BIOLOGY 2201 - UNIT 3 MAINTAINING DYNAMIC EQUILIBRIUM I	Text Reference
Homeostasis	
❑ explain the concept of homeostasis and its critical nature to living things	298-300
❑ explain the importance of temperature regulation in maintaining homeostasis – define homeotherm and poikilotherm – describe how homeotherms maintain a dynamic equilibrium – discuss mechanisms of temperature control, behaviourial and physiological	300-303
Circulatory System	
❑ explain how the human circulatory system helps maintain homeostasis – explain the need for a transport system – explain how the circulatory system contributes to the maintenance of equilibrium through its role in the transport of heat energy and matter – describe the structure and function of an artery, a vein and a capillary – relate this structure to the function of each in blood circulation – identify the main components of the human heart and explain the role of each. Include: (i) atria (ii) ventricles (iii) valves (bicuspid, tricuspid, semilunar) (iv) aorta (v) pulmonary vein (vi) pulmonary artery (vii) septum – trace the flow of blood through the heart and describe the pulmonary and systemic pathways – identify the main components of blood and explain the role of each. Include: (i) erythrocytes (iii) platelets (ii) leukocytes (iv) plasma	300-306 306-307 314-315 304-305 308-313
❑ carry out an experiment to relate blood pressure and physical activity and identify the specific variables involved	324-325
❑ compile and organize data, using appropriate formats and data treatments, to facilitate interpretation of blood pressure data	324-325
❑ identify the impact of circulatory diseases on the homeostasis of an organism – describe disorders linked to the circulatory system and their effect on the homeostasis of the system and the organism as a whole. Include: (i) hypertension (ii) atherosclerosis (iii) arteriosclerosis	324-328
❑ analyze why and how technology related to the treatment of circulatory disorders was developed and improved over time – describe the progress from bypass surgery to modern techniques such as shunts, angioplasty and clot busting drugs	326

Respiratory System	
❑ explain how the human respiratory system helps maintain homeostasis – explain the need for a respiratory surface in humans – identify and state the function of: (i) nasal cavity (ii) trachea (iii) bronchi (iv) bronchioles (v) alveoli (vi) diaphragm – investigate the mechanics of inhalation/exhalation and regulation of the breathing cycle	332-337 338-339
❑ carry out an experiment to collect data on respiratory function and identify the specific variables involved	340-341
❑ compile and organize data, using appropriate formats and data treatments, to facilitate interpretation of a completed respiratory activity	
❑ identify how respiratory diseases affect the homeostasis of an organism - investigate disorders; lung cancer, asthma, and pneumonia	343-348
❑ predict the impact of environmental factors, such as allergens, on homeostasis within an organism – identify the impact of environmental factors on the respiratory system of an asthmatic (i) cigarette smoke (ii) allergens (dust, mould, food) (iii) petrochemical fumes, perfumes	 345-348
Digestive System	
❑ explain how the human digestive system helps maintain homeostasis – describe the purpose and functioning of the digestive systems – define and explain the relationship between mechanical and chemical digestion – identify the major organs and glands of digestion and investigate their role in the digestive process Include: (i) salivary glands (ii) stomach (iii) liver (iv) pancreas (v) gall bladder (vi) small intestine (vii) large intestine	354 359 359-362

–	trace the pathway of food through the human digestive tract and explain the efficiency of its structure (i) teeth (ii) taste buds (iii) tongue (iv) mucous lining (v) villi (vi) sphincters (vii) peristalsis activity	359-362
❑	identify chemical elements and compounds that are commonly found in living systems – identify the six basic nutrients: carbohydrates, lipids, proteins, vitamins, mineral and water and determine the sources of each of these nutrients	354-358
❑	identify the role of some compounds involved in digestion – discuss the role of the six basic nutrients – discuss the general role of enzymes and secretions, and the role of these substances pertaining to the digestive system	354-358 363-368
❑	identify and describe the structure and function of the important biochemical compounds, carbohydrates, proteins and lipids – explain the role of hydrolysis and dehydration reactions within the digestive process – discuss the basic structural units of carbohydrates, lipids, and proteins – discuss the basic structure of carbohydrates, lipids and proteins – describe the end products of digestion for carbohydrates, lipids and proteins	363-368
❑	explain the importance of fitness and nutrition in maintaining homeostasis	370-371
❑	carry out an experiment to investigate the effect of specified variables on the effectiveness of an enzyme	
❑	compile and organize data, using appropriate formats and data treatments, to facilitate interpretation of the data from a completed digestive activity	
❑	describe disorders and the treatment of disorders linked to organs of the digestive system and their effect on the homeostasis of the system and the organism as a whole (317-4) Include: (i) ulcers (ii) gall stones (iii) Iletits/colitis	368-370
❑	propose alternative solutions to a given practical problem, identify the potential strengths and weaknesses of each, and select one as the basis for a plan – investigate the value of vitamins, minerals and herbal supplements in support of a healthy lifestyle	370-372

❑ identify multiple perspectives that influence a science-related decision of issue – evaluate how nutritional deficiency and starvation diets such as bulimia and anorexia nervosa can adversely affect the equilibrium – discuss whether the images portrayed through the media and advertising promote positive self image and a healthy lifestyle for men and women	372-373
Excretory System	
❑ explain how the excretory system, helps maintain homeostasis – explain how the following act as organs of excretion (i) lungs (ii) skin (iii) liver (iv) kidney – explain the role of the kidney as an excretory organ in removing metabolic wastes from the body – identify and describe the main structures of the human urinary system including kidney, ureter, bladder, and urethra – identify and describe the internal structure of the kidney, including the cortex, medulla and pelvis – identify and explain the function of the parts of a nephron. Include: (i) glomerulus (ii) Bowman's capsule (iii) loop of Henle (iv) tubules	374 374-375 374 375 375-378
❑ describe disorders linked to the excretory system and their effect on the homeostasis of the system and the organism as a whole Include: (i) kidney stones (ii) kidney infections (iii) bladder infections	379-381
❑ analyze and describe examples where technologies were developed to treat renal failure based on scientific understanding – briefly explain how the technology of dialysis works	378 and STSE
❑ analyze natural and technological systems to interpret and explain their structure and dynamics – compare the human system with that of kidney dialysis technology – briefly explain the eventual necessity of kidney transplant	STSE
❑ discuss the merits of funding kidney transplant therapy versus improvements in dialysis technology	STSE
❑ identify multiple perspectives that influence a science-related decision or issue	

Immune System	
❑ predict the impact of environmental factors such as allergens on homeostasis within an organism – explain the meaning of the terms antigen (allergen), antibody, and their role in an allergic reaction	382-384
❑ explain how the immune system helps to maintain homeostasis – explain the complete immune response 1st Line of defence (physical and chemical barriers) 2nd Line of defence (inflammatory response) 3rd Line of defence (immune response) – compare the role of the various white blood cells in the defence process including phagocytes and lymphocytes – compare the mechanism of various forms of acquired immunity including passive (breast milk) and active (actual exposure, vaccines)	382-384
❑ identify how autoimmune disorders determine diseases such as rheumatoid arthritis	386
❑ analyze why and how a particular technology was developed and improved over time	
❑ analyze and describe examples where technologies were developed based on scientific understanding	
❑ debate the merits of funding specific scientific or technological endeavors and not others	
❑ identify in general terms the impact of viral, bacterial, genetic, and environmental diseases on the homeostasis of an organism	