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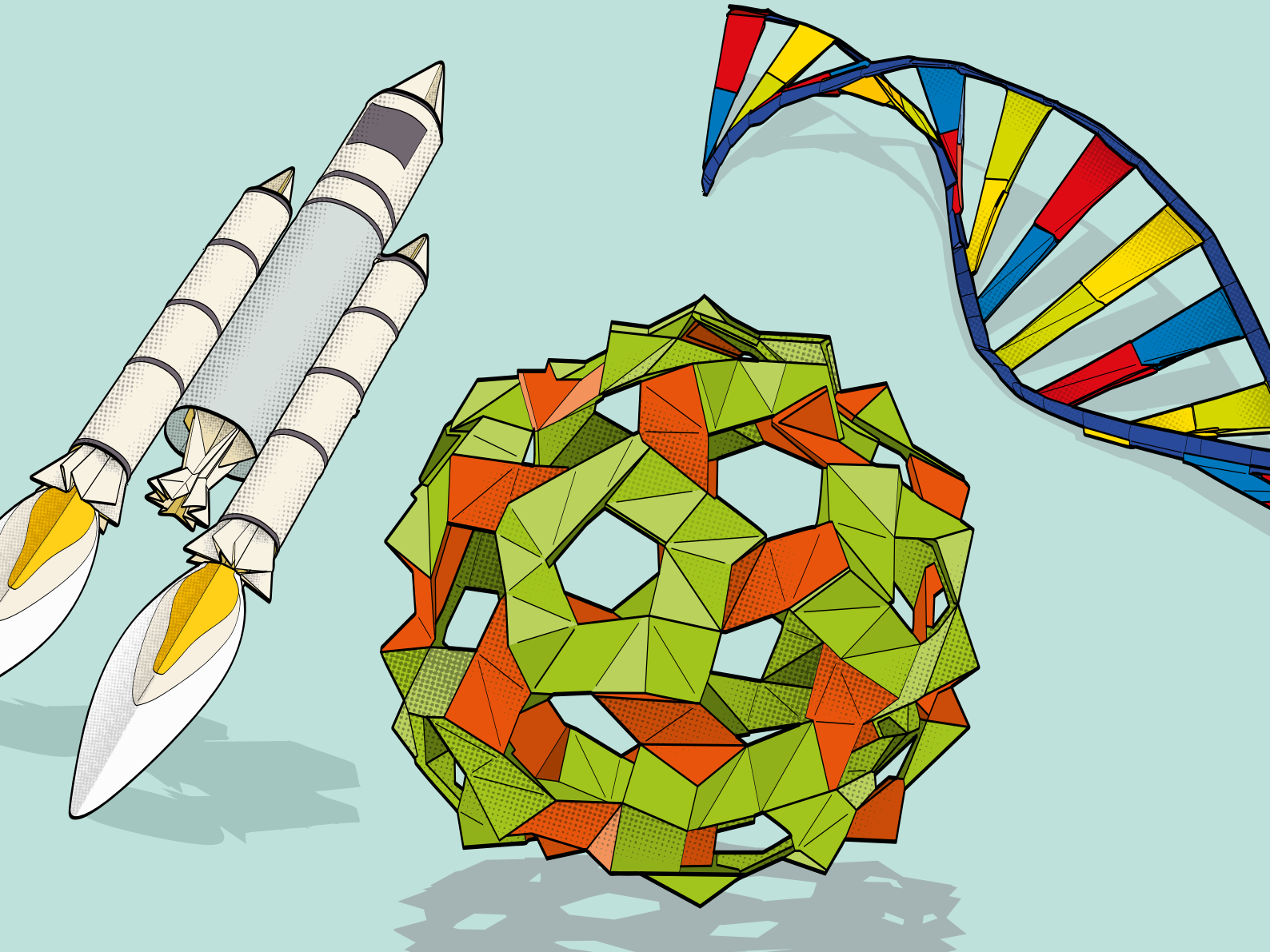

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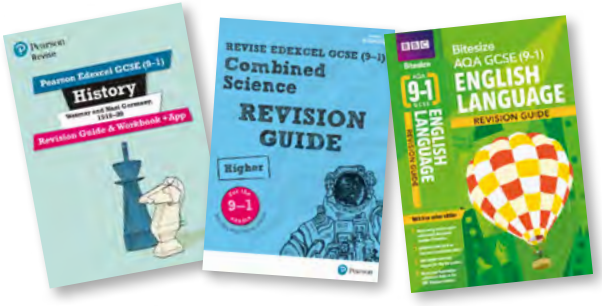

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About the Knowledge check

The Knowledge check can be used to support your progress as you transition to A level. Whether you're looking for ways to test your skills or spot potential knowledge gaps, this Knowledge check will be perfect for you.

These activities have come from our Pearson Edexcel Grades 7-9 Revision & Practice titles, the perfect companions to help you nail the knowledge and skills you need in Biology, Chemistry and Physics:

- **Expert advice** to help you get to grips with the tougher exam questions.
- **Worked examples** and fully worked answers to show you what the best answers will look like.
- **Plenty of opportunity** to practise the more challenging exam-style questions.
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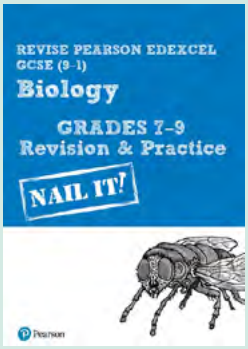
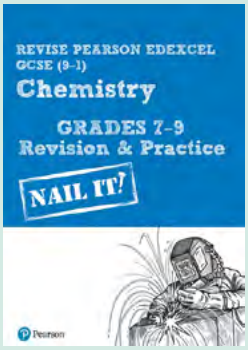
Have a look at the sample pages from page 19 onward and feel free to browse our Revision & Practice titles on our website:



REVISE Pearson Edexcel GCSE (9-1) Biology Grades 7-9 Revision & Practice

(ISBN 9781292294261)



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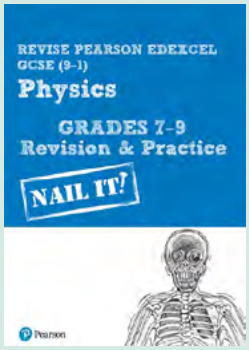

REVISE Pearson Edexcel GCSE (9-1) Physics Grades 7-9 Revision & Practice

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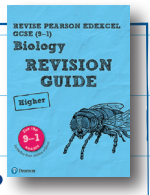
Knowledge check

If you are aiming for a top grade, you need to be confident with core skills and knowledge, such as knowing about cell structure, being able to name the parts of the eye and knowing how disease is spread. Take this quick quiz to find out which skills and knowledge you might need to brush up on before tackling the topics in this book.
Answers are on page 66.

Revise core skills



Use the **Revise Pearson Edexcel GCSE (9–1) Biology Revision Guide** if you need to revise any of the core skills. The green arrows tell you which pages in the Guide to look at for more help with each of the topics covered in the quiz.

1,2 **1.** Which of these cells does not contain a nucleus?

- ☐ **A** plant cell
- ☐ **B** bacterial cell
- ☐ **C** animal cell
- ☐ **D** algal cell

1 **2.** Which cell structure carries out respiration?

.....

1 **3.** Which cell structure is found in plant cells but not animal cells?

- ☐ **A** cell wall
- ☐ **B** cell membrane
- ☐ **C** mitochondrion
- ☐ **D** ribosome

3 **4.** What is the magnification of a microscope when using a ×5 eyepiece and a ×40 objective?

- ☐ **A** ×8
- ☐ **B** ×20
- ☐ **C** ×100
- ☐ **D** ×200

4 **5.** What is 1 micrometre written in standard form?

- ☐ **A** 1×10^{-2} m
- ☐ **B** 1×10^{-3} m
- ☐ **C** 1×10^{-6} m
- ☐ **D** 1×10^{-9} m

7,9 **6.** Why are enzymes called catalysts?

.....

9 **7.** Which subunits are proteins synthesised from?

- ☐ **A** amino acids
- ☐ **B** sugars
- ☐ **C** carbohydrates
- ☐ **D** fatty acids and glycerol

10 **8.** Which reagent is used to test for the presence of protein in food?

- ☐ **A** iodine solution
- ☐ **B** Benedict's reagent
- ☐ **C** biuret reagent
- ☐ **D** ethanol

11 **9.** What does a calorimeter measure?

.....

12

10. A cell is placed in a solution that has a lower solute concentration. In which direction will diffusion of solute molecules occur?

- ☐ **A** out of the cell into the solution
- ☐ **B** into the cell from the solution
- ☐ **C** in both directions at once
- ☐ **D** no diffusion will take place

12

11. How do water molecules enter a plant?

- ☐ **A** osmosis into root hair cells
- ☐ **B** active transport into root hair cells
- ☐ **C** diffusion into leaf cells
- ☐ **D** osmosis into leaf cells

19

12. Which part of the brain controls basic functions such as heart and breathing rate?

- ☐ **A** cerebral hemispheres
- ☐ **B** cerebellum
- ☐ **C** medulla oblongata
- ☐ **D** all of the above

21

13. Which type of neurone is only found in the brain and spinal cord (CNS)?

.....

21

14. Which part of a neurone insulates it from other neurones?

.....

23

15. Which part of the eye changes shape to focus a near object clearly?

- ☐ **A** the cornea
- ☐ **B** the iris
- ☐ **C** the lens
- ☐ **D** the retina

27

16. In which cells does meiosis take place?

- ☐ **A** all body cells
- ☐ **B** embryonic stem cells
- ☐ **C** gametes
- ☐ **D** gamete-producing cells

28

17. What links the two strands in a molecule of DNA?

- ☐ **A** bonds between sugars on each strand
- ☐ **B** bonds between phosphates on each strand
- ☐ **C** bonds between bases on each strand
- ☐ **D** no bonds, the strands just coil together

28

18. What is the definition of a genome?

.....

29

19. Which cell structure is important in protein synthesis?

- ☐ **A** mitochondrion
- ☐ **B** cytoplasm
- ☐ **C** ribosome
- ☐ **D** chloroplast

31

20. What is an allele?

.....

32

21. If R is the allele for red flowers and r is the allele for white flowers, what colour will the flowers be for a plant that is Rr (assuming no codominance)?

.....

36 **22.** Which of these human characteristics is caused by genetic variation?

- ☐ **A** length of trimmed fingernails
- ☐ **B** dyed hair colour
- ☐ **C** shape of face
- ☐ **D** none of the above

39 **23.** What causes natural selection?

- ☐ **A** humans choosing which organisms to breed
- ☐ **B** evolution
- ☐ **C** variation in survival due to the environment
- ☐ **D** genetic variation between species

43 **24.** Which process modifies an organism's genome to introduce a useful characteristic?

- ☐ **A** tissue culture
- ☐ **B** selective breeding
- ☐ **C** asexual reproduction
- ☐ **D** genetic engineering

49 **25.** What is the definition of a pathogen?

- ☐ **A** all bacteria
- ☐ **B** all bacteria and viruses
- ☐ **C** any kind of microorganism
- ☐ **D** a disease-causing microorganism

51 **26.** How is tuberculosis spread?

.....

53 **27.** Which of these is a chemical defence of the body?

- ☐ **A** mucus
- ☐ **B** lysozyme
- ☐ **C** skin
- ☐ **D** cilia

51 **28.** Which type of disease can be treated with antibiotics?

.....

63 **29.** What are BMI and waist : hip ratio used to assess?

.....

68 **30.** Which gas is a product of photosynthesis?

.....

69 **31.** Which of these factors will not limit the rate of photosynthesis?

- ☐ **A** light intensity
- ☐ **B** carbon dioxide concentration of air
- ☐ **C** oxygen concentration of air
- ☐ **D** temperature

71 **32.** Which tissue carries dissolved sucrose around a plant?

.....

77 **33.** What controls phototropism in plants?

- ☐ **A** auxin
- ☐ **B** gibberellin
- ☐ **C** ethene gas
- ☐ **D** gravity

80 **34.** How are hormones transported in the human body?

.....

83 **35.** Where are the sex hormones LH and FSH produced?

- ☐ **A** ovaries
- ☐ **B** testes
- ☐ **C** pituitary
- ☐ **D** thyroid

87

36. Which gland produces the hormones which control blood glucose concentration?

- ☐ **A** pancreas
- ☐ **B** thyroid
- ☐ **C** adrenal
- ☐ **D** pituitary

90

37. Which hormone is involved in osmoregulation?

- ☐ **A** insulin
- ☐ **B** glucagon
- ☐ **C** thyroxine
- ☐ **D** ADH

94

38. In humans, which structure has a large surface area for gas exchange between the air and blood?

.....

96

39. Which component of blood causes blood to clot?

- ☐ **A** platelets
- ☐ **B** red blood cells
- ☐ **C** white blood cells
- ☐ **D** plasma

98

40. Which chamber of the heart has the thickest muscular wall and pumps blood to most of the body?

- ☐ **A** left atrium
- ☐ **B** left ventricle
- ☐ **C** right atrium
- ☐ **D** right ventricle

100

41. What is the product of anaerobic respiration in muscle cells?

.....

104, 105

42. Which of these is a biotic factor of the environment?

- ☐ **A** light intensity
- ☐ **B** competition
- ☐ **C** temperature
- ☐ **D** water availability

106

43. Which type of dependent relationship benefits both partner species?

.....

109

44. Which trophic level feeds on herbivores?

- ☐ **A** producers
- ☐ **B** primary consumers
- ☐ **C** secondary consumers
- ☐ **D** tertiary consumers

113

45. Which group of organisms causes decay of dead plants and animals?

- ☐ **A** pathogens
- ☐ **B** decomposers
- ☐ **C** parasites
- ☐ **D** animal vectors

115

46. Why do farmers add fertilisers to soil where crop plants grow?

- ☐ **A** they contain nutrients that plants need
- ☐ **B** they prevent damage to crops by pests
- ☐ **C** they kill fungal pathogens
- ☐ **D** they kill weed plants

116

47. Which organism indicates the presence of pollution in water?

- ☐ **A** bloodworm
- ☐ **B** blackspot fungus
- ☐ **C** lichen
- ☐ **D** stonefly

Answers

Extended response questions

In your exam, your answers to 6-mark questions will be marked on how well you present and organise your response, not just on the scientific content. Your responses should contain most or all of the points given in the answers below, but you should also make sure that you show how the points link to each other, and structure your response in a clear and logical way.

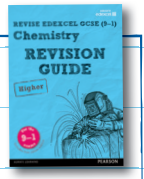
2–5. Knowledge check

1. B
2. mitochondrion
3. A
4. D
5. C
6. They speed up a reaction.
7. A
8. C
9. energy released from something by burning
10. A
11. A
12. C
13. relay neurone
14. myelin sheath
15. C
16. D
17. C
18. All the genes of an organism.
19. C
20. A version of a gene.
21. red
22. C
23. C
24. D
25. D
26. By (breathing in) bacteria in droplets of mucus coughed out by an infected person.
27. B
28. bacterial infection
29. The risk of developing cardiovascular disease.
30. oxygen
31. C
32. phloem
33. A
34. in blood
35. C
36. A
37. D
38. alveolus / alveoli
39. A
40. B
41. lactic acid
42. B
43. mutualistic / mutualism
44. C
45. B
46. A
47. A

Knowledge check

If you're aiming for a top grade, you need to be confident with core skills and knowledge, such as knowing about atomic structure, being able to balance equations and carry out mole calculations. Take this quick quiz to find out which skills you might need to brush up on before tackling the trickier topics. Answers are on page 70.

Revise core skills



Use the **Revise Pearson Edexcel GCSE (9–1) Chemistry Revision Guide** if you need to revise any of the core skills. The green arrow tell you which page in the Guide to look at for more help with each of the topics covered in the quiz.

2 **1.** Hydrogen and oxygen react to form water. What is the balanced equation for this reaction?

- ☐ **A** $2H + O \rightarrow H_2O$
- ☐ **B** $H_2 + O \rightarrow H_2O$
- ☐ **C** $H_2 + O_2 \rightarrow 2H_2O$
- ☐ **D** $2H_2 + O_2 \rightarrow 2H_2O$

3 **2.** Silver nitrate solution reacts with sodium iodide solution to form a precipitate of silver iodide and sodium nitrate solution. What is the **ionic** equation for this reaction?

- ☐ **A** $AgNO_3(aq) + NaI(aq) \rightarrow AgI(s) + NaNO_3(aq)$
- ☐ **B** $Ag^+(aq) + NaI(aq) \rightarrow AgI(s) + Na^+(aq)$
- ☐ **C** $Ag^+(aq) + I^-(aq) \rightarrow AgI(s)$
- ☐ **D** $Na^+(aq) + NO_3^-(aq) \rightarrow NaNO_3(aq)$

7 **3.** Complete this sentence.
The elements in the periodic table are arranged in order of increasing

.....

10 **4.** How many electrons are there in the aluminium ion $^{27}_{13}Al^{3+}$?

- ☐ **A** 10
- ☐ **B** 16
- ☐ **C** 24
- ☐ **D** 30

11 **5.** What is the name of the compound with the formula $KClO_3$?

.....

12 **6.** When do ionic compounds conduct electricity?

- ☐ **A** in aqueous solution only
- ☐ **B** in the solid state only
- ☐ **C** in aqueous solution and when molten
- ☐ **D** in the solid state and when molten

13 **7.** Carbon is in group 4 of the periodic table. How many covalent bonds can carbon atoms form?

- ☐ **A** 1
- ☐ **B** 2
- ☐ **C** 3
- ☐ **D** 4

14

8. Which of these is a simple molecular substance?

- ☐ **A** copper
- ☐ **B** diamond
- ☐ **C** salt
- ☐ **D** water

15

9. Which particles move through the structure when graphite conducts electricity?

- ☐ **A** atoms
- ☐ **B** electrons
- ☐ **C** ions
- ☐ **D** molecules

19

10. What is the relative formula mass of sulfuric acid, H_2SO_4?
(A_r: H = 1, O = 16, S = 32)

.....

20

11. The molecular formula of a compound is $C_2H_4O_2$. What is the empirical formula of this compound?

.....

23

12. A solution is made by dissolving 5.0 g of potassium hydroxide in 100 cm^3 of water.
What is the concentration of the solution formed in g/dm^3?

- ☐ **A** 0.50
- ☐ **B** 20
- ☐ **C** 50
- ☐ **D** 200

24

13. What is the amount, in mol, of methane molecules in 96 g of methane, CH_4?
(A_r: H = 1, C = 12)

- ☐ **A** 0.167
- ☐ **B** 2
- ☐ **C** 4
- ☐ **D** 6

24

14. How many **atoms** are there in 0.5 mol of nitrogen gas, N_2?
(Avogadro's constant = 6.02×10^{23})

- ☐ **A** 3.01×10^{23}
- ☐ **B** 6.02×10^{23}
- ☐ **C** 1.204×10^{24}
- ☐ **D** 2.408×10^{24}

34

15. Which ions are present in aqueous solutions of all acids?

- ☐ **A** Cl^-
- ☐ **B** H^+
- ☐ **C** Na^+
- ☐ **D** SO_4^{2-}

35

16. The concentration of an aqueous solution of an acid is decreased by a factor of 100. What is the change in pH of the solution?

- ☐ **A** decrease by 1
- ☐ **B** decrease by 2
- ☐ **C** increase by 1
- ☐ **D** increase by 2

36

17. Which of these reacts with dilute sulfuric acid to form magnesium sulfate and hydrogen?

- ☐ **A** magnesium
- ☐ **B** magnesium carbonate
- ☐ **C** magnesium hydroxide
- ☐ **D** magnesium oxide

40

18. Which of these is an insoluble salt?

- ☐ **A** ammonium nitrate
- ☐ **B** barium sulfate
- ☐ **C** potassium chloride
- ☐ **D** sodium carbonate

42

19. What is produced at the **cathode** during the electrolysis of molten zinc chloride?

- ☐ **A** chlorine
- ☐ **B** hydrogen
- ☐ **C** oxygen
- ☐ **D** zinc

43

20. What is produced at the **anode** during the electrolysis of an aqueous solution of sodium sulfate?

- ☐ **A** hydrogen
- ☐ **B** oxygen
- ☐ **C** sodium
- ☐ **D** sulfur

48

21. Four metals are arranged in order of decreasing reactivity from left to right: potassium, calcium, zinc, silver.
Which atoms form cations most easily?

- ☐ **A** potassium atoms
- ☐ **B** calcium atoms
- ☐ **C** zinc atoms
- ☐ **D** silver atoms

49

22. Zinc is formed when zinc oxide is heated with carbon.
$ZnO + C \rightarrow Zn + CO$
Which substance is reduced in this reaction?

- ☐ **A** ZnO
- ☐ **B** C
- ☐ **C** Zn
- ☐ **D** CO

55

23. Which of these is a typical property of a transition metal?

- ☐ **A** can act as a catalyst
- ☐ **B** forms white or colourless compounds
- ☐ **C** has a low density
- ☐ **D** has a low melting point

59

24. During an accurate titration, 25.0 cm^3 of sodium hydroxide solution reacted with 22.6 cm^3 of hydrochloric acid. Which of these should be used to measure the volume of sodium hydroxide solution?

- ☐ **A** burette
- ☐ **B** conical flask
- ☐ **C** measuring cylinder
- ☐ **D** pipette

59

25. A student obtained the following titres during a titration: 22.3 cm^3, 21.9 cm^3, 21.5 cm^3, 21.6 cm^3. What is the mean of the concordant titres?

- ☐ **A** 21.55 cm^3
- ☐ **B** 21.67 cm^3
- ☐ **C** 21.83 cm^3
- ☐ **D** 22.10 cm^3

60

26. What mass of sodium hydroxide, NaOH, is needed to make 100 cm^3 of a solution with a concentration of 0.100 mol/dm^3? (M_r of NaOH = 40)

- ☐ **A** 0.4 g
- ☐ **B** 4.0 g
- ☐ **C** 40 g
- ☐ **D** 400 g

61

27. What is the amount, in mol, of hydrochloric acid in 25.0 cm^3 of a solution of hydrochloric acid with a concentration of 0.200 mol/dm^3?

.....

62

28. The theoretical yield of iron produced in a reaction is 5.6 g. The actual yield of iron formed is 3.5 g. What is the percentage yield of iron in this reaction?

.....

68

29 Methanol, CH_3OH, is manufactured by this reaction

$CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g)$

The forward reaction is exothermic. What are the effects of increasing the temperature on this equilibrium?

- ☐ **A** rate of reaction decreases and less methanol is formed
- ☐ **B** rate of reaction decreases and more methanol is formed
- ☐ **C** rate of reaction increases and less methanol is formed
- ☐ **D** rate of reaction increases and more methanol is formed

78

30. Chlorine displaces bromine from aqueous potassium bromide. The half equations for this reaction are

$Cl_2(aq) + 2e^- \rightarrow 2Cl^-(aq)$

$2Br^-(aq) \rightarrow Br_2(aq) + 2e^-$

Which species is oxidised?

- ☐ **A** Cl_2
- ☐ **B** Cl^-
- ☐ **C** Br^-
- ☐ **D** Br_2

78

31. Complete the sentence.

The .....the rate of reaction,

the lower the ..... time.

82

32. Which of these is always endothermic?

- ☐ **A** displacement
- ☐ **B** dissolving
- ☐ **C** neutralisation
- ☐ **D** thermal decomposition

99

33. Which of these formulae represents a hydrocarbon?

- ☐ **A** C_3H_8
- ☐ **B** CH_2Cl_2
- ☐ **C** C_2H_6O
- ☐ **D** $NaHCO_3$

102

34. Which of these functional groups is needed to form an addition polymer?

- ☐ **A** alcohols and carboxylic acids
- ☐ **B** alcohols only
- ☐ **C** alkanes and alkenes
- ☐ **D** alkenes only

108

35. Which of these carboxylic acids will react with magnesium to form magnesium propanoate?

- ☐ **A** HCOOH
- ☐ **B** CH_3COOH
- ☐ **C** CH_3CH_2COOH
- ☐ **D** $CH_3CH_2CH_2COOH$

96

36. A compound reacts with aqueous sodium hydroxide when heated and releases a gas that turns damp red litmus blue.Which of these ions could be present in the compound?

- ☐ **A** N^{3-}
- ☐ **B** Na^+
- ☐ **C** NH_4^+
- ☐ **D** NO_3^-

Answers

Extended response questions

In your exam, your answers to 6-mark questions will be marked on how well you organise your response, not just on the scientific content. Your responses should contain most or all of the points given in the answers below, but you should also make sure that you show how the points link to each other, and structure your response in a clear and logical way.

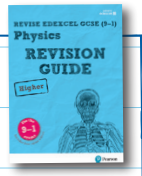
2–5. Knowledge check

1. D
2. C
3. atomic number / number of protons
4. A
5. potassium chlorate
6. C
7. D
8. D
9. B
10. 98
11. CH_2O
12. C
13. D
14. B
15. B
16. D
17. A
18. B
19. D
20. B
21. A
22. A
23. A
24. D
25. A
26. A
27. 0.005 00 / 5.00×10^{-3} mol
28. 62.5% / 63%
29. C
30. C
31. The greater the rate of reaction the lower the reaction time.
32. D
33. A
34. D
35. C
36. C

Knowledge check

If you're aiming for a top grade, you need to be confident with core skills and knowledge, such as acceleration, electrical circuits and sound waves. Take this quick quiz to find out which skills you might need to brush up on before tackling the topics in this book. Answers are on page 66.

Revise core skills



Use the **Revise Pearson Edexcel GCSE (9–1) Physics Higher Revision Guide** if you need to revise any of the core skills. The green arrow next to each question tells you which page to look at for more help.

6 **1.** What is the acceleration, g, in free fall?

- ☐ **A** 0.1 m/s^2
- ☐ **B** 1 m/s^2
- ☐ **C** 10 m/s^2
- ☐ **D** 100 m/s^2

6 **2.** What is the typical speed of a cyclist?

- ☐ **A** 1 m/s
- ☐ **B** 2.5 m/s
- ☐ **C** 6 m/s
- ☐ **D** 15 m/s

5 **3.** What is the formula to calculate the area of a right-angled triangle with base b and height h?

- ☐ **A** $0.5 \times b \times h$
- ☐ **B** $(b \times h)^2$
- ☐ **C** $2 \times b \times h$
- ☐ **D** $0.5\ (b \times h)^2$

8 **4.** Define Newton's second law.

.....

.....

9 **5.** What is the weight of an object with mass 2.5 kg?

- ☐ **A** 0.25 N
- ☐ **B** 2.5 N
- ☐ **C** 25 N
- ☐ **D** 250 N

12 **6.** What is the momentum of an object with a mass of 5 kg travelling at 15 m/s?

- ☐ **A** 0.3 kg m/s
- ☐ **B** 3 kg m/s
- ☐ **C** 75 kg m/s
- ☐ **D** 1125 kg m/s

15 **7.** Which equation is correct?

- ☐ **A** braking distance = thinking distance + stopping distance
- ☐ **B** stopping distance = thinking distance + braking distance
- ☐ **C** thinking distance = braking distance + stopping distance
- ☐ **D** stopping distance = braking distance – thinking distance

27 **8.** What type of wave is a sound wave?

.....

29 **9.** What is the formula for frequency?

- ☐ **A** wavelength ÷ wave speed
- ☐ **B** wave speed ÷ wavelength
- ☐ **C** wave speed × wavelength
- ☐ **D** wave speed^2 × wavelength

28 **10.** What type of sound waves are used to destroy kidney stones?

.....

37 **11.** What do all electromagnetic waves transfer?

.....

45 **12.** What is the typical diameter of an atom (approximately)?

- ☐ **A** 0.02 nm
- ☐ **B** 0.2 nm
- ☐ **C** 2 nm
- ☐ **D** 20 nm

46 **13.** What do isotopes of an element have different numbers of?

- ☐ **A** electrons
- ☐ **B** neutrons
- ☐ **C** positrons
- ☐ **D** protons

46 **14.** What is represented by 59 in $^{59}_{27}Co$?

- ☐ **A** atomic number
- ☐ **B** mass number
- ☐ **C** neutron number
- ☐ **D** relative electric charge

51 **15.** What is the plum pudding model?

.....

.....

52 **16.** What happens during β^+ decay?

.....

.....

64 **17.** List the eight planets in increasing order of their distance from the Sun.

....

....

....

....

67 **18.** Which correctly describes the effects on the wavelength and frequency of an EM wave when red-shift occurs?

		Wavelength	Frequency
☐	**A**	decreases	decreases
☐	**B**	decreases	increases
☐	**C**	increases	decreases
☐	**D**	increases	increases

75 **19.** What happens to an object when a resultant force acts on it?

.....

.....

.....

76 **20.** Which would have the biggest increase on the turning effect of a spanner?

- ☐ **A** A longer spanner with a smaller force.
- ☐ **B** A shorter spanner with a larger force.
- ☐ **C** A longer spanner with a larger force.
- ☐ **D** A shorter spanner with a smaller force.

76 **21.** What is the unit of the turning effect of a force?

.....

79 **22.** Draw the electrical symbol for a diode.

81 **23.** What is the unit of electrical charge?

.....

81 **24.** Define electric current.

.....

.....

84 **25.** What would you connect to a circuit to find the resistance of a component?

- ☐ **A** An ammeter and a voltmeter in parallel with the component.
- ☐ **B** An ammeter and a voltmeter in series with the component.
- ☐ **C** An ammeter in parallel and a voltmeter in series with the component.
- ☐ **D** An ammeter in series and a voltmeter in parallel with the component.

88 **26.** Which store is energy transferred to when an electric current flows in a resistor?

.....

89 **27.** What formula is used to calculate electrical power?

- ☐ **A** $P = (IR)^2$
- ☐ **B** $P = I^2 \times R$
- ☐ **C** $P = I \times R$
- ☐ **D** $P = I \times R^2$

93 **28.** If a material loses electrons, what does it become?

- ☐ **A** negatively charged
- ☐ **B** neutral
- ☐ **C** positively charged
- ☐ **D** repellent to other electrons

93 **29.** On which type of materials can electric charge build up?

- ☐ **A** conductors
- ☐ **B** insulators
- ☐ **C** magnets
- ☐ **D** metals

95 **30.** What term is used to describe the removal of excess charge?

.....

.....

105 **31.** What is the name of the UK high voltage electric power transmission network?

.....

107

32. Name the process by which a solid changes directly into a gas.

.....

113

33. Which substances can be compressed?

- ☐ **A** gases only
- ☐ **B** solids and liquids
- ☐ **C** liquids only
- ☐ **D** solids only

34. What is 135.06 written to 2 significant figures?

- ☐ **A** 130
- ☐ **B** 135
- ☐ **C** 135.1
- ☐ **D** 140

35. Write 0.003 18 in standard form.

.....

36. Convert 5000 W to MW.

- ☐ **A** 5×10^{-6} MW
- ☐ **B** 0.005 MW
- ☐ **C** 5 MW
- ☐ **D** 5 000 000 MW

37. Convert 76 A to mA.

- ☐ **A** 0.076 mA
- ☐ **B** 7.6 mA
- ☐ **C** 7600 mA
- ☐ **D** 76 000 mA

38. How can you convert μm to m?

- ☐ **A** divide by 1000
- ☐ **B** multiply by 1000
- ☐ **C** divide by 1 000 000
- ☐ **D** multiply by 1 000 000

Answers

Extended response questions

In your exam, your answers to 6-mark questions will be marked on how well you present and organise your response, not just on the scientific content. Your responses should contain most or all of the points given in the answers below, but you should also make sure that you show how the points link to each other, and structure your response in a clear and logical way.

2–5. Knowledge check

1. C
2. C
3. A
4. force = mass × acceleration
5. C
6. C
7. B
8. longitudinal
9. B
10. ultrasound waves
11. energy
12. B
13. B
14. B
15. An early model of the atom
16. A proton becomes a neutron plus a positron
17. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
18. C
19. It changes direction, speed or both
20. C
21. newton metre, Nm
22. 
23. coulomb, C
24. The rate of flow of charge
25. D
26. Thermal
27. B
28. C
29. B
30. earthing
31. National Grid
32. sublimation
33. A
34. D
35. 3.18×10^{-3}
36. B
37. D
38. C

REVISE PEARSON EDEXCEL GCSE (9–1)

Biology

GRADES 7–9
Revision & Practice

NAIL IT!

Series consultant: Harry Smith
Author: Sue Kearsey

Contents

Use this quick quiz to check that you are confident with the core skills and knowledge you need for the Pearson Edexcel GCSE (9-1) Biology Higher exam or Combined Science Higher exam.

Check your understanding with solutions to all the exam-style questions.

A small bit of small print

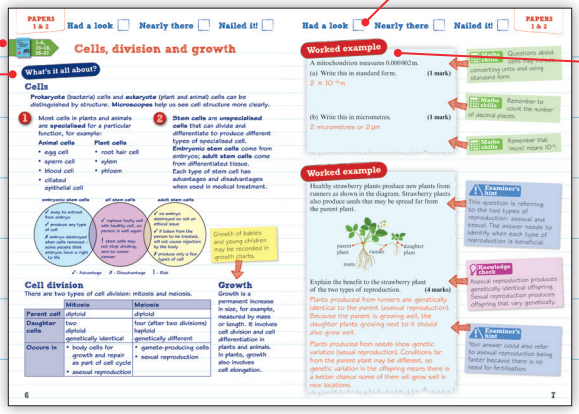
Pearson Edexcel publishes Sample Assessment Material and the Specification on its website. This is the official content and this book should be used in conjunction with it. The questions in the *Exam practice* sections have been written to help you revise topics and practise answering exam questions. Remember – the real exam questions may not look like this.

Welcome to Nail it!

This book provides revision and practice to help you nail down a top grade in your Pearson Edexcel GCSE (9–1) Biology Higher exam or Combined Science Higher exam. Designed for students aiming for a grade 7, 8 or 9, it is packed with exam tips, support for tricky topics, and exam-style practice questions to make sure you are ready to tackle the toughest questions and achieve top marks.

For more help with these topics, check out these pages in the Revise Pearson Edexcel GCSE (9–1) Biology Higher Revision Guide. To check out pages in the Revise Pearson Edexcel GCSE (9–1) Combined Science Higher Revision Guide, see the table on page 73.

Track your progress by ticking these boxes.



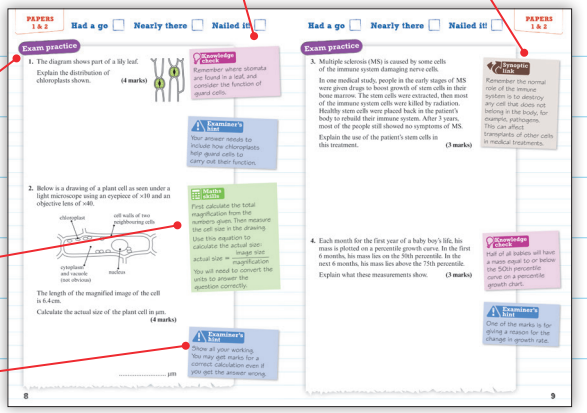
Worked example exam-style questions show you exactly how to tackle tricky questions and set out your working.

Knowledge check hints give you reminders of key information and core skills. You need to be confident with these to help you achieve that top grade.

Support in bringing in knowledge from other topics to enhance your answer is given in the synoptic links.

Revise the key facts for this topic.

Check that you are on track for a top grade with these exam-style questions. There are answers at the back of the book.



Reminders of any maths skills needed to answer a question.

Examiner's hints give top tips for exam success.

1–6, 15–18, 26–27

Cells, division and growth

What's it all about?

Cells

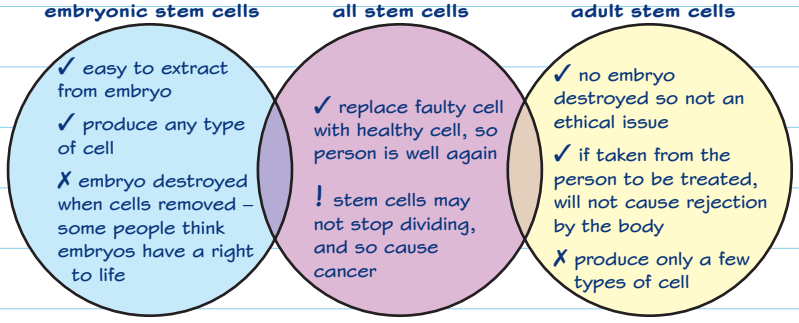
Prokaryote (bacteria) cells and **eukaryote** (plant and animal) cells can be distinguished by structure. **Microscopes** help us see cell structure more clearly.

1 Most cells in plants and animals are **specialised** for a particular function, for example:

Animal cells
- egg cell
- sperm cell
- blood cell
- ciliated epithelial cell

Plant cells
- root hair cell
- xylem
- phloem

2 **Stem cells** are **unspecialised cells** that can divide and differentiate to produce different types of specialised cell.
Embryonic stem cells come from embryos; **adult stem cells** come from differentiated tissue.
Each type of stem cell has advantages and disadvantages when used in medical treatment.



Growth of babies and young children may be recorded in growth charts.

Cell division

There are two types of cell division: mitosis and meiosis.

	Mitosis	Meiosis
Parent cell	diploid	diploid
Daughter cells	two diploid genetically identical	four (after two divisions) haploid genetically different
Occurs in	• body cells for growth and repair as part of cell cycle • asexual reproduction	• gamete-producing cells • sexual reproduction

Growth

Growth is a permanent increase in size, for example, measured by mass or length. It involves cell division and cell differentiation in plants and animals. In plants, growth also involves cell elongation.

Worked example

Explain why a person with cataracts can see more clearly after a cataract operation. **(3 marks)**

A cataract is a clouding of the lens. This reduces the amount of light that reaches the retina so the image is not clear. In a cataract operation, the cloudy lens is replaced with a clear plastic lens so more light can reach the retina and a clearer image is formed.

This answer is good because it begins by describing what a cataract is. This makes it clear how the operation improves vision.

Note that replacing the lens could also help to solve problems with long- or short-sightedness. However, because the plastic lens cannot change shape, spectacles are still needed for seeing clearly at the opposite end of the visual range.

Worked example

Multiple sclerosis is caused by the gradual loss of myelin from nerve cells.

Explain why some people with multiple sclerosis have difficulty walking. **(3 marks)**

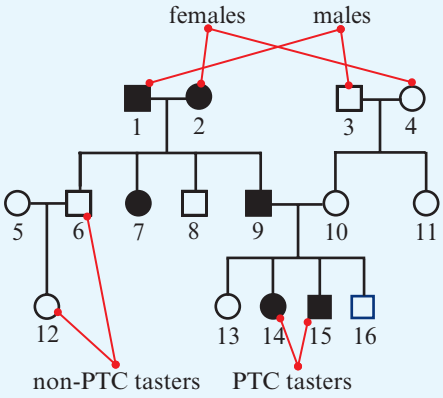
Myelin surrounds nerve cells, insulating them from other cells and allowing nerve impulses to pass quickly along the axon. Damage to the myelin will slow the nerve impulses and may allow impulses to jump from one axon to another, so they do not get to where they are meant to go. If nerve impulses to leg muscles are disrupted, then the person will have difficulty walking.

A good start to this answer is to describe the function of myelin in healthy nerve cells. This makes it easier to explain clearly why damage to the myelin causes problems with walking.

Worked example

The ability to taste phenylthiocarbamide (PTC) is a dominant condition. The diagram shows the inheritance of PTC tasting in one family.

Describe the evidence that PTC tasting is controlled by a dominant allele. **(2 marks)**



1 and 2 are both PTC tasters but they have two children who are non-tasters. Therefore, PTC tasting must be dominant and non-tasting must be recessive.

You are asked for evidence, so make sure you refer to specific individuals in the pedigree.

Worked example

Describe two possible developments as a result of decoding the human genome, and discuss the implications of these developments. **(4 marks)**

One development is the identification of genes that can cause disease. Knowing if a person has a faulty gene could help that person and their family to prepare for its effects, but some people would prefer not to know if they have a faulty gene, because it might make them worry about it.

Another development is gene therapy. This involves replacing faulty alleles in body cells with healthy ones. This allows the affected person to live a normal life. However, people will have to decide whether the faulty alleles are replaced in gametes, so that the healthy alleles can be passed on to children.

There are many possible answers to this question, because there are many new developments. Other possibilities include: creating personalised medicines and identifying evolutionary relationships between humans and other organisms. As well as learning about new developments, you need to be able to say what the implications are.

Exam practice

3. The effect of antibiotics on bacterial growth can be tested by placing discs containing the antibiotic on a bacterial lawn plate.

Describe three ways in which aseptic technique is used in this experiment. **(3 marks)**

Practical skills

Use your knowledge from the Core Practical that investigates the effect of antiseptics, antibiotics or plant extracts on microbial cultures to answer this question. What did you do to minimise the chance of infection of the culture by microorganisms in the air or on the equipment?

4. Measles is an infectious disease spread in droplets from coughs and sneezes. Most UK babies are immunised against measles. Some babies cannot be immunised because their immune system is too weak.

Explain why these individuals are protected against measles if most other people have been immunised. **(2 marks)**

Knowledge check

Herd immunity is where the few non-immunised people in a population are protected from infection because everyone else is immunised.

5. Two plant extracts were tested for their antibacterial properties against a particular species of bacterium. Filter paper discs dipped in the extracts were placed on an agar plate inoculated with bacteria.

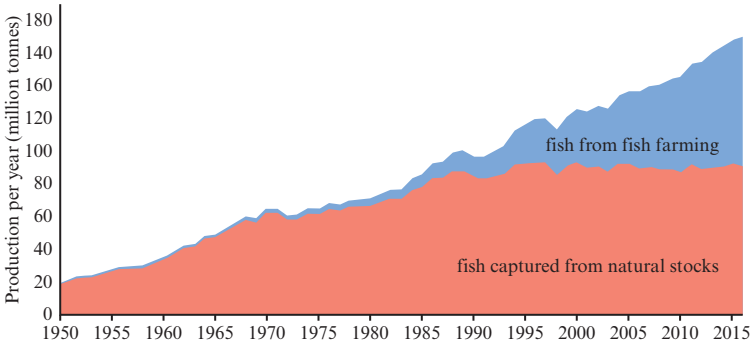
Describe how you would tell which plant extract was better at killing the bacteria. **(1 mark)**

Examiner's hint

There is only one mark for this answer, so do not spend time adding more detail than is needed.

Exam practice

1. The graph shows the changes in mass of fish captured globally for human food between 1950 and 2016.



Discuss the importance for biodiversity of the changing trends in fish production shown in the graph. **(4 marks)**

Synoptic link

Organisms in a community are interdependent for resources, including food. Your answer needs to consider how taking fish from wild stocks could have an impact on the whole community to which these fish belong.

Examiner's hint

A good way to start your answer is by describing the trends in fish production shown in the graph.

2. Maize (sweetcorn) is the main carbohydrate food for over 1.2 billion people. Many different varieties used to be grown but selective breeding to increase yield means that, in the US, only about six closely-related varieties are grown.

Describe the benefits and risks of using selective breeding to improve food security. **(3 marks)**

Synoptic link

Your answer needs to consider the effects of selective breeding on genetic variation in a population, and how this might affect the potential impact of a threat to yield, such as a new pest or pathogen.