CELL – THE STRUCTURAL AND FUNCTIONAL UNIT OF LIFE 1.

1.1	Cells – A basic study in biology	1
1.2	Cells – How numerous ?	1
1.3	Cells – How small ?	1
1.4	Cell shapes	1
1.5	Gross structure of cell – The three essential parts	2
1.6	Finer structure of cell – The organelles	3
1.7	Microscopic examination of onion peel	5
1.8	The Nucleus — Key to the life of a cell	5



STRUCTURE OF CHROMOSOMES, CELL CYCLE AND CELL DIVISION

		2A. Structure	of Chromos	somes	
2.1	What	are chromosomes ?	7		
2.2	Disco	very of chromosomes	7		
2.3	Struct	ture of chromosomes	8		The second secon
2.4	What	are genes ?	10		
		2B. Cell Division — New	Cells from	the Existing ones	
2.5	New o	cells need to be produced	11		~
2.6	Types	of cell division	12		
	2.6.1	Mitosis	12		6
	2.6.2	Differences in mitosis in animal and plant cells	14		4
	2.6.3	Significance of mitosis	14		3
2.7	Cell c	ycle — "Divide, grow and redivide"	15		

Meiosis (Reduction division producing gametes) 16 2.8

2.8.1 Significance of meiosis 17

Downloaded from https:// www.studiestoday.com

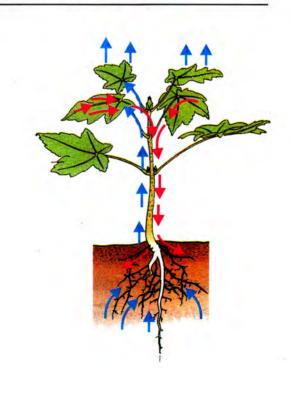
3. GENETICS — SOME BASIC FUNDAMENTALS

12

3.1	What is genetics ?	20	
3.2	Variations in population	21	
3.3	Chromosomes—The carriers of heredity	21	
3.4	The two main categories—Autosomes and sex chromosomes	22	
3.5	Sex determination—Son or daughter	22	i de la companya de l
3.6	Chromosomes—Carriers of genes	23	
3.7	Genes and their alleles	23	e M
3.8	Genotype and phenotype	24	\sim
3.9	From parents to children—Tongue rolling—An example of inheritance	24	
3.10	Sex-linked inheritance	26	MOTHER FATHER
3.11	Mendel's experiments on inheritance	27	
3.12	Mendel's laws of inheritance	29	Daughter Daughter Son Daughter
3.13	Mutation	30	STUR

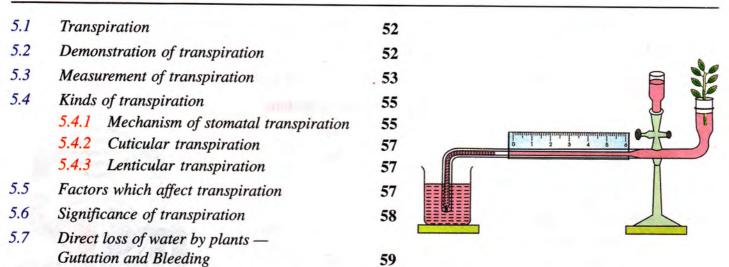
4. ABSORPTION BY ROOTS — THE PROCESSES INVOLVED

4.1	Absorption by the roots		
4.2	Need of water and minerals for plants		
4.3	Characteristics of roots for absorbing water	34	
4.4	Absorption and conduction of water and minerals	36	
	4.4.1 Imbibition	36	
	4.4.2 Diffusion	36	
	4.4.3 Osmosis and osmotic pressure	36	
	4.4.4 Active transport	41	
	4.4.5 Turgidity and flaccidity (plasmolysis)	41	
4.5	Root pressure	44	
4.6	Importance of root-hairs and the upward movement of absorbed water and minerals	45	
4.7	Some experiments on absorption and conduction of water in the plants	45	
4.8	Forces contributing to ascent of sap	46	



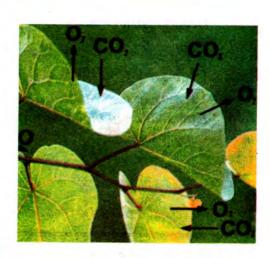
Downloaded from https://www.studiestoday.com

Downloaded from https:// www.studiestoday.com TRANSPIRATION



6. PHOTOSYNTHESIS — PROVIDER OF FOOD FOR ALL

6.1	Plants — Self food producers	64
6.2	What is photosynthesis ?	64
6.3	Chlorophyll — The vital plant pigment	64
6.4	Regulation of stomatal opening for letting in CO_2	65
6.5	Process of photosynthesis	66
6.6	Two main phases of photosynthesis — (A) Light-dependent phase and (B) Light-independent (Dark) phase	66
6.7	Adaptations in leaf for photosynthesis	67
6.8	End result of the products of photosynthesis	68
6.9	Factors affecting photosynthesis	68
6.10	Experiments on photosynthesis	69
6.11	Importance of photosynthesis	71
6.12	Carbon cycle	72



7. THE CIRCULATORY SYSTEM

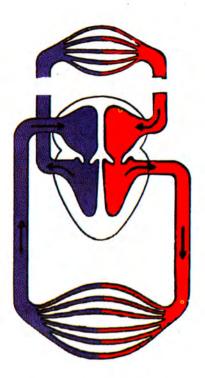
		7A. Body Fluids			
7.1	Need for transport inside the body	76			
7.2	Fluids in our body	76		MON	
7.3	The blood	77	10	0.55	100
7.4	Functions of blood	77	P	1 yes	

Downloaded from https://iiwww.studiestoday.com

7.5		Composition of blood		
		7.5.1 Plasma — The liquid portion of blood	78	
		7.5.2 Cellular elements	78	
	7.6	Clotting of blood (coagulation)	81	
	7.7	Blood transfusion and blood groups	82	

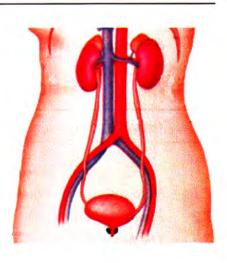
7B. The Circulatory System

7.8	Blood circulatory system	84
	7.8.1 The heart	84
	7.8.2 Blood vessels entering and leaving the heart	85
	7.8.3 Valves regulate the flow of blood in a single direction	86
7.9	Circulation of blood in the heart	87
	7.9.1 Heart beat	87
7.10	The blood vessels	88
7.11	The two blood circulations —	
	Pulmonary and systemic	89
7.12	Hepatic portal system	90
7.13	The pulse	91
7.14	Tissue fluid and lymph	92
7.15	The spleen	92
7.16	Examination of blood corpuscles under a microscope	93



8. THE EXCRETORY SYSTEM [ELIMINATION OF BODY WASTES]

8.1	Excretion	98
8.2	Substances to be got rid off	98
8.3	The excretory organs	99
8.4	Kidneys (urinary system)	99
	8.4.1 Internal structure of the kidney	100
	8.4.2 Structure of a kidney tubule	100
	8.4.3 Function of the kidney — Formation	
	of urine	101
8.5	Constituents of urine	102
8.6	Regulation of urine output	103
8.7	Osmoregulation	103
8.8	Miscellaneous information	103



Downloaded from https://iwww.studiestoday.com

Downloaded from https:// www.studiestoday.com 9. THE NERVOUS SYSTEM

	9A. The brain, the spinal cord an	d the peripheral 1	iervous system
9.1	Need of nervous system	107	
9.2	Neuron (or nerve cell) : the unit of the		
	nervous system	107	
	9.2.1 Structure of the neuron	107	
	9.2.2 Synapse	109	
	9.2.3 Types of neurons	109	A A A A A A A A A A A A A A A A A A A
9.3	Nerves	109	A Contraction
	9.3.1 Three kinds of nerves	109	
9.4	Two major divisions of the nervous system	110	
	9.4.1 The brain	110	
	9.4.2 The spinal cord	112	
9.5	Peripheral nervous system	112	
	9.5.1 Somatic nervous system	112	
	9.5.2 Autonomic nervous system	113	
9.6	Reflexes (Involuntary actions)	115	
	9B. Sense organs	— Eye and ear	
9.7	The sense organs	121	
	9.7.1 The eyes	121	
	9.7.2 Common defects of the eye	125	
	9.7.3 The ear — Senses of hearing & balance	127	
	9.7.4 The sense of taste (gustation)	129	

10. ENDOCRINE GLANDS – "THE PRODUCERS OF CHEMICAL MESSENGERS"

130

10.1	Need for the regulation of body activities	134	
10.2	General properties of hormones	135	
10.3	Endocrine glands	135	
	Adrenal glands	136	
	Pancreas	137	
	Thyroid	138	
	Pituitary	139	
10.4	Control of hormonal secretions	141	
10.5	The hormones at a glance	142	

9.7.5 The sense of smell



Downloaded from https;// www.studiestoday.com

11. THE REPRODUCTIVE SYSTEM

	11A. The rep	productive organs	\sim \sim
11.1	Reproduction in general	147	9 ~
11.2	Reproduction in humans	148	
	11.2.1 Male reproductive system	148	6
	11.2.2 Female reproductive system	151	
11.3	Menstrual cycle	152	A bear &
	11B. From fe	rtilisation to birth	201
11.4	Fertilisation	156	The second se
11.5	Implantation (conception) and pregnancy	157	Y
11.6	Placenta	158	5
11.7	Parturition (birth)	159	

12. POPULATION — THE INCREASING NUMBERS AND RISING PROBLEMS

12.1	Rising population – A global threat	165
12.2	World population through the ages	165
12.3	Rapid rise in population	166
12.4	Population explosion—A serious global concern	167
12.5	A highly simplified model of population growth	167
12.6	Population in India	168
12.7	Factors responsible for population explosion in India	169
12.8	Rising population — pressure on natural resources	169
12.9	Population growth and urbanisation causing serious pressure on resources	171
	12.9.1 Changing face of the earth	171
	12.9.2 Rising living standards of growing population12.9.3 Need to check exploitative use of	171
	resources	172
12.10	Rate of population growth must be reduced	172
12.11	Need for adopting control measures	172
12.12	Population education and population control	173
12.13	Methods of contraception Downloaded from https://	173 www.studiestoday.com



13. AIDS TO HEALTH

13.1	Need to keep healthy	176	
13.2	Immunity	176	
	13.2.1 Local defence system	176	
	13.2.2 Immune system	178	
	13.2.3 Antibodies	179	
13.3	Vaccination and immunisation	180	
13.4	Antitoxins	181	
13.5	Antiseptics and disinfectants prevent		
	catching diseases	182	
	13.5.1 Antiseptics	182	
	13.5.2 Disinfectants	182	
13.6	Antibiotics – Penicillin and others	182	
13.7	Sulphonamide group of medicines	183	
13.8	First Aid	183	



14. HEALTH ORGANISATIONS

14.1	Common health problems in India	187	
14.2	Categories of health organisations	188	
14.3	Local bodies	188	5
14.4	National bodies	188	
14.5	International bodies	188	
	14.5.1 Red Cross	188	
	14.5.2 WHO (World Health Organisation)	189	



15. POLLUTION — A RISING ENVIRONMENTAL PROBLEM

15.1	Pollution		191
15.2	Air pol	lution	191
	15.2.1	Vehicular air pollution	191
	15.2.2	Industrial air pollution	192
	15.2.3	Burning garbage	192
	15.2.4	Brick kilns	192
15.3	Water pollution		193
	15.3.1	Household detergents	193
	15.3.2	Sewage	193
	15.3.3	Industrial waste	193
	15.3.4	Oil spills	193
	15.3.5	Thermal pollution	193



Downloaded from https://www.studiestoday.com

2	Downloaded from https://	www.studiestoday.com
15.4	Soil pollution	193
	15.4.1 Industrial waste	194
	15.4.2 Urban commercial and domestic wastes	s 193
	15.4.3 Chemical fertilizers	193
	15.4.4 Biomedical waste	193
	15.4.5 Pesticides.	193
15.5	Radiation	193
15.6	Noise pollution	195
15.7	Effects of various types of pollution	196
15.8	Abatement of pollution	197
Word	Root Glossary	199
Resur	ne of Chapters	201
Select	ed Glossary of Biological Terms	211
Samp	le Paper — 1	216
Samp	le Paper — 2	221
Samp	le Paper — 3	225
Science	ce Paper 3 (Biology) 2014 (Solved)	229
Scienc	ce Paper 3 (Biology) 2015 (Solved)	239
Scienc	ce Paper 3 (Biology) 2016 (Solved)	248