

## **SBI4U REVIEW SHEETS:**

### **Unit 1 Metabolic Processes**

**Chemistry** – know your general chem, formulae, ionic/covalent, hydrogen bonding, etc  
**Condensation and Hydrolysis Reaction** –definitions and examples

#### **Energy**

–define energy, metabolism, catabolic reaction, anabolic reaction, kinetic energy, potential energy, activation energy, exothermic reaction, endothermic reaction

#### **Organic Molecules**

–functional groups: name and draw the structure of all the functional groups studied in class  
–the building and breaking of macromolecules: dehydration reactions and hydrolysis reactions. (be able to explain and draw examples)  
–macromolecules: building blocks, general structural features, main functions and examples of each.(carbohydrates, lipids, and proteins)

**Enzymes** –definition/how do they work/factors affecting their activity

**Redox Reactions** –oxidation and reduction/importance of such reactions

#### **The Structure of the Mitochondria**

–size /structure: outer membrane, inner membrane, intermembrane space, matrix

#### **Glycolysis**

–know glycolysis in as much detail as is in the notes we took  
–the overall equation of glycolysis (what goes in and what comes out)

#### **The Oxidation of Pyruvate and The Citric Acid Cycle/Kreb's Cycle/TCA Cycle**

–know all the intermediate compounds (in order) in the oxidation of pyruvate and the TCA cycle (track how many carbons they contain)  
–know where the CO<sub>2</sub>'s leave, NADH's are formed, water leaves, ATPs are formed  
–know the overall reaction

#### **The Electron Transport Chain**

–know the ETC in as much detail as is in the notes we took ie.where do NADH and FADH enter the chain?  
– trace the flow of electrons, why do they move from molecule to molecule  
explain the chemiosmotic generation of ATP

#### **Cellular Respiration**

–where they occur  
–what is their function (starting reactants and end products)  
–if they are anaerobic or aerobic  
–how ATP are generated per glucose molecule from the whole process  
–which molecules are oxidized and which are reduced  
–where most of the energy lies at the end of each process

#### **Fates of Pyruvic Acid**

–lactic acid fermentation: –overall equation  
–what is it's purpose  
–what are it's negative effects  
–alcoholic fermentation: –what organisms undergoes this process  
–overall reaction  
–purpose  
–by-product: use to humans?

#### **The Structure of the Chloroplast**

-size and structure: outer membrane, inner membrane, granum, thylakoid, stroma, starch grain

### **The Light Reaction**

-Photosystem I: 5 steps/source of electrons

-Photosystem II: 6 steps

-explain where all this is occurring by referring to a diagram of a chloroplast.

### **The Dark Reaction**

-where does it occur/know the purpose & know the reactants and the products

### **Compare and contrast**

-light reaction vs. dark reaction: location, reactants, products

-photosynthesis vs. cellular respiration: location, reactants, products, energy

### **Review Questions:**

p.85 # 19, 20/ p. 86-87 # 24, 25

p. 133 #1, 2, 3, 4, 5, 6, 9, 10, 14, 15, 17, 18

p. 134 #2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 16, 17, 20, 21

p. 191 #1, 5, 7, 8, 10, 11, 13, 14, 15, 16, 17

p. 192 #2, 4, 7, 8, 9, 11

p. 196-197 #1, 3, 4, 6, 7, 12, 13, 19, 21, 22, 23, 24, 25, 28, 30

## **Unit 2: Homeostasis**

### **Homeostasis**

-Define homeostasis and know the general homeostatic mechanism and terms.

Relate this to thermoregulation

### **Positive and negative feedback systems**

-be able to explain each, with examples

### **Human Urinary System**

-be able to label a diagram of the urinary system, the nephron and a kidney

-know the functions of the different parts of the urinary system

-know, in detail, how a nephron works

### **The Endocrine System**

-how it works, generally

-non-target vs. target hormones

-label diagram of endocrine glands

-know the difference in how steroid and protein hormones signal cells

-know the function, location and parts of the pituitary gland

-be able to describe how blood sugar regulation works

-be able to describe how stress and the adrenal gland work

-describe how hormones control metabolisms

### **The Nervous System**

-know the divisions of the NS and what each division is composed of/responsible for

-label a motor and a sensory neuron

-know the functions of the parts of a neuron

### **The Reflex Arc**

-know the parts of the reflex arc

-be able to label the parts for specific examples. Diagram!

### **How a Message is carried along a neuron**

- be able to describe the whole action potential, what is happening at each stage and why
- know the characteristics of action potentials
- know how an action potential is transmitted along a nerve
- describe how information is transferred from nerve to nerve
- be able to label a synapse

#### The Central Nervous System

- label the spinal cord and the brain
- know the parts and functions of the brain
- know the answers to the brain dissection lab

#### Immunity

- stages of defense, white blood cells, antibodies/antigens

p. 367 #1-8

p. 368 # 3, 10, 15, 17

p. 407 # 1-8

p. 408 # 2, 3

p. 457 # 1-9

p. 495 #1-10, p. 496 #1,2,3 Check p. 500 for understanding

### **Unit 3: Molecular Genetics**

#### **History of Genetics**

- in general, the contribution of the following scientists: Mendel, Hershey and Chase, Franklin, Watson and Crick.

#### **DNA Structure**

- know, the structure: 3 parts/be able to label diagrams
- define nucleotide, complementary base pairing, phosphodiester bond, and glycosyl bond

#### **DNA Replication**

- distinguish conservative and semi-conservative models of DNA replication.
- know the purpose, procedure, results and conclusion of the Meselson and Stahl experiment (evidence for the semi-conservative model of DNA replication)
- explain, in detail, how DNA replicates (unwinding, continuous vs discontinuous synthesis)
- know the function of the following enzymes: DNA gyrase, DNA helicase, DNA polymerase I, DNA polymerase III, DNA ligase, RNA primase

#### **Gene Expression**

- DNA vs RNA
- transcription (in enough detail to draw/answer a short answer question)
- translation (in enough detail to draw/answer a short answer question)
- given a DNA sequence, predict the mRNA sequence and the amino acid sequence (given a table)
- know the central dogma of molecular genetics
- know the role of all enzymes involved
- describe the modifications that are made to eukaryotic primary transcript and what their function is

## **Gene Mutation**

-define mutation, mutagen, nonsense mutation, missense mutation

## **Biotechnology/Genetic Engineering**

-be able to describe the following topics in as much detail as your paper:  
restriction endonucleases, DNA ligase, gel electrophoresis, plasmids, transformation

## **Review Questions:**

p. 229 #1-6, 8, 9, 11-16

p. 230 #3, 5, 6, 7, 9, 10, 13, 14, 16

p. 273 # 1-3, 5, 6, 8, 9-16

p. 274-275 # 1-8, 10, 11, 15, 18, 21

p. 319 #1-7, 9, 11, 13

p. 320 #1, 2, 3, 6, 7, 8, 14, 16, 17, 18, 20, 23

p. 324-327 #1-16, 18-22, 23 (omit h), 24, 27-30, 32abd, 38, 40, 41

## **Unit 4: Evolution**

### **Evidence for Macroevolution**

-the fossil record -the molecular record/biochemistry

-comparative anatomy: homology and vestigial structures -development embryos

-patterns of distribution/biogeography

### **Different theories of evolution**

-Darwin: Natural Selection/ Lamarck: Acquired characteristics \*compare and contrast

The life of Charles Darwin:-observations on the Galapagos

-development of his theory/-publication of his research/-be able to apply the example of industrial melanism: peppered moths

### **Conditions that lead to evolutionary change**

-mutation be able to describe how each of

-migration these conditions leads to evolutionary

-genetic drift (founder effect) change, give examples of each

-non-random mating

-natural selection

**Hardy Weinberg!** Conditions for it to be true, how to use the equation.

### **Speciation** -definition of species

-barriers of hybridization: prezygotic/ postzygotic isolating mechanisms

geographical isolation embryos die

ecological isolation weaker hybrids

temporal isolation sterile hybrids

behavioral isolation mechanical isolation prevention of gamete fusion

-be able to use the Galapagos finches as an example

Review key terms p. 538, self quiz p. 539 and review questions p. 540 # 1, 5, 6, 7, 10, 11, 12, 16. Review key terms p. 580, self quiz p. 581, review questions p. 582 # 1, 3, 4, 5, 6, 7, 11, 12, 14, 16. Review key terms p. 634, self quiz p. 635, review questions p. 636 # 2, 5, 6, 8, 10, 12.