

Inquiry Investigations™
Genetics and Inheritance MODULE - 1282831
Grades: 7-10

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Rhode Island Standards and State Frameworks
Science
Grade 7

DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (5-8) SAE+FAF-2.	Describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems).
PERFORMANCE STANDARD	LS1 (7-8)-2.	Students demonstrate understanding of structure and function-survival requirements by...
GRADE SPAN EXPECTATION	2a.	Explaining how the cell, as the basic unit of life, has the same survival needs as an organism (i.e., obtain energy, grow, eliminate waste, reproduce, provide for defense). <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization
GRADE SPAN EXPECTATION	2b.	Observing and describing (e.g., drawing, labeling) individual cells as seen through a microscope targeting cell membrane, cell wall, nucleus, and chloroplasts. <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (5-8) POC-3.	Compare and contrast sexual reproduction with asexual reproduction.
PERFORMANCE STANDARD	LS1 (7-8)-3.	Students demonstrate an understanding of reproduction by...
GRADE SPAN EXPECTATION	3a.	Explaining reproduction as a fundamental process by which the new individual receives genetic information from parent(s). <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of

		<p>Dominance</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle Genetics and Inheritance: Unit 3 Lab 4 Activity 3: Constructing a Family Pedigree Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population Teacher Resource CD: Genetics and Heredity Teacher Resource CD: Genetics and Inheritance Teacher Resource CD: The DNA Connection Virtual Laboratory: Mendelian Genetics Law of Dominance Virtual Laboratory: Mendelian Genetics Law of Independent Assortment
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (5-8) FAF-4.	Explain relationships between or among the structure and function of the cells, tissues, organs, and organ systems in an organism.
PERFORMANCE STANDARD	LS1 (7-8)-4.	Students demonstrate understanding of differentiation by...
GRADE SPAN EXPECTATION	4c.	<p>Explaining how each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1:

		<p>Simulating Meiosis and Fertilization</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population Teacher Resource CD: The DNA Connection
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (5-8) POC-9.	Cite examples supporting the concept that certain traits of organisms may provide a survival advantage in a specific environment and therefore, an increased likelihood to produce offspring.
PERFORMANCE STANDARD	LS3 (7-8)-9.	Students demonstrate an understanding of Natural Selection/ evolution by...
GRADE SPAN EXPECTATION	9a.	<p>Explaining that genetic variations/traits of organisms are passed on through reproduction and random genetic changes.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle Genetics and Inheritance: Unit 3 Lab 4 Activity 3: Constructing a Family Pedigree Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes

		<ul style="list-style-type: none"> • Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting • Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing • Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome • Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease • Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease • Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood • Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery • Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population • Teacher Resource CD: Genetics and Heredity • Teacher Resource CD: Genetics and Inheritance • Teacher Resource CD: The DNA Connection • Virtual Laboratory: Mendelian Genetics Law of Dominance • Virtual Laboratory: Mendelian Genetics Law of Independent Assortment
<p>GRADE SPAN EXPECTATION</p>	<p>9c.</p>	<p>Differentiating between acquired and inherited characteristics and giving examples of each.</p> <ul style="list-style-type: none"> • Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs • Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication • Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix • Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics • Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment • Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization • Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population • Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle • Genetics and Inheritance: Unit 3 Lab 4 Activity 3: Constructing a Family Pedigree • Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using

		<p>Punnett Squares to Determine Genotypes and Phenotypes</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population Teacher Resource CD: Genetics and Heredity Teacher Resource CD: Genetics and Inheritance Teacher Resource CD: The DNA Connection Virtual Laboratory: Mendelian Genetics Law of Dominance Virtual Laboratory: Mendelian Genetics Law of Independent Assortment
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS 4.	Life Science: Humans are similar to other species in many ways, and yet are unique among Earth's life forms.
ASSESSMENT TARGET	LS4 (5-8) INQ-10.	Use data and observations to support the concept that environmental or biological factors affect human body systems (biotic & abiotic).
PERFORMANCE STANDARD	LS4 (7-8)-10.	Students demonstrate an understanding of human body systems by...
GRADE SPAN EXPECTATION	10c.	<p>Researching and reporting on how biotic (e.g., microbes, parasites, food availability, aging process) and abiotic (e.g., radiation, toxic materials, carcinogens) factors cause disease and affect human health.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Heredity
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS 4.	Life Science: Humans are similar to other species in many ways, and yet are unique among Earth's life forms.
ASSESSMENT TARGET	LS4 (5-8) INQ+POC-11.	Using data provided, select evidence that supports the concept that genetic information is passed on from both parents to offspring.
PERFORMANCE STANDARD	LS4 (7-8)-11.	Students demonstrate an understanding of human heredity by...
GRADE SPAN EXPECTATION	11a.	Recognizing that characteristics of an organism result from inherited traits of one or more genes from the parents and others result from

interactions with the environment.

- Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs
- Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication
- Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix
- Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics
- Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance
- Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance
- Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment
- Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization
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- Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes
- Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting
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- Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome
- Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease
- Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease
- Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood
- Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery
- Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population
- Teacher Resource CD: Genetics and Heredity
- Teacher Resource CD: Genetics and Inheritance
- Teacher Resource CD: The DNA Connection
- Virtual Laboratory: Mendelian Genetics Law of Dominance
- Virtual Laboratory: Mendelian Genetics Law of

		Independent Assortment
GRADE SPAN EXPECTATION	11b.	Tracing a genetic characteristic through a given pedigree (e.g., genealogical chart, Queen Victoria-hemophilia or hypothetical example) to demonstrate the passage of traits. <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle Teacher Resource CD: Genetics and Inheritance
GRADE SPAN EXPECTATION	11c.	Identifying that genetic material (i.e. chromosomes and genes) is located in the cell's nucleus. <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Heredity Teacher Resource CD: Genetics and Inheritance Teacher Resource CD: The DNA Connection
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.PS1.	Physical Science: All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).
ASSESSMENT TARGET	PS1 (5-8) SAE+MAS-4.	Represent or explain the relationship between or among energy, molecular motion, temperature, and states of matter.
PERFORMANCE STANDARD	PS1 (7-8)-4.	Students demonstrate an understanding of states of matter by...
GRADE SPAN EXPECTATION	4a.	Creating diagrams or models that represent the states of matter at the molecular level. <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.PS1.	Physical Science: All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).
ASSESSMENT TARGET	PS1 (5-8) MAS-5.	Given graphic or written information, classify matter as atom/molecule or element/compound (Not the structure of an atom).
PERFORMANCE STANDARD	PS1 (7-8)-5.	Students demonstrate an understanding of the structure of matter by...
GRADE SPAN EXPECTATION	5a.	Using models or diagrams to show the difference between atoms and molecules. <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs

		<ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix
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**Rhode Island Standards and State Frameworks
Science
Grade 8**

DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (5-8) SAE+FAF-2.	Describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems).
PERFORMANCE STANDARD	LS1 (7-8)-2.	Students demonstrate understanding of structure and function-survival requirements by...
GRADE SPAN EXPECTATION	2a.	<p>Explaining how the cell, as the basic unit of life, has the same survival needs as an organism (i.e., obtain energy, grow, eliminate waste, reproduce, provide for defense).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization
GRADE SPAN EXPECTATION	2b.	<p>Observing and describing (e.g., drawing, labeling) individual cells as seen through a microscope targeting cell membrane, cell wall, nucleus, and chloroplasts.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (5-8) POC-3.	Compare and contrast sexual reproduction with asexual reproduction.
PERFORMANCE STANDARD	LS1 (7-8)-3.	Students demonstrate an understanding of reproduction by...
GRADE SPAN EXPECTATION	3a.	<p>Explaining reproduction as a fundamental process by which the new individual receives genetic information from parent(s).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance

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DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (5-8) FAF-4.	Explain relationships between or among the structure and function of the cells, tissues, organs, and organ systems in an organism.
PERFORMANCE STANDARD	LS1 (7-8)-4.	Students demonstrate understanding of differentiation by...
GRADE SPAN EXPECTATION	4c.	<p>Explaining how each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2:

		<p>Analyze Genetic Origins through DNA Sequencing</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population Teacher Resource CD: The DNA Connection
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (5-8) POC-9.	Cite examples supporting the concept that certain traits of organisms may provide a survival advantage in a specific environment and therefore, an increased likelihood to produce offspring.
PERFORMANCE STANDARD	LS3 (7-8)-9.	Students demonstrate an understanding of Natural Selection/ evolution by...
GRADE SPAN EXPECTATION	9a.	<p>Explaining that genetic variations/traits of organisms are passed on through reproduction and random genetic changes.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle Genetics and Inheritance: Unit 3 Lab 4 Activity 3: Constructing a Family Pedigree Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing

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<p>GRADE SPAN EXPECTATION</p>	<p>9c.</p>	<p>Differentiating between acquired and inherited characteristics and giving examples of each.</p> <ul style="list-style-type: none"> • Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs • Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication • Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix • Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics • Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment • Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization • Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population • Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle • Genetics and Inheritance: Unit 3 Lab 4 Activity 3: Constructing a Family Pedigree • Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes • Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting

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DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS 4.	Life Science: Humans are similar to other species in many ways, and yet are unique among Earth's life forms.
ASSESSMENT TARGET	LS4 (5-8) INQ-10.	Use data and observations to support the concept that environmental or biological factors affect human body systems (biotic & abiotic).
PERFORMANCE STANDARD	LS4 (7-8)-10.	Students demonstrate an understanding of human body systems by...
GRADE SPAN EXPECTATION	10c.	<p>Researching and reporting on how biotic (e.g., microbes, parasites, food availability, aging process) and abiotic (e.g., radiation, toxic materials, carcinogens) factors cause disease and affect human health.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Heredity
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS 4.	Life Science: Humans are similar to other species in many ways, and yet are unique among Earth's life forms.
ASSESSMENT TARGET	LS4 (5-8) INQ+POC-11.	Using data provided, select evidence that supports the concept that genetic information is passed on from both parents to offspring.
PERFORMANCE STANDARD	LS4 (7-8)-11.	Students demonstrate an understanding of human heredity by...
GRADE SPAN EXPECTATION	11a.	<p>Recognizing that characteristics of an organism result from inherited traits of one or more genes from the parents and others result from interactions with the environment.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1:

		<p>Learning About Base Pairs</p> <ul style="list-style-type: none"> • Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication • Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix • Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics • Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment • Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization • Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population • Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle • Genetics and Inheritance: Unit 3 Lab 4 Activity 3: Constructing a Family Pedigree • Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes • Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting • Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing • Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome • Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease • Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease • Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood • Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery • Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population • Teacher Resource CD: Genetics and Heredity • Teacher Resource CD: Genetics and Inheritance • Teacher Resource CD: The DNA Connection • Virtual Laboratory: Mendelian Genetics Law of Dominance • Virtual Laboratory: Mendelian Genetics Law of Independent Assortment
GRADE SPAN EXPECTATION	11b.	Tracing a genetic characteristic through a given pedigree (e.g., genealogical chart, Queen Victoria-hemophilia or hypothetical example)

		<p>to demonstrate the passage of traits.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle Teacher Resource CD: Genetics and Inheritance
GRADE SPAN EXPECTATION	11c.	<p>Identifying that genetic material (i.e. chromosomes and genes) is located in the cell's nucleus.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Heredity Teacher Resource CD: Genetics and Inheritance Teacher Resource CD: The DNA Connection
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.PS1.	Physical Science: All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).
ASSESSMENT TARGET	PS1 (5-8) SAE+MAS-4.	Represent or explain the relationship between or among energy, molecular motion, temperature, and states of matter.
PERFORMANCE STANDARD	PS1 (7-8)-4.	Students demonstrate an understanding of states of matter by...
GRADE SPAN EXPECTATION	4a.	<p>Creating diagrams or models that represent the states of matter at the molecular level.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.PS1.	Physical Science: All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).
ASSESSMENT TARGET	PS1 (5-8) MAS-5.	Given graphic or written information, classify matter as atom/molecule or element/compound (Not the structure of an atom).
PERFORMANCE STANDARD	PS1 (7-8)-5.	Students demonstrate an understanding of the structure of matter by...
GRADE SPAN EXPECTATION	5a.	<p>Using models or diagrams to show the difference between atoms and molecules.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3:

Exploring DNA's Structure - the Double Helix

Rhode Island Standards and State Frameworks
 Science
 Grade 9

DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (9-11) INQ+SAE+FAF-1.	Use data and observation to make connections between, to explain, or to justify how specific cell organelles produce/regulate what the cell needs or what a unicellular or multi-cellular organism needs for survival (e.g., protein synthesis, DNA replication, nerve cells).
PERFORMANCE STANDARD	LS1 (9-11)-1.	Students demonstrate understanding of structure and function-survival requirements by...
GRADE SPAN EXPECTATION	1a.	Explaining the relationships between and amongst the specialized structures of the cell and their functions (e.g. transport of materials, energy transfer, protein building, waste disposal, information feedback, and even movement). <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (9-11) FAF+ POC-2.	Explain or justify with evidence how the alteration of the DNA sequence may produce new gene combinations that make little difference, enhance capabilities, or can be harmful to the organism (e.g., selective breeding, genetic engineering, mutations).
PERFORMANCE STANDARD	LS1 (9-11)-2.	Students demonstrate an understanding of the molecular basis for heredity by...
GRADE SPAN EXPECTATION	2a.	Describing the DNA structure and relating the DNA sequence to the genetic code. <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery Teacher Resource CD: Genetics and Heredity Teacher Resource CD: The DNA Connection
GRADE SPAN EXPECTATION	2b.	Explaining how DNA may be altered and how this affects genes/heredity (e.g. substitution, insertion, or deletion).

		<ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Inheritance
GRADE SPAN EXPECTATION	2c.	<p>Describing how DNA contains the code for the production of specific proteins.</p> <ul style="list-style-type: none"> Teacher Resource CD: The DNA Connection
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (9-11) FAF+ POC-2.	Explain or justify with evidence how the alteration of the DNA sequence may produce new gene combinations that make little difference, enhance capabilities, or can be harmful to the organism (e.g., selective breeding, genetic engineering, mutations).
PERFORMANCE STANDARD	LS1 (Ext)-2.	Example Extension(s): Students demonstrate an understanding of the molecular basis for heredity by...
GRADE SPAN EXPECTATION	2aa.	<p>Diagramming or modeling the relationship between chromosomes, genes and DNA, including histones and nucleosomes.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4:

		<p>Diagnosing Genetic Disease</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery Teacher Resource CD: Genetics and Heredity Teacher Resource CD: Genetics and Inheritance Teacher Resource CD: The DNA Connection
GRADE SPAN EXPECTATION	2cc.	<p>Tracing in a diagram or model the information flow-DNA to RNA to Protein-through transcription and translation.</p> <ul style="list-style-type: none"> Teacher Resource CD: The DNA Connection
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (9-11) NOS-6.	Explain how evidence from technological advances supports or refutes the genetic relationships among groups of organisms (e.g., DNA analysis, protein analysis).
PERFORMANCE STANDARD	LS3 (9-11)-6.	Students will demonstrate their understanding of the degree of genetic relationships among organisms by...
GRADE SPAN EXPECTATION	6a.	<p>Using given data (diagrams, charts, narratives, etc.) and advances in technology to explain how our understanding of genetic variation has developed over time.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population Teacher Resource CD: Genetics and Inheritance
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (9-11) NOS-6.	Explain how evidence from technological advances supports or refutes the genetic relationships among groups of organisms (e.g., DNA analysis, protein analysis).
PERFORMANCE STANDARD	LS3 (Ext)-6.	Example Extension(s): Students will demonstrate their understanding of the degree of genetic relationships among organisms by...
GRADE SPAN EXPECTATION	6aa.	<p>Describing how the Human Genome Project has contributed to our understanding of both human heredity and the commonality of DNA sequences among organisms.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome

		<ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Heredity Teacher Resource CD: Genetics and Inheritance
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (9-11) INQ POC-7.	Given a scenario, provide evidence that demonstrates how sexual reproduction results in a great variety of possible gene combinations and contributes to natural selection (e.g., Darwin's finches, isolation of a species, Tay Sach's disease).
PERFORMANCE STANDARD	LS3 (9-11)-7.	Students demonstrate an understanding of Natural Selection/ evolution by...
GRADE SPAN EXPECTATION	7a.	<p>Investigating how information is passed from parents to offspring by encoded molecules (e.g. evidence from electrophoresis, DNA fingerprinting).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle Genetics and Inheritance: Unit 3 Lab 4 Activity 3: Constructing a Family Pedigree Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome

		<ul style="list-style-type: none"> • Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease • Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease • Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood • Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery • Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population • Teacher Resource CD: Genetics and Heredity • Teacher Resource CD: Genetics and Inheritance • Teacher Resource CD: The DNA Connection • Virtual Laboratory: Mendelian Genetics Law of Dominance • Virtual Laboratory: Mendelian Genetics Law of Independent Assortment
<p>GRADE SPAN EXPECTATION</p>	<p>7b.</p>	<p>Investigating how the sorting and recombination of genes in sexual reproduction results in a great variety of possible gene combinations in the offspring of any two parents. (e.g. manipulate models to represent and predict genotypes and phenotypes, Punnett Squares, probability activities).</p> <ul style="list-style-type: none"> • Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics • Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment • Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population • Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle • Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes • Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease • Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood • Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population • Teacher Resource CD: Genetics and Heredity • Teacher Resource CD: Genetics and Inheritance • Virtual Laboratory: Mendelian Genetics Law of Dominance

		<ul style="list-style-type: none"> Virtual Laboratory: Mendelian Genetics Law of Independent Assortment
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (9-11) INQ POC-7.	Given a scenario, provide evidence that demonstrates how sexual reproduction results in a great variety of possible gene combinations and contributes to natural selection (e.g., Darwin's finches, isolation of a species, Tay Sach's disease).
PERFORMANCE STANDARD	LS3 (Ext)-7.	Example Extension(s): Students demonstrate an understanding of Natural Selection/ evolution by...
GRADE SPAN EXPECTATION	7aa.	<p>Distinguishing the stages of mitosis and meiosis and how each contributes to the production of offspring with varying traits</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS4.	Life Science: Humans are similar to other species in many ways, and yet are unique among Earth's life forms.
ASSESSMENT TARGET	LS4 (9-11) NOS+INQ-9.	Use evidence to make and support conclusions about the ways that humans or other organisms are affected by environmental factors or heredity (e.g., pathogens, diseases, medical advances, pollution, mutations).
PERFORMANCE STANDARD	LS4 (9-11)-9.	Students demonstrate an understanding of how humans are affected by environmental factors and/or heredity by...
GRADE SPAN EXPECTATION	9a.	<p>Researching scientific information to explain how such things as radiation, chemicals, and other factors can cause gene mutations or disease.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Inheritance
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS4.	Life Science: Humans are similar to other species in many ways, and yet are unique among Earth's life forms.
ASSESSMENT TARGET	LS4 (9-11) SAE+FAF-10.	Explain how the immune system, endocrine system, or nervous system works and draw conclusions about how systems interact to maintain homeostasis in the human body.
PERFORMANCE STANDARD	LS4 (Ext)-10.	Example Extension(s): Students demonstrate an understanding of human body systems by...
GRADE SPAN EXPECTATION	10bb.	<p>Investigating and reporting on a human disease and its consequential disruption of homeostasis (e.g. diabetes, cancer, AIDS).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4:

		<p>Diagnosing Genetic Disease</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Heredity
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.PS1.	Physical Science: All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).
ASSESSMENT TARGET	PS1 (9-11) MAS+FAF-4.	Model and explain the structure of an atom or explain how an atom's electron configuration, particularly the outermost electron(s), determines how that atom can interact with other atoms.
PERFORMANCE STANDARD	PS1 (9-11)-4.	Students demonstrate an understanding of the structure of matter by...
GRADE SPAN EXPECTATION	4b.	<p>Writing formulae for compounds and developing basic (excluding transition elements) models using electron structure.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix
GRADE SPAN EXPECTATION	4c.	<p>Explaining or modeling how the electron configuration of atoms governs how atoms interact with one another (e.g. covalent, hydrogen and ionic bonding).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting

Rhode Island Standards and State Frameworks

Science

Grade 10

DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (9-11) INQ+SAE+FAF-1.	Use data and observation to make connections between, to explain, or to justify how specific cell organelles produce/regulate what the cell needs or what a unicellular or multi-cellular organism needs for survival (e.g. , protein synthesis, DNA replication, nerve cells).
PERFORMANCE STANDARD	LS1 (9-11)-1.	Students demonstrate understanding of structure and function-survival requirements by...
GRADE SPAN EXPECTATION	1a.	<p>Explaining the relationships between and amongst the specialized structures of the cell and their functions (e.g. transport of materials, energy transfer, protein building, waste disposal, information feedback, and even movement).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 2 Lab 3 Activity 1:

		Simulating Meiosis and Fertilization
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (9-11) FAF+ POC-2.	Explain or justify with evidence how the alteration of the DNA sequence may produce new gene combinations that make little difference, enhance capabilities, or can be harmful to the organism (e.g., selective breeding, genetic engineering, mutations).
PERFORMANCE STANDARD	LS1 (9-11)-2.	Students demonstrate an understanding of the molecular basis for heredity by...
GRADE SPAN EXPECTATION	2a.	<p>Describing the DNA structure and relating the DNA sequence to the genetic code.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery Teacher Resource CD: Genetics and Heredity Teacher Resource CD: The DNA Connection
GRADE SPAN EXPECTATION	2b.	<p>Explaining how DNA may be altered and how this affects genes/heredity (e.g. substitution, insertion, or deletion).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Inheritance
GRADE SPAN EXPECTATION	2c.	<p>Describing how DNA contains the code for the production of specific proteins.</p> <ul style="list-style-type: none"> Teacher Resource CD: The DNA Connection
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS1.	Life Science: All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).
ASSESSMENT TARGET	LS1 (9-11) FAF+ POC-2.	Explain or justify with evidence how the alteration of the DNA sequence may produce new gene combinations that make little difference, enhance capabilities, or can be harmful to the organism

		(e.g., selective breeding, genetic engineering, mutations).
PERFORMANCE STANDARD	LS1 (Ext)-2.	Example Extension(s): Students demonstrate an understanding of the molecular basis for heredity by...
GRADE SPAN EXPECTATION	2aa.	<p>Diagramming or modeling the relationship between chromosomes, genes and DNA, including histones and nucleosomes.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery Teacher Resource CD: Genetics and Heredity Teacher Resource CD: Genetics and Inheritance Teacher Resource CD: The DNA Connection
GRADE SPAN EXPECTATION	2cc.	<p>Tracing in a diagram or model the information flow-DNA to RNA to Protein-through transcription and translation.</p> <ul style="list-style-type: none"> Teacher Resource CD: The DNA Connection
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (9-11) NOS-6.	Explain how evidence from technological advances supports or refutes the genetic relationships among groups of organisms (e.g., DNA

		analysis, protein analysis.
PERFORMANCE STANDARD	LS3 (9-11)-6.	Students will demonstrate their understanding of the degree of genetic relationships among organisms by...
GRADE SPAN EXPECTATION	6a.	Using given data (diagrams, charts, narratives, etc.) and advances in technology to explain how our understanding of genetic variation has developed over time. <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population Teacher Resource CD: Genetics and Inheritance
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (9-11) NOS-6.	Explain how evidence from technological advances supports or refutes the genetic relationships among groups of organisms (e.g., DNA analysis, protein analysis).
PERFORMANCE STANDARD	LS3 (Ext)-6.	Example Extension(s): Students will demonstrate their understanding of the degree of genetic relationships among organisms by...
GRADE SPAN EXPECTATION	6aa.	Describing how the Human Genome Project has contributed to our understanding of both human heredity and the commonality of DNA sequences among organisms. <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Heredity Teacher Resource CD: Genetics and Inheritance
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (9-11) INQ POC-7.	Given a scenario, provide evidence that demonstrates how sexual reproduction results in a great variety of possible gene combinations and contributes to natural selection (e.g., Darwin's finches, isolation of a species, Tay Sach's disease).
PERFORMANCE STANDARD	LS3 (9-11)-7.	Students demonstrate an understanding of Natural Selection/ evolution by...
GRADE SPAN EXPECTATION	7a.	Investigating how information is passed from parents to offspring by encoded molecules (e.g. evidence from electrophoresis, DNA fingerprinting).

		<ul style="list-style-type: none"> • Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs • Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication • Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix • Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics • Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment • Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization • Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population • Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle • Genetics and Inheritance: Unit 3 Lab 4 Activity 3: Constructing a Family Pedigree • Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes • Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting • Genetics and Inheritance: Unit 3 Lab 5 Activity 2: Analyze Genetic Origins through DNA Sequencing • Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome • Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease • Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease • Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood • Genetics and Inheritance: Unit 4 Lab 7 Activity 1: Case of the Royal Mystery • Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population • Teacher Resource CD: Genetics and Heredity • Teacher Resource CD: Genetics and Inheritance • Teacher Resource CD: The DNA Connection • Virtual Laboratory: Mendelian Genetics Law of Dominance • Virtual Laboratory: Mendelian Genetics Law of Independent Assortment
GRADE SPAN	7b.	Investigating how the sorting and recombination of genes in sexual

EXPECTATION		<p>reproduction results in a great variety of possible gene combinations in the offspring of any two parents. (e.g. manipulate models to represent and predict genotypes and phenotypes, Punnett Squares, probability activities).</p> <ul style="list-style-type: none"> • Genetics and Inheritance: Unit 2 Lab 2 Activity 1: Applying the Laws of Chance to Genetics • Genetics and Inheritance: Unit 2 Lab 2 Activity 2: Modeling a Genetic Cross to Demonstrate the Law of Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 3: Modeling a Genetic Cross to Demonstrate the Law of Incomplete Dominance • Genetics and Inheritance: Unit 2 Lab 2 Activity 4: Modeling a Dihybrid Cross to Demonstrate the Law of Independent Assortment • Genetics and Inheritance: Unit 3 Lab 4 Activity 1: Determine the Frequency of Common Human Traits in a Population • Genetics and Inheritance: Unit 3 Lab 4 Activity 2: Taste Tests and the Hardy-Weinberg Principle • Genetics and Inheritance: Unit 3 Lab 4 Activity 4: Using Punnett Squares to Determine Genotypes and Phenotypes • Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease • Genetics and Inheritance: Unit 3 Lab 6 Activity 1: Examining Human Variation in Blood • Genetics and Inheritance: Unit 4 Lab 7 Activity 2: Calculating the Frequency of Human Traits in a Population • Teacher Resource CD: Genetics and Heredity • Teacher Resource CD: Genetics and Inheritance • Virtual Laboratory: Mendelian Genetics Law of Dominance • Virtual Laboratory: Mendelian Genetics Law of Independent Assortment
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS3.	Life Science: Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
ASSESSMENT TARGET	LS3 (9-11) INQ POC-7.	Given a scenario, provide evidence that demonstrates how sexual reproduction results in a great variety of possible gene combinations and contributes to natural selection (e.g., Darwin's finches, isolation of a species, Tay Sach's disease).
PERFORMANCE STANDARD	LS3 (Ext)-7.	Example Extension(s): Students demonstrate an understanding of Natural Selection/ evolution by...
GRADE SPAN EXPECTATION	7aa.	<p>Distinguishing the stages of mitosis and meiosis and how each contributes to the production of offspring with varying traits</p> <ul style="list-style-type: none"> • Genetics and Inheritance: Unit 2 Lab 3 Activity 1: Simulating Meiosis and Fertilization
DOMAIN / STATEMENT OF	RI.LS4.	Life Science: Humans are similar to other species in many ways, and yet are unique among Earth's life forms.

ENDURING KNOWLEDGE		
ASSESSMENT TARGET	LS4 (9-11) NOS+INQ-9.	Use evidence to make and support conclusions about the ways that humans or other organisms are affected by environmental factors or heredity (e.g., pathogens, diseases, medical advances, pollution, mutations).
PERFORMANCE STANDARD	LS4 (9-11)-9.	Students demonstrate an understanding of how humans are affected by environmental factors and/or heredity by...
GRADE SPAN EXPECTATION	9a.	<p>Researching scientific information to explain how such things as radiation, chemicals, and other factors can cause gene mutations or disease.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Inheritance
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.LS4.	Life Science: Humans are similar to other species in many ways, and yet are unique among Earth's life forms.
ASSESSMENT TARGET	LS4 (9-11) SAE+FAF-10.	Explain how the immune system, endocrine system, or nervous system works and draw conclusions about how systems interact to maintain homeostasis in the human body.
PERFORMANCE STANDARD	LS4 (Ext)-10.	Example Extension(s): Students demonstrate an understanding of human body systems by...
GRADE SPAN EXPECTATION	10bb.	<p>Investigating and reporting on a human disease and its consequential disruption of homeostasis (e.g. diabetes, cancer, AIDS).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 3 Lab 5 Activity 3: Understanding the Human Genome Genetics and Inheritance: Unit 3 Lab 5 Activity 4: Diagnosing Genetic Disease Genetics and Inheritance: Unit 3 Lab 5 Activity 5: Predicting Genetic Disease Teacher Resource CD: Genetics and Heredity
DOMAIN / STATEMENT OF ENDURING KNOWLEDGE	RI.PS1.	Physical Science: All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).
ASSESSMENT TARGET	PS1 (9-11) MAS+FAF-4.	Model and explain the structure of an atom or explain how an atom's electron configuration, particularly the outermost electron(s), determines how that atom can interact with other atoms.
PERFORMANCE STANDARD	PS1 (9-11)-4.	Students demonstrate an understanding of the structure of matter by...
GRADE SPAN EXPECTATION	4b.	<p>Writing formulae for compounds and developing basic (excluding transition elements) models using electron structure.</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication

		<ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix
GRADE SPAN EXPECTATION	4c.	<p>Explaining or modeling how the electron configuration of atoms governs how atoms interact with one another (e.g. covalent, hydrogen and ionic bonding).</p> <ul style="list-style-type: none"> Genetics and Inheritance: Unit 1 Lab 1 Activity 1: Learning About Base Pairs Genetics and Inheritance: Unit 1 Lab 1 Activity 2: Modeling DNA Replication Genetics and Inheritance: Unit 1 Lab 1 Activity 3: Exploring DNA's Structure - the Double Helix Genetics and Inheritance: Unit 3 Lab 5 Activity 1: Analyze Genetic Origins through DNA Fingerprinting

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