

Chapter 1, Sections 1, 2, & 3: Intro to Biology

Section 1

Student should be able to...

- *1. explain and use the following terms and concepts in a sentence;
- | | | |
|------------------|----------------|---------------------|
| biosphere | biology | biodiversity |
| species | DNA | metabolism |
| organism | cell | |
- *2. List the characteristics that are common to all living things;
- | | |
|------------------------|---------------------------------------|
| cells | response to environment |
| need for energy | reproduction & development |

Section 2

Student should be able to...

- *1. explain and use the following terms and concepts in a sentence;
- | | | |
|--------------------|-------------------|------------------|
| system | ecosystem | evolution |
| homeostasis | adaptation | |
- *2. give an example of each of the following;
- | | | |
|--------------------|------------------|-------------------|
| homeostasis | ecosystem | adaptation |
|--------------------|------------------|-------------------|

Section 3

Student should be able to...

- using the following terms, explain how a scientist would go about solving an unexplained observation;

data	hypothesis
experiment	theory
 - use a set of data (collected by student or given to student) to create a **line graph**, **bar graph** (histogram), or **circle graph** (pie) .
 - identify on a graph the **independent** (X-axis) and **dependent variables** (Y-axis).
 - identify the **constant(s)** used to create a **controlled experiment**.
 - interpret the information shown in a line, bar, or pie graph. (see pages R15 - R17 in book)
- * Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts

Chapter 2: Chemistry of Life

Section 2.1

Student should be able to...

- *1. differentiate between **atoms**, **elements**, and **compounds**.
2. diagram an atom illustrating the charge and location of the **electrons**, **protons**, **neutrons**, and **nucleus**.
3. use the **Bohr Model** to illustrate and differentiate between **ions** and **molecules**, and **ionic bonds** and **covalent bonds**. For example; draw a Na^{+1} ion.

Section 2.2

Student should be able to...

- *1. diagram and explain the **water molecule** and why it is said to be **polar**.
- *2. illustrate **hydrogen bonding** using 5 or more molecules.
3. explain the following 3 properties of water relative to its polarity; **high heat capacity**, **cohesion**, and **adhesion**. Give common examples of each.
4. explain the nature of a **solution** including the terms **solvent** and **solute**.
5. explain what it means for a watery solution to be an **acid**, a **base**, or **neutral**.
6. utilize the **pH scale** to ascertain (determine) the concentration of the **H⁺ ion**.

Section 2.3

Student should be able to...

1. explain why carbon atoms always form **4 covalent bonds** using the Bohr Model.
2. create a diagram that differentiate between **monomers** and **polymers**.
- *3. identify a **carbohydrate** by the ratio of carbon to hydrogen to oxygen atoms (1C :2 H : 1O).
- *4. explain the differences between a **monosaccharides**, a **disaccharide** and a **polysaccharide**, and give a common example of each.
5. recognize that monosaccharides, like glucose, are the monomers of larger carbohydrates.
6. explain how plants and animals utilize polysaccharides differently; **starch**, **cellulose**, and **glycogen**.
- *7. explain the composition of **lipids** and how they differ from carbohydrates.
- *8. differentiate the uses or functions of the various types of lipids, including **fats**, **oils**, **fatty acids**, **triglycerides**, and **cholesterol**.

- *9. explain the structural differences between **saturated** and **unsaturated** fatty acids.
- *10. recognize that **amino acids** are the monomers of **protein** molecules.
- 11. Distinguish between a **polypeptide** and the **peptide bonds** holding the amino acids together and relate polypeptides to proteins..
- *12. explain the main function and location of **nucleic acids**.

Section 2.4

Student should be able to...

1. identify the **reactants** and **products** in a **chemical reaction** when written in a **chemical equation**.
2. understand that in a **chemical reaction**, bonds between atoms are broken and bonds between different atoms form.
3. look at an energy graph of a chemical reaction and determine whether or not the reaction is an **exothermic** or **endothermic** reaction
4. explain that chemical reactions require some amount of **activation energy**.

Section 2.5

Student should be able to...

- *1. understand that **catalysts** reduce the amount of **activation energy** required by a chemical reaction and increase the rates at which reactions occur.
- *2. understand that **enzymes** are a special class of proteins that behave as organic catalysts.
- *3. understand that almost all chemical reactions in living organisms require **enzymes**.
- *4. identify the **enzyme**, **active site**, **substrate(s)**, and **products** as shown in a **lock-and-key model** of a chemical reaction. Draw and label a diagram of this model.
- * Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts

Chapter 3: Cell Structure and Function

Section 3.1

Student should be able to...

1. write out the 3 main parts of the **cell theory**.
- *2. differentiate **prokaryotic cells** from **eukaryotic cells**.
- *3. understand that all cells have a **cytoskeleton**, but not all cells have **organelles**.

Section 3.2

Student should be able to...

- *1. state the name and function of the following parts of a cell:

cytoskeleton	mitochondrion	nucleus
vacuole	lysosome	chloroplast
ribosome	centriole	Golgi apparatus
vesicle	cell wall	cytoplasm
endoplasmic reticulum (rough and smooth)		

- *2. identify plant only or animal only parts from the above list.

Section 3.3

Student should be able to...

- *1. explain the composition and function of a **cell membrane**, a.k.a plasma membrane.
- *2. explain the three basic parts of a **phospholipid**, including the charged **phosphate group**, the **glycerol**, and 2 **fatty acid chains**, and why they form a bi-layer when put in watery environment like your body.
3. identify the constituents of the cell membrane such as the phospholipids, proteins and carbohydrates, and, understand the nature of the **Fluid Mosaic Model**.
- *4. explain what is meant when we say the cell membrane is **selectively permeable**.

Section 3.4

Student should be able to...

- *1. differentiate between **osmosis** and **diffusion**.
2. explain that **concentration gradients** are the driving force behind osmosis and diffusion.
3. identify diagrams as being **hypotonic**, **hypertonic**, or **isotonic**, and draws arrows showing the direction water flows in each.

- *4. differentiate between **passive transport** and **facilitated transport** and the role proteins play in the latter

Section 3.5

Student should be able to...

- *1. explain **active transport** across a cell membrane via proteins and the expenditure of energy to move substances against a concentration gradient.
- 2. compare and contrast **endocytosis**, **phagocytosis**, and **exocytosis**, and, how they differ from simple active transport.

* Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts

Chapter 4: Cells and Energy

Section 4.1

Students should be able to...

- *1. label a diagram of adenosine triphosphate, including **adenine**, **ribose**, and the **3 phosphate groups**.
- *2. explain the ATP - ADP cycle, and, identify the **exothermic reaction**, $\text{ATP} \rightarrow \text{ADP} + \text{P} + \text{energy}$, and the **endothermic reaction**, $\text{ADP} + \text{P} + \text{energy} \rightarrow \text{ATP}$.
- *3. explain that most organisms obtain **calories** by digesting food to drive the production of ATP. Calories are what we use to measure energy stored in foods.
- *4. explain the energy source of **chemosynthesis**, and how it differs from **photosynthesis**.

Section 4.2

Students should be able to...

1. explain the energy source of **photosynthesis**, and how it differs from **chemosynthesis**.
- *2. explain that **chemosynthetic** and **photosynthetic** organisms are **autotrophs**, a.k.a. producers.
3. identify the parts of a chloroplast, including the **stroma**, **thylakoid**, and granum.
- *4. identify the locations of the **light-dependent** and **light-independent reactions** (a.k.a. dark reactions) on a diagram of the chloroplast.
- *5. explain that **chlorophyll** is the main, but not only, **pigment**, that absorbs sunlight energy in the red and blue part of the spectrum. (Why are most plants green?)
- *6. write out the balanced chemical formula for photosynthesis and label the reactants and the products.

Section 4.3

Students should be able to...

1. explain why the light-dependent reactions are broken into **photosystem II**, PS II, and **photosystem I**, PS I. (which system occurs first?)
2. explain that in **PS II** light is used to breakdown the **water molecule**, H_2O , into oxygen atoms, 2 H^+ , and 2 e^- .
3. explain that in **PS I** the e^- from **PS II** are used to make **NADPH**, and the H^+ are used to make **ATP**.
4. recognize that in the **Calvin Cycle**, the energy stored in **NADPH** and **ATP** are used in the Light-independent reactions to produce simple sugars.
5. identify all reactants and products as they cycle back and forth between the light-dependent and light-independent reactions.

Sections 4.4 & 4.5

Students should be able to...

- *1. relate the process of **breathing** to the final digesting of food in the cell to produce **ATP** to drive all metabolic reactions requiring energy.
- *2. compare and contrast **cellular respiration** (aerobic) to anaerobic process of **fermentation** (anaerobic respiration).
- *3. summarize the pathway of organic food as it enters your mouth and is digested into the simple sugars which enter into the cell.
4. explain the process of **glycolysis** as the first step in of **cellular respiration** (aerobic) or **fermentation** (anaerobic respiration).
5. write out the **reactants** and **products** of **glycolysis**.
6. describe the reactants and products of the **Krebs cycle**, specifically the number of **ATP**, **NADH**, and **FADH₂** molecules produced.
7. describe the pathway of the **NADH** and **FADH₂** after being produced in the **Krebs cycle**, including the **electron chain transport**, and the number of **ATP's** produced overall.
- *8. compare and contrast the balanced chemical reactions for **photosynthesis** and **cellular respiration**.

Section 4.6

Students should be able to...

- *1. explain how in the absence of oxygen, **fermentation** allows **glycolysis** to continue, including the reactants and products for both and how they cycle.
2. compare and contrast the two possible pathways of fermentation, specifically based on their products of **alcohol** or **lactic acid**.
- *3. identify which type of organisms use **lactic acid fermentation** and which type use **alcohol fermentation**.
4. list some common products of **alcoholic fermentation** that humans have relied upon.
5. discuss how or when humans use **cellular respiration** or **lactic acid fermentation**, citing common examples.

* Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts!

Chapter 5: *Cell Growth and Division*

Section 5.1

Student should be able to...

- *1. diagram the **cell cycle**, include the following terms in your diagram: **interphase, mitosis, cytokinesis, Gap 2, Gap 1, and Synthesis phase**.
2. explain why cell size has upper limits, include the terms **surface area, volume, and ratio**.

Section 5.2

Student should be able to...

- *1. differentiate between **DNA, chromatin, chromosome, and chromatids**, and, be sure to include **telomere, centromere, and histones** in the explanation.
- *2. diagram each of the phases of **mitosis** and label the phases of **prophase, metaphase, anaphase, and telophase**, and, briefly explain key characteristics of each phase.
- *3. differentiate between **mitosis** and **cytokinesis**.

Section 5.3

Student should be able to...

- *1. explain the internal and external factors regulating cell division, including the activities of **growth factors, and cyclins**.
2. explain **apoptosis** and why it occurs. Give a good example.
- *3. compare and contrast normal **body (a.k.a. somatic) cells** from cancerous cells.
- *4. differentiate cancer cells that are **benign, malignant**, and include the term **metastasize** in your explanation.
- *5. discuss **carcinogens** and the different types. Give at least one example of each.

Section 5.4

Student should be able to...

- *1. differentiate between **asexual reproduction** and **sexual reproduction**.
- *2. state at least **one advantage** and one **disadvantage** to **asexual reproduction**.
3. explain how **binary fission** differs from **mitosis**.

Section 5.5

Student should be able to...

- *1. understand that in **multicellular organisms** cells are arranged into **tissue**, and tissue is arranged into **organs**, and organs arranged into **organ systems**.
- *2. explain that **cell differentiation** occurs in new, **unspecialized cells** in order for them to develop into a **specialized form** to perform **specialized functions**.
3. state how **stem cells** may do one of 3 things;
 - a. divide and maintain their stem cell status.
 - b. remain undifferentiated.
 - c. differentiate into a variety of specialized cells.
4. compare and contrast **embryonic stem cells** with **adult stem cells**. Are there advantages to using one or the other from a medical point of view of what they can or cannot do?

* Refers to MCCSC *Power Standards*.

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Section 6.1

Student should be able to...

- *1. compare and contrast **somatic cells** and **gametes**. Give two examples of each.
- *2. differentiate between **homologous chromosomes**, **autosomes**, and **sex chromosomes**.
- *3. understand that **sexual reproduction** is the fusion of two **gametes**.
- *4. explain the difference between **diploid cells, $2n$** , and **haploid cells, n** . Give two examples of each that are found in the human body.

Section 6.2

Student should be able to...

- *1. diagram and explain the following steps of **meiosis**; **interphase**, **prophase I**, **metaphase I**, **anaphase I**, **telophase I**, **cytokinesis**, **prophase II**, **metaphase II**, **anaphase II**, **telophase II**, and **cytokinesis**.
- *2. compare and contrast the final stages of gametogenesis for males and females, be sure to include **sperm**, **eggs**, and **polar bodies**.

Section 6.3

Student should be able to...

- *1. relate the study of **genetics** to **Gregor Mendel**.
- *2. explain how Mendel set up his experiments using organisms with **traits** that he referred to as **purebreds**, and how he did a **cross** between purebreds for a single trait.
- *3. explain the **law of segregation** as proposed by Mendel.

Section 6.4

Student should be able to...

- *1. differentiate between a **gene** and an **allele**.
- *2. point out the differences between **homozygous** and **heterozygous genotypes**.
- *3. analyze the difference between **phenotype** and **genotype**.
- *4. understand that members of the same species have the same **genome**, which is different from the genomes of other species.
- *5. contrast **dominant** and **recessive alleles**.
- *6. explain the difference between **homozygous dominant** and **homozygous recessive** genotypes.

Section 6.5

Student should be able to...

- *1. compare and contrast **monohybrid cross**, **dihybrid cross**, and a **testcross**.
- *2. predict the **probability** for a given outcome to occur based on a **Punnett Square**.
- *3. analyze the data obtained using a **Punnett Square**.
- 4. calculate what portion of a population will express a given **phenotype** based on the results found in a **Punnett Square**.

- *5. explain Mendel's **law of independent assortment**. Relate this law to the differences in traits found among brothers and sisters in a family.

Section 6.6

Student should be able to...

- *1. explain the main advantage of **sexual reproduction** to the success of a species.
- *2. discuss the process of and results of **crossing over**.
- *3. explain verbally or diagrammatically what is meant by **genetic linkage**.

* Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts!!!

Chapter 7: Extending Mendelian Genetics

Section 7.1

Student should be able to...

- *1. compare and contrast **autosomal disorders** created by **recessive alleles** verses **dominant alleles**.
2. explain what Mendel understood about **autosomes** and **sex chromosomes**, or what he didn't understand. Where were the traits located that he studied?
- *3. explain the mechanisms of expression for genes found on **autosomes** verses those found on **sex chromosomes** called **sex-linked genes**.
4. explain **X chromosome inactivation** and which sex this affects.
- *5. use a Punnett square to predict the results of a genetic cross involving a sex-linked gene.

Section 7.2

Student should be able to...

- *1. compare and contrast **incomplete dominance** and **codominance**.
- *2. explain what is meant by a **polygenic trait**. Give at least two examples found in humans.
- *3. differentiate between **multi-allele traits** and **polygenic traits**.

Section 7.3

Student should be able to...

explain how **linkage maps** are created.

Section 7.4

Student should be able to...

- *1. explain how females can carry and/or have a **recessive genetic disorder** on the **sex chromosomes**, but much more probable for a male to have the disorder.
- *2. interpret a pedigree chart and determine whether a trait is **sex-linked dominant**, **sex-linked recessive**, **autosomal recessive**, or **autosomal dominant**.
3. discuss how a **karyotype** is made and what one can tell us about a fetus.
4. interpret a **karyotype** in order to evaluate genetic disorders in an individual.

* Relates to MCCSC *Power Standards*.

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Chapter 8: *From DNA to Proteins* (Omit Section 8.6)

Section 8.1

Student should be able to...

1. explain **Griffith's transforming principle**.
2. list the key steps that **Avery's** team used to identify the **transforming principle**.
3. explain how **Hershey** and **Chase** used the **bacteriophage** to verify Avery's work.

Section 8.2

Student should be able to...

- *1. label a diagram of DNA identifying one **nucleotide**, **phosphate group**, **deoxyribose**, and one **nitrogenous base**.
- *2. construct 4 nucleotides of DNA to illustrate "two rungs" on the ladder of DNA that show proper base pairing of **adenine** to **thymine** and **cytosine** to **guanine**.
- *3. realize the DNA molecule is a **double helix**.

Section 8.3

Student should be able to...

- * explain **DNA replication** and the role **DNA polymerase** plays in the process.

Section 8.4

Student should be able to...

1. state the **central dogma** of molecular biology as stated by **Francis Crick**.
- *2. recognize that **RNA** is **single strand helix**, contains **uracil** instead of thymine, and is not confined to the **nucleus**.
- *3. explain the process of **transcription** and how **RNA polymerase** is involved in the process.
- *4. describe the **3 types of RNA** and the role each play in the production of **protein synthesis**.
- *5. compare and contrast **replication** and **transcription**.

Section 8.5

Student should be able to...

- *1. explain the process of **translation**.
- *2. differentiate between **codons** and **anticodons**.
- *3. discuss the roles of **stop codons** and **start codons**.
- *4. determine the number of **amino acids** required from a given mRNA.
5. explain how the number of codons well exceeds the number of amino acids in an attempt to alleviate **point mutations**.

Section 8.7

Student should be able to...

- *1. differentiate **point mutations** and **frameshift mutations** while discussing **gene mutations**.
- *2. explain **gene duplication** and **gene translocation** while discussing **chromosomal mutations**.
- *3. compare and contrast **somatic cell mutations** and **germ cell mutations**, including who is affected by each.
- *4. explain what **mutagens** are and how they can affect our cells.
5. explain how **introns** and **exons** might mitigate mutations. (see page 251)

* Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts!!!

Chapter 9: *Frontiers of Biotechnology*

Section 9.1

Student should be able to...

1. explain the role **restriction enzymes** play in manipulating DNA.
2. summarize the process of **gel electrophoresis** in the formation of **restriction maps**.

Section 9.2

Student should be able to...

1. point out the purpose of **polymerase chain reaction, PCR**, and the **primer**.
2. compare and contrast **PCR** and **DNA replication**.

Section 9.3

Student should be able to...

- *1. state the purposes or uses of **DNA fingerprinting**.
2. explain two excellent reasons for using **DNA fingerprinting** in a court of law.

Section 9.4

Student should be able to...

- *1. state what a **clone** is, and whether it occurs naturally or unnaturally.
- *2. explain what is meant by **genetic engineering**.
3. explain how **recombinant DNA** can occur naturally in **bacterial plasmids** or unnaturally in the hands of a **genetic engineer**.
- *4. explain how a **transgenic organism** differs from a normal organism.
5. describe what is meant by **gene knockout**.

Section 9.5

Student should be able to...

1. compare and contrast **genomics, bioinformatics, DNA microarrays, and proteomics**.
2. explain how **gene sequencing** plays a role in each of the aforementioned terms in #1 above in this section.

Section 9.6

Student should be able to...

- * explain how **genetic screening** and **gene therapy** are used to treat genetic disorders.

* Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts!!!

Chapter 10: Principles of Evolution
Chapter 11, Section 6: The Evolution of Populations

Section 10.1

Student should be able to...

- *1. define the term **evolution** as it is used by biologist.
- 2. compare and contrast **catastrophism**, **gradualism**, and **uniformitarianism**.

Section 10.2

Student should be able to...

- *1. explain the connection between **variation** and **adaptation** relative to an organism and its environment.
- 2. describe the connection made by **Darwin** after he experienced an earthquake and the sea shells he found in layers near the top of a mountain...how did this influence his thoughts?

Section 10.3

Student should be able to...

- *1. compare and contrast **artificial selection** and **natural selection**.
- *2. explain what **heritability** is and how it plays an important role in **natural selection**.
- *3. explain how **evolution** occurs using the four parts of **natural selection** as described by Darwin. Be sure to include **variation**, **overproduction**, **adaptation**, and **descent with modification**.
- *4. describe how **fitness** applies to a particular variation in a population.

Section 10.4

Student should be able to...

- * explain how the following terms and concepts can be used as evidence for evolution: **fossils**, **geography**, **biogeography**, **embryology**, **anatomy** (both **homologous structures** and **analogous structures**), and **vestigial structures**.

Section 10.5

Student should be able to...

- *1. understand how we use **modern techniques** to sequence **DNA**, **RNA**, and **proteins** to support **fossil** and **anatomical evidence** supporting evolution.
- *2. understand that **evolution unites all fields of biology**.

(continue on backside)

Section 11.6

Student should be able to...

- * compare and contrast the various patterns of evolution, including the following;
convergent evolution **divergent evolution**
co-evolution **extinction**
punctuated equilibrium **adaptive radiation**

- * Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts!

Chapter 12, Sections 1, 3, & 4 : *The History of Life*
and
Chapter 17, Sections 1, 2, & 3: *The Tree of Life*

Section 12.1

Student should be able to...

1. compare and contrast the different ways fossils are formed:

permineralization	natural casts
trace fossils	amber-preserved fossils
preserved remains	
2. summarize **relative dating** of fossil.
3. explain **radiometric dating** of fossils and the **half life** of a radioactive isotope.
4. interpret a **graph of radiometric dating**.

Section 12.3

Student should be able to...

1. summarize the **origin of Earth**, beginning with the condensing of a **nebula**.
2. summarize and critique the **Miller-Urey experiment**.
3. compare and contrast the **iron-sulfide bubbles hypothesis** and the **lipid membrane hypothesis** as possible origins of the first cells.
4. summarize the **RNA hypothesis** as early genetic material.

Section 12.4

Student should be able to...

- *1. discuss the origins of the first **Eukaryotic cells** as proposed by the **theory of endosymbiosis**.
- *2. point out the main advantage(s) **sexual reproduction** has offered.

Section 17.1

Student should be able to...

- *1. describe the science of **taxonomy**.
- *2. explain what is meant by **binomial nomenclature**.
- *3. correctly write out the binomial name of humans, be sure to include the correct format for using **genus** and **species**.
- *4. arrange in the correct order the 7 levels of the **Linnaean Classification System**.
- *5. construct and/or use a **dichotomous key** to identify an organism.

Section 17.2

Student should be able to...

- *1. understand that **phylogeny** refers to the evolutionary history for a group of species.
- *2. describe **cladistics**; include **cladogram**, **clade**, and **derived characteristics** in your description.
3. explain how **DNA** often has the final word in which **clade** an organism belongs.

Section 17.3

Student should be able to...

- *1. explain how **molecular clocks** are used in determining when 2 species separated from a common ancestor.
- *2. differentiate between the use of **DNA, mitochondrial DNA, or ribosomal RNA** in creating a **molecular clock**.

* Refers to MCCSC *Power Standards*.

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Chapter 13: Principles of Ecology

(done in the order given below)

Section 1

Student should be able to...

understand & arrange the levels of organization from smallest to largest or largest to smallest.

organism → population → community → ecosystem → biome

Section 2

Student should be able to...

- *1. identify the **biotic** and **abiotic** factors in a given ecosystem.
- *2. explain what is meant by **biodiversity** and the effect of eliminating the **keystone species** in an ecosystem.

Section 3

Student should be able to...

- *1. explain the role of **producers (autotrophs)** and **consumers (heterotrophs)** in an ecosystem.
- *2. compare and contrast **chemosynthesis** and **photosynthesis** relative to being autotrophs.

Section 4

Student should be able to...

- *1. construct a **food chain** given a list of common organisms from a specific ecosystem recognized by all. i.e., an old field.
- *2. differentiate between a food chain and a **food web**.
- *3. differentiate between **herbivores, carnivores, omnivores, detritivores, and decomposers**, and, be able to give an example of each.

Section 6

Student should be able to...

- * organize species of a specific ecosystem into **pyramids** illustrating the decrease of **biomass** or **energy** at each **trophic level**.

Section 5

Student should be able to...

- * illustrate how matter cycles on Earth, including the **hydrologic cycle** and the **biogeochemical cycles** or **oxygen, carbon, nitrogen, and phosphorus**.
- * Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts

Chapter 14; Interactions in Ecosystems
&
Chapter 16 Section 4; Threats to Biodiversity

Section 14.1

Student should be able to...

1. differentiate between **habitat** and **ecological niche**.
2. explain how and why **competitive exclusion** results in one of 4 possible outcomes;
 - a. one species being pushed into another niche.
 - b. becoming extinct.
 - c. **niche partitioning**.
 - d. **evolutionary response**.
3. understand and recognize **ecological equivalents**.

Section 14.2

Student should be able to...

- *1. understand and explain what is meant by **competition** between species and within a species.
- *2. understand the relationship between **predator** and **prey** in an ecosystem.
- *3. differentiate and give examples of the three **symbiotic relationships** that exist, **including mutualism, commensalism, and parasitism**.

Section 14.3

Student should be able to...

1. calculate **population density** given a set of data, for example, number of rabbits per square kilometer.
2. explain the differences of population dispersion as either **clumped dispersion, uniform dispersion, or random dispersion**.

Section 14.4

Student should be able to...

1. explain and differentiate the 4 mechanisms that cause population sizes to change; **immigration, births, emigration, and deaths**.
- *2. construct and/or interpret a line graph illustrating **exponential growth, or J-curve**, of a given set of data for population.
- *3. construct and/or interpret a line graph illustrating **logistical growth** for a given set of data for a population.
- *4. explain what **carrying capacity** is relative to the organisms that inhabit a particular environment.

- *5. explain what is meant by **population crash** and give an example of how this occurs.
- 6. explain and differentiate between **density-dependent limiting factors** and **density independent limiting factors**.

Section 14.5

Student should be able to...

- *1. explain the role of **pioneer species** in the succession of an ecosystem.
- *2. give examples and differentiate between **primary succession** and **secondary succession**.

Section 16.4 This is the only section in Chapter 16 we will discuss.

Student should be able to...

- 1. explain why preserving biodiversity is so important to the health of our planet, and thus our own health.
- *2. explain how the loss of **habitat** and **habitat fragmentation** has a negative effect on the organisms existing in ecosystems experiencing either or both of these problems.
- *3. explain the effects of **introduced species**, a.k.a. **invasive species**, has on the pre-existing organisms in an ecosystem.

* Relates to MCCSC *Power Standards*.

Students are responsible for all BOLD FACE terms & concepts above!