Title: Unit I: Basic Biological Principles **Topic**: Science Process, Characteristics of Life, Cells Overview	**Subject/Course**: Biology **Grade:** 10 E. Gallagher

Stage 1- Desired Results

Established Goals:

Student knowledge & understanding of…

- Scientific problem solving skills
- Biological levels of organization and the relationships between levels
- Characteristics of life shared by all organisms

Anchor Descriptors:

BIO. A 1.1 Explain the characteristics common to all organisms.

BIO.A.1.2 Describe relationships between structure and function at biological levels of organization.

BIO.B Apply scientific thinking, processes, tools and technologies in the study of science

Eligible Content:

BIO.A.1.1.1 Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms.

BIO.A.1.2.2 Describe and interpret relationships between structure and function at various levels of biological organization (i.e. organelles, cells, tissues, organs, organ systems, and multicellular organisms).

NGSS:

HS-LS1: From Molecules to Organisms: Structures and Processes

HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Science and Engineering Practices:

- Developing & Using Models (HS-LS1-2)

Disciplinary Core Ideas:

LS1.A: Structure & Function

Crosscutting Concepts

- Systems & Systems Models (HS-LS1-2)

Transfer:

Students will be able to independently use their learning to…

- Apply scientific process/nature of science skills to scientific problems
- Apply knowledge of life characteristics to determine life
- Describe the interplay between organizational levels of living things

Meaning:

Understandings:	**Essential Questions:**
Students will understand that… • Scientific processes and methodology enable scientists (and students) to determine solutions to problems. Application of science process	1. What are the goals and processes of science? 2. What is scientific theory? 3. How do we apply the characteristics of life to determine what is living?

clarifies understanding of the natural world • Life, from chemical compounds to organism to biosphere is highly organized, with relationships between levels. • The characteristics of life are common to all living things, from the simplest prokaryote to the most complex multicellular organism	
Acquisition:	
Students will know… • Overview of biology • Science process skills • Characteristics of life • Levels of organization of living things	*Students will be skilled at …* 1. Identify science process skills 2. Apply scientific method and experimental components to scientific problem scenarios 3. Identify the characteristics of life 4. Apply scientific process to determine life 5. Compare and contrast prokaryotic and eukaryotic cells 6. Explain levels of organization and their relationship
Stage 2- Assessment Evidence	
Unit-Based Project <u>Experimental Design & Characteristics of Life</u> Using components of science process and experimental set-up, students develop and hypothesis and design a controlled experiment to test the hypothesis.	**Other Evidence:** Chapter quizzes: • Science of Biology Unit Test: Science Process, Characteristics of Life, Biological Organization Laboratory Activities & Reports
Stage 3 - Learning Plan	
Pre-Assessment	
Learning Events Vocabulary: • <u>CH1:</u> *Science, observation, inference, hypothesis, controlled experiment, independent variable, dependent variable, control group, data, theory, bias, biology, DNA, stimulus, sexual reproduction, asexual reproduction,*	**Progress-Monitoring** ✓ Do Nows ✓ Vocabulary quizzes ✓ Classwork/homework check ✓ Online activities completion and accuracy check with discussion on results ✓ Accuracy of section and chapter review

homeostasis, metabolism, biosphere Vocabulary Lecture presentation/notes/discussion Animations/videos Chapter Section Assessment Questions Exercises: • Scientific scenarios • Graphic organizer (pyramid) for levels of organization • Poster/chart comparing living vs non-living according to life characteristics, with rationale Online activities/webquests • Scientific method webquest • Characteristics of Life webquest Laboratory Activities: • Scientific method lab activity • Characteristics of life lab activity Guided reading/Review handouts Chapter 1 Assessment Questions Chapter 1 Standardized Test Prep	questions, guided reading handouts, chapter reading synopses ✓ Lab exercises execution & data analyses ✓ Unit project progression monitoring
Technology • Laptops and Internet for online activities and project research • PowerPoint/LCD projector for lecture/discussion • Laboratory equipment & materials for lab exercises • Pearson Biology: eBook, online assignments, quizzes, tests, online activities, questions, presentations, animations • Text companion website: www.pearsonsuccessnet.com • Discovery Streaming, TeacherTube, various online sources for visuals, etc.	**Pacing Guide** September Chapters 1 Approx: 2 weeks 1 day: Includes course overview, classroom protocols, safety, textbook distribution & layout, course expectations Review/reteach Unit test / Unit Project due

Title: Unit II: Ecology and Evolution Review **Topic**: Review of Ecology, Review of Natural Selection, Evolutionary Evidence and Mechanisms	**Subject/Course**: Biology **Grade:** 10 E. Gallagher, J. Gutterman

Stage 1- Desired Results

Established Goals:

Student knowledge & understanding of…

- Abiotic and biotic factors in aquatic and terrestrial ecosystems
- Interactions between organisms in an ecosystem (symbiosis, predation, competition)
- The levels of ecological organization
- The conservation, movement and cycling of energy in an ecosystem
- The relationship between genetic inheritance and evolution
- The relationship between an organism's features and its environment.
- What drives natural selection and speciation.

Anchor Descriptors:

BIO.B.4.1 Describe ecological levels of organization in the biosphere.
BIO.B.4.2 Describe interactions and relationships in an ecosystem.
BIO.B.3.1 Explain the mechanisms of evolution.
BIO.B.3.2 Analyze the sources of evidence for biological evolution.
BIO.B.3.3 Apply scientific thinking, processes, tools, and technologies in the study of the theory of evolution.

Eligible Content:**

BIO.B.4.1.1, .2: (levels of ecological organization; characteristics of biotic/abiotic ecosystem components)
BIO.B.4.2.1, .2, .3, .4, .5: (energy flow through an ecosystem; biotic interactions in an ecosystem; cycles of matter; ecosystems changing due to natural and human disturbances; limiting factors and species extinction).
BIO.B.3.1.1, .2, .3: (natural selection effect on allele frequency; development of new species; genetic mutations producing variations)
BIO.B.3.2.1: (evidence to support evolution)
BIO.B.3.3.1: (distinguish hypothesis, inference, law, theory, principle, fact, and observation)

NGSS:

HS-LS2: Ecosystems: Interactions, Energy, and Dynamics
HS-LS2-1: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
HS-LS2-2: Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
HS-LS2-3: Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.
HS-LS2-4: Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

HS-LS2-5: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
HS-LS2-6: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
HS-LS2-8: Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.
HS-LS3: Heredity: Inheritance and Variation of Traits
HS-LS3-3: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
HS-LS4: Biological Evolution: Unity and Diversity
HS-LS4-1. Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
HS-LS4-2. Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

Science and Engineering Practices:

- Developing & using Models (HS-LS2-5)
- Using Mathematical & Computational Thinking (HS-LS2-1, HS-LS2-2, HS-LS2-4)
- Constructing Explanations and Designing Solutions (HS-LS2-3), (HS-LS2-7, HS-LS4-2)
- Engaging in Argument from Evidence (HS-LS2-6), (HS-LS2-8)
- Analyzing & Interpreting Data (HS-LS3-3)
- Obtaining, Evaluating, and Communicating Information (HS-LS4-1)

Disciplinary Core Ideas:

LS2.A: Interdependent Relationships in Ecosystems
LS2.B: Cycles of Matter and Energy Transfers in Ecosystems
LS2.C: Ecosystem Dynamics, Functioning and Resilience
LS2.D: Social Interactions & Group Behaviors
LS4.A: Evidence of Common Ancestry and Diversity
LS4.B: Natural Selection
LS4.C: Adaptation
LS4.D: Biodiversity & Humans

Crosscutting Concepts

- Scale, Proportion, and Quantity (HS-LS2-1) (HS-LS3-3)
- Systems & Systems Models (HS-LS2-5)
- Energy & Matter (HS-LS2-3, HS-LS2-4)
- Stability & Change (HS-LS2-6) (HS-LS2-7)
- Patterns (HS-LS4-2)

- Cause & Effect (HS-LS2-8, HS-LS4-2)

For full description of eligible content, please refer to Units I & II of the 9th grade curriculum.

Transfer:

Students will be able to independently use their learning to…

1. Describe and differentiate between the levels of ecological organization.
2. Describe characteristic biotic and abiotic components of terrestrial and aquatic ecosystems.
3. Explain how energy flows through an ecosystem.
4. Describe biotic interactions within an ecosystem.
5. Describe Darwin's theory of evolution, supported by his observations and research.
6. Relate heredity to natural selection.
7. Support Darwin's theory using various types of observable evidence.
8. Explain natural selection and its components.
9. Explain the process of speciation and differentiate between its various causes.

Meaning:

Understandings:

Students will understand that…

- Energy and matter cycle through an ecosystem.
- Food chains and food webs demonstrate predative interactions between living organisms.
- Organisms interact symbiotically.
- Natural disasters, human impact and limiting factors impact ecosystems.
- The relationship between genetic inheritance and evolution
- Types of natural selection, speciation and the contributing factors
- Organisms are organized for study by various physical and physiological features.

Essential Questions:

1. How are ecosystems organized?
2. What factors limit population growth?
3. How does energy flow through an ecosystem?
4. What is the difference between and endangered and a threatened species?
5. How do organisms interact with each other and with abiotic factors in their environments?
6. What are limiting factors and how do they affect an ecosystem and its organisms?
7. How does human activity impact an ecosystem?
8. What evidence convinced Darwin that species could change over time?
9. What are the principles of natural selection?
10. What's the evidence for natural selection?
11. How are living things organized for study?

Acquisition:

Students will know…

- Levels of ecological organization
- Different types of organism interaction

Students will be skilled at …

1. Describe and differentiate between the levels of ecological organization, as

• Classification of organisms based on diet • Abiotic resources upon which organism rely for survival (water, O_2, CO_2, sunlight) • Factors that influence organism diversity/survival • Principles of inheritance as they relate to evolution • Natural selection contributing factors • Speciation contributing factors • Evidence of evolution • Basics of taxonomy and classification.	well as biotic and abiotic factors. 2. Explain how energy flows through an ecosystem. 3. Describe biotic interactions within an ecosystem. 4. Explain how matter recycles in an ecosystem. 5. Analyze how ecosystems change in response to natural and human disturbances. 6. Cite specific fossil evidence, biochemical evidence and morphology to support organism relatedness due to evolution. 7. Explain how mechanisms of evolution drive speciation. 8. Differentiate between analogous, homologous and vestigial structures. 9. Use a dichotomous key to understand how and why organisms are categorized for study.

Stage 2- Assessment Evidence

Unit-Based Project Ecology/Natural selection mini research project	**Other Evidence:** **Mid-unit quiz after reviewing concepts in the following chapters:** • Ch 2: Principles of Ecology • Ch 3: Communities, Biomes and Ecosystems • Ch 4.1: Population Ecology • Ch 5.1: Biodiversity **Unit Test after completing the remaining chapters:** • Ch 15: Evolution • Ch 17.1: Organizing Life's Diversity

Stage 3 - Learning Plan

Pre-Assessment

Learning Events	**Progress-Monitoring**
Vocabulary: • <u>CH 2:</u> *Ecology, biosphere, biotic factor, abiotic factor, population, biological community, ecosystem, biome, habitat, niche, predation, symbiosis, mutualism, commensalism, parasitism, autotroph, heterotroph,*	✓ Do Nows ✓ Vocabulary quizzes ✓ Classwork/homework check ✓ Online activities

herbivore, carnivore, omnivore, decomposer (detritivore), trophic level, food chain, food web, biomass, matter, nutrient, biogeochemical cycle, nitrogen fixation, denitrification • CH 3: *Community, limiting factor, tolerance, ecological succession, primary succession, climax community, secondary succession, terrestrial ecosystem, weather, latitude, climate, tundra, boreal forest, temperate forest, woodland, grassland, desert, tropical savanna, tropical seasonal forest, tropical rain forest, aquatic ecosystem, sediment, littoral zone, limnetic zone, plankton, profundal zone, wetlands, estuary, intertidal zone, photic zone, aphotic zone, benthic zone, abyssal zone* • CH 4.1: *Population density, dispersion, population growth rate, carrying capacity* • CH 5.1: *Extinction, biodiversity, genetic diversity, species diversity, ecosystem diversity* • CH 15: *Artificial selection, natural selection, evolution, derived trait, ancestral trait, homologous structure, vestigial structure, analogous structure, embryo, biogeography, fitness, camouflage, mimicry, genetic drift, founder effect, bottleneck, stabilizing selection, directional selection, sexual selection, allopatric speciation, sympatric speciation, gradualism, punctuated equilibrium* • CH 17.1, 17.2: *Classification, taxonomy, binomial nomenclature, taxon, species, genus, family, order, class, phylum, kingdom, domain, phylogeny, character, cladistics, cladogram* Vocabulary Lecture presentation/notes/discussion Animations/videos Chapters 2/3/4.1/5.1/15/17.1 Section Assessment Questions **Exercises:** • Review activities for ecology and evolution o Graphic organizers o Readings and questions o Video clips o Web quests o Modeling concepts (ecosystems, food webs, cladograms) **Laboratory Activities:**	completion and accuracy check with discussion on results ✓ Accuracy of section and chapter review questions, guided reading handouts, chapter reading synopses ✓ Lab exercises execution & data analyses ✓ Unit project progression monitoring

• Modeling food chains • Demonstrating natural selection using manipulatives • Analyzing and graphic data of observable change in species over time Guided reading/Review handouts Chapter 2/3/4.1/5.1/15/17.1 Assessment Questions Chapter 2/3/4.1/5.1/15/17.1 Standardized Test Prep	
Technology • Laptops and Internet for online activities and project research • PowerPoint/LCD projector for lecture/discussion • Laboratory equipment & materials for lab exercises • Pearson Biology: eBook, online assignments, quizzes, tests, online activities, questions, presentations, animations • Text companion website: www.pearsonsuccessnet.com • Discovery Streaming, TeacherTube, various online sources for visuals, etc.	**Pacing Guide** September/October Chapters 2/3/4.1/5.1/15/17.1 Approx: 2 weeks Review/reteach Unit test / Unit Project due

Title: Unit III: Genetics **Topic**: DNA, RNA & Protein Synthesis, Mendelian Inheritance, Non-Mendelian Inheritance	**Subject/Course**: Biology **Grade:** 10 E. Gallagher, J. Gutterman

Stage 1- Desired Results

Established Goals:

Student knowledge & understanding of…

- DNA structure and replication
- RNA structure and processes of transcription and translation
- Protein synthesis pathway
- Relationship between DNA and traits
- Mendelian patterns of inheritance
- Non-Mendelian patterns of inheritance
- Genetic engineering impacts

Anchor Descriptors

BIO.B.2.1 Compare Mendelian and non-Mendelian patterns of inheritance.

BIO.B.2.2 Explain the process of protein synthesis (i.e., transcription, translation, and protein modification).

BIO.B.2.3 Explain how genetic information is expressed.

BIO.B.2.4 Apply scientific thinking, processes, tools, and technologies in the study of genetics.

Eligible Content:

BIO.B.2.1.1 Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).

BIO.B.2.1.2 Describe processes that can alter composition or number of chromosomes (i.e., crossing-over, nondisjunction, duplication, translocation, deletion, insertion, and inversion).

BIO.B.2.2.1 Describe how the processes of transcription and translation are similar in all organisms.

BIO.B.2.2.2 Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production of specific types of proteins.

BIO.B.2.3.1 Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frameshift).

BIO.B.2.4.1 Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture (e.g., selective breeding, gene splicing, cloning, genetically modified organisms, gene therapy).

NGSS:

HS-LS1: <u>From Molecules to Organisms: Structures and Processes</u>

HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.

HS-LS3: <u>Heredity: Inheritance and Variation of Traits</u>

HS-LS3-1: Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
HS-LS3-2: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

Science and Engineering Practices:

- Planning & Carrying Out Investigations (HS-LS1-3)
- Asking Questions & Defining Problems (HS-LS3-1)
- Engaging in Argument from Evidence (HS-LS3-2)

Disciplinary Core Ideas:

LS3.A: Inheritance of Traits
LS3.B: Variation of Traits
LS1.A: Structure & Function

Crosscutting Concepts

- Structure & Function (HS-LS1-1)
- Cause & Effect (HS-LS3-1, HS-LS3-2)

Transfer:

Students will be able to independently use their learning to…

- Explain how the genetic code (DNA) is translated into physical traits of an organism
- Compare and contrast Mendelian and non-Mendelian inheritance patterns
- Describe how mutations can occur and their effect on genotypes/phenotypes
- Discuss impact of genetic engineering in modern life

Meaning:

Understandings:

Students will understand that…

- DNA is the basis of life because of three qualities: it holds information, it copies itself, and it changes.
- DNA sequences are the blueprints of life. Cells must maintain this information, yet also access it to manufacture proteins. RNA acts as the go-between, linking DNA to protein.
- Mutations provide the variation necessary for life to exist. Usually DNA repair protects against harmful mutations, but some mutations are helpful.
- Gregor Mendel deduced the basis of inheritance patterns. His two laws

Essential Questions:

1. How does the structure of DNA enable efficient replication?
2. How is the information encoded within DNA accessed to create proteins?
3. Why is the sequence and structure of proteins so crucial to gene expression?
4. What are the causes and types of mutations?
5. How do mutations contribute to genetic variations?
6. How did Mendel's work form the basis of modern genetics?
7. How do we track inheritance patterns?
8. How do non-Mendelian inheritance patterns (incomplete dominance, codominance, multiple alleles, pleiotropy) affect gene expression?

brilliantly described how chromosomes behave in meiosis, which had not yet been discovered. • Patterns of inheritance can be obscured when genes have many variants, interact with each other or the environment, are in mitochondria, or are linked on the same chromosome	
Acquisition:	

Students will know…
• Common patterns of inheritance
• Tools for predicting patterns of inheritance
  o Punnett square
  o Pedigree
  o Mathematics of probability
• Relationship between genotype and phenotype
• Phenotype as a function of gene expression (DNA to protein to phenotype)
• Different types of gene mutations
• Possible effect of mutation (change in the DNA sequence) on phenotype
• Environmental influences on phenotype
• Importance of chromosome composition and number in controlling phenotype
	Students will be skilled at …
	1. Explain the structural relationships between DNA, genes, and chromosomes.
	2. Explain the unified process of protein synthesis.
	3. Describe the role of the nucleus, ribosomes, ER, and Golgi apparatus in the production and processing of proteins.
	4. Describe how genetic mutations alter DNA sequence and may or may not affect phenotype.
	5. Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in inheritance.
	6. Describe and/or predict observed patterns of inheritance.
	7. Describe how cellular information pass from one generation to another
	8. Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).
	9. Describe processes that can alter composition or number of chromosomes (i.e., crossing-over, nondisjunction, duplication, translocation, deletion, insertion, and inversion).
	10. Describe how the processes of transcription and translation are similar

	in all organisms. 11. Compare and contrast translation and transcription 12. Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production of specific types of proteins. 13. Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frameshift). 14. Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture (e.g., selective breeding, gene splicing, cloning, genetically modified organisms, gene therapy). 15. Identify the function of the three types of RNA 16. Explain why a restrictive enzyme can be used for
Stage 2- Assessment Evidence	
Unit-Based Project Genetic Disorder Brochure	**Other Evidence:** Chapter quizzes: • Ch 12: DNA • Ch 13:RNA & Protein Synthesis • Ch 11.1-11.3: Introduction to Genetics Unit Test: Genetics
Stage 3 - Learning Plan	
Pre-Assessment	
Learning Events Vocabulary: • CH 12: *Base pairing, replication, DNA polymerase, telomere* • CH 13: *RNA, messenger RNA, ribosomal RNA, transfer RNA, transcription, RNA polymerase, promoter, intron, exon, polypeptide, genetic code, codon, translation, anticodon, gene expression* • CH 11.1-11.3: *Genetics, fertilization, trait, hybrid, gene, allele, principle of dominance, segregation, gamete, probability, homozygous, heterozygous,*	**Progress-Monitoring** ✓ Do Nows ✓ Vocabulary quizzes ✓ Classwork/homework check ✓ Online activities completion and accuracy check with discussion on results ✓ Accuracy of section and chapter review

phenotype, genotype, Punnett square, independent assortment, incomplete dominance, codominance, multiple allele, polygenic trait Vocabulary Lecture presentation/notes/discussion Animations/videos Chapters 12/13/11.1-11.3 Section Assessment Questions Exercises: • DNA diagram • DNA replication practice • DNA models • RNA diagram • DNA-RNA transcription practice • Protein synthesis pathway diagram • Translation practice • Punnett Square practice – Mendelian inheritance • Punnett Square practice – non-Mendelian inheritance • Pedigrees • Mutations & Disorders chart • Genetic engineering types and purposes chart Online activities/webquests • Replication/Transcription/Translation webquest • Punnett Square practice online • Online mutations activity • Genetic mutations & chromosomal abnormalities activity • Genetic engineering articles & reflections Laboratory Activities: • DNA extraction lab • Protein synthesis modeling activity • Interpreting PCR results activity Guided reading/Review handouts Chapter 12/13/11.1-11.3 Assessment Questions Chapter 12/13/11 Standardized Test Prep	questions, guided reading handouts, chapter reading synopses ✓ Lab exercises execution & data analyses ✓ Unit project progression monitoring
Technology • Laptops and Internet for online activities and project research • PowerPoint/LCD projector for lecture/discussion • Laboratory equipment & materials for lab exercises • Pearson Biology: eBook, online assignments, quizzes, tests, online activities, questions, presentations, animations • Text companion	**Pacing Guide** January/February Chapters 12, 13, 11.1-11.3. Approx: 4 weeks Review/reteach Unit test / Unit Project due

website: www.pearsonsuccessnet.com • Discovery Streaming, TeacherTube, various online sources for visuals, etc.	

Title: Unit IV: Cell Growth & Reproduction **Topic**: Cell Cycle, mitosis, Differentiation, Meiosis	**Subject/Course**: Biology **Grade:** 10 E. Gallagher

Stage 1- Desired Results

Established Goals:

Student knowledge & understanding of…

- Cell reproduction, sexual and asexual
- Cell cycle, mitosis and cell differentiation, mitosis role in genetic conservation
- Meiosis and sexual reproduction and its role in genetic diversity

Anchor Descriptors:

BIO.A.1.2 Describe relationships between structure and function at biological levels of organization.
BIO.B.1.1 Describe the three stages of the cell cycle: interphase, nuclear division, cytokinesis.
BIO.B.1.2 Explain how genetic information is inherited.

Eligible Content:

BIO.A.1.2.1 Compare cellular structures and their functions in prokaryotic and eukaryotic cells.
BIO.B.1.1.1 Describe the events that occur during the cell cycle: interphase, nuclear division (i.e., mitosis or meiosis), cytokinesis.
BIO.B.1.1.2 Compare the processes and outcomes of mitotic and meiotic nuclear divisions.
BIO.B.1.2.1 Describe how the process of DNA replication results in the transmission and/ or conservation of genetic information.
BIO.B.1.2.2 Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in inheritance.

NGSS:

HS-LS1: <u>From Molecules to Organisms: Structures and Processes</u>
HS-LS1-4: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
HS-LS3: <u>Heredity: Inheritance and Variation of Traits</u>
HS-LS3-1: Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
HS-LS3-2: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

Science and Engineering Practices:

- Developing & Using Models (HS-LS1-4)
- Asking Questions & Defining Problems (HS-LS3-1)
- Engaging in Argument from Evidence (HS-LS3-2)

Disciplinary Core Ideas:

LS1.B: Growth & Development of Organisms
LS3.A: Inheritance of Traits

LS3.B: Variation of Traits

Crosscutting Concepts

- Systems & Systems Models (HS-LS1-4)
- Cause & Effect (HS-LS3-1, HS-LS3-2)

Transfer:

Students will be able to independently use their learning to…

- Compare and contrast asexual and sexual reproduction
- Describe the stages of the cell cycle and possible genetic outcomes
- Explain cell cycle regulation and results of loss of controls
- Explain how DNA replication conserves genetic information, and how cell/nuclear divisions can affect genetic outcomes of new organisms

Meaning:

Understandings:

Students will understand that…

- Cells reproduce by division after DNA replication. Asexual reproduction (mitosis) produces genetically identical offspring, while sexual reproduction (meiosis & fertilization) produces genetically diverse offspring
- DNA replication during the cell cycle conserves the genetic code of cells for the new daughter cells
- Cell cycle controls determine cell division; errors in controls can result in cancer

Essential Questions:

1. Why do cells reproduce?
2. How do cells reproduce?
3. How do mitotic and meiotic cell divisions compare and contrast?
4. How does DNA replication conserve genetic information?
5. Why are the cell cycle controls important in cell division?

Acquisition:

Students will know…

- Cell cycle in a non-reproductive, eukaryotic cell
  - Interphase
  - G1
  - S
  - G2
- Nuclear division
  - Mitosis
  - Cytokinesis
- Plant vs. animal cell
- Phases of mitosis: prophase, metaphase, anaphase, telophase
- Phases of meiosis in diploid, germ-line stem cells

Students will be skilled at …

1. Describe the events that occur during the cell cycle: interphase, nuclear division (i.e., mitosis or meiosis), cytokinesis.
2. Compare the processes and outcomes of mitotic and meiotic nuclear divisions.
3. Describe how the process of DNA replication results in the transmission and/ or conservation of genetic information.
4. Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in

• Roles & importance of mitosis and meiosis • Genetic outcomes of mitosis and meiosis • Structure of eukaryotic chromosomes • DNA replication and conservation	inheritance. 5. Describe to the homologous chromosomes in each phase of mitosis. 6. Identify the difference between mitosis and meiosis 7. Explain cancer in terms of mitosis.
Stage 2- Assessment Evidence	
Unit-Based Project	**Other Evidence:** Chapter quizzes: • Ch 10: Cell Growth & Division • Ch 11.4: Meiosis Unit Test: Cell Growth & Reproduction
Stage 3 - Learning Plan	
Pre-Assessment	
Learning Events Vocabulary: <u>CH 10/11.4:</u> *Cell division, asexual reproduction, sexual reproduction, chromosome, chromatin, cell cycle, interphase, mitosis, cytokinesis, prophase, centromere, chromatid, centriole, metaphase, anaphase, telophase, cyclin, growth factor, apoptosis, cancer, tumor, embryo, differentiation, stem cell / homologous, diploid, haploid, meiosis, tetrad, crossing-over, zygote* Vocabulary Lecture presentation/notes/discussion Animations/videos Chapters 10/11.4 Section Assessment Questions Exercises: • Cell Cycle diagram • Chromosome diagram • Mitosis phases diagram & questions • Meiosis phases diagram & questions Online activities/webquests • Mitosis webquest • Meiosis webquest • Cell division Virtual Lab Laboratory Activities: • Mitosis Microscope Lab	**Progress-Monitoring** ✓ Do Nows ✓ Vocabulary quizzes ✓ Classwork/homework check ✓ Online activities completion and accuracy check with discussion on results ✓ Accuracy of section and chapter review questions, guided reading handouts, chapter reading synopses ✓ Lab exercises execution & data analyses ✓ Unit project progression monitoring

• Meiosis Microscope Lab • Mitosis and meiosis modeling activity Guided reading/Review handouts Chapter 10 Assessment Questions Chapter 10 Standardized Test Prep Chapter 11.4 Assessment Questions	
Technology • Laptops and Internet for online activities and project research • Powerpoint/LCD projector for lecture/discussion • Laboratory equipment & materials for lab exercises • Pearson Biology: eBook, online assignments, quizzes, tests, online activities, questions, presentations, animations • Text companion website: www.pearsonsuccessnet.com • Discovery Streaming, TeacherTube, various online sources for visuals, etc.	**Pacing Guide** December/January Chapters 10 & 11.4. Approx: 3 weeks Review/reteach Unit test / Unit Project due

Title: Unit V: Bioenergetics **Topic**: Energy of Life and ATP, Photosynthesis, Cellular Respiration, Fermentation	**Subject/Course**: Biology **Grade:** 10 E. Gallagher

Stage 1- Desired Results

Established Goals:

Student knowledge & understanding of…

- Energy transformations within living cells
- Relationship between photosynthesis and cellular respiration
- Role of ATP in bioenergetic transformations

Anchor Descriptors:

BIO.A.1.2 Describe relationships between structure and function at biological levels of organization.

BIO.A.3.1 Identify and describe the cell structures involved in processing energy.

BIO.A.3.2 Identify and describe how organisms obtain and transform energy for their life processes.

Eligible Content:

BIO.A.1.2.1 Compare cellular structures and their functions in prokaryotic and eukaryotic cells.

BIO.A.3.1.1 Describe the fundamental roles of plastids (e.g., chloroplasts) and mitochondria in energy transformations.

BIO.A.3.2.1 Compare the basic transformation of energy during photosynthesis and cellular respiration.

BIO.A.3.2.2 Describe the role of ATP in biochemical reactions

NGSS:

HS-LS1: From Molecules to Organisms: Structures and Processes

HS-LS1-5: Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

HS-LS1-7: Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

HS-LS2: Ecosystems: Interactions, Energy, and Dynamics

HS-LS2-3: Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

Science and Engineering Practices:

- Developing & Using Models (HS-LS1-5, HS-LS1-7)
- Construction Explanations & Designing Solutions (HS-LS2-3)

Disciplinary Core Ideas:

LS1.B: Organization for Matter & Energy Flow in Organisms (HS-LS1-5, HS-LS1-7)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

Crosscutting Concepts

- Cause & Effect (HS-LS1-5, HS-LS1-7)
- Energy & Matter (HS-LS2-3)

<table>
<tr><th colspan="2">Transfer:</th></tr>
<tr><td colspan="2">Students will be able to independently use their learning to…
Describe the bioenergetics transformations of photosynthesis and cellular respiration, and where they occur
Explain how the relationship between cellular respiration and photosynthesis supports life on earth
Describe the role of ATP in all energy transformations</td></tr>
<tr><th colspan="2">Meaning:</th></tr>
<tr><td>Understandings:
Students will understand that…
Cells, therefore all living things, must obtain and use energy. Energy transformations such as photosynthesis and cellular respiration convert energy into usable forms.
Photosynthesis is a multi-phased biochemical reaction that converts sunlight into chemical energy
Cellular respiration is a multi-phased biochemical reaction that converts chemical energy into another form, ATP
Fermentation is another process that can convert one form of chemical energy into another</td><td>Essential Questions:
How do cells obtain and use energy?
How does the relationship between photosynthesis and cellular respiration support life?
Why is ATP crucial to all cells?
How does fermentation supply ATP?</td></tr>
<tr><th colspan="2">Acquisition:</th></tr>
<tr><td>Students will know…
Double membrane structure of mitochondria
Double membrane structure of chloroplasts
Roles of mitochondria and chloroplasts in energy transformations
Catabolic vs. anabolic chemical reactions
Overall (summary) chemical equations for photosynthesis and cellular respiration
Basic energy transformations during photosynthesis and cellular respiration
Relationship between photosynthesis and cellular respiration</td><td>Students will be skilled at …
Describe the structure of mitochondria and chloroplasts in eukaryotic cells.
Describe the fundamental roles of plastids (e.g., chloroplasts) and mitochondria in energy transformations.
Identify the stages of photosynthesis, and the reactants & products of each stage
Identify the stages of cellular respiration, and the reactants and products of each stage.
Compare the basic transformations of energy during photosynthesis and cellular respiration.</td></tr>
</table>

• Molecular structure of ATP • ATP-ADP cycle • Importance of ATP as the energy currency (fuel) for cell processes	6. Describe the relationship between photosynthesis and cellular respiration 7. Describe the structure of ATP. 8. Describe the role of ATP in biochemical reactions
Stage 2- Assessment Evidence	
Unit-Based Project	**Other Evidence:** Chapter quizzes: • Ch 8: Photosynthesis • Ch 9: Cellular Respiration & Fermentation Unit Test: Energy & ATP, Photosynthesis, Cellular Respiration, Fermentation
Stage 3 - Learning Plan	
Pre-Assessment	
Learning Events Vocabulary: • CH8: *Adenosine triphosphate (ATP), heterotroph, autotroph, photosynthesis, pigment, chlorophyll, thylakoid, stroma, NADP+, light dependent reactions, light-independent reactions, photosystem, electron transport chain, ATP synthase, Calvin cycle* • CH9: *Calorie, cellular respiration, aerobic, anaerobic, glycolysis, NAD+, Krebs cycle, matrix, fermentation* Vocabulary Lecture presentation/notes/discussion Animations/videos Chapters 8 & 9 Section Assessment Questions Exercises: • ATP diagrams and questions • Photosynthesis diagrams & question • Cellular respiration diagrams & questions • Photosynthesis poster • Cellular respiration poster Online activities/webquests • Photosynthesis vs. Cellular respiration webquest Laboratory Activities: • Photosynthesis & Cellular Respiration lab Guided reading/Review handouts Chapter 8 & 9 Assessment Questions Chapter 8 & 9 Standardized Test Prep	**Progress-Monitoring** ✓ Do Nows ✓ Vocabulary quizzes ✓ Classwork/homework check ✓ Online activities completion and accuracy check with discussion on results ✓ Accuracy of section and chapter review questions, guided reading handouts, chapter reading synopses ✓ Lab exercises execution & data analyses ✓ Unit project progression monitoring
Technology	**Pacing Guide**

• Laptops and Internet for online activities and project research • Powerpoint/LCD projector for lecture/discussion • Laboratory equipment & materials for lab exercises • Pearson Biology: eBook, online assignments, quizzes, tests, online activities, questions, presentations, animations • Text companion website: www.pearsonsuccessnet.com • Discovery Streaming, TeacherTube, various online sources for visuals, etc.	October/November Chapters 8 & 9. Approx: 4 weeks Review/reteach Unit test / Unit Project due

Title: Unit VI: Homeostasis & Transport **Topic**: Cell Structures & Functions, Cell Transport, Homeostasis in Cells	**Subject/Course**: Biology **Grade:** 10 E. Gallagher

Stage 1- Desired Results

Established Goals:

Student knowledge & understanding of…

- Cell structures (cell membrane, Golgi complex, endoplasmic reticulum) and their functions in transport and homeostasis
- Passive transport versus active transport within and between cells
- Homeostasis maintenance within cells and whole organism

Anchor Descriptors:

BIO.A.1.2 Describe relationships between structure and function at biological levels of organization.

BIO.A.4.1 Identify and describe the cell structures involved in transport of materials into, out of, and throughout a cell.

BIO.A.4.2 Explain mechanisms that permit organisms to maintain biological balance between their internal and external environments.

Eligible Content

BIO.A.1.2.1 Compare cellular structures and their functions in prokaryotic and eukaryotic cells.

BIO.A.4.1.1 Describe how the structure of the plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell.

BIO.A.4.1.2 Compare the mechanisms that transport materials across the plasma membrane (i.e., passive transport—diffusion, osmosis, facilitated diffusion; and active transport—pumps, endocytosis, exocytosis)

BIO.A.4.1.3 Describe how membrane-bound cellular organelles (e.g., endoplasmic reticulum, Golgi apparatus) facilitate the transport of materials within a cell.

BIO.A.4.2.1 Explain how organisms maintain homeostasis (e.g., thermoregulation, water regulation, oxygen regulation).

NGSS:

HS-LS1: From Molecules to Organisms: Structures and Processes

HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Science and Engineering Practices:

- Developing & Using Models (HS-LS1-2)
- Planning and Carrying Out Investigations (HS-LS1-3)

Disciplinary Core Ideas:

LS1.A: Structure & Function

LS1.B: Organization for Matter & Energy Flow in Organisms (HS-LS1-5, HS-LS1-7)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

Crosscutting Concepts

- Systems & Systems Models (HS-LS1-2)
- Stability & Change (HS-LS1-3)

Transfer:

Students will be able to independently use their learning to…

- Describe the transport mechanisms that maintain homeostasis within cells and organisms
- Explain how these transport processes (active and passive) support homeostasis
- Identify the roles various cell structures play in transport and homeostasis

Meaning:

Understandings:

Students will understand that…

- Cellular transport mechanisms allow the cell to control what enters and exits the cell, both actively and passively. The cell membrane is a selectively permeable barrier that determines the balance of molecules within and outside of the cell.
- Cellular membrane bound organelles (Golgi, ER) also support homeostasis through transport mechanisms

Essential Questions:

1. How do cells transport molecules/materials in and out of the cell?
2. How do passive and active transport mechanisms compare and contrast?
3. How does transport help maintain cellular homeostasis?
4. What are some mechanisms that the cell employs to support homeostasis?

Acquisition:

Students will know…

- Chemical structure of the plasma membrane (Phospholipid bilayer)
- Fluid mosaic model
- Functions of the plasma membrane
- Passive transport mechanisms
- Endoplasmic reticulum
  - Diffusion
  - Osmosis
  - Facilitated diffusion
- Active transport mechanisms
  - Pumps
  - Endocytosis
  - Exocytosis
- Endoplasmic reticulum
  - Rough ER
    - Synthesis/transport of proteins
  - Smooth ER
    - Synthesis/transport of lipids
    - Synthesis/transport of carbohydrates

Students will be skilled at …

1. Describe how the structure of the plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell.
2. Compare and contrast active vs. passive transport mechanisms.
3. Describe how membrane-bound cellular organelles facilitate intracellular transport of materials.
4. Discuss how the membrane can perform both active and passive passport.
5. Explain mechanisms organisms use to maintain homeostasis

• Golgi apparatus -- processes and packages for intra and extra-cellular transport • Examples of Mechanisms o Thermoregulation o Water regulation o Oxygen regulation o Chemical regulation ▪ pH/Buffers ▪ Hormone ▪ Electrolyte	
Stage 2- Assessment Evidence	
Unit-Based Project	**Other Evidence:** Chapter quizzes: • Ch 7.3: Cell Transport • Ch 7.4: Homeostasis and Cells Unit Test: Cell structures and Functions, Cell Transport, Homeostasis
Stage 3 - Learning Plan	
Pre-Assessment	
Learning Events Vocabulary: • CH 7.3/7.4: *Diffusion, facilitated diffusion, aquaporin, osmosis, isotonic, hypertonic, hypotonic, osmotic pressure, homeostasis, tissue, organ, organ system, receptor* Vocabulary Lecture presentation/notes/discussion Animations/videos Chapters 7.3/7.4 Section Assessment Questions Exercises: • Cell diagrams • Cell membrane diagrams • Cell membranes & transport chart Online activities/webquests • Cell Transport webquest • Cell Transport Virtual Lab Laboratory Activities: • Osmosis in Cells Microscope Lab • Osmosis & Diffusion Lab • Cell size and Diffusion lab Guided reading/Review handouts	**Progress-Monitoring** ✓ Do Nows ✓ Vocabulary quizzes ✓ Classwork/homework check ✓ Online activities completion and accuracy check with discussion on results ✓ Accuracy of section and chapter review questions, guided reading handouts, chapter reading synopses ✓ Lab exercises execution & data analyses ✓ Unit project progression monitoring

Chapter 7 Assessment Questions Chapter 7 Standardized Test Prep	
Technology • Laptops and Internet for online activities and project research • Powerpoint/LCD projector for lecture/discussion • Laboratory equipment & materials for lab exercises • Pearson Biology: eBook, online assignments, quizzes, tests, online activities, questions, presentations, animations • Text companion website: www.pearsonsuccessnet.com • Discovery Streaming, TeacherTube, various online sources for visuals, etc.	**Pacing Guide** November/December Chapters 7.3/7.4. Approx: 3 weeks Review/reteach Unit test / Unit Project due

Title: Unit VII: Chemical Basis of Life **Topic**: Nature of Matter, Properties of Water, Carbon Compounds (Macromolecules), Chemical Reactions & Enzymes	**Subject/Course**: Biology **Grade:** 10 E. Gallagher

Stage 1- Desired Results

Established Goals:

Student knowledge & understanding of…

- The properties of water and how these support life
- Biochemical molecule (carbohydrates, proteins, lipids, nucleic acids) organization, structure and function within organisms
- Role of enzymes in biochemical reactions and factors affecting enzyme function

Anchor Descriptors

BIO.A.2.1 Describe how the unique properties of water support life on Earth.

BIO.A.2.2 Describe and interpret relationships between structure and function at various levels of biochemical organization (i.e, atoms, molecules, and macromolecules).

BIO.A.2.3 Explain how enzymes regulate biochemical reactions within a cell.

Eligible Content:

BIO.A.2.1.1 Describe the unique properties of water and how these properties support life on Earth (e.g., freezing point, high specific heat, cohesion).

BIO.A.2.2.1 Explain how carbon is uniquely suited to form biological macromolecules

BIO.A.2.2.2 Describe how biological macromolecules form from monomers.

BIO.A.2.2.3 Compare the structure and function of carbohydrates, lipids, proteins, and nucleic acids in organisms.

BIO.A.2.3.1 Describe the role of an enzyme as a catalyst in regulating a specific biochemical reaction.

BIO.A.2.3.2 Explain how factors such as pH, temperature, and concentration levels can affect enzyme function.

NGSS:

HS-LS1: <u>From Molecules to Organisms: Structures and Processes</u>

HS-LS1-6: Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

Science and Engineering Practices:

- Construction Explanations & Designing Solutions (HS-LS1-6)

Disciplinary Core Ideas:

LS1.A: Structure and Function

LS1.B: Organization for Matter & Energy Flow in Organisms

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

Crosscutting Concepts

- Energy & Matter (HS-LS1-6)

Transfer:

Students will be able to independently use their learning to…

- Describe how water and its properties make it vital to the existence of life on earth

- Apply knowledge of biomacromolecules to informed decision making on health choices
- Explain how enzymes function and how physiological and environmental factors can affect efficacy

Meaning:

Understandings:

Students will understand that…

- Water, while not a biotic factor, is essential to the continued existence of life on earth. Water's properties support the functions of organisms.
- Carbon compounds (carbohydrates, lipids, proteins, nucleic acids) have specific structures and roles within the cell and increasing levels of organismal complexity. Insufficient quantities of these macromolecules can disrupt cellular functions and structures.
- Enzymes catalyze biochemical reactions within the cell, necessary to continue optimal cellular function

Essential Questions:

1. How do the properties of water support life?
2. How are the biomacromolecules important to the structure and function of the cell?
3. How do enzymes facilitate biochemical reactions within the cell?

Acquisition:

Students will know…

- Basic structure of matter
- Chemical structure of water
- Polarity of water and hydrogen bonding and related properties
  - Adhesion/Cohesion
    - Surface tension, capillary action
  - High specific heat
  - Versatile solvent
  - Density of ice
- Examples of how properties of water support life on earth
  - Temperature moderation
  - Solid water less dense than liquid water
  - Water cycle
  - Metabolism requires aqueous environment
  - Transpiration
  - Buffering properties of water

Students will be skilled at …

1. Describe the unique properties of water.
2. Explain how the unique properties of water make life on earth possible.
3. Describe the structure of a carbon atom.
4. Explain how carbon atoms bond to form biological macromolecules.
5. Describe how biological macromolecules form from monomers.
6. Compare the structural and function of carbohydrates, lipids, proteins, and nucleic acids in organisms.
7. Explain how enzymes act as catalysts to regulate biochemical reactions.
8. Explain how environmental factors affect the function and reaction rate of the enzyme.
9. Interpret graphs to analyze enzyme catalyzed reactions.

• Levels of biochemical organization (atoms, molecules, macromolecules)
• Chemical properties of carbon atoms
  o Form 4 covalent bonds
• Structural shapes of carbon molecules (straight chains, branched chains, rings)
• Monomers vs. polymers
• Monomer that forms carbohydrates, proteins and nucleic acids (monosaccharide, amino acid, nucleotide)
• Idea of no common monomer for lipids
• Dehydration synthesis (condensation) and hydrolysis reactions
• Basic structure of the four major classes of biological macromolecules
  o Common chemical components
  o Examples of monomers from each class
  o Examples of polymers constructed of the monomers
• Importance and use of each macromolecule for biological functions
• Enzymes as proteins
• Enzyme and substrate specificity/interactions
  o Lock and key model
  o Induced fit
• Effect of enzymes on activation energy and reaction rates
• Reusable nature of enzymes
• Examples of enzyme controlled reactions in living things
• Enzyme activity as a function of specific conditions
• Effects of environmental factors (pH, temperature, concentration) on enzyme function	

Stage 2- Assessment Evidence

Unit-Based Project

Roles of Macromolecules in Living Things

- Students will identify and describe each class of macromolecules, their structures and functions.
- Students will apply this knowledge, as well as information from food pyramid, RDVs and nutrition labels, to design a healthy diet plan to meet daily nutritional requirements, as well as identifying poor sources of nutrition.

Other Evidence:

Chapter quizzes:

- 2.1/2.2: Nature of Matter/Properties of Water
- 2.3/2.4: Carbon Compounds/Enzymes

Unit Test: Nature of Matter, Properties of Water, Macromolecules, Enzymes

Laboratory Activities & Reports

Stage 3 - Learning Plan

Pre-Assessment

Learning Events

Vocabulary:

- CH2: *Atom, nucleus, electron, element, isotope, compound, ionic bond, ion, covalent bond, molecule, hydrogen bond, cohesion, adhesion, mixture, solution, solute, solvent, suspension, pH scale, acid, base, buffer, monomer, polymer, carbohydrate, monosaccharide, lipid, nucleic acid, nucleotide, protein, amino acid, chemical reaction, reactant, product, activation energy, catalyst, enzyme, substrate*

Vocabulary

Lecture presentation/notes/discussion

Animations/videos

Chapter 2 Section Assessment Questions

Exercises:

- Matter Review handout
- Water diagrams
- Macromolecule diagrams and questions
- Macromolecules models and analysis questions

Online activities/webquests

- Macromolecules webquest
- Online Enzyme simulation

Laboratory Activities:

- Water properties lab
- Biomacromolecules lab
- Enzyme lab

Guided reading/Review handouts

Progress-Monitoring

- ✓ Do Nows
- ✓ Vocabulary quizzes
- ✓ Classwork/homework check
- ✓ Online activities completion and accuracy check with discussion on results
- ✓ Accuracy of section and chapter review questions, guided reading handouts, chapter reading synopses
- ✓ Lab exercises execution & data analyses
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Chapter 2 Assessment Questions Chapter 2 Standardized Test Prep	
Technology • Laptops and Internet for online activities and project research • Powerpoint/LCD projector for lecture/discussion • Laboratory equipment & materials for lab exercises • Pearson Biology: eBook, online assignments, quizzes, tests, online activities, questions, presentations, animations • Text companion website: www.pearsonsuccessnet.com • Discovery Streaming, TeacherTube, various online sources for visuals, etc.	**Pacing Guide** September/October Chapter 2 Approx: 4 weeks Review/reteach Unit test / Unit Project due