, in phototropism and gravitropism	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how phototropism and gravitropism result from the unequal distribution of hormones causing unequal growth rates	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that plant growth hormones are used in agriculture and horticulture as weed killers and as rooting hormones	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the use of plant hormones in horticulture as weed killers and to encourage the rooting of plant cuttings	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B1.3 Use and abuse of drugs

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that scientists are continually developing new drugs, which affect body chemistry	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the stages used to find if new drugs are safe and effective, including the use of cells, tissues and live animals in laboratories	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the stages used in clinical trials, beginning with safety tests with healthy volunteers and including double blind placebo controlled trials	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the use of statins in lowering the risk of heart and circulatory diseases	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the effect of statins in cardiovascular disease	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how thalidomide was used as a medicine when it was first developed	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the misuse of thalidomide led to the introduction of more rigorous drug testing, and describe how thalidomide has been used successfully to treat some diseases	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the effects of misuse of legal recreational drugs (alcohol and nicotine)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the effects of misuse of the illegal recreational drug cannabis, and state that ecstasy, cannabis and heroin may have adverse effects on the heart and circulation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that cannabis smoke contains chemicals that may cause mental illness	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the impact of legal (prescribed and non-prescribed) and illegal drugs on health	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider the benefits of medicinal drugs, the impact of non-medical drugs such as alcohol, and the possible misuse of legal drugs	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain that some drugs, such as heroin and	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

cocaine, are very addictive because of the way they change the chemical processes in peoples' bodies causing dependency			
I can evaluate different types of drugs and why some people use illegal drugs for recreation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate claims made about the effect of prescribed and non-prescribed drugs on health	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider the possible progression from recreational drugs to hard drugs	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline some of the drugs that athletes can use to enhance performance, including stimulants and anabolic steroids	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that some performance-enhancing drugs are banned by law while others are legally available on prescription, but all are prohibited by sporting regulations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the use of drugs to enhance performance in sport and consider the ethical implications of their use	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B1.4. Interdependence and adaptation

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that organisms need a supply of materials from their surroundings and from other living organisms in order to survive and reproduce	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe four things for which plants often compete with each other	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe three things for which animals often compete with each other	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can suggest factors for which organisms are competing in a given habitat	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the word 'adaptation' as used to describe organisms, including microorganisms	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can suggest how organisms are adapted to the conditions in which they live, when given unfamiliar examples	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can observe the adaptations, e.g. body shape, of a range of organisms from different habitats	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can develop an understanding of the ways in which adaptations enable organisms to survive	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can give three examples of conditions to which extremophiles might be tolerant	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline adaptations found in animals to dry and arctic environments	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline adaptations found in plants to dry environments	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify how animals and plants may be adapted to cope with specific features of their environment (e.g. thorns, poisons and warning colours to deter predators)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe examples of when changes in the environment have affected the distribution of living organisms (e.g. the disappearance of pollinating insects such as bees)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can describe how living (e.g. competitors) and non-living (e.g. temperature or rainfall) factors may cause environmental changes that affect animals and plants	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how lichens and invertebrate animals can be used as indicators of pollution	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how environmental changes can be measured using non-living indicators (e.g. oxygen levels, temperature and rainfall), including the use of relevant equipment	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate data concerned with the effect of environmental changes on the distribution and behaviour of living organisms	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B1.5 Energy and biomass in food chains

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that radiation from the Sun is the source of energy for most communities of living organisms, a small amount of which is absorbed by green plants and algae	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe 'photosynthesis' as the process that transfers light energy to chemical energy, which can be stored in the substances that make up the cells of the plants	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the mass of living material (biomass) at different stages in a food chain	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent the biomass at each stage of a food chain using a pyramid of biomass	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret pyramids of biomass and construct them from appropriate information	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the amounts of material and energy are reduced at each successive stage in a food chain because: some material and energy are always lost in waste materials; and much of the energy transferred during respiration is transferred to the surroundings	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B1.6 Waste materials from plants and animals

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe how materials that living things remove from the environment for growth are returned to the environment in waste materials or when living things die and decay	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the conditions in which microorganisms break down (digest) materials fastest	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that decay processes release substances that plants need to grow	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how materials are constantly recycled in a stable community, as the processes removing materials are balanced by the processes returning materials	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the necessity and effectiveness of schemes for recycling organic kitchen or garden waste	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the carbon cycle as the continual cycling of carbon	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how photosynthesis removes carbon dioxide from the environment	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how plants and algae use carbon to make carbohydrates, fats and proteins	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that microorganisms and detritus feeders can feed on the bodies of dead organisms	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how respiration (in plants, algae, animals and decomposers) releases carbon dioxide, returning carbon to the atmosphere	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that all the energy originally absorbed by green plants and algae has been transferred by the time microorganisms and detritus feeders have broken down the waste products and dead bodies of organisms in ecosystems and cycled the materials	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

as plant nutrients			
I can describe how the combustion of wood and fossil fuels releases carbon dioxide into the atmosphere	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify the stages in the carbon cycle that remove or return carbon dioxide to the atmosphere	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B1.7 Genetic variation and its control

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that genes carry the information that results in plants and animals having similar characteristics to their parents	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that genes are passed on in sex cells (gametes) from which the offspring develop	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how asexual reproduction can be used to produce individuals that are genetically identical to their parent	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that genes operate at a molecular level to develop characteristics that can be seen	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe where chromosomes, which carry genes, can be found inside cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that different genes control the development of different characteristics	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how inherited genes, environmental causes, or combinations of the two can lead to differences between species and between individuals of the same species	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe sexual reproduction as the fusion of male and female gametes, resulting in mixing of the genetic information from two parents and variation in the offspring	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe asexual reproduction as the production of genetically identical clones from a single parent, as there is no mixing of genetic information so no variation in offspring	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how new plants, genetically identical to their parents, can be produced quickly and cheaply by taking cuttings from older plants	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the cloning technique of tissue culture	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the cloning technique of embryo transplants (splitting apart cells from a developing	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

animal embryo then transplanting the identical embryos to host mothers)			
I can outline adult cell cloning, including: removal of a nucleus from an unfertilized egg cell; insertion of a nucleus from an adult body cell; use of electric shock to cause the cell to divide to form embryo cells; implantation of the developing embryo to the womb of an adult female to continue its development	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how genes from the chromosomes of organisms can be 'cut out' using enzymes and transferred to the cells of other organisms in the process of genetic engineering	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret information about cloning techniques and genetic engineering techniques, when given data to work from	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how genes can be transferred at an early stage of animal, plant or microorganism development so that they develop with desired characteristics	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how this can be used to produce genetically modified (GM) crops, such as those resistant to insect attack or to herbicides, which usually show increased yields	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline concerns about GM crops including the effect on wild flowers and insects, and uncertainty about the effects of eating GM crops on human health	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can make informed judgements about the economic, social and ethical issues concerning cloning and genetic engineering, including GM crops	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B1.8 Evolution

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can outline Darwin's theory of evolution by natural selection, which states that all species have evolved from life forms that first developed more than 3 billion years ago	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the process of evolution by natural selection: differences between genes causes variation within a species; some individuals are best suited to survive and reproduce; the genes that enabled these individuals to survive are passed on to the next generation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can appreciate the timescales involved in evolution	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how mutations (resulting in new forms of a gene) can lead to relatively rapid changes in a species if the environment changes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret evidence relating to evolutionary theory, when given data to work from	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can suggest three reasons why Darwin's theory was only gradually accepted	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the competing evolutionary theory of Lamarck, which is based on the idea that changes which occur in an organism during its lifetime can be inherited	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify the differences between Darwin's theory of evolution and conflicting theories, such as that of Lamarck	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that we now know that this type of inheritance cannot occur in almost all cases	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can suggest reasons for the different theories, based on the idea that scientists may produce different hypotheses to explain the same observations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can state that hypotheses are supported or refuted by data from investigations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how we can classify living things into animals, plants and microorganisms by studying the similarities and differences between them	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use evolutionary trees (models) to suggest evolutionary and ecological relationships between organisms	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B2 – Additional 9th June 2017

80 Quick fire B2 Questions https://youtu.be/sWK842Eq80s

1. What is an independent variable?
2. What is a dependent variable?
3. What is range?
4. What is an interval?
5. What is a control variable?
6. When do we draw a line graph?
7. When do we draw a bar graph?
8. What is an anomalous result?
9. How can we increase the validity of readings?
10. What does the nucleus do?
11. What does the cell membrane do?
12. What do the mitochondria do?
13. What do ribosomes do?
14. Give three things plant cells have that animal cells don't
15. Where is the DNA in a bacterial cell?
16. Give two examples of specialised cells
17. What is diffusion?
18. What is a tissue?
19. What is an organ?
20. What is an organ system?
21. Give three organs that can be found in plants
22. Give three organ system that can be found in humans
23. What is the equation for photosynthesis?
24. What three factors can affect the rate of photosynthesis?
25. Why do plants need to do photosynthesis?
26. What do we call a long chain of amino acids?
27. What is a catalyst?
28. What is a biological catalyst?
29. What does amylase do?
30. Where is amylase produced?
31. What does protease do?

32. Where is protease produced?
33. What does lipase do?
34. Where is lipase produced?
35. What acid is in the stomach?
36. Where is bile produced?
37. Where is bile stored?
38. What does bile do?
39. What can microorganisms be used for in the home?
40. What can microorganisms be used for in industry?
41. What is the equation for respiration?
42. Where does aerobic respiration take place?
43. What changes take place during exercise?
44. What is the equation for anaerobic respiration?
45. When does anaerobic respiration take place?
46. What is the oxygen debt?
47. Who proposed the idea of 'inherited factors'?
48. What does homozygous mean?
49. What does heterozygous mean?
50. What is a phenotype?
51. What is a genotype?
52. How do skins cells divide?
53. How many new cells are formed?
54. What are chromosomes?
55. How do cells in the reproductive organs divide?
56. How many new cells are formed?
57. What is a gamete?
58. How many chromosomes are in a skin cell?
59. How many chromosomes are in a gamete?
60. What sex chromosomes does women have?
61. What sex chromosomes does a man have?
62. What is a gene?
63. What is an allele?
64. What is a dominant allele?
65. What is a recessive allele?
66. What is polydactyly?
67. Is polydactyly control by a recessive or dominant allele?
68. What is cystic fibrosis?

69. Is cystic fibrosis control by a recessive or dominant allele?
70. What evidence is there for early life?
71. Why might an animal not leave a fossil?
72. Why might a species become extinct?
73. When might a new species arise?
74. In mitosis how many times does a cell divide?
75. In meiosis how many times does a cell divide?
76. In mitosis, compared to the original cell how many chromosomes does the new cell have?
77. In meiosis, compared to the original cell how many chromosomes does the new cell have?
78. Where does mitosis happen?
79. Where does meiosis happen?
80. Are you going to do amazingly well in you GCSE? ☺

B2.1 Cells and simple cell transport

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that all living things are made up of cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify, and describe the functions of, the following parts of human and animal cells: nucleus, cytoplasm, cell membrane, mitochondria and ribosomes.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify, and describe the functions of, the following parts of plant and algal cells: chloroplasts and a permanent vacuole.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the main features of a bacterial cell, including the cytoplasm, cell membrane, cell wall and genes.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the main feature of a yeast cell, including the nucleus, cytoplasm, membrane and cell wall, and state that yeast is a single-celled fungus.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain that cells may be specialised to carry out a particular function	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the structure of different types of cell to their function	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how dissolved substances can move in and out of cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe diffusion in terms of net movement of particles in gas or solution from an area of high concentration to an area of low concentration	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the difference in concentration to the rate of diffusion	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that dissolved substances must cross cell membranes to get into or out of cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how oxygen required for respiration passes through cell membranes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B2.2 Tissues, organs, organ systems

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can recognise that large multicellular organisms need to exchange materials with their environment, and develop systems to do so	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the process of cell differentiation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'tissue'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify, and describe the functions of, some animal tissues including: muscular tissue, glandular tissue and epithelial tissue	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify, and describe the functions of, and the tissues that may be contained in an organ such as the stomach	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify, and describe the functions of, the key organs of the digestive system: glands, the stomach, the liver, the small intestine, the large intestine	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'organ system'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B2.3 Photosynthesis

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can write the word equation for photosynthesis (including 'light energy' on the arrow)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the role of chlorophyll in photosynthesis, and state which types of cells contain chlorophyll	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe where the carbon dioxide and water used come from	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can give three examples of factors that may limit photosynthesis	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret data showing how factors affect the rate of photosynthesis	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the economic benefits of changing conditions in a greenhouse, using the principle of limiting factors	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the glucose produced in photosynthesis may be used in respiration, stored as starch, used to make fat or oil, used to make cellulose to strengthen cell walls, and used to make proteins	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that nitrate ions absorbed from the soil are also needed by plants in order to make proteins	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B2.4 Organisms & their environment

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that living organisms form communities and understand the relationships within and between these communities	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify six physical factors that may affect organisms	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can suggest reasons for the distribution of living organisms in a particular habitat	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate methods used to collect environmental data	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider the validity of the method used to collect the data, and the reproducibility of the data	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate sample size to both validity and reproducibility	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise and terms 'mean' 'median' and 'mode'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B2.5 Proteins – functions and uses

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe the structure of proteins as a chain of amino acids folded into a specific shape	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify four types of proteins	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'catalyst'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe enzymes as biological catalysts	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the shape of an enzyme to its function	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how high temperatures affect enzymes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how enzymes work at different pH values	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe examples of enzymes that work outside of body cells, such as digestive enzymes, including details of where they are produced, where they go, and what reactions they catalyse	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the function and sites of production of amylase, protease enzymes and lipase enzymes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the acidic conditions in the stomach to the enzymes produced there	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the role of bile, produced by the liver, in digestion of food	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the pH of bile to the action of enzymes in the small intestine	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe two examples of enzymes that are produced by microorganisms that can be used in products found in the home	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe three examples of enzymes produced by microorganisms that are used in the manufacture of foods and food additives	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the advantages and disadvantages of using enzymes in the home and industry, in terms of reaction conditions, rates of reaction and costs	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B2.6 Aerobic & anaerobic respiration

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that the chemical reactions inside cells are controlled by enzymes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state the reactants needed for the reactions involved in aerobic respiration	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that aerobic respiration takes place continuously in plants and animals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify where, in cells, most of the reactions in aerobic respiration happen	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can write the word equation that sums up aerobic respiration	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe three ways that energy from respiration may be used in animals, and one way in which it may be used in plants	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the changes to heart rate and breathing that take place during exercise	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why these changes take place, in terms of blood flow, sugar and oxygen supply, and removal of carbon dioxide	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how muscles store glucose for future use	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify when anaerobic respiration would be used in muscles	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe anaerobic respiration as the incomplete breakdown of glucose to produce lactic acid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can relate the incomplete breakdown of glucose to the relatively low energy yield from anaerobic respiration	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain how anaerobic respiration can lead to an oxygen debt, and state the two reasons why this oxygen must be 'repaid'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe muscle fatigue and relate it to the	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

build-up of lactic acid from anaerobic respiration			
I can state that blood flowing through muscles removes lactic acid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret data relating to the effects of exercise on the human body	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B2.7 Cell division and inheritance

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can identify where pairs of chromosomes (which contain genetic information) are normally found in body cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how body cells divide by mitosis, including copying of the genetic material and division to form two identical body cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that mitosis occurs during growth or to produce replacement cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the number of chromosomes in body cells and sex cells (gametes)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify the reproductive organs as testes and ovaries	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that meiosis is the type of cell division that forms gametes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can describe meiosis in terms of copying of genetic material, followed by the cell diving twice to form four different gametes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the process of fertilisation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret genetic diagrams, including family trees	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'differentiation'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe when differentiation occurs in plants and animals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify human embryo and bone marrow cells as stem cells, and describe how they can be used	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can give an example of a condition that could be treated using stem cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how asexual reproduction leads to the production of offspring with the same alleles as the parents	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'allele'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can explain how sexual reproduction leads to variation, in terms of alleles	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how a single pair of chromosomes in humans determines sex, and identify the chromosome pairings in males and females	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'dominant allele'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'recessive allele'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the shape of the DNA molecule as a double helix	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain how genes code for combinations of amino acids in proteins	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why DNA fingerprinting can be used to identify individuals, using the idea of unique DNA	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can construct genetic diagrams and predict the outcomes of crosses, using the terms 'homozygous' 'heterozygous' 'phenotype' and 'genotype'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can predict or explain the outcome of crosses between individuals for any combination of dominant and recessive alleles	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can make informed judgements about the social and ethical issues concerning the use of stem cells from embryos in medical research and treatments	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify some disorders as inherited	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how polydactyly – caused by a dominant allele – is inherited	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how cystic fibrosis – caused by a recessive allele – is inherited, and explain why an individual may be a 'carrier' without having the disorder themselves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the economic, social and ethical issues surrounding embryo screening to test for alleles that cause genetic disorders	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B2.8 Speciation

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can identify the main source of evidence for early forms of life	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe three ways in which fossils may be formed	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why soft-bodied forms of life have left few traces behind	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how fossil evidence can tell us how much or how little different organisms have changed as life developed on Earth	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify at least six possible causes for the extinction of a species	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how new species arise, in terms of isolation of populations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can further describe how new species arise, in terms of genetic variation within populations, natural selection in those populations and speciation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can suggest reasons why scientists cannot be certain about how life began on Earth, in terms of valid evidence	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B3 – Biology or Further Additional 9th June 2017

B3.1 Movement in and out of cells

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that dissolved substances move by diffusion and active transport	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe osmosis as movement of water from a dilute to a more concentrated solution through a partially permeable membrane	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how osmosis is affected by the concentrations of the solutions inside and outside a cell	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that most soft drinks contain water, sugar and ions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the contents of sports drinks: sugars to replace that used in energy release during activity, and water and ions to replace those lost during sweating	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the effect on the body's water balance of not replacing water and ions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the claims of manufacturers about sports drinks	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe active transport at the process that allows cells to absorb ions from very dilute solutions, against the concentration gradient	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline four ways that to increase the effectiveness of an exchange surface (such as the lungs or small intestine)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the lungs and small intestine are adapted to increase their effectiveness at exchanging materials	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the size and complexity of an organism to the difficulty it has in exchanging materials with	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

its surroundings			
I can describe how the villi aid the absorption of nutrients in the small intestine, in terms of diffusion and active transport	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the structure and location of the lungs in the thorax, and recognise the ribcage and diaphragm on diagrams	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the function of the breathing system in terms of diffusion of oxygen and carbon dioxide into and out of the bloodstream	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the mechanism by which ventilation takes place (i.e. describe how the ribcage and diaphragm move during breathing)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the development and use of artificial aids to breathing, including the use of artificial ventilators	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that carbon dioxide enters leaves by diffusion	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that most of the water and mineral ions are absorbed by the roots	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the surface area of the roots and leaves are increased, referring to root hairs, the flattened shape of leaves, and internal air spaces	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise stomata as the openings on the underside of leaves through which carbon dioxide, oxygen and water vapour can diffuse	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the effects of hot, dry and windy conditions on the rate of water loss from leaves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the effect on the plant of losing water faster than it is replace by the leaves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the action of guard cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can analyse and evaluate the conditions that affect water loss in plants	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B3.2 Transport systems in plants & animals

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe the role of the circulatory system	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the structure of the heart in terms of muscle tissue, the four chambers, heart valves and the main blood vessels associated with the heart	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the sequence of events that take place in a heart beat	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise the two separate circulation systems, one for the lungs and one for all other organs of the body	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the use of artificial hearts and heart valves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the structures of arteries and veins, in terms of muscle, elastic fibres, thickness of the walls, and valves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how stents are used to keep arteries open	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the use of stents	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the structure of capillaries, and how substances needed by body cells pass out of the blood, and substances produced by the cells pass into the blood	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that blood is a tissue	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the contents of blood, including plasma, red blood cells, white blood cells and platelets	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe where blood transports the following substances from and to: carbon dioxide, soluble products of digestion, and urea	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the structure of red blood cells to their function in carrying oxygen	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can outline how haemoglobin combines with oxygen to form oxyhaemoglobin, and vice versa	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the structure of a white blood cell, and state that they form part of the body's defence system against microorganisms	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe platelets as small fragments of cells, and state that their function is to help blood to clot at the site of a wound	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate data on the production and use of artificial blood products	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how xylem tissue transports water and mineral ions from the roots to the stem and leaves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe transpiration as the movement of water from the roots, through the xylem, and out of the leaves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how phloem tissue carries dissolved sugars from the leaves to the rest of the plant, including the growing regions and storage organs	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B3.3 Homeostasis

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can explain how and where carbon dioxide and urea are produced and how they leave the body	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the effect of changes to the water or ion content of the body, in terms of water moving in or out of cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that water and ions enter the body when we eat and drink	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how the kidney produces urine by: filtering the blood; reabsorbing all the sugar; reabsorbing the dissolved ions needed by the body; reabsorbing as much water as the body needs; releasing urea, excess ions and water	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline two possible treatments for people suffering from kidney failure	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe dialysis treatment in terms of restoring the concentrations of dissolved substances in the blood to normal levels, and state that it has to be carried out at regular intervals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how a dialysis machine works, in terms of partially permeable membranes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why dialysis fluid contains the same concentration of useful substances as the blood	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why a donor kidney may be rejected by the immune system, in terms of and antigens antibodies	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how this is prevented by 'tissue-typing' and treatment with drugs to suppress the immune system	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the advantages and disadvantages of treating kidney failure by dialysis or kidney transplant	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how sweating helps to cool the body,	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

how this affects the water balance of the body, and how lost water must be replaced			
I can describe how body temperature is monitored by the brain and skin	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can describe how blood vessels supplying skin capillaries and sweat glands respond if core body temperature is too high	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can describe how blood vessels supplying skin capillaries and muscles respond if core body temperature is too low	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that the pancreas monitors and controls blood glucose concentration	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that insulin, a hormone produced by the pancreas, allows glucose to move from the blood into body cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can state that glucagon, another hormone produced by the pancreas, causes glycogen to be converted into glucose and released into the blood	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the cause of Type 1 diabetes in terms of insulin production	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how Type 1 diabetes can be controlled by careful attention to diet, exercise, and by injecting insulin	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate modern methods of treating diabetes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

B3.4 Humans and their environment

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can relate the growth in human population and increase in standard of living to the increased amount of waste produced	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how waste can cause pollution of water, air and land	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain four human activities that reduce the amount of land available for other animals and plants	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can analyse and interpret scientific data concerning waste production and land use	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate methods used to collect environmental data and consider their validity when used as evidence for environmental change	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why large-scale deforestation in the tropical areas has taken place, in terms of growing crops and grazing cattle	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how this deforestation has increased levels of carbon dioxide in the atmosphere, in terms of the release and 'locking up' of carbon dioxide	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can link deforestation to reductions in biodiversity	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe two environmental effects of grazing animals on deforested land	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the effect on the atmosphere of destroying peat bogs, and explain the increasing importance of 'peat free' compost	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline five likely effects of an increase in global average temperatures	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how carbon dioxide can be sequestered in water	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how biofuels can be made, and specifically how biogas is made	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can evaluate the use of biogas generators, from single-family generators in the third world to large-scale commercial generators, taking into account how climatic conditions could affect their output	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the efficiency of food production can be improved by reducing the number of stages in food chains	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how efficiency of food production can be improved by reducing the energy lost from animals, and how this is achieved	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how and why fish stocks should be maintained as sustainable levels, to avoid some species disappearing in some areas	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how net size and fishing quotas help to conserve fish stocks	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how *Fusarium* fungus can be used to grow protein-rich food	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the positive and negative effects of managing food production and distribution, in terms of the differences between producing food from plants and animals, the pros and cons of factory farming, and the implications of 'food miles'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise that practical solutions may require compromise	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

Chemistry

Important links and websites

The whole of AQA C1 in xxx minutes… coming soon.

The whole of AQA C2 in 29 minutes https://youtu.be/iNXJ259fBa0

The whole of AQA C3 in 32 minutes https://youtu.be/zEWGDi4N3xw

5 most common mistakes in a chemistry exam https://youtu.be/ycw094CMUtE

1. Drawing the wrong number of bonds in organic chemistry
2. Being too wishy washy in colour changes
3. Putting numbers in the wrong place
4. Missing out (or adding in too many) capital letters
5. Keep numbers in your calculator memory to avoid rounding errors

Important tips

- When balancing equations, if you really, really can't work it out. Write 2 as the answer
- If you've forgotten the reaction conditions, write 'hot and a catalyst'

C1 – Core 18th May 2017

100 quick fire C1 Questions https://youtu.be/aG4pMWXwbF0

1. Where are protons?
2. Where are neutrons?
3. Where are electrons?
4. What is the charge on a proton?
5. What is the charge on a neutron?
6. What is the charge on an electron?
7. What is a compound?
8. What is a mixture?
9. What is an element?
10. How can we use the periodic table to find the number of protons an element has?
11. How can we use the periodic table to find the number of neutrons an element has?
12. How can we use the periodic table to find the number of electrons an element has?
13. How many electrons are in the first electron shell?
14. How many electrons are in the second electron shell?
15. How many electrons are in the third electron shell?
16. What do the groups in the periodic table tell use?
17. What do the periods on the periodic table tell us?
18. What type of ions (positive/negative) do metals form?
19. What type of ions (positive/negative) do non-metals form?
20. Balance this $H_2 + O_2 \rightarrow H_2O$
21. Balance this $N_2 + H_2 \rightarrow NH_3$
22. Balance this $N_2 + Cl_2 \rightarrow NCl_3$
23. How many elements in $MgSO_4$?
24. How many atoms in $MgSO_4$?
25. How many elements in $Pb(OH)_2$?
26. How many atoms in $Pb(OH)_2$?
27. What is the chemical name for limestone?
28. What is thermal decomposition?
29. What are the two products when $CaCO_3$ is thermally decomposed?
30. How do we test for carbon dioxide?

31. When we react a carbonate with a dilute acid what happens?
32. What we heat a metal carbonate what happens?
33. What we add water to calcium oxide what happens?
34. Give 3 advantages to lime stone quarries
35. Give 3 disadvantages to lime stone quarries
36. How are metals found in the ground?
37. What does the reactivity series show?
38. What is reduction?
39. What is electrolysis?
40. What is an alloy?
41. What is Phytomining?
42. What is bioleaching?
43. Give 3 properties of transition metals?
44. What is crude oil?
45. What is a hydrocarbon?
46. Name this CH_4
47. Name this C_2H_6
48. Name this C_3H_8
49. Name this C_4H_{10}
50. Name this C_5H_{12}
51. What is an alkane?
52. Give the general formula for alkanes
53. What is a saturated hydrocarbon?
54. In fractional distillation what type (long/small) chains comes out at the bottom?
55. In fractional distillation what type (long/small) chains comes out at the top?
56. What is the generally equation for combustion of a hydrocarbon?
57. Give two products of combustion from fossil fuels
58. What is the difference between complete and incomplete combustion?
59. What is the problem with dust particle getting into the air?
60. What is acid rain?
61. What do catalytic converts do?
62. What is climate change?
63. What is a biofuel?
64. Give 3 advantages of biofuels
65. Give 3 disadvantages of biofuels

66. What is cracking?
67. What is an alkene?
68. What is an unsaturated hydrocarbon?
69. Name these C_2H_4
70. Name these C_3H_6
71. Name these C_4H_8
72. Name these C_5H_{10}
73. What is the general formula for alkenes?
74. What is the test for unsaturated double bonds?
75. What is a monomer?
76. What is a polymer?
77. How do monomers turn into polymers?
78. What are the two different ways of making ethanol?
79. Give the word equation for the fermentation of sugars
80. Give an advantage of using fermentation to produce ethanol
81. Give a disadvantage of using fermentation to produce ethanol
82. Give the word equation for hydration of crude oil
83. Give an advantage of using hydration to produce ethanol
84. Give a disadvantage of using hydration to produce ethanol
85. How can extract oils from plants?
86. How can we harden vegetable oils?
87. Which is better for you hard or soft fats?
88. What is an emulsion?
89. What is hydrophobic?
90. What is hydrophilic?
91. What do we add e-numbers to foods?
92. Starting with the outer crust, name the layers of the earth
93. What evidence is there that the continents used to be joined?
94. How are continents moving apart?
95. What was in the earth early atmosphere?
96. Give two ways carbon dioxide was removed from the early atmosphere
97. What did Miller and Urey show?
98. What is the main gas in today's atmosphere?
99. What does locked up carbon refer to?
100. Are you going to do amazing in your exam?

The 10 hardest questions in C1 https://youtu.be/JyQ2n8B7uPI

1. Using a diagram, describe the structure of a calcium atom.
2. Using diagrams, describe the difference between hydrophilic and hydrophobic.
3. Explain why a building made with limestone might not be safe to enter after a fire.
4. Describe the process of polymerisation. Use chlorethene as an example and draw the different steps.
5. Describe Wegeners theory of continental drift, give his proposed mechanism, the evidence for it and the reaction to his ideas at the time.
6. Describe how the early atmosphere changed to be the atmosphere we have today.
7. Three (made up) transition metals were reacted together. Tromium oxide was reacted with pure carboltium and nothing happened, but when it was reacted with triomium oxide was reacted with pure harbold a reaction was seen. Give the order of reactivity and explain you reasoning. Predict what would happen when harbold oxide is reacted with carboltium.
8. Describe the pathway crude oil takes from the ground until it becomes petrol.
9. Evaluate the ethical and environmental impact of using ethanol as a biofuel
10. Describe how to harden an unsaturated vegetable oil

C1.1 Fundamental ideas

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can correctly use the term atom and element and describe the structure of the periodic table	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent atoms using their symbols	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the electronic structure of the first 20 elements	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the basic structure of the atom	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall the charges of the three subatomic particles	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the link between number of protons and the element	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe and use the terms atomic number and mass number	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why atoms have no overall charge	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why elements in the same group have similar properties	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why Group 0 elements are unreactive	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the basics of ionic and covalent bonding	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent reactions using word and symbol equations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use the idea of conservation of mass and balance chemical equations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C1.2 Limestone and building Materials

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I know that limestone, mainly composed of the compound calcium carbonate ($CaCO_3$), is quarried and can be used as a building material.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the reaction of calcium oxide and water	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the reaction of lime water and carbon dioxide	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the thermal decomposition of calcium carbonate	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the similarities of the metal carbonates	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the reaction of limestone and acid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how cement and concrete are made	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the developments in using limestone, cement and concrete as building materials, and their advantages and disadvantages over other materials.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider and evaluate the environmental, social and economic effects of exploiting limestone and producing building materials from it	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C1.3 Metals and their uses

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe ores as naturally occurring rocks	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise that ores contain enough metal to make it economic to extract the metal.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that ores are mined and may be concentrated before the metal is extracted.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify unreactive metals, such as gold.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define reduction	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how metals less reactive than carbon can be extracted from their oxides by reduction	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how metals that are more reactive than carbon are extracted by electrolysis	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why electrolysis of molten compounds of metals is expensive, in terms of energy	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how copper can be extracted from copper-rich ores by heating in a furnace	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that the supply of copper-rich ores is limited and decreasing	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider the social, economic and environmental impacts of mining	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe new ways of extracting copper from low-grade ores, including phytomining and bioleaching	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how copper can be obtained from solutions of copper salts by electrolysis	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify which ions (positive or negative) move towards which electrode in electrolysis	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why aluminium and titanium methods of extraction of aluminium and titanium are	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

expensive			
I can consider and evaluate the social, economic and environmental impacts of recycling	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why cast iron from the blast furnace has limited uses	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that most iron is converted into steels, which are alloys of iron with carbon	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how alloys can be designed to have properties for specific uses	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe some properties of transition metals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state uses of transition metals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C1.4 Crude oil and fuels

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that crude oil is derived from an ancient biomass found in rocks	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe crude oil as a mixture	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term mixture	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise that most of the compounds in crude oil consist hydrocarbons	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use the term 'saturated hydrocarbons' to describe alkanes, which have the general formula C_nH_{2n+2}	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can name, identify and draw the first 6 alkanes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the process of fractional distillation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the difference between the fractions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the properties of hydrocarbons, and explain how the size of the molecules affect their boiling points, viscosity and flammability	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the products of combustion of fuels to the elements present in their compounds	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that burning fuels may also produce oxides of nitrogen at very high temperatures, and that solid particles (particulates, or 'soot') may also be released into the atmosphere	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the impact on the environment of burning hydrocarbon fuels	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe combustion as a chemical reaction with oxygen that releases energy	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can describe the environmental impacts of sulphur dioxide (acid rain), oxides of nitrogen (acid rain), carbon dioxide (global warming) and solid particles (global dimming)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider and evaluate the social, economic and environmental impacts of the uses of different fuels	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define 'biofuels' and state two examples of biofuels made from plants	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate developments in the production and uses of better fuels, for example ethanol and hydrogen, in terms of: use of renewable resources; storage and use of the fuels; the products of combustion of the fuels	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C1.5 Obtaining useful substances from oils

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can discuss and evaluate the uses of crude oil for fuels and as a raw material	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the process involved in cracking hydrocarbons	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the products of cracking	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I know that products of cracking are useful as fuels.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent alkenes by different formulae	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the reaction between alkenes and bromine water	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the process of polymerisation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can discuss and evaluate the uses and recycling of polymers	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the uses and properties of some modern materials	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can discuss the issues surrounding non-biodegradable polymers	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how non-biodegradable polymers are made	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can discuss and evaluate the uses of ethanol as a fuel	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how ethanol is made from crude oil.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how ethanol is made from renewable sources.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C1.6 Plant oils and their uses

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can explain how plant oils can be extracted.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the importance of plant oils as foods and fuels.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the detection of unsaturated oils.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can discuss and evaluate the use of vegetable oils in my diet and on my health	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can discuss the differences between cooking in water and vegetable oils.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can discuss and evaluate the advantages and disadvantages of emulsifiers in my food.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the formation, properties and uses of emulsions.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the chemical properties of emulsifiers.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the formation and uses of hardened oils.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C1.7 Changes in the Earth and its atmosphere

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I know that the Earth's crust, oceans and atmosphere are the source of all materials we need	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the basic structure of the Earth.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why Wegener's theory of continental drift was not generally accepted for many years after it was proposed	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain what drives continental drift.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the existence of earthquakes and volcanoes.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why scientists cannot accurately predict when earthquakes and volcanic eruptions will occur	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the nature of tectonic plates.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the nature of the Earth's atmosphere over the last 200 million years.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the nature of Earth's early atmosphere.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the formation of Earth's early atmosphere.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why we do not know how life was first formed.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the Miller-Urey experiment.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain and evaluate theories of the changes to the Earth's atmosphere	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe why oxygen is present in today's atmosphere.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain and evaluate the effects of human activities on the atmosphere.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the link between burning fossil fuels and atmospheric carbon.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can describe how air is separated and used industrially.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the oceans interact with atmospheric carbon.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how atmospheric carbon is gradually locked away.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C2 – Additional 14th June 2017

100 quick fire C2 Questions https://youtu.be/qWP2ky9mv6o

1. Where are protons?
2. Where are neutrons?
3. Where are electrons?
4. What is the mass of a proton?
5. What is the mass of an electron?
6. What is the mass of a neutron?
7. What is the charge on a proton?
8. What is the charge on a neutron?
9. What is the charge on an electron?
10. What type of bond is it when a metal and a non-metal bond?
11. What type of bond is it when two non-metals bond?
12. Draw the bonding in NaCl
13. Draw the bonding in MgO
14. Draw the bonding in H_2O
15. Draw the bonding in NH_3
16. How can we use the periodic table to quickly find the number of electrons in an elements outer shell?
17. What is a compound?
18. What is a mixture?
19. What is an element?
20. What is an ion?
21. How many elements in $CaCO_3$?
22. How many atoms in $CaCO_3$?
23. How many elements in $Mg(OH)_2$?
24. How many atoms in $Mg(OH)_2$?
25. What is the formula of the sulfate ion?
26. What is the formula of the carbonate ion?
27. What is the formula of the nitrate ion?
28. What is the formula of the hydroxide ion?
29. Describe what happens in ionic bonding?

30. List 4 simple molecules?
31. Why are simple molecules a gas at room temperature?
32. List 2 giant covalent structures?
33. Why are giant covalent structures solid at room temperature?
34. Give one giant ionic structure?
35. How can we make giant ionic structures conduct electricity?
36. What is the difference between a pure metal and an alloy?
37. What is a shape memory alloy?
38. What is the difference in structure between thermosetting and Thermosoftening polymers?
39. How big are Nano things?
40. What are the benefits of nanotechnology?
41. What are possible risks of nanotechnology?
42. How can we tell the mass of an element?
43. How can we tell the number of protons an element has?
44. How can we find the number of electrons an element has?
45. How can we find the number of neutrons an element has?
46. What is an isotope?
47. How can we find the molecular mass of a compound?
48. What is the mass of $CaCO_3$?
49. What is the mass of $Mg(OH)_2$?
50. What is a mole?
51. How can we find the percentage yield?
52. Why might a reaction not give 100% yield?
53. What does this symbol mean? $\rightleftharpoons$
54. What does chromatography do?
55. How does GC-MS separate things?
56. What are the advantages of instrument analysis methods?
57. What does (s) mean?
58. What does (l) mean?
59. What does (aq) mean?
60. What does (g) mean?
61. What might you see in a reaction where (g) was next to one of the products?
62. What might you see in a reaction where (s) was next to on o the products?
63. How can we measure the rate of a gas being given off?

64. How can we measure the rate of a precipitate being produced?
65. How does increasing the temperature affect the rate of reaction?
66. How does increasing the surface area affect the rate of a reaction?
67. How does adding a catalyst affect the rate of a reaction?
68. How does decreasing the pressure affect the rate of a reaction?
69. How does decreasing the concentration affect the rate of a reaction?
70. What is the smallest amount of energy needed to start a reaction?
71. What is a catalyst?
72. Give an example of a use for a catalyst?
73. What is an exothermic reaction?
74. What is an endothermic reaction?
75. Which ion makes a solution acidic?
76. Which ion makes a solution alkali?
77. How do we draw a line of best fit?
78. What pH is acid?
79. What pH is alkali?
80. What colour is hydrated copper sulfate?
81. What colour is anhydrous copper sulfate?
82. How can we change between hydrated and anhydrous copper sulfate?
83. What is produced when we mix an acid and a base?
84. What is produced when we mix an acid and a metal?
85. What is the neutralisation reaction?
86. Which acid produces …….chloride?
87. Which acid produces …… nitrate?
88. Which acid produces …… sulfate?
89. Towards which electrode will a positive ion move?
90. Towards which electrode will a negative ion move?
91. Why won't electrolysis work on a solid?
92. What does cryolite do?
93. What happens at the negative electrode?
94. What happens at the positive electrode?
95. What is reduction?
96. What is oxidation?
97. In aluminium electrolysis why does this positive electrode wear away?
98. What are the 3 product of brine electrolysis?

99. Why do we electroplate objects?

100. Are you going to do amazingly well in your GCSE???? :D

The 10 hardest questions in C2 https://youtu.be/bJyU6SDHV6Y

1. Describe the difference in structures of diamond and graphite. Explain how this relates to their properties.
2. Why are alloys hard? And why do metals conduct electricity?
3. Explain what nanotechnology is and why some people are concerned about it.
4. Use pictures to show the differences in structure and function between thermosetting and thermosoftening polymers.
5. How much zinc carbonate ($ZnCO_3$) would make 97.2g of zinc oxide (ZnO)?
6. Upon investigation a compound is found to have 52.3g of iron, 2.8g of hydrogen and 44.9g of oxygen. Find the empirical formula.
7. Describe how temperature and pressure will affect the rate of a reaction.
8. Describe a method for finding the rate of reaction between magnesium ribbon and hydrochloric acid.
9. Explain what happens at each electrode during electrolysis of aluminium oxide.
10. Describe how to make copper sulfate crystals, using sulfuric acid and excess copper oxide, explain what safety precautions should be taken.

C2.1 Structure and Bonding

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can write formula for ionic compounds from given symbols and ionic charges	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent the electronic structure of ions in NaCl, MgO and $CaCl_2$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent covalent bonds as dot and cross diagrams in molecules like water, ammonia, hydrogen chloride, methane, oxygen AND giant structures like diamond and SiO_2	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent covalent bonds as single lines in molecules like water, ammonia, hydrogen chloride, methane, oxygen AND giant structures like diamond and SiO_2	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can draw a diagram to represent bonding in metals.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define a compound	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the process of making ions to allow ionic bonding to happen	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can draw the ions made from Group 1 metals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can draw the ions made from Group 7 elements	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why ionic compounds can form giant ionic structures	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why covalent compounds are often simple molecules	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe and explain the properties of giant covalent structures like diamond and SiO_2	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can explain how delocalised electrons occur in metals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C2.2 Structure and Properties

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can explain why simple molecules are gases, liquids or solids with low melting and boiling points.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can understand that the intermolecular forces are overcome when a simple molecular substance melts or boils – NOT the covalent bond!	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why simple molecules do not conduct electricity.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why ionic compounds have high melting and boiling points.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how ionic compounds conduct electricity when molten or dissolved in water.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why giant covalent structures like diamond/graphite have very high melting points.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the bonding in diamond allows it to be very hard.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the bonding in graphite allows it to be soft and slippery.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can explain how delocalised electrons allow graphite to conduct heat and electricity.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can explain why the structure of metals allow them to conduct heat and electricity	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why metals can be bent and shaped.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state what an alloy is and explain why alloys are harder than pure metals (different sizes atoms)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state what is unique about shape memory alloys that allows them to be used in dental braces	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how properties of polymers depend on what they are made from and the conditions they were made under	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why thermosetting polymers don't melt when heated, but thermosoftening do.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can describe the sizes of nanoparticles in nm.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can list uses of nanoparticles due to the high surface area to volume ratio.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can describe the uses of fullerenes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C2.3 Quantitative chemistry and analysis

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can recall the masses and charges of protons, neutrons and electrons	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can remember that protons + neutrons = mass number	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the word isotope.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall that the relative atomic mass of an element (*Ar*) compares the mass of atoms of the element with the 12C isotope. It is an average value for the isotopes of the element.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall that the relative formula mass (*Mr*) of a compound is the sum of the relative atomic masses of the atoms in the numbers shown in the formula.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that the relative formula mass of a substance, in grams, is known as one mole of that substance	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the benefits of using instrumental methods to detect and ID elements and compounds	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how chemical analysis like paper chromatography allows us to ID additives in food – like artificial colours.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how gas chromatography linked to mass spectroscopy (GC-MS) works and how it IDs the Mr of substances	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the percentage of an element within	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

a compound			
[HT] I can calculate the empirical formula of a compound from its mass or percentages.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can calculate the masses of reactants or products from balanced symbol equations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I understand the idea of, and calculate the percentage yield from a chemical reaction	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent a reversible reaction using a word equation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate sustainable development issues relating the starting materials of an industrial process to the product yield and the energy requirements of the reactions involved	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C2.4 Rates of reaction

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe the changing rate of a reaction by looking at a graph	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the advantages and disadvantages of using catalysts in industry	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the rate of a reaction using this: Rate of reaction = $\frac{\text{Amount of reactant used or product formed}}{\text{Time}}$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can name 5 factors that would affect the rate of a reaction	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe collision theory in terms of particles and energy	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall the name of the energy needed to be overcome to start a reaction	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how each factor would affect the rate of reaction using collision theory	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state what a catalyst is and what it does	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can recall the unit of concentrations of solutions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can recall that equal volumes of gases at the same temperature and pressure have the same number of molecules	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C2.5 Exothermic/Endothermic Reactions

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that when chemical reactions occur, energy is transferred to or from the surroundings.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state what an exothermic reaction is in terms of energy and give examples.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define an endothermic reaction in terms of energy and give examples.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall that if a reversible reaction is exothermic in one direction, it is endothermic in the opposite direction.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C2.6 Acids, bases and salts

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can use the state symbols in equations - (s), (l), (g) and (aq).	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how soluble salts can be made by reacting acids with metals, insoluble bases and alkalis	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how salt solutions can be crystallised to produce solid salts.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall that insoluble salts can be made by mixing certain salts in solution (precipitate formed)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how precipitation can be used to remove unwanted ions from solutions, e.g. in treating water for drinking.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the difference between a base (metal oxides) and an alkali (metal hydroxides)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can name the salts that HCl, HNO_3, H_2SO_4 produce	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that ammonia dissolves in water to produce an alkaline solution. It is used to produce ammonium salts, which are important as fertilisers.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall that the pH scale is a measure of the acidity or alkalinity of a solution.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe an acid as releasing H^+ ions in solution.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe an alkali as releasing OH^- ions in solution.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall that in neutralisation reactions, hydrogen ions react with hydroxide ions to produce water. Represent this reaction with the equation: $H^+_{(aq)} + OH^-_{(aq)} \rightarrow H_2O_{(l)}$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C2.7 Electrolysis

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe what electrolysis is and what it does.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state the type of compound that can be used as an electrolyte	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the electrolyte must have been molten or in solution for electrolysis to work	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe which ions move to which electrode.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain what then happens to ions at that electrode, in terms of electrons.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how electrolysis is used to electroplate objects with copper or silver plating.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can remember OIL RIG and describe what it means in terms of electrons	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recall that if there's a mix of ions, the products formed depend on the reactivity of elements involved.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
[HT] I can represent reactions at electrodes using half equations. For example: $2Cl^- \rightarrow Cl_2 + 2e^-$ or $2Cl^- - 2e^- \rightarrow Cl_2$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how aluminium is manufactured by electrolysis	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why cryolite is needed in the electrolysis of aluminium oxide.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the carbon electrodes in the electrolysis of aluminium must be replaced often.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the details of the electrolysis of sodium chloride solution (brine)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the products of brine electrolysis are useful reagents in the chemical industry – particularly soap, bleach and plastics.	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C3 – Chemistry or Further Additional 14th June 2017

The 10 hardest questions in C3 https://youtu.be/TNcMxHNqoQw

1- 25.0cm^3 of H_2SO_4 at 0.1 mol is titrated against 30.0cm^3 of NaOH. Find the concentration of sodium hydroxide in g/dm^3
2- Describe how to find the concentration of an alkali, when using an acid of a known concentration. The QWC will count for 1 mark.
3- Calculate the energy change when methane burns completely in oxygen. (C-H 413 KJ/mol; O=O 498 KJ/mol; O-H 464 KJ/mol; C=O 805 KJ/mol)
4- Describe, using diagrams, how a catalyst changes the activation energy of an endothermic reaction.
5- Compare the Periodic Tables developed by Newlands and Mendeleev and the modern Periodic Table.
6- Explain the difference in reactivity between the group 1 and the group 7 elements.
7- Explain why the commercial Haber process is carried out at high temperatures and pressures.
8- Show, using diagrams, the reaction to produce ethyl ethanoate.
9- Describe the advantages and disadvantages of the adding chlorine and fluorine to our water supply.
10- An unknown compound burns lilac in a flame and produces a yellow precipitate when mixed with dilute nitric acid followed by silver nitrate. Give the formula of the compound and explain your reasoning.

C3.1 The periodic table

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe how Newlands, then Mendeleev, attempted to classify the elements by arranging them in order of their atomic weights	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how this list can be arranged in a table so that elements with similar properties are in periodically repeating columns, known as groups	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that early periodic tables were incomplete so some elements were placed in the wrong groups, and describe how Mendeleev overcame this problem	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the work of Newlands and Mendeleev in terms of their contributions to the development of the modern periodic table (you may be given information about other models so that comparisons can be made)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why scientists regarded the periodic table first as a curiosity, then as a useful tool and finally as an important summary of the structure of atoms	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the ordering of elements in periodic table was changed after the discovery of protons, neutrons and electrons in the early 20th century	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the modern periodic table can be seen as an arrangement of the elements in terms of their electronic structures, in terms of outer shell electrons	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can work out the electronic configurations of all elements up to and including calcium	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the properties of the alkali metals (Group 1) in terms of density, reactions with non-metals to form unipositive ions, reactions with	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

water, and formation of soluble hydroxides that form alkaline solutions			
I can describe the products of the reactions between alkali metals and non-metals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the trends in reactivity, melting & boiling points of the alkali metals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the transition elements with the alkali metals, in terms of melting points (except mercury) and density, strength and hardness, and reactivity (particularly with water or oxygen)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that many transition elements have ions with different charges, form coloured compounds, and are useful as catalysts	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the halogens (Gp 7) react with metals	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the trends in reactivity and melting and boiling points of the halogens	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the reactivity of a halogen to the displacement reactions between halogens and aqueous solutions of their salts	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can write word equations for all the reactions described in unit C3	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can write symbol equations for all the reactions described in unit C3	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain the trends in reactivity within groups in terms of how more or less easily outer electrons are lost or gained, due to their energy levels	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C3.2 Water

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that soft water easily forms a lather with soap, but hard water reacts with soap to form a scum, so more soap is needed to form a lather	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can measure the hardness of water by titration with a soap solution	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that soapless detergents do not form scum	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how compounds (such as those of calcium or magnesium) become dissolved in water to make it hard	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how temporary hard water can be softened, and how this can be used to distinguish between temporary and permanent hard water	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain how hydrogencarbonate (HCO_3^-) ions in temporary hard water decompose on heating to produce ccarbonate ions, which react with calcium and magnesium to form precipitates	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the use hard water can increase costs, and how the heating of temporary hard water can affect the efficiency of heating systems and kettles	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the health benefits of hard water resulting from the presence of calcium compounds, in terms of bone and tooth development and rates of heart disease	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the reactions involved in two methods for removing calcium and magnesium ions from hard water: by adding sodium carbonate, or by using commercial water softeners such as ion exchange columns	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the use of commercial water softeners	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can explain why correct water quality is essential for life, in particular why human drinking water should have low levels of dissolved salts and microbes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how good quality water is produced by: choosing an appropriate source, passing the water through filter beds and sterilising with chlorine	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the materials found in water filters and how they improve the taste and quality, including ion exchange resins	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why chlorine and fluoride may be added to drinking water, and recognise the arguments for and against the addition of fluoride to drinking water	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how pure water can be produced by distillation, showing awareness of the large amount of energy (and therefore high cost) involved	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider and evaluate the environmental, social and economic aspects of water quality and hardness	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C3.3 Calculating & explaining energy change

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can outline how the relative amounts of energy released when substances burn can be measured by simple calorimetry, and how this can be used to compare the energy released by fuels and foods	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use the equation $Q = mc\Delta T$ to calculate energy released	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use the appropriate units for energy (joules, kilojoules, kJ per mole, kJ per gram, or calories per gram)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the energy change of a reaction in solution can be calculated from the measured temperature change in an insulated container, for example when solids react with water or for neutralisation reactions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise simple energy level diagrams for exothermic and endothermic reactions to show the relative energies of reactants and products, activation energy, and overall energy change	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that, during a chemical reaction, energy must be supplied to break bonds, and that energy is released when bonds are formed	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret simple energy level diagrams in terms of bond breaking and bond formation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain why energy is released in exothermic reactions, in terms of the energy released from forming bonds and energy needed to break bonds	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain why energy is taken in during endothermic reactions, in terms of bond breaking and bond formation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can calculate the energy transferred in reactions from given bond energies	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can explain how catalysts speed up chemical reactions, in terms of activation and different pathways for reactions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can represent the effect of a catalyst on an energy level diagram	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the advantages and disadvantages of the combustion of hydrogen with the use of hydrogen fuel cells, using information provided	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the use of hydrogen to power cars compared to other fuels	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider the social, economic and environmental consequences of using fuels. You may be provided with information for comparison and evaluation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C3.4 Further analysis & quantitative chemistry

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can identify the following metal ions from the colours that their compounds produce in flame tests: lithium, sodium, potassium, calcium and barium	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the appearance of the precipitates that are formed from the reactions between aluminium, calcium and magnesium ions with hydroxide ions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify aluminium hydroxide as the only hydroxide precipitate that dissolves in excess sodium hydroxide solution	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify copper (II), iron (II) and iron (III) ions from the colours of precipitates that they form with sodium hydroxide solution	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify carbonates from their reaction dilute acids to form carbon dioxide, which produces a white precipitates with limewater, turning it cloudy	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify halide ions in solution from the colours of precipitates formed with silver nitrate solution in the presence of dilute nitric acid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify sulphate ions in solution from the white precipitate they form with barium chloride solution in the presence of dilute hydrochloric acid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret the results of these chemical tests. You may be asked to interpret results of any of these tests applied to solutions or mixtures of substances in different contexts	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can carry out titrations using strong acids and strong alkalis in which the volumes of acid and alkali that react are measured using a suitable indicator	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can calculate the chemical quantities involved in titrations using concentrations (in moles	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

per dm^3) and masses (in grams per dm^3)			
I can interpret and evaluate the results of analyses carried out to identify elements and compounds for forensic, health or environmental purposes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C3.5 The production of ammonia

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that, in industrial processes, energy requirements and emissions need to be considered for economic reasons and for sustainable development	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify the two raw materials for the Haber process and where they are obtained from	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the Haber process, including details of the catalyst used, the temperature and the pressure	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can write the equation for the reversible reaction between hydrogen and nitrogen gases that produces ammonia gas	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that, on cooling, the ammonia liquefies and is removed, while the remaining hydrogen and nitrogen are recycled	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the conditions necessary in an industrial process to maximise yield and minimise environmental impact	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can describe the meaning of the term 'equilibrium' as applied to a reversible reaction in a closed system	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can relate the relative amounts of all the reacting substances at equilibrium to the conditions of the reaction	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can describe the effects of raising or lowering the temperature on the yields of the endothermic and exothermic reactions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can describe which reaction will be favoured in a gaseous reaction if the pressure is increased, in terms of numbers of gaseous molecules	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can outline how these factors, together with reaction rates, are taken into account when	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

determining the optimum conditions for industrial processes, including the Haber process			
(HT) I can describe and evaluate the effects of changing the conditions of temperature and pressure on a given reaction or process	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the conditions used in industrial processes, in terms of energy requirements	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

C3.6 Alcohols, carboxylic acids and esters

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can identify alcohols from their functional group –OH, and name the first three members of the homologous series of alcohols	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can draw the structures of alcohols	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe some of the properties of methanol, ethanol and propanol, including: dissolving in water; reactions with sodium; burning in air; use as fuels, solvents and (in the case of ethanol) in alcoholic drinks	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how ethanol can be oxidised to form ethanoic acid either by chemical oxidising agents or microbial action	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify carboxylic acids from their functional group –OOH	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can draw the structures of carboxylic acids	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that ethanoic acid is the main acid in vinegar	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the chemical behaviour of carboxylic acids when dissolving in water, reacting with carbonates, and reacting with alcohols in the presence of an acid catalyst	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain why carboxylic acids are described as weak acids, in terms of the degree that they ionise when dissolved in water	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can compare the pH values of aqueous solutions of weak and strong acids of equal concentrations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify esters from the functional group –COO–	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify ethyl ethanoate as the ester produced from ethanol and ethanoic acid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can explain why esters are often used as flavourings and in perfumes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the social and economic advantages and disadvantages of the uses of alcohols, carboxylic acids and esters. You may be given information and data for comparison and evaluation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

Physics

Important links and websites

The whole of P1 on xxx minutes	coming soon
The whole of P2 in 39 minutes	https://youtu.be/cKDbzh9MojY
The whole of P3 in 26 minutes	https://youtu.be/UoTgo5wi6AQ
P1 units flashcards	coming soon
P2 units flashcards	https://youtu.be/Ie0BDQ8PEYQ
P3 units flashcards	https://youtu.be/J3TvKt1L7OA
5 most common mistakes in a physics exam	https://youtu.be/Ie0BDQ8PEYQ

1. Not knowing your units - this comes up a lot as separate marks and your formula sheet will be useless if don't know these
2. Not being able to rearrange equations - if you want to get the top grades you'll need to use sophisticated maths skills
3. We don't use reoccurring in science - you need to round to the nearest whole number
4. Store numbers in your calculator's memory - so you don't make an error due to rounding
5. Missing out the keywords – easy, easy makes here but you need to learn them!!

P1 – Core 24th May 2017

100 quick fire P1 Questions https://youtu.be/YtmBoMjRu2Y

1. What is infrared radiation?
2. What does emit mean?
3. What is the greenhouse effect?
4. Which surfaces are the best emitters?
5. Which surfaces are the best absorbers?
6. Which surfaces are the best reflectors?
7. Solid, liquid or gas? Which two have a fixed volume?
8. Solid, liquid or gas? Which two can flow?
9. Solid, liquid or gas? Which has a fixed shape?
10. Draw the particles in a solid.
11. Draw the particles in a liquid.
12. Draw the particles in a gas.
13. What is evaporation?
14. What is condensation?
15. What is a conductor?
16. What is an insulator?
17. What do free electrons do?
18. How do convection currents work?
19. What can convection currents be used for?
20. What are the units for energy?
21. What are the units for mass?
22. What are the units for specific heat capacity?
23. What are the units for temperature?
24. What is the equation linking energy, mass, specific heat capacity and temperature?
25. What are U-values?
26. What is payback time?
27. Give three ways we can reduce energy loss from our homes?
28. What is chemical energy?
29. What is kinetic energy?
30. What is gravitational potential energy?

31. What is electrical energy?
32. What is wasted energy?
33. What energy is supplied to a light bulb?
34. What is the useful energy from a light bulb?
35. What is the wasted energy from a light bulb?
36. What happens to wasted energy?
37. What is the equation for efficiency?
38. What does a Sankey diagram show?
39. What is the standard unit for power?
40. What is the standard unit for energy?
41. What is the standard unit for time?
42. What is the equation linking power, energy and time?
43. What is the electrical appliance unit for power?
44. What is the electrical appliance unit for energy?
45. What is the electrical appliance unit for time?
46. Give an advantage of coal and oil fuelled power stations.
47. Give a disadvantage of coal and oil fuelled power stations.
48. What is carbon capture and storage (CCS)?
49. What is acid rain?
50. What is climate change?
51. Give an advantage of biofuels.
52. Give a disadvantage of biofuels.
53. Give an advantage of nuclear power.
54. Give a disadvantage of nuclear power.
55. Give an advantage of wind farms.
56. Give a disadvantage of wind farms.
57. Where are wind farms best located?
58. Give an advantage of hydroelectric power.
59. Give a disadvantage of hydroelectric power.
60. Give an advantage of solar power.
61. Give a disadvantage of solar power.
62. Give an advantage of geothermal energy.
63. Give a disadvantage of geothermal energy.
64. What is the national grid?
65. What are step up transformers?

66. What are step down transformers?
67. Why are power cables overhead and not buried underground?
68. What is 'start up time'
69. Draw a transverse wave.
70. Give an example of a transverse wave.
71. Draw a longitudinal wave.
72. Give an example of a longitudinal wave.
73. On to your transverse wave, add wavelength.
74. On to your transverse wave, add amplitude.
75. What is frequency?
76. What is the unit for frequency?
77. What is the unit for wave speed?
78. What is the unit for wavelength?
79. What if the equation linking frequency, wave speed and wavelength?
80. What is the law of reflection?
81. When does refraction occur?
82. What is diffraction?
83. How does increasing the loudness affect the amplitude?
84. How does increasing the frequency affect the pitch of a sound?
85. Fill in the gaps... Radio wave → → → → →X-rays and Gamma Rays
86. What can infrared be used for?
87. What can radio waves be used for?
88. What can microwaves be used for?
89. Why are some people hesitant about using mobile phones?
90. What can visible light be used for?
91. What can UV light be used for?
92. What can X-rays be used for?
93. What can gamma rays be used for?
94. What is the Doppler effect?
95. What is red-shift?
96. What is blue-shift?
97. What is cosmic microwave background radiation (CMBR)?
98. What is the Big Bang Theory (not the TV show)
99. What are two possible futures for our universe?
100. Are you going to do amazingly well in you exam?!?!? :D

The 10 hardest questions in P1 https://youtu.be/rLsbzZ11i7M

1. What evidence is there for the Big Bang?
2. Describe how a vacuum flask keeps liquids inside it hot
3. Explain the process of evaporation and condensation in terms of energy and particles
4. Describe how electricity gets from the power station to our homes
5. Describe the energy transfer involved in a bungee jump
6. Evaluate the ethical and environmental impacts of renewable energy and fossil fuelled power stations
7. Describe the ways that the EM spectrum can be used for communication
8. 750g of lead and 750g aluminium were both supplied with 900J of energy. Given that the specific heat capacity of lead is 130J/kg°C and the specific heat capacity of aluminium is 900J/Kg°C, and the both started at 20°C, find the final temperature for both.
9. Using examples describe what happens to wasted energy
10. Sketch a ray diagram showing how an image can be formed in a plane mirror

P1.1 Heat energy transfers

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that all objects emit and absorb infrared radiation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the temperature of an object to the amount of infrared radiation it radiates in a given time	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the colour (light or dark), and reflectivity (shiny or matt) of surfaces to how well they absorb, emit and reflect infrared radiation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise diagrams to show the difference between the particles in solids, liquids and gases, and use the kinetic theory to explain states of matter	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the energy that particles have in solids, liquids and gases	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how particles are involved in heat transfers by conduction, convection, evaporation and condensation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise from the arrangement and movement of particles whether a material is a conductor or insulator	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the free electrons in metals make them good conductors	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use the idea of particles moving apart to make a fluid less dense, to explain simple applications of convection	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use the kinetic theory to explain the cooling effect of evaporation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the factors that affect the rate of evaporation and condensation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the design of devices in terms of energy transfer (e.g. cooling fins)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the rate that heat energy is	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

transferred by an object to: surface area and volume; material; the surface the object is in contact with			
I can explain animal adaptations in terms of energy transfer (e.g. relative ear sizes of animals in cold and warm climates)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the rate of energy transfer to the temperature difference between an object and its surroundings	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare ways in which energy is transferred in and out of objects by heating and ways in which the rates of these transfers can be varied (e.g. in the design of a vacuum flask, insulating buildings)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the design of everyday appliances that transfer energy by heating, including economic considerations (e.g. radiators and heat sinks)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the U-value of a material to how effective it is as an insulator	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how solar heating panels can be used to provide hot water	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the energy transferred to a substance (E) from the mass of substance heated (m), its specific heat capacity (c) and the change in temperature (θ) using this equation: $E = m \times c \times \theta$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the effectiveness of different types of material used for insulation, including U-values and economic factors including payback times	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate different materials according to their specific heat capacity	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P1.2 Energy and efficiency

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that energy can be transferred usefully, stored, or dissipated, but cannot be created or destroyed	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that, when energy is transferred, only part of it may be usefully transferred; the rest is 'wasted'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how wasted energy is transferred to the surroundings (which become warmer), and how it becomes increasingly spread out (less useful)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the efficiency of a device using either of these equations:	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the efficiency and cost-effectiveness of methods used to reduce energy consumption, including 'payback time', given relevant data	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider methods such as low energy light bulbs and LED lighting, replacing old appliances with energy efficient ones, and making use of 'waste' energy (e.g. in heat exchangers)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the energy transfers and the main energy wastages that occur with a range of appliances, such as common electrical appliances	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret and draw Sankey diagrams and use them to calculate the efficiency of appliances	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P1.3 Using electrical energy

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can give examples of energy transfers that everyday electrical appliances are designed to bring about	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the amount of energy an appliance transfers to the time it is switched on for, and its power	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the amount of energy transferred (E) from the mains from its power (P) and the time it is switched on for (t) using the formula: $E = P \times t$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use the equation $E = P \times t$ with units in either kilowatt-hours, kilowatts and hours, OR in joules, watts and seconds	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the advantages and disadvantages of using different electrical appliances for a particular application, when provided with data	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider the implications of instances when electricity is not available	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P1.4 Generating electricity

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe how a thermal power station generates electricity by heating water to produce steam which turns a turbine coupled to a generator	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how fossil fuels, uranium, plutonium and biofuels can be used as energy sources in thermal power stations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how water (e.g. waves, tides and falling water) and wind can be used to drive turbines directly	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the advantages and disadvantages of producing electricity directly from the Sun's radiation using solar cells	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how hot water and steam rise to the surface in some volcanic areas, and how this steam can be tapped and used to drive turbines (geothermal)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe situations when small-scale production of electricity may be useful locally, although it may be uneconomical to connect it to the National Grid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the effects of different energy resources on the environment, including: the release of substances into the atmosphere, production of waste materials, noise and visual pollution, and destruction of habitats	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that carbon capture and storage is a rapidly evolving technology, and that some of the best natural containers for carbon dioxide storage are old oil and gas fields such as those in the North Sea	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate different methods of generating electricity, given data such as: start-up times, costs	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

of building, decommissioning and generation, reliability			
I can compare the start-up times for different types of fossil fuel power stations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how pumped storage can be used to meet peak demand and as a means of storing energy for later use	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify and label the essential parts of the National Grid, and outline how electricity is distributed from power stations to consumers along it	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the size of the voltage to the size of the current for a given power	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how transformers are used to reduce energy loss in the National Grid	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify where step-up and step-down transformers are used	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate ways of matching supply with demand, either by increasing supply or decreasing demand	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the advantages and disadvantages of overhead power lines and underground cables	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P1.5 Waves

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that waves transfer energy	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify waves as transverse (oscillations perpendicular to the direction of energy transfer) or longitudinal (oscillations parallel to the direction of energy transfer)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that electromagnetic waves are transverse, sound waves are longitudinal, and mechanical waves may be either transverse or longitudinal	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that all types of electromagnetic waves travel at the same speed in a vacuum	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify the order of electromagnetic waves in the electromagnetic spectrum in terms of energy, frequency and wavelength	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify areas of compression and rarefaction in longitudinal waves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe diffraction of a wave passing through a gap of similar size to the wavelength of the wave	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that waves can be reflected and refracted	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how waves are refracted at an interface, except when they are travelling along the normal	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the speed of a wave (v, in m/s) from its frequency (f, in Hz) and wavelength (λ, in m) using the wave equation: $v = f \times \lambda$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how radio waves, microwaves, infra-red and visible light may be used for communication, and identify any associated hazards	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the use of different types of waves for communication	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can evaluate the possible risks involving the use of mobile phones	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can draw and recognise diagrams showing rays of light reflecting, including the normal line (an imaginary line perpendicular to the point of incidence)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state the law of reflection: "angle of incidence equals angle of reflection"	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe images produced in a mirrors as virtual, upright and laterally inverted	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can draw ray diagrams to show how virtual images are formed in mirrors	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe sound waves as longitudinal waves that cause vibrations in a medium that can be detected as sound by the ear	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the pitch of a sound to its frequency, and the loudness of a sound to its amplitude	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe echoes as reflections of sounds	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the Doppler effect as it applies to light, sound or microwaves	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the observed wavelength and frequency to the speed at which a source is moving away from or towards an observer	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the link between the distance of galaxies and their observed red-shift	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the observed red-shift provides evidence that the universe is expanding and supports the 'Big Bang' theory (that the universe began from a very small initial point)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe cosmic microwave background radiation (CMBR) as a form of electromagnetic radiation filling the universe that comes from radiation that was present shortly after the beginning of the universe, and that the Big Bang theory explains the existence of CMBR	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can consider the limitations of the model that scientists use to explain how the universe began and why the universe continues to expand	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P2 – Additional 16th June 2017

130 quick fire P2 Questions https://youtu.be/RAPHlBM2lHQ

1. What is the unit for speed?
2. What is the unit for distance?
3. What is the unit for time?
4. What is the equation linking speed, distance and time?
5. What is the difference between speed and velocity?
6. What does a flat line on a distance-time graph show?
7. What does an upward line on a distance-time graph show?
8. How can we work out speed from a distance time graph?
9. What is the unit for acceleration?
10. What equation can be used to find acceleration?
11. What does a flat line on a velocity-time graph show?
12. What does an upward line on a velocity-time graph show?
13. From a velocity-time graph how can we work out the distance travelled?
14. What is the unit for force?
15. What is the unit for mass?
16. What is the equation linking mass, force and acceleration?
17. What is resultant force?
18. How is an object moving if the resultant force is zero?
19. What two parts make up stopping distance?
20. What forces act against the forward movement of an object?
21. Give three things that affect thinking distance.
22. Give three things that affect braking distance.
23. What is the unit for weight?
24. What is the value and unit for gravity?
25. What is the equation linking weight, gravity and mass?
26. What is terminal velocity?
27. What is the unit for the spring constant?
28. What is Hooke's Law?
29. What is the unit for work done?

30. What is the equation linking distance, work done and force?
31. What is the unit for gravitational potential energy?
32. What is the equation to find an objects gravitational potential energy?
33. What is the unit for power?
34. What is the unit for energy?
35. What is the equation inking time, energy and power?
36. What is the unit for kinetic energy?
37. What is the equation to find kinetic energy?
38. What is the unit for momentum?
39. What is the equation to calculate momentum?
40. What is the Law of Conservation of Momentum?
41. How does increasing impact time affect the force?
42. Where can we find protons and neutrons?
43. Where can we find electrons?
44. What is the charge on a proton?
45. What is the charge on a neutron?
46. What is the charge on an electron?
47. Draw the symbol for a cell
48. Draw the symbol for a switch
49. Draw the symbol for a bulb
50. Draw the symbol for a diode
51. Draw the symbol for a LED
52. Draw the symbol for a ammeter
53. Draw the symbol for a resistor
54. Draw the symbol for a variable resistor
55. Draw the symbol for a fuse
56. Draw the symbol for a heater
57. Draw the symbol for a voltmeter
58. What is the unit for current?
59. What is the unit for potential difference?
60. What is the unit for charge?
61. What is the equation linking charge, time and current?
62. What is the equation linking charge, work done and potential difference?
63. What is the unit for resistance?
64. What is the equation linking current, resistance and potential difference?

65. How should an ammeter be connected?
66. How should a voltmeter be connected?
67. What is Ohm's Law?
68. Draw the current-potential difference graph for a filament lamp
69. Draw the current-potential difference graph for a diode
70. Draw the current-potential difference graph for a thermistor
71. Draw the current-potential difference graph for a LDR
72. In a series circuit how does the current change between each component?
73. In a parallel circuit how does the current change between each component?
74. In a series circuit how is the resistance calculated?
75. In a parallel circuit how is the resistance calculated?
76. What is dc?
77. What is ac?
78. What is the frequency of main electricity in the UK?
79. What does an oscilloscope do?
80. Sketch the inside of a plug showing the location of the 3 wires
81. What are plug sockets made of plastic?
82. Why are mains electricity cables surrounded in plastic?
83. What does the earth wire do?
84. How does a fuse work?
85. How does an RCCB work?
86. What is the advantage of and RCCB over a fuse?
87. What is the equation linking power, current and potential difference?
88. What is the equation linking potential difference, charge and energy?
89. What are the 3 types of radiation?
90. What is the symbol for alpha radiation?
91. What is alpha radiation also known as?
92. What is an alpha particle made up of?
93. What is the symbol for beta radiation?
94. What is beta radiation also known as?
95. Give two sources of background radiation
96. Where are protons?
97. Where are neutrons?
98. Where are electrons?
99. What is the mass of a proton?

100. What is the mass of an electron?
101. What is the mass of a neutron?
102. What is the charge on a proton?
103. What is the charge on a neutron?
104. What is the charge on an electron?
105. How can we tell the mass of an element?
106. How can we tell how many protons an element has?
107. How can we tell how many neutrons an element has?
108. What is an isotope?
109. What is left after Th-228 has undergone alpha decay?
110. What is left after Th-228 has under gone beta decay?
111. What is an alpha particle range in air?
112. What can stop an alpha particle?
113. What is a beta particle range in air?
114. What can stop a beta particle?
115. What is a gamma radiation's range in air?
116. What can stop a gamma radiation?
117. What is half-life?
118. Why doesn't radioactivity decay at a constant rate?
119. Give a use for alpha radiation
120. Give a use for beta radiation
121. Give a use for gamma radiation
122. What is carbon dating?
123. What is nuclear fission?
124. What is nuclear fusion?
125. Give the life cycle of a low mass star
126. Give the life cycle of a high mass star
127. What is main sequence star?
128. Describe the forces inside a main sequence star
129. How are heavy elements formed?
130. Are you going to do amazingly well in your physics exam? ☺

The 10 hardest questions in P2 https://youtu.be/ek_DtGRlZGA

1. Describe how the forces change on a parachutist as they are falling.
2. A climber, who has a mass of 75Kg, climbs to the top of a cliff (150m) and bungee jumps off. Find her velocity.
3. Describe the life cycle of a star bigger than our sun.
4. Compare the current and potential difference in series and parallel circuits.
5. Sophia (mass 47Kg) is travelling to the right with a velocity of 7.2m/s and Neesha (mass 68Kg) is travelling to the left with a velocity 4.8m/s. When they meet, they hold hands and travel off together. Give their final velocity and direction.
6. Give the final product when Pb-207 undergoes the following decay series, alpha, alpha, beta, alpha, beta.
7. Primrose leaves our house and travels for 5 minutes at 3m/s, she then pauses for 1 minute to see where she is. She spots a bird and spends 2 minutes chasing it at 5m/s, once she has it she spends 3 minutes dragging it home at a rate of 1.5m/s. Draw a velocity time graph and calculate the distance she has travelled.
8. When a 4N weigh is attached to the end of a spring it extends 62cm, find the spring constant and explain Hooke's Law
9. A car is travelling at 27m/s and with 3 passengers (and 1 kitten) it weighs 1200N, a hedgehog waddles into the road and the brakes are applied. The car travels 17m before stopping to let the hedgehog finish crossing the road safely. How much work is needed to be done by the breaks for the car to stop?
10. Explain how Rutherford and Marsden came up with the nuclear model of the atom

P2.1 Forces and their effects

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe equal and opposite pairs of forces	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe and calculate resultant forces	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can predict how resultant forces (zero or not zero) will affect the motion of stationary and moving objects	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate acceleration (a) using force (F) and mass (m), or calculate force using mass and acceleration	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can remember what the gradient of a distance-time graph represents	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can calculate speed of an object from gradient of a distance-time graph	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define 'velocity'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate acceleration (a) from final velocity (v), initial velocity (u) and time taken (t)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can remember what the gradient of a velocity-time graph represents	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can calculate the acceleration of an object from the gradient of a velocity-time graph	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the forces acting on a car travelling at a steady speed	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the relationship between the speed of a vehicle and the braking force needed to stop it in a certain distance	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the stopping distance as the sum of the thinking distance and the braking distance	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the effects of alcohol and drugs on stopping distances	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how work is done by friction to reduce the kinetic energy of the vehicle and heat up the brakes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can describe the relationship between the speed of an object (in a fluid) affects the frictional force (drag) acting on it	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the forces change on falling objects, and why a parachute reduces a skydiver's terminal velocity	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can draw and interpret velocity-time graphs for falling objects, and consider the forces acting on them	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the weight (W) of an object using mass (m) and gravitational field strength (g)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how forces applied to elastic objects like springs will result in the objects stretching and storing elastic potential energy	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how elastic potential energy is stored when work is done on objects that return to their original shapes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the force (F) acting on a spring from the spring constant (k) and its extension (e)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P2.2 Kinetic energy of moving objects

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe 'work done' in terms of forces causing objects to move	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the kinetic energy of an object increases or decreases when its speed changes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate work done (W) from force (F) and distance moved in a direction (d)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that energy is transferred when work is done, for example against frictional forces	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the benefits of different types of braking system, such as regenerative braking	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate Power (P) from work done or energy transferred (E) and time (t)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate gravitational potential energy (Ep) from mass (m), gravitational field strength (g) and change in height (h)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate kinetic energy of an object (Ek) from its mass (m) and speed (v)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P2.3 Currents in electrical circuits

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe how some insulating materials can become electrically charged	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how this charge (positive or negative) depends on the material losing or gaining electrons	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the forces exerted by electrically charged objects on each other	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that electrical charges can move easily through some substances (e.g. electrons moving through metals, or ions moving through a solution)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe an electric current as flow of electric charge	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the size of an electric current (I) from charge (Q) and time (t)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe potential difference (voltage) as the work done per coulomb of charge as it passes between two points	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the potential difference (V) from work done (W) and charge (Q)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise circuit symbols	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how thermistors are use in circuits (e.g. in thermostats)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how LDRs are used in circuits (e.g. switching lights on in the dark)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise and sketch the current-potential difference graph for a resistor at a constant temperature	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise and sketch the current-potential difference graph for a filament bulb	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain how the resistance changes in terms of ions and electrons	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise and sketch the current-potential difference graph for a diode	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can describe how to find the resistance of a component by measuring the current through, and the potential difference across, the component	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the relationship between the current through and potential difference across a resistor (at a constant temperature) as directly proportional	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate potential difference (V) using current (I) and resistance (R)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the potential difference of a number of cells connected in series	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the resistance of a number of components connected in series	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe and predict the current through and potential difference across components connected in series and parallel circuits	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why light emitting diodes (LEDs) are increasingly popular	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the resistance of an LDR changes as light intensity changes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the resistance of a thermistor changes as the temperature changes	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can apply the principles of basic electrical circuits to practical situations	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the use of different forms of lighting, in terms of cost and energy efficiency (e.g. filament bulbs, fluorescent bulbs and LEDs)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P2.4 Mains electricity and power

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can understand the principles of safe practice and recognise dangerous practice in the use of mains electricity	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the difference between direct current (d.c.) and alternating current (a.c.)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare and calculate the potential differences of d.c. supplies and the peak potential difference of a.c. supplies from diagrams of oscilloscope traces	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can determine the period and therefore the frequency of a supply from diagrams of oscilloscope traces	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can remember the frequency and peak potential difference of the UK mains electricity supply	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the structure of two-core and three-core electrical cable	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can valuate and explain the need to use different cables for different appliances	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the structure and materials used in a three-pin plug and explain how to wire one safely	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the role of fuses or circuit breakers in disconnecting circuits if an electrical fault causes the current to become too great	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how a fuse disconnects a circuit if the current exceeds the rating of the fuse	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the uses of fuses and circuit breakers Remember that residual current circuit breakers (RCCBs) work by detecting a difference in the current between the live and neutral wires	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the earth wire and fuse together protect the wiring of the circuit in	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

appliances with metal cases (unless they are double insulated)			

P2.5 Radioactive decay: uses and risks

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can describe, recognise and draw the basic structure of an atom	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how results from the Rutherford and Marsden scattering experiments led to the 'plum pudding' model being replaced by the nuclear model	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can appreciate that new evidence can cause theories to be re-evaluated	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can appreciate that, according to the nuclear model, most of the atom (and therefore most of any form of matter) is empty space	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the relative masses and relative electric charges of protons, neutrons and electrons	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the numbers of protons and electrons in atoms, and explain why they have no overall electrical charge	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how atoms may lose or gain electrons to become ions	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define 'isotope'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define 'atomic number'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define 'mass number'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P2.6 Nuclear fission and nuclear fusion

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can identify the two main fissionable substances commonly used in nuclear reactors	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define 'nuclear fission' and describe what must first happen to the nucleus of an atom for fission to occur	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe what happens when a nucleus undergoes fission	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe or sketch a diagram to show how a chain reaction can happen	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how nuclear fission can be used to generate electricity in a nuclear power station	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define 'nuclear fusion' and identify it as the process that releases energy in stars	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why the early universe contained only hydrogen but now contains a large variety of different elements (but still mainly hydrogen)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the formation of stars and planets	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why stars are stable during the 'main sequence' periods of their life cycles, in terms of the forces within them	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the life cycle of stars of different sizes (see below)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how fusion processes produce all of the elements heavier than hydrogen, and how they can be distributed throughout the universe	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can recognise which elements can be formed in stars, and which elements are formed in supernovae	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the uses of nuclear fusion and nuclear fission in generating electricity	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P3 – Physics or Further Additional 16th June 2017

80 quick fire P3 Questions

1. What can X-rays be used for?
2. What is a problem with using X-rays?
3. What is a CT scan?
4. What is an advantage of using a CT scanner?
5. What is a disadvantage of a CT scanner?
6. What is ultrasound?
7. What can ultrasound be used for?
8. What is an advantage of using ultrasound?
9. What is a disadvantage of using ultrasound?
10. What happens when the ultrasound wave hits a boundary?
11. What unit is distance measured in?
12. What unit is time measured in?
13. What unit is speed measured in?
14. What is the equation linking distance, speed and time?
15. What can an oscilloscope show us?
16. Give two things ultrasound can be used for?
17. What is refractive index?
18. What is the critical angle?
19. How can we use the angle of incidence and the angle of refraction to find the critical angle?
20. What are the 2 type of lenses?
21. What is the line called that passes through the middle of a lens?
22. What is the point called where all the rays converge?
23. How do you work out magnification?
24. What does the cornea do?
25. What does the retina do?
26. What does he pupil do?
27. What does the lens do?
28. What do the suspensory ligaments do?
29. What do the ciliary muscles do?

30. Give three ways an eye is similar to a camera
31. What is a possible cause of short-sightedness?
32. What is a possible cause of long-sightedness?
33. What type of lens can correct short-sightedness?
34. What type of lens can correct long-sightedness?
35. What unit if lens power measured in?
36. Give the equation linking lens power and focal length
37. When does total internal reflection occur?
38. What is a possible use for TIR?
39. What is an advantage of an endoscope?
40. How can the critical angle be used to work our refractive index?
41. How can you work out the centre of mass for a regular shaped object?
42. How can you work out the centre of mass for an irregular shaped object?
43. What unit is frequency measured in?
44. Give the equation that can be used to work out the time period for a pendulum
45. How does changing the length of a pendulum affect the time taken for a swing?
46. What two things can increase the stability of an object?
47. What is the unit for force?
48. What is the unit for distance?
49. What is the unit for moment?
50. What is the equation lining moment, distance and force?
51. Why are levers force multipliers?
52. If the total anticlockwise moment and the total clockwise moment are balanced, what will happen to the movement of the object?
53. Why are liquids used in hydraulic systems?
54. Give one use for a hydraulic system.
55. What is the unit for pressure?
56. What is the unit for area?
57. What is the equation linking pressure, force and area?
58. Define speed
59. Define velocity
60. Define acceleration
61. Describe how an object can be accelerating while going at a steady speed.
62. Which way do the forces act when an object is moving in a constant circle?
63. What three things affect centripetal force?

64. Which way do the magnetic field lines go?
65. Using Fleming's Left Hand Rule, what does the thumb represent?
66. Using Fleming's Left Hand Rule, what does the first finger represent?
67. Using Fleming's Left Hand Rule, what does the second finger represent?
68. How can the force on a wire be changed?
69. What is the motor effect?
70. What is electromagnetic induction?
71. What does a transformer do
72. In a step-up transformer what is the difference between the primary and secondary coils?
73. In a step-down transformer what is the difference between the primary and secondary coils?
74. What is the unit for potential difference?
75. Give the equation linking potential difference and number of turns
76. What is the unit for current?
77. What is the equation that links the potential difference across the primary and secondary coils to the current across the primary and secondary coils?
78. What type of transformer is in a mobile phone charger?
79. What is an advantage of switch-mode transformers?
80. Are you going to do amazingly well in your GCSE?? :D

The 10 hardest questions in P3 https://youtu.be/PIOwMIkj9Ug

1. Describe the causes of long and short sightedness and how to correct them
2. Describe how ultrasound can be used to give an image of a foetus.
3. Construct a ray diagram for a diverging lens, where the object is sitting above the axis and is between F and 2F
4. Describe how a transformer works.
5. If a transformer has 35 turns on the primary coil, and a current of 17amps, its secondary coil has 65 turns and a voltage of 200V. Find the current across the secondary coil and the voltage across the primary coil.
6. Explain how an electromagnet can be used in a starter motor.
7. a) explain how you can be accelerating while going at a constant speed. (3 marks) b) list the three things that affect centripetal force (3 marks)
8. If Primrose has a weighs 18N and is 3m from the centre of a seesaw, how far away does Trig have to be if he weighs 35N.
9. Explain how pressure can be transmitted in a hydraulics system.
10. Describe how to find the centre of mass of an irregular shaped object.

P3.1 Medical applications of physics

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can compare the wavelength of X-rays to the diameter of an atom	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how X-rays affect photographic film, and how they interact with bone and tissue	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline some uses of X-rays for diagnosis and treatment of some medical conditions (including charge-coupled devices, or CCDs)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the precautions that needed when using X-ray machines and CT scanners	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define 'ultrasound' in relation to the range of human hearing	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how ultrasound waves can be partially reflected when they meet a boundary between one medium and another, and how the time taken for reflections to reach a detector can be used	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the distance between interfaces in various media using: $s = v \times t$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can use data from oscilloscope traces in the above equation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can give examples of how ultrasound waves can be used in medicine	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the medical use of ultrasound and X-rays	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate advantages and disadvantages of using ultrasound, X-rays and CT scans	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'refraction' and state that a lens forms an image by refracting light	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the effect of a convex or converging lens on parallel rays of light	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can define the term 'focal length'	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can calculate the refractive index using angles of incidence (*i*) and refraction (*r*)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the nature of an image is defined by its size relative to the object, whether it is upright or inverted and whether it is real or virtual	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the nature of images produced by a converging lens for an object placed at different distances to the lens	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the use of converging lenses as magnifying glasses	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the nature of an image produced by a concave or diverging lens	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can construct ray diagrams to show the formation of images by converging and diverging lenses, and complete such diagrams drawn on graph paper	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can draw and interpret ray diagrams in order to determine the nature of the image	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the structure of the eye, including the functions of the retina, lens, cornea, pupil/iris, ciliary muscle and suspensory ligaments	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how long sight and short sight are causes, and how convex and concave lenses can be used to correct such vision to produce an image on the retina	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can evaluate the use of different lenses for the correction of defects of vision	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the range of vision in terms of near point and far point, including distances	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the structure of the eye with a camera	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the power (*P*, expressed in dioptres, D) of a lens using the equation: $P = 1 / f$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how the focal length of a lens is determined using the refractive index of the material and the curvature of the two surfaces of the lens	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can relate the flatness of a lens to its refractive index, allowing for thinner lenses	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can describe total internal reflection and explain what is meant by 'critical angle' (c)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can calculate refractive index as $1 / \sin c$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can give examples of how visible light can be sent along optical fibres	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P3.2 Using physics to make things work

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can define the term 'centre of mass' and describe how to find the centre of mass of a thin, irregular sheet of a material	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe what will happen to an object that is freely suspended	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that the centre of mass of a symmetrical object is along the axis of symmetry	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate periodic time (T) for a pendulum using $T = 1 / f$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that the time period of a pendulum depends on its length	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe 'moment' as the turning effect of a force	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the size of a moment (M) using $M = F \times d$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain why an object is not turning, in terms of clockwise and anticlockwise moments	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can calculate the size of a force or distance from pivot, acting on a balanced object	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the use of simple levers as force multipliers	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
(HT) I can explain why a body will tend to topple if the line of action of the weight of an object lies outside the base of the object, because their will be a resultant moment	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can analyse the stability of objects by evaluating	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

their tendency to topple, using a range of laboratory equipment to model real-life situations, such as cranes			
I can explain how width of base and position of centre of mass affect the stability of an object	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that liquids are virtually incompressible, and the pressure in a liquid is therefore transmitted equally in all directions (to all other points in the liquid)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain how a hydraulic system can be used as a force multiplier when there are different cross-sectional areas on the effort and load side of the system	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can calculate the pressure in different parts of a hydraulic system using $P = F \times A$	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain that an object moving in a circle continuously accelerates towards the centre of the circle, which changes the direction of motion but not the speed of the object	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the resultant force as the centripetal force, which is always directed towards the centre of the circle, and identify which force(s) provide(s) the centripetal force in a given situation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how the centripetal force needed to make an object perform circular motion increase as: the mass increases, the speed increases, the radius of the circle increases	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret and evaluate data on objects moving in circular paths, remembering that the centripetal force does not exist in its own right, but is always provided by something else (such as gravitational force, friction or tension)	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

P3.3 Keeping things moving

Specification statement These are the bits the exam board wants you to know, make sure you can do all of these…	**First review** 4-7 months before exam	**Second review** 1-2 months before exam	**Final review** Week before exam
I can state that a magnetic field is produced around a wire when a current flows through it	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can give examples of applications of electromagnets, such as cranes for lifting iron/steel	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe the principle of the motor effect and its use in any given situation	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how the motor effect creates movement in electric motors	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain two ways that the size of the force can be increased	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that a conductor will not experience a force if it is parallel to the magnetic field	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can identify the direction of the force using Fleming's left-hand rule	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that the direction of the force is reversed if either the direction of the current or the direction of the magnetic field is reversed	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can interpret diagrams of electromagnetic appliances in order to explain how they work	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how a potential difference is induced across the ends of an electrical conductor when it 'cuts' through a magnetic field	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can describe how a potential difference is induced across the ends of a coil if a magnet is moved into a coil of wire	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline the basic structure of a transformer	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can outline how an alternating current in the primary coil produces a changing magnetic field in the iron core and hence in the secondary coil, which in turn induces an alternating potential difference across the ends of the secondary coil	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹

I can compare the potential difference across the primary and secondary coils in step-up and in step-down transformers	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate the potential difference across the primary and secondary coils of a transformer	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can relate electrical power input and output for transformers, assuming they are 100% efficient	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that switch mode transformers operate at a high frequency, often between 50 kHz and 200 kHz	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can explain the advantages of switch mode transformers working from a 50 Hz mains supply in terms of size and weight, and why this makes them useful for applications such as mobile phone chargers	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can state that switch mode transformers use very little power when they are switched on but no load is applied	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹
I can compare the use of different types of transformer for a particular application. Examples might include mobile phones chargers and power supplies for laptops	☺ 😐 ☹	☺ 😐 ☹	☺ 😐 ☹