

Pine Hill Public Schools Curriculum

Content Area:	Science		
Course Title/ Grade Level:	College Prep (CP) Biology / Grade 10		
Unit 1:	Scientific Process	Duration:	2 weeks
Unit 2:	Intro to Biology/Characteristics of Life	Duration:	1 week
Unit 3:	Inorganic Chemistry	Duration:	2 weeks
Unit 4:	Organic Chemistry	Duration:	2 weeks
Unit 5:	Cellular Structures and Functions	Duration:	3 weeks
Unit 6:	Photosynthesis, Respiration, and Enzymatic Reactions	Duration:	3 weeks
Unit 7:	Cell Cycle and Mitosis	Duration:	2 weeks
Unit 8:	Meiosis and Heredity	Duration:	3 weeks
Unit 9:	DNA, RNA and Protein Synthesis	Duration:	2 weeks
Unit 10:	Biotechnology	Duration:	2 weeks
Unit 11:	Evolution	Duration:	3 weeks
Unit 12:	Ecology and Human Impacts	Duration:	2 weeks
BOE Approved date:			
Date Created or Revised:	August 21, 2018		

Pine Hill Public Schools Science Curriculum	
Unit Title: Scientific Process	Unit #1
Course or Grade Level: College Prep Biology	Length of Time: 2 weeks
NGSS Performance Expectations (PE's)	<p>HS-ETS1-1 Analyze a major global challenge to specify quantitative and qualitative criteria and constraints and solutions that account for societal needs and wants.</p> <p>HS-ETS1-2 Design a solution to a complex real world problem by breaking it down into smaller more manageable problems that can be solved through engineering.</p> <p>HS-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</p>
Cross Cutting Concepts	Science and Engineering Practices
<input checked="" type="checkbox"/> Patterns <input checked="" type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input type="checkbox"/> Systems and Systems Models <input type="checkbox"/> Energy and Matter in Systems <input type="checkbox"/> Structure and Function <input checked="" type="checkbox"/> Stability and Change in Systems <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input checked="" type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input checked="" type="checkbox"/> NOS-Science is a Human Endeavor <input checked="" type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input checked="" type="checkbox"/> Using mathematics and computational thinking <input checked="" type="checkbox"/> Constructing explanations and designing solutions <input checked="" type="checkbox"/> Engaging in argument from evidence <input checked="" type="checkbox"/> Obtaining, evaluating, and communicating information <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> Scientific Investigations Use a Variety of Methods <input checked="" type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input checked="" type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Root Words - Steps of the scientific method - Experiment Controls vs. Variables

	<ul style="list-style-type: none"> - Data collection and organization methods - Inquiring, observing and discovering as a way to build science knowledge from the know to the unknown
Skills	<ul style="list-style-type: none"> - Determine the meaning of a term based on its root words - Design and perform experiments applying the steps of the scientific method - Differentiate and Identify groups and variables - Articulate and express ideas and conclusions using scientific reasoning
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student's level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - Simulated Lab Practice Activities - Guided Notes - M&Ms lab - Student driven inquiry Lab - Chapter study guides and review games
ELA	<ul style="list-style-type: none"> - RI.9-10.1. Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.) and make relevant connections, to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain. - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
Technology	<ul style="list-style-type: none"> - 8.1.12.E.1 Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.

Pine Hill Public Schools Science Curriculum	
Unit Title: Intro to Biology/Characteristics of Life	Unit #2
Course or Grade Level: College Prep Biology	Length of Time: 1 week
NGSS Performance Expectations (PE's)	HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
Cross Cutting Concepts	Science and Engineering Practices
<input checked="" type="checkbox"/> Patterns <input type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input type="checkbox"/> Energy and Matter in Systems <input checked="" type="checkbox"/> Structure and Function <input type="checkbox"/> Stability and Change in Systems Nature of Science (NOS) <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input checked="" type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input checked="" type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Asking questions and defining problems <input type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input type="checkbox"/> Analyzing and interpreting data <input type="checkbox"/> Using mathematics and computational thinking <input type="checkbox"/> Constructing explanations and designing solutions <input checked="" type="checkbox"/> Engaging in argument from evidence <input checked="" type="checkbox"/> Obtaining, evaluating, and communicating information Nature of Science (NOS) <input type="checkbox"/> Scientific Investigations Use a Variety of Methods <input checked="" type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input checked="" type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Applications of biological science - Characteristics of Life

	<ul style="list-style-type: none"> - Compare abiotic and biotic factors - Needs of an organism - Levels of organization from biosphere to cell
Skills	<ul style="list-style-type: none"> - Identify the characteristics of life - Describe the needs of an organism - List levels of organization and provide an example - Explain the impact and technologies produced by biological science
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Investigations/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student's level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - Chapter study guides and review games - Guided Notes - Group discussions - Characteristics of life investigation
ELA	<ul style="list-style-type: none"> - RI.9-10.8. Describe and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and reasoning. - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
Technology	<ul style="list-style-type: none"> - 8.2.12.D.6 Synthesize data, analyze trends and draw conclusions regarding the effect of a technology on the individual, society, or the environment and publish conclusions.

Pine Hill Public Schools Science Curriculum	
Unit Title: Inorganic Chemistry	Unit #3
Course or Grade Level: College Prep Biology	Length of Time: 2 weeks
NGSS Performance	HS-PS1-1 Use the periodic table as a model to predict the

Expectations (PE's)	<p>relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.</p> <p>HS-PS-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of patterns of chemical properties.</p>
Cross Cutting Concepts	Science and Engineering Practices
<input type="checkbox"/> Patterns <input type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input checked="" type="checkbox"/> Energy and Matter in Systems <input checked="" type="checkbox"/> Structure and Function <input type="checkbox"/> Stability and Change in Systems <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input checked="" type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input checked="" type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input checked="" type="checkbox"/> Using mathematics and computational thinking <input type="checkbox"/> Constructing explanations and designing solutions <input type="checkbox"/> Engaging in argument from evidence <input type="checkbox"/> Obtaining, evaluating, and communicating information <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> Scientific Investigations Use a Variety of Methods <input type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Unique properties of Water - pH and buffers
Skills	<ul style="list-style-type: none"> - Explain the unique properties of water and how they are important for life - Utilize the pH scale to determine the pH of a substance - Explain the role of buffers in organisms
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and

instruction	<p>assessments</p> <ul style="list-style-type: none"> - Present materials suitable to student's level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - pH Lab Investigation - Properties of Water investigation - Chapter study guides and review games - Guided notes - Group discussion
ELA	<ul style="list-style-type: none"> - RI.9-10.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper). - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
Technology	<ul style="list-style-type: none"> - 8.2.12.A.2 Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.

Pine Hill Public Schools Science Curriculum	
Unit Title: Organic Chemistry	Unit #4
Course or Grade Level: College Prep Biology	Length of Time: 2 weeks
NGSS Performance Expectations (PE's)	<p>HS-LS-1-6 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.</p> <p>HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.</p> <p>HS-PS-2 Construct and revise an explanation for the outcome of</p>

	a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of patterns of chemical properties.
Cross Cutting Concepts	Science and Engineering Practices
<input type="checkbox"/> Patterns <input type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input checked="" type="checkbox"/> Energy and Matter in Systems <input checked="" type="checkbox"/> Structure and Function <input type="checkbox"/> Stability and Change in Systems <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input checked="" type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input checked="" type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input type="checkbox"/> Using mathematics and computational thinking <input checked="" type="checkbox"/> Constructing explanations and designing solutions <input checked="" type="checkbox"/> Engaging in argument from evidence <input checked="" type="checkbox"/> Obtaining, evaluating, and communicating information <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> Scientific Investigations Use a Variety of Methods <input checked="" type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Importance of specific elements (carbon, oxygen, hydrogen, nitrogen, phosphorus, sulfur) - Dehydration synthesis and hydrolysis reactions - Macromolecules (structure and function)
Skills	<ul style="list-style-type: none"> - Describe the structure and function of the four major types of organic molecules - Describe how polymers are built and broken down - Model (using physical or digital tools) the four major categories of organic molecules
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments

	<ul style="list-style-type: none"> - Present materials suitable to student’s level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - “Who stole the ipod” investigation - Testing for Organic Compounds Lab - Chapter study guides and games - Guided notes - Group discussion
ELA	<ul style="list-style-type: none"> - RI.9-10.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper). - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
Technology	<ul style="list-style-type: none"> - 8.2.12.A.2 Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.

Pine Hill Public Schools Science Curriculum	
Unit Title: Cellular Structures and Functions	Unit #5
Course or Grade Level: College Prep Biology	Length of Time: 3 weeks
NGSS Performance Expectations (PE’s)	<p>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.</p> <p>HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</p> <p>HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p>
Cross Cutting Concepts	Science and Engineering Practices
<input type="checkbox"/> Patterns	<input checked="" type="checkbox"/> Asking questions and defining problems

<input type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input type="checkbox"/> Energy and Matter in Systems <input checked="" type="checkbox"/> Structure and Function <input type="checkbox"/> Stability and Change in Systems <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input checked="" type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input checked="" type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input checked="" type="checkbox"/> Using mathematics and computational thinking <input checked="" type="checkbox"/> Constructing explanations and designing solutions <input type="checkbox"/> Engaging in argument from evidence <input checked="" type="checkbox"/> Obtaining, evaluating, and communicating information <p style="text-align: center;">Nature of Science (NOS)</p> <input type="checkbox"/> Scientific Investigations Use a Variety of Methods <input checked="" type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
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Content	<ul style="list-style-type: none"> - Cell size - Cell discovery and theory - Operation of the microscope - Anatomy and physiology of Plant and Animal Cells - Structure and function of the cell membrane - Cell transport, diffusion, and osmosis
Skills	<ul style="list-style-type: none"> - Proficiency in microscope operation - Differentiate plant and animal cells - Explain the structures of the endomembrane system - Describe how cells transport substances - Compare and contrast hypertonic, hypotonic, and isotonic solutions
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student’s level of functioning - Include hands on activities

	<ul style="list-style-type: none"> - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - Microscope operations Lab - Plant and Animal Cell Lab - Chapter study guides and review games - Guided notes - Diffusion/osmosis lab investigation
ELA	<ul style="list-style-type: none"> - NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. - SL.9-10.1. Initiate and participate effectively in a range of collaborative discussions
Technology	<ul style="list-style-type: none"> - 8.2.12.B.4 Investigate a technology used in a given period of history, e.g., stone age, industrial revolution or information age, and identify their impact and how they may have changed to meet human needs and wants.

Pine Hill Public Schools Science Curriculum	
Unit Title: Photosynthesis, Cell Respiration, and Enzymatic Reactions	Unit #6
Course or Grade Level: College Prep Biology	Length of Time: 3 weeks
NGSS Performance Expectations (PE's)	<p>HS-LS-1-5 Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.</p> <p>HS-LS-1-7 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.</p> <p>HS-LS-2-5 Develop a model to illustrate the role of photosynthesis and cell respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere and geosphere.</p> <p>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.</p>

Cross Cutting Concepts	Science and Engineering Practices
<input type="checkbox"/> Patterns <input type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input checked="" type="checkbox"/> Energy and Matter in Systems <input checked="" type="checkbox"/> Structure and Function <input checked="" type="checkbox"/> Stability and Change in Systems <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Asking questions and defining problems <input type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input type="checkbox"/> Using mathematics and computational thinking <input checked="" type="checkbox"/> Constructing explanations and designing solutions <input type="checkbox"/> Engaging in argument from evidence <input checked="" type="checkbox"/> Obtaining, evaluating, and communicating information <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> Scientific Investigations Use a Variety of Methods <input checked="" type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Original source of energy for all living things is the sun - Photosynthesis and cellular respiration are dependent processes - Aerobic vs. Anaerobic - Recognize the equations for cell respiration and photosynthesis - The role of enzymes in living systems
Skills	<ul style="list-style-type: none"> - Link energy from the sun to the energy needs of organisms - Differentiate between aerobic and anaerobic processes - Describe how energy flows through an ecosystem by ways of photosynthesis and respiration. - Explain why and how enzymes play an important role in living organisms
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and

instruction	<p>assessments</p> <ul style="list-style-type: none"> - Present materials suitable to student’s level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - Virtual Photosynthesis Lab - Respiration yeast demonstration - Beef liver catalase lab - Chapter study guides and review games - Guided notes - Group discussion
ELA	<ul style="list-style-type: none"> - RI.9-10.1. Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.) and make relevant connections, to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain. - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
Technology	<ul style="list-style-type: none"> - 8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Pine Hill Public Schools Science Curriculum	
Unit Title: Cell Cycle and Mitosis	Unit #7
Course or Grade Level: College Prep Biology	Length of Time: 2 weeks
NGSS Performance Expectations (PE’s)	HS-LS1-4 Use a model to illustrate the role of cell division (mitosis) and differentiation in producing and maintaining complex organisms.
Cross Cutting Concepts	Science and Engineering Practices
<input checked="" type="checkbox"/> Patterns <input type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input type="checkbox"/> Energy and Matter in Systems <input type="checkbox"/> Structure and Function	<input type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input checked="" type="checkbox"/> Using mathematics and computational thinking

<input checked="" type="checkbox"/> Stability and Change in Systems Nature of Science (NOS) <input type="checkbox"/> NOS-Science is a Way of Knowing <input checked="" type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input type="checkbox"/> Constructing explanations and designing solutions <input type="checkbox"/> Engaging in argument from evidence <input type="checkbox"/> Obtaining, evaluating, and communicating information Nature of Science (NOS) <input type="checkbox"/> Scientific Investigations Use a Variety of Methods <input checked="" type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Importance of cell division - Cell Cycle- interphase, mitosis (prophase, metaphase, anaphase, telophase) and cytokinesis - Cancer
Skills	<ul style="list-style-type: none"> - Describe what occurs during the major steps of the cell cycle - Describe the causes and characteristics of cancer
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student’s level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - Normal cell cycle/cancer virtual Lab - Guided notes - Chapter study guides and review games - Group discussion
ELA	<ul style="list-style-type: none"> - RI.9-10.8. Describe and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and reasoning.

	<ul style="list-style-type: none"> - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
Technology	<ul style="list-style-type: none"> - 8.2.12.A.2 Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.

Pine Hill Public Schools Science Curriculum	
Unit Title: Meiosis and Heredity	Unit #8
Course or Grade Level: College Prep Biology	Length of Time: 3 weeks
NGSS Performance Expectations (PE's)	<p>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.</p> <p>HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.</p>
Cross Cutting Concepts	Science and Engineering Practices
<input checked="" type="checkbox"/> Patterns <input checked="" type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input type="checkbox"/> Energy and Matter in Systems <input type="checkbox"/> Structure and Function <input checked="" type="checkbox"/> Stability and Change in Systems <p style="text-align: center;">Nature of Science (NOS)</p> <input type="checkbox"/> NOS-Science is a Way of Knowing <input checked="" type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input checked="" type="checkbox"/> Using mathematics and computational thinking <input type="checkbox"/> Constructing explanations and designing solutions <input type="checkbox"/> Engaging in argument from evidence <input type="checkbox"/> Obtaining, evaluating, and communicating information <p style="text-align: center;">Nature of Science (NOS)</p> <input checked="" type="checkbox"/> Scientific Investigations Use a Variety of Methods <input type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

Content	<ul style="list-style-type: none"> - Meiosis produces genetically different gametes - Mendel's experiments - Punnett squares - Dominant/recessive, genotype/phenotype - Non-mendelian inheritance patterns - Genetic Disorders
Skills	<ul style="list-style-type: none"> - Compare and contrast meiosis and mitosis - Sorting and recombination of genes in sexual reproduction - Describe Mendel's experiments - Utilize Punnett squares to predict genotypic and phenotypic outcomes (mono- and dihybrid crosses) - Describe a genetic disorder
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student's level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - Karyotyping Lab - Common human traits activity - Spongebob genetics practice - Genetic Disorders Research Project - Chapter study guides and review games - Group discussion - Guided notes - View and discuss the film <i>Lorenzo's Oil</i>
ELA	<ul style="list-style-type: none"> - RI.9-10.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper). - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective

	selection, organization, and analysis of content.
Technology	- 8.1.12.A.3 Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

Pine Hill Public Schools Science Curriculum	
Unit Title: DNA, RNA and Protein Synthesis	Unit #9
Course or Grade Level: College Prep Biology	Length of Time: 2 weeks
NGSS Performance Expectations (PE's)	<p>HS-LS-1-1 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.</p> <p>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.</p>
Cross Cutting Concepts	Science and Engineering Practices
<input type="checkbox"/> Patterns <input checked="" type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input type="checkbox"/> Energy and Matter in Systems <input checked="" type="checkbox"/> Structure and Function <input checked="" type="checkbox"/> Stability and Change in Systems Nature of Science (NOS) <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input checked="" type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input type="checkbox"/> Using mathematics and computational thinking <input type="checkbox"/> Constructing explanations and designing solutions <input type="checkbox"/> Engaging in argument from evidence <input type="checkbox"/> Obtaining, evaluating, and communicating information Nature of Science (NOS) <input type="checkbox"/> Scientific Investigations Use a Variety of Methods <input type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and

	Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Historical events and experiments that led to the discovery of DNA - DNA carries instructions for characteristics of organisms and is a large polymer formed from 4 subunits (Adenine, Thymine, Guanine, Cytosine) - Explain how the chemical and structural properties of DNA allow for genetic information to be encoded and replicated - Genes are sections of DNA that encode instructions for making proteins. - Mutations (point and frameshift) - Trace the flow of information from DNA to RNA to amino acid sequence
Skills	<ul style="list-style-type: none"> - Build a model of DNA - Describe the process of DNA replication - Decode a strand of DNA into amino acid sequences - Differentiate between types of mutations and their outcomes
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student's level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - Building a DNA model - DNA extraction activity - Chapter study guides and review games - Guided notes - Group discussion
ELA	<ul style="list-style-type: none"> - RI.9-10.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).

	<ul style="list-style-type: none"> - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
Technology	<ul style="list-style-type: none"> - 8.2.12.A.1 Propose an innovation to meet future demands supported by an analysis of the potential full costs, benefits, trade-offs and risks, related to the use of the innovation.

Pine Hill Public Schools Science Curriculum	
Unit Title: Biotechnology	Unit #10
Course or Grade Level: College Prep Biology	Length of Time: 2 weeks
NGSS Performance Expectations (PE's)	<p>HS-LS-1-1 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.</p> <p>HS-ETS1-1 Analyze a major global challenge to specify quantitative and qualitative criteria and constraints and solutions that account for societal needs and wants.</p>
Cross Cutting Concepts	Science and Engineering Practices
<input checked="" type="checkbox"/> Patterns <input type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input type="checkbox"/> Energy and Matter in Systems <input type="checkbox"/> Structure and Function <input type="checkbox"/> Stability and Change in Systems Nature of Science (NOS) <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input type="checkbox"/> NOS-Science is a Human Endeavor <input type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input checked="" type="checkbox"/> Using mathematics and computational thinking <input type="checkbox"/> Constructing explanations and designing solutions <input type="checkbox"/> Engaging in argument from evidence <input type="checkbox"/> Obtaining, evaluating, and communicating information Nature of Science (NOS) <input checked="" type="checkbox"/> Scientific Investigations Use a Variety of Methods <input type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input type="checkbox"/> Scientific Knowledge is Open to Revision in

	<p>Light of New Evidence</p> <p><input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p>
Content	<ul style="list-style-type: none"> - Forms of genetic engineering - Uses for the human genome project - Risks and benefits of genetic engineering - Transgenic organisms and GMOs - Gel electrophoresis - Stem cells and cloning - Ethical implications
Skills	<ul style="list-style-type: none"> - Explain the steps in gene cloning - Model gel electrophoresis and analyze the results - Describe the process of cloning and explain why cloning is controversial - Analyze current and potential impact of genome projects on human health
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student's level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - View and discuss the film <i>GATTACA</i> - Chapter study guides and review games - Group discussions - Gel electrophoresis virtual lab - Gene cloning virtual lab - Guided notes - View and discuss the documentary <i>The Clone Age</i>
ELA	<ul style="list-style-type: none"> - NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. - SL.9-10.1. Initiate and participate effectively in a range of collaborative discussions
Technology	<ul style="list-style-type: none"> - 8.2.12.A.1 Propose an innovation to meet future

	demands supported by an analysis of the potential full costs, benefits, trade-offs and risks, related to the use of the innovation.
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Pine Hill Public Schools Science Curriculum	
Unit Title: Evolution	Unit #11
Course or Grade Level: College Prep Biology	Length of Time: 3 weeks
NGSS Performance Expectations (PE's)	<p>HS-LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.</p> <p>HS-LS4- 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.</p> <p>HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations.</p> <p>HS-LS4-5 Evaluate the evidence supporting the claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.</p>
Cross Cutting Concepts	Science and Engineering Practices
<input checked="" type="checkbox"/> Patterns <input checked="" type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input type="checkbox"/> Systems and Systems Models <input type="checkbox"/> Energy and Matter in Systems <input type="checkbox"/> Structure and Function <input checked="" type="checkbox"/> Stability and Change in Systems Nature of Science (NOS) <input checked="" type="checkbox"/> NOS-Science is a Way of Knowing <input type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems	<input checked="" type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input type="checkbox"/> Using mathematics and computational thinking <input type="checkbox"/> Constructing explanations and designing solutions <input checked="" type="checkbox"/> Engaging in argument from evidence <input type="checkbox"/> Obtaining, evaluating, and communicating information Nature of Science (NOS)

<input checked="" type="checkbox"/> NOS-Science is a Human Endeavor <input checked="" type="checkbox"/> NOS-Science Addresses Questions About the Natural and Material World	<input checked="" type="checkbox"/> Scientific Investigations Use a Variety of Methods <input checked="" type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input checked="" type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Darwin and the development of his theory of natural selection - Evidence for evolution- fossils, comparative anatomy, embryological similarities, biochemistry - Evolutionary processes- reproductive isolation, adaptive radiation, divergent evolution, convergent evolution and co-evolution - Human evolution and ancestry
Skills	<ul style="list-style-type: none"> - Provide examples of adaptations in organisms - Define and model natural selection - Refer to evidence to support and explain evolution
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student’s level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - View sections of the documentary <i>What Darwin Never Knew</i> - Natural Selection Lab - Chapter study guides and Review Games - Group discussions - Guided Notes
ELA	<ul style="list-style-type: none"> - NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. - SL.9-10.1. Initiate and participate effectively in a range of collaborative discussions

Technology	- 8.1.12.E.1 Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
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Pine Hill Public Schools Science Curriculum	
Unit Title: Ecology and Human Impacts on the Environment	Unit #12
Course or Grade Level: College Prep Biology	Length of Time: 2 weeks
NGSS Performance Expectations (PE's)	<p>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.</p> <p>HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.</p> <p>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.</p> <p>HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.</p>
Cross Cutting Concepts	Science and Engineering Practices
<input checked="" type="checkbox"/> Patterns <input checked="" type="checkbox"/> Cause and Effect <input type="checkbox"/> Scale, Proportion, and Quantity <input checked="" type="checkbox"/> Systems and Systems Models <input checked="" type="checkbox"/> Energy and Matter in Systems <input type="checkbox"/> Structure and Function <input checked="" type="checkbox"/> Stability and Change in Systems Nature of Science (NOS) <input type="checkbox"/> NOS-Science is a Way of Knowing <input checked="" type="checkbox"/> NOS-Scientific Knowledge Assumes an Order and Consistency in Natural Systems <input checked="" type="checkbox"/> NOS-Science is a Human Endeavor <input checked="" type="checkbox"/> NOS-Science Addresses Questions	<input checked="" type="checkbox"/> Asking questions and defining problems <input checked="" type="checkbox"/> Developing and using models <input checked="" type="checkbox"/> Planning and carrying out investigations <input checked="" type="checkbox"/> Analyzing and interpreting data <input checked="" type="checkbox"/> Using mathematics and computational thinking <input type="checkbox"/> Constructing explanations and designing solutions <input type="checkbox"/> Engaging in argument from evidence <input type="checkbox"/> Obtaining, evaluating, and communicating information Nature of Science (NOS) <input type="checkbox"/> Scientific Investigations Use a Variety of Methods

About the Natural and Material World	<input type="checkbox"/> Scientific Knowledge is Based on Empirical Evidence <input checked="" type="checkbox"/> Scientific Knowledge is Open to Revision in Light of New Evidence <input checked="" type="checkbox"/> Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
Content	<ul style="list-style-type: none"> - Abiotic and biotic factors in an ecosystem - Organization of ecological levels - Trophic levels - Energy flow - Habitat and niche - Limits on populations - Symbiosis - Biogeochemical cycles - Human modification of ecosystems - Evidence of habitat destruction and threats on ecosystem stability
Skills	<ul style="list-style-type: none"> - Identify biotic and abiotic factors in an ecosystem - Diagram and explain energy flow through an ecosystem - Identify factors that limit population growth - Provide evidence of habitat destruction and threats to current local and global ecosystem stability - Analyze the various symbiotic relationships among plants and animals - Explain how matter is cycled through an ecosystem and energy flows - Predict the impact of natural disasters on ecosystems
Assessments	<ul style="list-style-type: none"> - Teacher evaluation of special projects - Quizzes and chapter tests - Homework/class work assignments - Experiments/lab reports
Interventions/ differentiated instruction	<ul style="list-style-type: none"> - Provide advanced notice for tests - Provide modified instructional materials and assessments - Present materials suitable to student's level of functioning - Include hands on activities - Provide options for independent study - Strategic grouping of students
Lesson resources/Activities	<ul style="list-style-type: none"> - Predator/ Prey Activity - Interpreting Ecological Data - Food Chain/ Food Web Construction Activity

	<ul style="list-style-type: none"> - Calculation of Trophic Levels - Chapter study guides and Review games - Group discussions - Guided notes
ELA	<ul style="list-style-type: none"> - RI.9-10.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper). - W.9-10.2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
Technology	<ul style="list-style-type: none"> - 8.2.12.A.1 Propose an innovation to meet future demands supported by an analysis of the potential full costs, benefits, trade-offs and risks, related to the use of the innovation.