

Contents

Introduction	3	2.24 Digestion prepares useful food molecules for absorption	78
Section 1: Characteristics and classification of living organisms		2.25 Absorption and assimilation make food available	82
1.1 Biology is the study of life and living organisms	6	Questions on nutrition and health	84
1.2 The variety of life	8	2.26 Uptake of water and minerals by roots	86
1.3 Bacteria and viruses	10	2.27 Transport systems in plants	88
1.4 Fungi	12	2.28 Water movement through the plant: transpiration	90
1.5 Plants	14	2.29 The leaf and water loss	92
1.6 Invertebrate animals	16	2.30 Transport systems in animals use blood as the transport medium	94
1.7 Vertebrate animals: five classes	18	2.31 Combating infection: blood and defence against disease	98
Questions on characteristics and classification	20	2.32 Antibodies and the immune response	100
Section 2: Organisation and maintenance of organisms		2.33 The circulatory system	102
2.1 Organisms are made up of cells	22	2.34 Materials are exchanged between blood and tissues at the capillaries: tissue fluid is formed	104
2.2 The organisation of living organisms	24	2.35 The heart is the pump for the circulatory system	106
Questions on cells and organisation	26	2.36 Control of blood pressure and the benefit of exercise	108
2.3 Movement in and out of cells	28	2.37 Coronary heart disease	110
2.4 Enzymes control biochemical reactions in living organisms	32	Questions on circulation	112
2.5 Humans use enzymes from microorganisms	34	2.38 Respiration provides the energy for life	114
2.6 Enzyme experiments and the scientific method	36	2.39 Contraction of muscles requires energy supplied by respiration	116
2.7 All living things are made up of organic molecules	38	2.40 The measurement of respiration	118
2.8 Testing for biochemicals	40	2.41 Gas exchange supplies oxygen for respiration	120
2.9 Food and the ideal diet: carbohydrates, lipids and proteins	42	2.42 Breathing ventilates the lungs	122
2.10 Food and the ideal diet: vitamins, minerals, water and fibre	44	Questions on gas exchange	125
2.11 Food from microorganisms: fungi, bacteria and fermentation	48	2.43 Smoking and disease	126
2.12 The economic importance of yeast: brewing and baking	50	2.44 Homeostasis: maintaining a steady state	128
2.13 Food is the fuel that drives the processes of life	52	2.45 Control of body temperature	130
2.14 Balancing energy intake and energy demand: problems causing malnutrition	54	2.46 Excretion: removal of the waste products of metabolism	132
Questions on energy	56	2.47 Osmoregulation and the treatment of kidney failure	134
2.15 Malnutrition and famine	58	Questions on homeostasis	136
2.16 Photosynthesis and plant nutrition	60	2.48 Coordination: the nervous system	138
2.17 The rate of photosynthesis	62	2.49 Neurones can work together in reflex arcs	140
2.18 The leaf and photosynthesis	64	2.50 The brain is the processor for the central nervous system	142
2.19 The control of photosynthesis	66	2.51 Receptors and senses: the eye as a sense organ	144
2.20 Photosynthesis and the environment	68	Questions on receptors and senses	148
Questions on photosynthesis	70	2.52 Integration by the central nervous system	152
2.21 Plants and minerals	72	2.53 Drugs and disorders of the nervous system	154
2.22 Nutrition converts food molecules to a usable form	74	2.54 The endocrine system	156
2.23 Ingestion provides food for the gut to work on	76	2.55 Sensitivity and movement in plants	160

Section 3: Development of organisms and the continuity of life

3.1	Reproduction is an important characteristic of living organisms	164
3.2	Reproduction in humans	165
3.3	The menstrual cycle	168
3.4	Copulation and conception	170
3.5	Contraception	172
3.6	Pregnancy: the role of the placenta	174
3.7	Pregnancy: development and prenatal care	176
3.8	Birth and the newborn baby	178
3.9	Sexually transmitted diseases	181
3.10	Growth	182
	Questions on reproduction and growth	184
3.11	Reproduction in flowering plants: flowers	186
3.12	Pollination: the transfer of male sex cells to female flower parts	188
3.13	Fertilisation and the formation of seed and fruit	190
3.14	Dispersal of seeds and fruits	192
3.15	Germination of seeds	194
3.16	Vegetative propagation	196
3.17	Artificial propagation	198
3.18	Variation and inheritance	200
3.19	DNA, proteins and the characteristics of organisms	202
3.20	Cell division	204
3.21	Variation	206
3.22	Causes of variation	208
3.23	Inheritance	210
3.24	Studying patterns of inheritance	212
3.25	Inherited medical conditions and codominance	214
3.26	Sex is determined by X and Y chromosomes	216
3.27	Variation and natural selection: the evolution of species	218
3.28	Natural selection	220
3.29	Artificial selection	222
3.30	Genetic engineering	224
3.31	Gene transfer in plants and animals	226

Section 4: Relationships of organisms with one another and with their environment

4.1	Ecology and ecosystems	230
4.2	Feeding relationships: food chains and food webs	232
4.3	Feeding relationships: pyramids of number, biomass and energy	236
4.4	Decay is a natural process	238
4.5	The carbon cycle	240
4.6	The nitrogen cycle	242
4.7	Water is recycled too!	244
	Questions on decay and cycles	246
4.8	Factors affecting population size	248
4.9	Human population growth	250
4.10	Human impacts on the environment: pollution of the atmosphere	251
4.11	Pollution of water	255
4.12	Preventing disease: safe water	258
4.13	Humans, agriculture and conservation	260
4.14	Pollution of the land	262
4.15	Disposal of solid waste	264
4.16	Humans may have a positive effect on the environment: conservation	266
4.17	Human management of ecosystems: fish farming and horticulture	268
4.18	Helping the environment: fuel from fermentation	270
4.19	Humans can control disease: using fungi to produce antibiotics	272
4.20	Controlling disease by understanding vectors	274
	Questions on human impacts on environment	278
	Index	279