Oxford Area School District Science Scope and Sequence – Quarter 1:

Biology

3.1.B.A1	- Describe the common characteristics of life. - Compare and contrast the cellular structures and degrees of complexity of prokaryotic and eukaryotic organisms. - Explain that some structures in eukaryotic cells developed from early prokaryotic cells (e.g., mitochondria, chloroplasts)

3.1.B.A2	- Explain why many biological macromolecules such as ATP and lipids contain high energy bonds. - Explain the importance of enzymes as catalysts in cell reactions. - Identify how factors such as pH and temperature may affect enzyme function.

3.1.B.A8	- Recognize that systems within cells and multicellular organisms interact to maintain homeostasis. - Demonstrate the repeating patterns that occur in biological polymers. - Describe how the unique properties of water support life.

3.1.B.A7	- Analyze the importance of carbon to the structure of biological macromolecules. - Compare and contrast the functions and structures of proteins, lipids, carbohydrates, and nucleic acids. - Explain the consequences of extreme changes in pH and temperature on cell proteins.

BIO.B.4.1	Describe ecological levels of organization in the biosphere.

4.1.10.A	• Examine the effects of limiting factors on population dynamics. • Analyze possible causes of population fluctuations. • Explain the concept of carrying capacity in an ecosystem. • Describe how organisms become classified as threatened or endangered. • Describe how limiting factors cause organisms to become extinct.
4.1.10.B	• Explain the consequences of interrupting natural cycles.
4.1.10.C	• Evaluate the efficiency of energy flow within a food web. • Describe how energy is converted from one form to another as it moves through a food web.
4.5.10.D	• Research practices that impact biodiversity in specific ecosystems.
4.1.10.E	• Analyze how human influence the pattern of natural changes (e.g primary/ secondary succession and desertification) in ecosystems over time.
4.2.10.A	• Examine the interactions between abiotic and biotic factors within a watershed.
4.2.10.B	• Examine how interactions impact wetlands and their surrounding environments.
4.2.10.C	• Explain the relationship between water quality and the diversity of life in a freshwater ecosystem

CC.3.6.9.-10.C.	• Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CC.3.6.9-10.H.	• Draw evidence from informational texts to support analysis, reflection, and research.
CC.3.5.9-10.C.	• Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the test.

Oxford Area School Science Scope and Sequence – Quarter 2:

Biology

3.1.B.A2	- Identify the initial reactants, final products, and general purposes of photosynthesis and cellular respiration. - Explain the important role of ATP in cell metabolism. - Describe the relationship between photosynthesis and cellular respiration in photosynthetic organisms.

3.1.B.A5	- Relate the structure of cell organelles to their function (energy capture and release, transport, waste removal, protein synthesis, movement, etc). - Explain how the cell membrane functions as a regulatory structure and protective barrier for the cell. - Explain the role of water in cell metabolism. - Describe transport mechanisms across the plasma membrane.

CC.3.6.9.-10.C.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CC.3.6.9-10.H.	Draw evidence from informational texts to support analysis, reflection, and research.

CC.3.5.9-10.C.	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the test.

Oxford Area School District Science Scope and Sequence – Quarter 3:

Biology

3.1B.A3

- Explain how all organisms begin their life cycles as a single cell and that in multicellular organisms, successive generations of embryonic cells form by cell division.

3.1.B.A4

- Summarize the stages of the **cell cycle.**
- Examine how interactions among the different molecules in the cell cause the distinct stages of the cell cycle which can also be influenced by other signaling molecules.
- Explain the role of **mitosis** in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
- Compare and contrast a virus and a cell. Relate the stages of viral cycles to the cell cycle.

3.1.B.A6

- Explain how cells differentiate in multicellular organisms.

3.1.B.B1

- Explain that the information passed from parents to offspring is transmitted by means of genes which are coded in **DNA** molecules.
- Explain the basic process of **DNA** replication.
- Describe the basic processes of transcription and translation.
- Explain how crossing over, jumping genes, and deletion and duplication of genes results in genetic variation.
- Explain how **mutations** can alter genetic information and the possible consequences on resultant cells.

3.1.B.B2	• Describe how the process of **meiosis** results in the formation of haploid gametes and analyze the importance of **meiosis** in sexual reproduction. • Compare and contrast the function of **mitosis** and **meiosis.** • Illustrate that the sorting and recombining of genes in sexual reproduction results in a great variety of possible gene combinations in offspring.

3.1.B.B3	• Describe the basic structure of **DNA**, including the role of hydrogen bonding. • Explain how the process of **DNA** replication results in the transmission and conservation of the genetic code. • Describe how transcription and translation result in gene expression. • Differentiate among the end products of replication, transcription, and translation. • Cite evidence to support that the genetic code is universal.

3.1.B.B5	• Describe how Mendel's laws of segregation and independent assortment can be observed through patterns of inheritance. • Distinguish among observed inheritance patterns caused by several types of genetic traits (dominant, recessive, codominant, sex-linked, polygenic, incomplete dominance, multiple alleles) • Explain how the processes of replication, transcription, and translation are similar in all organisms. Explain how gene actions, patterns of heredity, and reproduction of cells and organisms account for the continuity of life. • Demonstrate how inherited characteristics can be observed at the molecular, cellular, and organism levels.

CC.3.6.9.-10.C.	• Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CC.3.6.9-10.H.	• Draw evidence from informational texts to support analysis, reflection, and research.

CC.3.5.9-10.C.	• Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the test.

Oxford Area School District Science Scope and Sequence – Quarter 4:

Biology

3.1.B.B4	• Explain how **genetic technologies** have impacted the fields of medicine, **forensics**, and agriculture

3.1.B.C1	• Describe species as reproductively distinct groups of organisms. • Analyze the role that geographic isolation can play in speciation. • Explain how evolution through natural selection can result in changes in biodiversity through the increase or decrease of genetic diversity within a population. • Describe how the degree of kinship between species can be inferred from the similarity in their **DNA** sequences.

3.1.B.C2	• Describe the theory suggesting that life on Earth arose as a single, primitive prokaryote about 4 billion years ago and that for the next 2 billion years, a huge diversity of single-celled **organisms** evolved. • Analyze how increasingly complex, multicellular organisms evolved once cells with nuclei developed. • Describe how mutations in sex cells may be passed on to successive generations and that the resulting **phenotype** may help, harm, or have little or no effect on the offspring's success in its environment. • Describe the relationship between environmental changes and changes in the gene pool of a population.

3.1.B.C3	• Compare and contrast various theories of evolution. • Interpret data from fossil records, anatomy and **physiology**, and **DNA** studies relevant to the **theory of evolution.** • Discuss the implications of a universal genetic code for evolution.

CC.3.6.9.-10.C.	• Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CC.3.6.9-10.H.	• Draw evidence from informational texts to support analysis, reflection, and research.
CC.3.5.9-10.C.	• Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the test.
CC.3.6.9-10B.	• Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
CC.3.6.9-10.D.	• Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
CC.3.6.9-10.E.	• Use technology, including the internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly
CC.3.5.9-10.A.	• Cite specific textual evidence to support of science and technical texts, attending to the precise details of explanations of descriptions.
CC.3.5.9-10.E.	• Analyze the structure of relationships among concept in a text, including relationships among key terms.
CC.3.5.9-10.G.	• Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically.
CC.3.5.9-10.H.	• Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
CC.3.5.9-10.I.	• Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

Science Curriculum - Biology			
Big Idea **Organisms share common characteristics of life.**			
EQ. How do we know if something is alive?			
Concepts	**Competencies**	**Resources**	**Assessments**
S11.A.1.1.1 Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms S11.A.1.1.2 Analyze and explain the accuracy of scientific facts, principles, theories, and laws. S11.A.1.1.3 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in	Pearson Biology – Miller & Levine	

use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars).

S11.A.1.2.1Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy).

S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data).

S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication).

S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information.

S11.B.2.2.3 Explain how different patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits). Pennsylvania

S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meter, probe, interface, imaging technology,

which the development, organization, and style are appropriate to task, purpose, and audience.

CC.3.5.11-12.C.
Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

CC.3.5.11-12.D.
Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

CC.3.5.11-12.H.
Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

CC.3.6.11-12.B.
Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

CC.3.6.11-12.C.
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

telescope) is used to extend human abilities and precision. S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts. S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality) S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy). S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data).			

Vocabulary
Prokaryote, eukaryote, multicellular, unicellular, science, observation, inference, hypothesis, controlled experiment, independent variable, dependent variable, control group, data, theory, bias, biology, DNA, stimulus, sexual reproduction:
asexual reproduction, homeostasis, metabolism, biosphere:

Science Curriculum - Biology			
Big Idea			
New cells arise from the division of pre-existing cells.			
How do cells grow and reproduce?			
Concepts	**Competencies**	**Resources**	**Assessments**
S11.A.1.1.1 Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms S11.A.1.1.2 Analyze and explain the accuracy of scientific facts, principles, theories, and laws. S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization,	Pearson Biology – Miller & Levine	

HIV, deforestation, environmental health, energy). S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality) S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meter, probe, interface, imaging technology, telescope) is used to extend human abilities and precision. S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts. S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior. S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes. S11.A.3.2.3 Describe how relationships represented in models	and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

are used to explain scientific or technological concepts (e.g., dimensions of objects within the solar system, life spans, size of atomic particles, topographic maps). S11.B.1.1.3 Compare and contrast cellular processes (e.g., photosynthesis and respiration, meiosis and mitosis, protein synthesis and DNA replication). S11.B.2.1.1 Explain the theory of evolution by interpreting data from fossil records, similarities in anatomy and physiology, or DNA studies that are relevant to the theory of evolution. S11.B.2.1.2 Explain the role of mutations, differential reproduction, and gene recombination in changing the genetic makeup of a population. S11.B.2.1.3 Explain the role of selective breeding and biotechnology in changing the genetic makeup of a population. S11.B.2.1.4 Explain why natural selection can act only on inherited traits. S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication). S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on			

genetic information. S11.B.2.2.3 Explain how different patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits)			

Vocabulary
Photosynthesis, cellular respiration, meiosis and mitosis, protein synthesis, DNA replication, evolution,

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Science Curriculum - Biology

Big Idea
Heredity information in genes is inherited and expressed.

How is hereditary information in genes inherited and expressed?			

Concepts	Competencies	Resources	Assessments
S11.A.1.1.1 Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms S11.A.1.1.2 Analyze and explain the accuracy of scientific facts, principles, theories, and laws. S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts*	Pearson Biology – Miller & Levine	

scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy). S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication). S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information.	*and topics.* CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics.* CC.3.5.11-12.H. Evaluate the hypotheses, data,		

S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts. S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior. S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes. S11.A.3.2.3 Describe how relationships represented in models are used to explain scientific or technological concepts (e.g., dimensions of objects within the solar system, life spans, size of atomic particles, topographic maps). S11.B.1.1.3 Compare and contrast cellular processes (e.g., photosynthesis and respiration, meiosis and mitosis, protein synthesis and DNA replication). S11.B.2.1.1 Explain the theory of evolution by interpreting data from fossil records, similarities in anatomy and physiology, or DNA studies that are relevant to the theory of evolution. S11.B.2.1.2 Explain the role of mutations, differential reproduction, and gene recombination in changing	analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		

the genetic makeup of a population.			
S11.B.2.1.3 Explain the role of selective breeding and biotechnology in changing the genetic makeup of a population.			
S11.B.2.1.4 Explain why natural selection can act only on inherited traits.			
S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication).			
S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information.			
S11.B.2.2.3 Explain how different patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits).			

Vocabulary
cell division, asexual reproduction, sexual reproduction, chromosome, chromatin, cell cycle, interphase, cytokinesis, prophase, centromere, chromatid, centriole, metaphase, anaphase, telophase:

Science Curriculum - Biology	
Big Idea	
Evolution is a result of many random processes selection for the survival and reproduction of a population?	
How do we scientifically explain the evidence and mechanisms for biological evolution?	

Concepts	Competencies	Resources	Assessments
S11.A.1.1.1 Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	Pearson Biology – Miller & Levine	
S11.A.1.1.2 Analyze and explain the accuracy of scientific facts, principles, theories, and laws.			
S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable).	CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.		
S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws).	CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.		
S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars).	CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.		
	CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		
S11.A.1.2.1Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy).	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out		
S11.A.1.3.1 Use appropriate			

quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). S11.A.2.2.3 S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication). S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information. S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts. S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior. S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes. S11.A.3.2.3 Describe how relationships represented in models are used to explain scientific or technological concepts (e.g., dimensions of objects within the solar system, life spans, size of atomic	experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		

particles, topographic maps). S11.B.1.1.3 Compare and contrast cellular processes (e.g., photosynthesis and respiration, meiosis and mitosis, protein synthesis and DNA replication). S11.B.2.1.1 Explain the theory of evolution by interpreting data from fossil records, similarities in anatomy and physiology, or DNA studies that are relevant to the theory of evolution. S11.B.2.1.2 Explain the role of mutations, differential reproduction, and gene recombination in changing the genetic makeup of a population. S11.B.2.1.3 Explain the role of selective breeding and biotechnology in changing the genetic makeup of a population. S11.B.2.1.4 Explain why natural selection can act only on inherited traits. S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication). S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information. S11.B.2.2.3 Explain how different			

patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits).			

Vocabulary
multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits,

Science Curriculum - Biology

Big Idea
Life emerges due to the chemical organization of matter into cells.

How does life result from chemical structure and function?

Concepts	Competencies	Resources	Assessments
S11.A.1.1.1 Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the universal law of gravitation, how light travels, formation of moons, stages of ecological succession). S11.A.1.1.2 Analyze and explain the accuracy of scientific facts, principles, theories, and laws. S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics,	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data	Pearson Biology – Miller & Levine	

conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy). S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality) S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meter, probe, interface, imaging technology, telescope) is used to extend human abilities and precision. S11.A.3.1.1 Apply systems analysis,	when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.		

showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts. S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior. S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes. S11.A.3.2.3 Describe how relationships represented in models are used to explain scientific or technological concepts (e.g., dimensions of objects within the solar system, life spans, size of atomic particles, topographic maps). S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication). S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information. S11.B.2.2.3 Explain how different patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits).	CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		

Vocabulary
Atom, nucleus, electron, element, compound, ionic bond, ion, covalent bond, molecule, van der Waals forces, 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,

Science Curriculum - Biology			
Big Idea **Cells have organized structures and systems necessary to support chemical reactions needed to maintain the living condition.**			
How does life result from cellular structure and function?			
Concepts	**Competencies**	**Resources**	**Assessments**
S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy).	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics.* CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/	Pearson Biology – Miller & Levine	

S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality) S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meter, probe, interface, imaging technology, telescope) is used to extend human abilities and precision. S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts. S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior. S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes. S11.A.3.2.3 Describe how relationships represented in models are used to explain scientific or technological concepts (e.g., dimensions of objects within the solar system, life spans, size of atomic	experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in	

particles, topographic maps). S11.B.1.1.1 Explain how structure determines function at multiple levels of organization (e.g., chemical, cellular, anatomical). S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication). S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information. S11.B.2.2.3 Explain how different patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits).	which the development, organization, and style are appropriate to task, purpose, and audience.		

Vocabulary
Cells, homeostasis, active transport, passive transport, endocytosis, exocytosis

Science Curriculum - Biology			
Big Idea **Structure is related to function at all biological levels of organization.**			
How is structure related to function at all biological levels of organization?			
Concepts	**Competencies**	**Resources**	**Assessments**

S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy). S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality)	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or	Pearson Biology – Miller & Levine	

S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meter, probe, interface, imaging technology, telescope) is used to extend human abilities and precision. S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts. S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior. S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes. S11.A.3.2.3 Describe how relationships represented in models are used to explain scientific or technological concepts (e.g., dimensions of objects within the solar system, life spans, size of atomic particles, topographic maps). S11.B.1.1.1 Explain how structure determines function at multiple levels of organization (e.g., chemical, cellular, anatomical). S11.B.1.1.2 Compare and contrast the structural and functional similarities and differences among living things (e.g., classify organisms into classification groups, compare	performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		

| systems).

S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication).

S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information.

S11.B.2.2.3 Explain how different patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits).			
Vocabulary Cells, tissue, organ, organ system, mitosis, meiosis, prophase, metaphase, anaphase, telophase, karyotype, DNA, transcription, translation,			

Science Curriculum - Biology			
Big Idea **Through a variety of mechanisms organisms seek to maintain a biological balance between their internal and external environments.**			
How do organisms maintain a biological between their internal and external environments?			
Concepts	**Competencies**	**Resources**	**Assessments**
S11.A.1.1.1 Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the universal law of gravitation, how light travels, formation of moons, stages of ecological succession). S11.A.1.1.2 Analyze and explain the accuracy of scientific facts, principles, theories, and laws.	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols,	Pearson Biology – Miller & Levine	

S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy). S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare	key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts*		

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S11.B.2.2.3 Explain how different patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits).			
Vocabulary			
facts, principles, theories, and laws, multiple alleles, population, biosphere, community, organism, biome,			

Science Curriculum - Biology			
Big Idea			
Eukaryotic cells can differentiate and organize making it possible for multicellularity.			
What are the advantages of multicellularity?			
Concepts	**Competencies**	**Resources**	**Assessments**
S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable).

S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars).

S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy).

S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). | CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

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CC.3.5.11-12.H.

Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. | Pearson Biology – Miller & Levine | |

S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication). S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information. S11.B.2.2.3 Explain how different patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits).	CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical		

	events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		

Vocabulary
Atom, electron, neutron, proton, independent variable, dependent variable

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Science Curriculum - Biology			
Big Idea **Organisms obtain and use energy to carry out their life processes.**			
How do different organisms obtain and use energy to survive in their environment?			
Concepts	**Competencies**	**Resources**	**Assessments**
S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars).	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or	Pearson Biology – Miller & Levine	

S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy). S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data). S11.A.1.3.2 Describe or interpret dynamic changes to stable systems (e.g., chemical reactions, human body, food webs, tectonics, homeostasis). S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality) S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meter, probe, interface, imaging technology, telescope) is used to extend human abilities and precision. S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts. S11.A.3.2.1 Compare the accuracy of	challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B.		

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Vocabulary
Photosynthesis ,cellular respiration, krebs cycle, stroma, thylakoid, light-independent, light dependent, glycolysis, electron transport chain,

Science Curriculum - Biology			
Big Idea **Organisms on Earth interact and depend in a variety of ways on other living and nonliving things in their environments?**			
How do organisms interact and depend on each other and their environment for survival?			
Concepts	**Competencies**	**Resources**	**Assessments**
S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy). S11.A.1.3.1 Use appropriate quantitative data to describe or	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.	Pearson Biology – Miller & Levine	

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Vocabulary
Biotic, abiotic, mitosis, meiosis, DNA, heredity, observation, inference

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Science Curriculum - Biology

Big Idea
DNA segments contain information for the production of proteins necessary for growth and function of cells.

Why is DNA called the "blueprint of life?"			
Concepts	**Competencies**	**Resources**	**Assessments**
S11.A.1.1.1 Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the universal law of gravitation, how light travels, formation of moons, stages of ecological succession). S11.A.1.1.2 Analyze and explain the accuracy of scientific facts, principles, theories, and laws. S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.5.11-12.C.	Pearson Biology – Miller & Levine	

health, energy).	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data).	
	CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality)	
S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meter, probe, interface, imaging technology, telescope) is used to extend human abilities and precision.	CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts.	CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior.	CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes.	
S11.A.3.2.3 Describe how relationships represented in models are used to explain scientific or technological concepts (e.g.,	

dimensions of objects within the solar system, life spans, size of atomic particles, topographic maps). S11.B.1.1.3 Compare and contrast cellular processes (e.g., photosynthesis and respiration, meiosis and mitosis, protein synthesis and DNA replication). S11.B.2.1.1 Explain the theory of evolution by interpreting data from fossil records, similarities in anatomy and physiology, or DNA studies that are relevant to the theory of evolution. S11.B.2.1.2 Explain the role of mutations, differential reproduction, and gene recombination in changing the genetic makeup of a population. S11.B.2.1.3 Explain the role of selective breeding and biotechnology in changing the genetic makeup of a population. S11.B.2.1.4 Explain why natural selection can act only on inherited traits. S11.B.2.2.1 Describe how genetic information is expressed (i.e., DNA, genes, chromosomes, transcription, translation, and replication). S11.B.2.2.2 Compare and contrast mitosis and meiosis in passing on genetic information. S11.B.2.2.3 Explain how different			

patterns of inheritance affect population variability (i.e., multiple alleles, codominance, dominance, recessiveness, sex-influenced traits, and sex-linked traits).			

Vocabulary
DNA, RNA, nucleotide, transcription, translation, helicase, polymerase, mRNA, tRNA, rRNA, base pairing rules