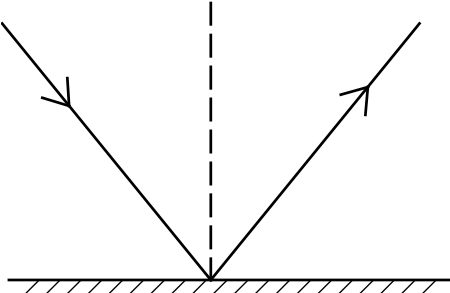
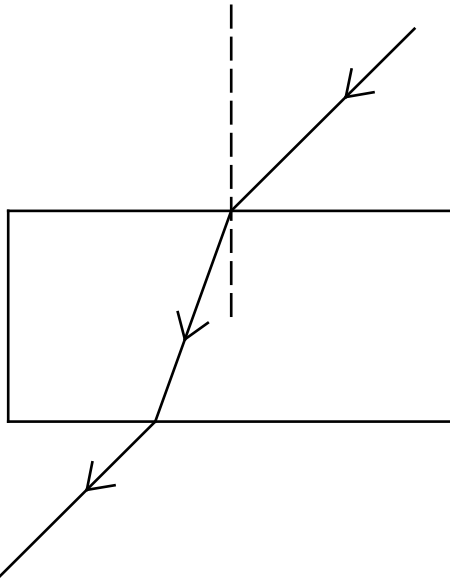
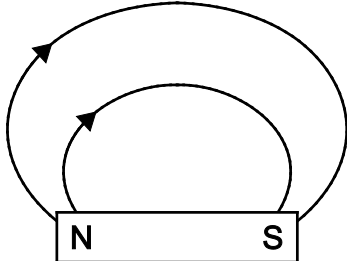


Question	Answer	Marks	Further Information
1(a)(i)	X = rib(s) (cage) Y = diaphragm	2	each correct answer = 1 mark Ignore intercostal muscles
1(a)(ii)	rib(s) (cage) moves up / moves out diaphragm contracts / moves down / flattens	2	each correct answer = 1 mark
1(b)(i)	stop-watch / timer	1	Accept data logger Ignore chest band / spirometer
1(b)(ii)	(running) speed	1	
1(b)(iii)	(same) duration / (same) person doing the running / (same) breathing rate at start	1	
1(b)(iv)	in a table / graph / bar chart	1	Do not accept pie chart
2(a)	positive charge on protons or nucleus and negative charge on electrons attract each other	2	each correct answer = 1 mark
2(b)	any two from different number of electrons / more electrons different number of protons / more protons different size (of electron cloud, nucleus or atom) / larger size	2	Assume answer refers to sodium unless lithium specified Accept different number of neutrons / more neutrons Accept higher level answers from Stage 9 e.g. Na has 3 shells

Question	Answer	Marks	Further Information
3(a)(i)		1	<p>reflected ray drawn (with correct arrow) and angle of incidence approximately equal to angle of reflection by eye</p>
3(a)(ii)		2	<p>first refracted ray bends towards normal = 1 mark second refracted ray bends away from normal = 1 mark</p> <p>Ignore arrows on rays</p>
3(b)	dispersion	1	

Question	Answer	Marks	Further Information
4(a)	any one from growth repair	1	Accept (makes) enzymes / (makes) muscles / (makes) hormones / (makes) skin / (makes) hair / lactation Ignore for strength / energy
4(b)	water	1	Ignore vitamins, salts or minerals
4(c)(i)	194 (kJ)	1	
4(c)(ii)	carbohydrate	1	
4(d)	4 g of protein RDA = 80 g	2	correct answer = 2 marks sight of 4g of protein or $4 \times 20 = 1$ mark Accept ecf of $20 \times$ mass of protein

Question	Answer	Marks	Further Information
5(a)	idea that different dyes move across the paper at different speeds	1	Accept different dyes have different attraction to the paper
5(b)	A the spots from ink A match the spots from the ink from the letter (exactly)	2	if any other letter given = 0 marks for the question

Question	Answer	Marks	Further Information
6(a)	two lines going from N to S and not crossing e.g. 	1	
6(b)	increase the number of turns (of wire) increase the number of cells / increase the current	2	each correct answer = 1 mark Accept have 7 or more turns (of wire) Accept have a larger voltage or potential difference

Question	Answer	Marks	Further Information
7(a)	<p>any two from</p> <p>yes (evidence shows that) iguanodons lived in lush vegetation which grew in warm conditions</p> <p>yes (evidence shows that) mammoths had thick woolly covering showing adaptations to cold conditions</p> <p>no because (idea of) one is in winter and one is in summer</p> <p>no because no evidence for what happens in between</p>	2	<p>yes or no only = 0 marks</p> <p>Accept maybe with one reason for yes and one reason for no</p>
7(b)	<p>any one from</p> <p>yes because (evidence shows that) almost 120 million years between hot and cold conditions</p> <p>yes because (evidence shows that) almost 120 million years between iguanodon and mammoth conditions</p> <p>yes because Europe is now warmer than it was 4000 years ago when mammoths existed</p> <p>no because you cannot tell how long either iguanodon or mammoth lived on Earth</p> <p>no because there is no evidence for time between 4000 years and 120 million years ago</p>	1	<p>yes or no only = 0 marks</p>

Question	Answer	Marks	Further Information
8(a)	temperature increases	1	Accept mixture gets hotter
8(b)	endothermic	1	Accept answer written in table but answer line takes precedence
8(c)	metals non-metals inert explosive	1	Accept any indication of the correct answer, e.g. underlining or ticking but circling takes precedence

Question	Answer	Marks	Further Information
9(a)	(speed =) 7.69/7.7 m/s or metres per second	2	correct speed = 1 mark correct units = 1 mark Accept 7.692307 correctly rounded or truncated Do not accept 8 Accept m s ⁻¹
9(b)	B and C	1	if more than one box ticked = 0 marks Accept any indication of the correct answer, e.g. circling or underlining but ticking takes precedence

Question	Answer	Marks	Further Information
10(a)	(idea that the asteroids are) too small to be seen / too dim to be seen / too far away to be seen / cannot be seen without the aid of powerful telescope	1	
10(b)	Galle Herschel Lippershey Piazzi	1	
10(c)(i)	(pieces of) rock	1	Accept metals, e.g. nickel and iron
10(c)(ii)	they are too small / not spherical	1	
10(d)	any two from can show more detail can see even the smallest asteroids can see more asteroids can see the asteroids that are further away	2	

Question	Answer	Marks	Further Information
11(a)	H ₂ SO ₄	1	Accept any order of symbols
11(b)(i)	idea of a model showing the similarity of like features for comparison	1	
11(b)(ii)	high concentration – a lot of children in the room low concentration – a few children in the room	2	each correct answer = 1 mark
Question	Answer	Marks	Further Information
12	prediction – diameter of balloon increases because at higher temperatures particles move faster or have more energy particles spread out / greater distance between particles / balloon walls pushed out	3	each correct answer = 1 mark Accept particles hit surface of balloon harder Accept atoms or molecules instead of particles