

Inquiry Investigations™
Biotechnology Applications MODULE - 1278382
Grades: 7-10

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New Jersey Academic Standards
Science
Grade 7

STANDARD	NJ.5.1.	Scientific Processes: All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.
STRAND	5.1.8.A.2.	<p>Habits of Mind: Communicate experimental findings to others.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.1.8.A.4.	<p>Habits of Mind: Recognize that curiosity, skepticism, open-mindedness, and honesty are attributes of scientists.</p> <ul style="list-style-type: none"> • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine

STRAND	5.1.8.B.1.	<p>Inquiry and Problem Solving: Identify questions and make predictions that can be addressed by conducting investigations.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
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		<p>Spills in Various Shore Environments</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
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STRAND	5.3.8.C.1.	<p>Patterns and Algebra: Express physical relationships in terms of mathematical equations derived from collected data.</p> <ul style="list-style-type: none"> Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.3.8.D.1.	Data Analysis and Probability: Represent and describe mathematical relationships among variables using: graphs; tables.

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STRAND	5.3.8.D.2.	<p>Data Analysis and Probability: Analyze experimental data sets using measures of central tendency: mean, mode, median.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect
STRAND	5.3.8.D.3.	<p>Data Analysis and Probability: Construct and use a graph of experimental data to draw a line of best fit and identify a linear relationship between variables when appropriate.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination
STRAND	5.3.8.D.4.	<p>Data Analysis and Probability: Use computer spreadsheets, graphing and database applications to assist in quantitative analysis of data.</p> <ul style="list-style-type: none"> • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STANDARD	NJ.5.4.	<p>Nature and Process of Technology: All students will understand the interrelationships between science and technology and develop a conceptual understanding of the nature and process of technology.</p>
STRAND	5.4.8.A.1.	<p>Science and Technology: Compare and contrast science with technology, illustrating similarities and differences between these two human endeavors.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.4.8.B.1.	<p>Nature of Technology: Analyze a product or system to determine the problem it was designed to solve, the design constraints, trade-offs and risks involved in using the product or system, how the product or system might fail, and how the product or system might be improved.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.4.8.C.1.	<p>Technological Design: Recognize how feedback loops are used to control systems.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination
STANDARD	NJ.5.5.	<p>Characteristics of Life: All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life.</p>

STRAND	5.5.8.B.1.	<p>Diversity and Biological Evolution: Compare and contrast kinds of organisms using their internal and external characteristics.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.5.8.B.2.	<p>Diversity and Biological Evolution: Discuss how changing environmental conditions can result in evolution or extinction of a species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments
STRAND	5.5.8.C.1.	<p>Reproduction and Heredity: Describe how the sorting and recombining of genetic material results in the potential for variation among offspring of humans and other species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STANDARD	NJ.5.8.	<p>Earth Science: All students will gain an understanding of the structure, dynamics, and geophysical systems of the earth.</p>
STRAND	5.8.8.A.1.	<p>Earth's Properties and Materials: Observe that most rocks and soils are made of several substances or minerals.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-

		Degrading Microbes
STRAND	5.8.8.A.2.	<p>Earth's Properties and Materials: Observe that the properties of soil vary from place to place and will affect the soil's ability to support life.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
STRAND	5.8.8.D.2.	<p>How We Study the Earth: Explain how technology designed to investigate features of the Earth's surface impacts how scientists study the Earth.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STANDARD	NJ.5.10.	Environmental Studies: All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.
STRAND	5.10.8.A.1.	<p>Natural Systems and Interactions: Investigate the impact of catastrophic events such as forest fires, floods, and hurricanes on the environment of New Jersey.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil

		<p>Spills in Various Shore Environments</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
STRAND	5.10.8.B.1.	<p>Human Interactions and Impact: Compare and contrast practices that affect the use and management of natural resources.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes

New Jersey Academic Standards
Science
Grade 8

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STRAND	5.2.8.B.1.	<p>Historical Perspectives: Describe the impact of major events and people in the history of science and technology, in conjunction with other world events.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STANDARD	NJ.5.3.	Mathematical Applications: All students will integrate mathematics as a tool for problem-solving in science, and as a means of expressing and/or modeling scientific theories.
STRAND	5.3.8.C.1.	<p>Patterns and Algebra: Express physical relationships in terms of mathematical equations derived from collected data.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at

		<p>Risk for SARS</p> <ul style="list-style-type: none"> Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.3.8.D.1.	<p>Data Analysis and Probability: Represent and describe mathematical relationships among variables using: graphs; tables.</p> <ul style="list-style-type: none"> Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination
STRAND	5.3.8.D.2.	<p>Data Analysis and Probability: Analyze experimental data sets using measures of central tendency: mean, mode, median.</p> <ul style="list-style-type: none"> Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect
STRAND	5.3.8.D.3.	<p>Data Analysis and Probability: Construct and use a graph of experimental data to draw a line of best fit and identify a linear relationship between variables when appropriate.</p> <ul style="list-style-type: none"> Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination
STRAND	5.3.8.D.4.	<p>Data Analysis and Probability: Use computer spreadsheets, graphing and database applications to assist in quantitative analysis of data.</p> <ul style="list-style-type: none"> Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STANDARD	NJ.5.4.	<p>Nature and Process of Technology: All students will understand the interrelationships between science and technology and develop a conceptual understanding of the nature and process of technology.</p>
STRAND	5.4.8.A.1.	<p>Science and Technology: Compare and contrast science with technology, illustrating similarities and differences between these two human endeavors.</p>

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.4.8.B.1.	<p>Nature of Technology: Analyze a product or system to determine the problem it was designed to solve, the design constraints, trade-offs and risks involved in using the product or system, how the product or system might fail, and how the product or system might be improved.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.4.8.C.1.	<p>Technological Design: Recognize how feedback loops are used to control systems.</p>

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination
STANDARD	NJ.5.5.	Characteristics of Life: All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life.
STRAND	5.5.8.A.1.	<p>Matter, Energy and Organization in Living Systems: Explain how the products respiration and photosynthesis are recycled.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments
STRAND	5.5.8.B.1.	<p>Diversity and Biological Evolution: Compare and contrast kinds of organisms using their internal and external characteristics.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.5.8.B.2.	<p>Diversity and Biological Evolution: Discuss how changing environmental conditions can result in evolution or extinction of a species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments
STRAND	5.5.8.C.1.	<p>Reproduction and Heredity: Describe how the sorting and recombining of genetic material results in the potential for variation among offspring of humans and other species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at

		<p>Risk for SARS</p> <ul style="list-style-type: none"> • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STANDARD	NJ.5.8.	Earth Science: All students will gain an understanding of the structure, dynamics, and geophysical systems of the earth.
STRAND	5.8.8.A.1.	<p>Earth's Properties and Materials: Observe that most rocks and soils are made of several substances or minerals.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
STRAND	5.8.8.A.2.	<p>Earth's Properties and Materials: Observe that the properties of soil vary from place to place and will affect the soil's ability to support life.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
STRAND	5.8.8.D.2.	<p>How We Study the Earth: Explain how technology designed to investigate features of the Earth's surface impacts how scientists study the Earth.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS

		<ul style="list-style-type: none"> • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STANDARD	NJ.5.10.	Environmental Studies: All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.
STRAND	5.10.8.A.1.	<p>Natural Systems and Interactions: Investigate the impact of catastrophic events such as forest fires, floods, and hurricanes on the environment of New Jersey.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
STRAND	5.10.8.B.1.	<p>Human Interactions and Impact: Compare and contrast practices that affect the use and management of natural resources.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes

New Jersey Academic Standards
Science
Grade 9

STANDARD	NJ.5.1.	Scientific Processes: All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.
STRAND	5.1.12.A.1.	<p>Habits of Mind: When making decisions, evaluate conclusions, weigh evidence, and recognize that arguments may not have equal merit.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.1.12.A.2.	<p>Habits of Mind: Assess the risks and benefits associated with alternative solutions.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.1.12.A.3.	<p>Habits of Mind: Engage in collaboration, peer review, and accurate reporting of findings.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STRAND	5.1.12.A.4.	<p>Habits of Mind: Explore cases that demonstrate the interdisciplinary nature of the scientific enterprise.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.1.12.B.1.	<p>Inquiry and Problem Solving: Select and use appropriate instrumentation to design and conduct investigations.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case

		<p>History of Baby Mike</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.1.12.B.2.	<p>Inquiry and Problem Solving: Show that experimental results can lead to new questions and further investigations.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype

STRAND	5.1.12.C.1.	<p>Safety: Understand, evaluate and practice safe procedures for conducting science investigations.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STANDARD	NJ.5.2.	<p>Science and Society: All students will develop an understanding of how people of various cultures have contributed to the advancement of science and technology, and how major discoveries and events have advanced science and technology.</p>
STRAND	5.2.12.A.1.	<p>Cultural Contributions: Recognize the role of the scientific community in responding to changing social and political conditions and how scientific and technological achievement effect historical events.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.2.12.B.2.	<p>Historical Perspectives: Discuss significant technological achievements in which science has played an important part as well as technological advances that have contributed directly to the advancement of scientific knowledge.</p>

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STANDARD	NJ.5.3.	Mathematical Applications: All students will integrate mathematics as a tool for problem-solving in science, and as a means of expressing and/or modeling scientific theories.
STRAND	5.3.12.C.1.	<p>Patterns and Algebra: Apply mathematical models that describe physical phenomena to predict real world events.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS

		<ul style="list-style-type: none"> Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.3.12.D.1.	<p>Data Analysis and Probability: Construct and interpret graphs of data to represent inverse and non-linear relationships, and statistical distributions.</p> <ul style="list-style-type: none"> Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STANDARD	NJ.5.4.	<p>Nature and Process of Technology: All students will understand the interrelationships between science and technology and develop a conceptual understanding of the nature and process of technology.</p>
STRAND	5.4.12.A.1.	<p>Science and Technology: Know that scientific inquiry is driven by the desire to understand the natural world and seeks to answer questions that may or may not directly influence humans, while technology is driven by the need to meet human needs and solve human problems.</p> <ul style="list-style-type: none"> Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene

		<p>Defect</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.4.12.C.1.	<p>Technological Design: Plan, develop, and implement a proposal to solve an authentic, technological problem.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STANDARD	NJ.5.5.	<p>Characteristics of Life: All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life.</p>
STRAND	5.5.12.A.3.	<p>Matter, Energy and Organization in Living Systems: Describe how plants produce substances high in energy content that become the primary source of energy for life.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.5.12.B.1.	<p>Diversity and Biological Evolution: Explain that through evolution the Earth's present species developed from earlier distinctly different species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.5.12.C.1.	<p>Reproduction and Heredity: Describe how information is encoded and transmitted in genetic material.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.5.12.C.2.	<p>Reproduction and Heredity: Explain how genetic material can be altered by natural and/or artificial means; mutations and new gene combinations may have positive, negative, or no effect on organisms or species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STRAND	5.5.12.C.3.	<p>Reproduction and Heredity: Assess the impact of current and emerging technologies on our understanding of inherited human characteristics.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STANDARD	NJ.5.10.	<p>Environmental Studies: All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.</p>
STRAND	5.10.12.A.1.	<p>Natural Systems and Interactions: Distinguish naturally occurring process from those believed to have been modified by human interaction or activity: climate change, ozone production, erosion and deposition, threatened and endangered species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
STRAND	5.10.12.B.1.	<p>Human Interactions and Impact: Assess the impact of human activities on the cycling of matter and the flow of energy through ecosystems.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-

		Degrading Microbes
STRAND	5.10.12.B.2.	<p>Human Interactions and Impact: Use scientific, economic, and other data to assess environmental risks and benefits associated with societal activity.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes

New Jersey Academic Standards
Science
Grade 10

STANDARD	NJ.5.1.	<p>Scientific Processes: All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.</p>
STRAND	5.1.12.A.1.	<p>Habits of Mind: When making decisions, evaluate conclusions, weigh evidence, and recognize that arguments may not have equal merit.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype

STRAND	5.1.12.A.2.	<p>Habits of Mind: Assess the risks and benefits associated with alternative solutions.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.1.12.A.3.	<p>Habits of Mind: Engage in collaboration, peer review, and accurate reporting of findings.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STRAND	5.1.12.A.4.	<p>Habits of Mind: Explore cases that demonstrate the interdisciplinary nature of the scientific enterprise.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.1.12.B.1.	<p>Inquiry and Problem Solving: Select and use appropriate instrumentation to design and conduct investigations.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing

		<p>Electrophoresed DNA Profiles</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.1.12.B.2.	<p>Inquiry and Problem Solving: Show that experimental results can lead to new questions and further investigations.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.1.12.C.1.	<p>Safety: Understand, evaluate and practice safe procedures for conducting science investigations.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case

		<p>History of Baby Mike</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STANDARD	NJ.5.2.	Science and Society: All students will develop an understanding of how people of various cultures have contributed to the advancement of science and technology, and how major discoveries and events have advanced science and technology.
STRAND	5.2.12.A.1.	<p>Cultural Contributions: Recognize the role of the scientific community in responding to changing social and political conditions and how scientific and technological achievement effect historical events.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.2.12.B.2.	<p>Historical Perspectives: Discuss significant technological achievements in which science has played an important part as well as technological advances that have contributed directly to the advancement of scientific knowledge.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STANDARD	NJ.5.3.	Mathematical Applications: All students will integrate mathematics as a tool for problem-solving in science, and as a means of expressing and/or modeling scientific theories.
STRAND	5.3.12.C.1.	<p>Patterns and Algebra: Apply mathematical models that describe physical phenomena to predict real world events.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.3.12.D.1.	<p>Data Analysis and Probability: Construct and interpret graphs of data to represent inverse and non-linear relationships, and statistical distributions.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STANDARD	NJ.5.4.	Nature and Process of Technology: All students will understand the interrelationships between science and technology and develop a conceptual understanding of the nature and process of technology.
STRAND	5.4.12.A.1.	<p>Science and Technology: Know that scientific inquiry is driven by the desire to understand the natural world and seeks to answer questions that may or may not directly influence humans, while technology is driven by the need to meet human needs and solve human problems.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STRAND	5.4.12.C.1.	<p>Technological Design: Plan, develop, and implement a proposal to solve an authentic, technological problem.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops

		<ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS
STANDARD	NJ.5.5.	Characteristics of Life: All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life.
STRAND	5.5.12.A.3.	Matter, Energy and Organization in Living Systems: Describe how plants produce substances high in energy content that become the primary source of energy for life. <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait
STRAND	5.5.12.B.1.	Diversity and Biological Evolution: Explain that through evolution the Earth's present species developed from earlier distinctly different species. <ul style="list-style-type: none"> • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree

		to Analyze a Family Trait
STRAND	5.5.12.C.1.	<p>Reproduction and Heredity: Describe how information is encoded and transmitted in genetic material.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles • Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine • Virtual Laboratory: Preparation and Analysis of a Human Karyotype
STRAND	5.5.12.C.2.	<p>Reproduction and Heredity: Explain how genetic material can be altered by natural and/or artificial means; mutations and new gene combinations may have positive, negative, or no effect on organisms or species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike • Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes • Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek • Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret • Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait • Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS

		<ul style="list-style-type: none"> • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STRAND	5.5.12.C.3.	<p>Reproduction and Heredity: Assess the impact of current and emerging technologies on our understanding of inherited human characteristics.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery • Teacher Resource CD: Biotechnology in Agriculture and the Environment • Teacher Resource CD: Biotechnology in Forensic Science • Teacher Resource CD: Biotechnology in Medicine
STANDARD	NJ.5.10.	<p>Environmental Studies: All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.</p>
STRAND	5.10.12.A.1.	<p>Natural Systems and Interactions: Distinguish naturally occurring process from those believed to have been modified by human interaction or activity: climate change, ozone production, erosion and deposition, threatened and endangered species.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
STRAND	5.10.12.B.1.	<p>Human Interactions and Impact: Assess the impact of human activities on the cycling of matter and the flow of energy through ecosystems.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes
STRAND	5.10.12.B.2.	<p>Human Interactions and Impact: Use scientific, economic, and other data to assess environmental risks and benefits associated with societal activity.</p> <ul style="list-style-type: none"> • Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill • Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments • Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes