

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

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**Maryland Content Standards**  
**Science**  
**Grade 7**

STRAND / TOPIC / STANDARD	MD.1.O.	Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.
TOPIC / INDICATOR	1.A.1.	Constructing Knowledge: Design, analyze, or carry out simple investigations and formulate appropriate conclusions based on data obtained or provided.
INDICATOR / PROFICIENCY LEVEL	1.A.1.b.	<p>Develop the ability to clarify questions and direct them toward objects and phenomena that can be described, explained, or predicted by scientific investigations.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.A.1.c.	<p>Explain and provide examples that all hypotheses are valuable, even if they turn out not to be true, if they lead to fruitful investigations.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese</li> </ul>

		<p>the Biotech Way</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<b>STRAND / TOPIC / STANDARD</b>	<b>MD.1.0.</b>	<b>Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.</b>
<b>TOPIC / INDICATOR</b>	<b>1.B.1.</b>	<b>Applying Evidence and Reasoning: Review data from a simple experiment, summarize the data, and construct a logical argument about the cause-and-effect relationships in the experiment.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.B.1.a.</b>	<p>Verify the idea that there is no fixed set of steps all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> </ul>

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<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.B.1.b.</p>	<p>Explain that what people expect to observe often affects what they actually do observe and that scientists know about this danger to objectivity and take steps to try to avoid it when designing investigations and examining data.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.B.1.d.</p>	<p>Describe the reasoning that lead to the interpretation of data and conclusions drawn.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> </ul>

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<b>STRAND / TOPIC / STANDARD</b>	<b>MD.1.0.</b>	<b>Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.</b>
<b>TOPIC / INDICATOR</b>	<b>1.C.1.</b>	<b>Communicating Scientific Information: Develop explanations that explicitly link data from investigations conducted, selected readings and, when appropriate, contributions from historical discoveries.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.C.1.a.</b>	<p>Organize and present data in tables and graphs and identify relationships they reveal.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.C.1.b.</b>	<p>Interpret tables and graphs produced by others and describe in words the relationships they show.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a</li> </ul>

		<p>Pedigree to Analyze a Family Trait</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.C.1.e.	<p>Explain how different models can be used to represent the same thing. What kind of a model to use and how complex it should be depend on its purpose. Choosing a useful model is one of the instances in which intuition and creativity come into play in science, mathematics, and engineering</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.C.1.f.	<p>Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.0.	Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.
TOPIC / INDICATOR	1.D.1.	Technology: Explain that complex systems require control mechanisms.

INDICATOR / PROFICIENCY LEVEL	1.D.1.a.	<p>Explain that the choice of materials for a job depends on their properties and on how they interact with other materials.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.D.1.b.	<p>Demonstrate that all control systems have inputs, outputs, and feedback.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.D.1.c.	<p>Realize that design usually requires taking constraints into account. (Some constraints, such as gravity or the properties of the materials to be used, are unavoidable. Other constraints, including economic, political, social, ethical, and aesthetic ones also limit choices.)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.0.	Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.
TOPIC / INDICATOR	1.D.2.	Technology: Analyze, design, assemble and troubleshoot complex systems.
INDICATOR / PROFICIENCY LEVEL	1.D.2.c.	<p>Analyze any system to determine its connection, both internally and externally to other systems and explain that a system may be thought of as containing subsystems and as being a subsystem of a larger system.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the</li> </ul>

Second Examination		
STRAND / TOPIC / STANDARD	MD.1.0.	Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.
TOPIC / INDICATOR	1.D.3.	Technology: Analyze the value and the limitations of different types of models in explaining real things and processes.
INDICATOR / PROFICIENCY LEVEL	1.D.3.a.	<p>Explain that the kind of model to use and how complex it should be depends on its purpose and that it is possible to have different models used to represent the same thing.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.D.3.b.	<p>Explain, using examples that models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or that are too vast to be changed deliberately, or that are potentially dangerous.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.D.3.c.	<p>Explain that models may sometimes mislead by suggesting characteristics that are not really shared with what is being modeled.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.0.	Life Science: The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.
TOPIC / INDICATOR	3.B.1.	Cells: Gather and organize data to defend or argue the proposition that all living things are cellular (composed of cells) and that cells carry out the basic life functions.
INDICATOR / PROFICIENCY LEVEL	3.B.1.a.	<p>Use microscopes or other magnifying instruments to observe, describe, and compare the cellular composition of different body tissues and organs in a variety of organisms (animals and plants).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.0.	Life Science: The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.
TOPIC / INDICATOR	3.C.1.	Genetics: Explain the ways that genetic information is passed from parent to offspring in different organisms.
INDICATOR / PROFICIENCY LEVEL	3.C.1.d.	<p>Use information about how the transfer of traits from parent or parents to offspring occurs, to explain how selective breeding for particular traits has resulted in new varieties of cultivated plants and domestic animals.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> </ul>

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<b>STRAND / TOPIC / STANDARD</b>	<b>MD.6.0.</b>	<b>Environmental Science: Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.</b>
<b>TOPIC / INDICATOR</b>	<b>6.B.1.</b>	<b>Environmental Issues: Recognize and describe that environmental changes can have local, regional, and global consequences.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>6.B.1.a.</b>	Identify and describe a local, regional, or global environmental issue. <ul style="list-style-type: none"> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>• Teacher Resource CD: Biotechnology in Forensic Science</li> <li>• Teacher Resource CD: Biotechnology in Medicine</li> </ul>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>6.B.1.b.</b>	Identify and describe that different individuals or groups are affected by an issue in different ways. <ul style="list-style-type: none"> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>• Teacher Resource CD: Biotechnology in Forensic Science</li> <li>• Teacher Resource CD: Biotechnology in Medicine</li> </ul>

### Maryland Content Standards

#### Science

#### Grade 8

<b>STRAND / TOPIC / STANDARD</b>	<b>MD.1.0.</b>	<b>Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.</b>
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<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.A.1.b.</b>	Develop the ability to clarify questions and direct them toward objects and phenomena that can be described, explained, or predicted by scientific investigations. <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> </ul>



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INDICATOR / PROFICIENCY LEVEL	1.A.1.c.	<p>Explain and provide examples that all hypotheses are valuable, even if they turn out not to be true, if they lead to fruitful investigations.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
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INDICATOR / PROFICIENCY LEVEL	1.B.1.a.	<p>Verify the idea that there is no fixed set of steps all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p><b>INDICATOR / PROFICIENCY LEVEL</b></p>	<p>1.B.1.b.</p>	<p>Explain that what people expect to observe often affects what they actually do observe and that scientists know about this danger to objectivity and take steps to try to avoid it when designing investigations and examining data.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing</li> </ul>

		<p>Electrophoresed DNA Profiles</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.B.1.d.	<p>Describe the reasoning that lead to the interpretation of data and conclusions drawn.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.0.	Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.
TOPIC / INDICATOR	1.C.1.	Communicating Scientific Information: Develop explanations that explicitly link data from investigations conducted, selected readings and, when appropriate, contributions from historical discoveries.
INDICATOR / PROFICIENCY LEVEL	1.C.1.a.	<p>Organize and present data in tables and graphs and identify relationships they reveal.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.C.1.b.	<p>Interpret tables and graphs produced by others and describe in words the relationships they show.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.C.1.e.	<p>Explain how different models can be used to represent the same thing. What kind of a model to use and how complex it should be depend on its purpose. Choosing a useful model is one of the instances in which intuition and creativity come into play in science, mathematics, and engineering</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.C.1.f.	<p>Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<b>STRAND / TOPIC / STANDARD</b>	<b>MD.1.0.</b>	<b>Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.</b>
<b>TOPIC / INDICATOR</b>	<b>1.D.1.</b>	<b>Technology: Explain that complex systems require control mechanisms.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.D.1.a.</b>	<p>Explain that the choice of materials for a job depends on their properties and on how they interact with other materials.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.D.1.b.</b>	<p>Demonstrate that all control systems have inputs, outputs, and feedback.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>

INDICATOR / PROFICIENCY LEVEL	1.D.1.c.	Realize that design usually requires taking constraints into account. (Some constraints, such as gravity or the properties of the materials to be used, are unavoidable. Other constraints, including economic, political, social, ethical, and aesthetic ones also limit choices.) <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.0.	Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.
TOPIC / INDICATOR	1.D.2.	Technology: Analyze, design, assemble and troubleshoot complex systems.
INDICATOR / PROFICIENCY LEVEL	1.D.2.c.	Analyze any system to determine its connection, both internally and externally to other systems and explain that a system may be thought of as containing subsystems and as being a subsystem of a larger system. <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.0.	Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.
TOPIC / INDICATOR	1.D.3.	Technology: Analyze the value and the limitations of different types of models in explaining real things and processes.
INDICATOR / PROFICIENCY LEVEL	1.D.3.a.	Explain that the kind of model to use and how complex it should be depends on its purpose and that it is possible to have different models used to represent the same thing. <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.D.3.b.	Explain, using examples that models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or that are too vast to be changed deliberately, or that are potentially dangerous. <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.D.3.c.	Explain that models may sometimes mislead by suggesting characteristics that are not really shared with what is being modeled. <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.0.	Life Science: The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.
TOPIC / INDICATOR	3.D.1.	Evolution: Recognize and describe that evolutionary change in species over time occurs as a result of natural variation in organisms and environmental changes.
INDICATOR / PROFICIENCY LEVEL	3.D.1.a.	Recognize and describe that gradual (climatic) and sudden (floods and fires) changes in environmental conditions affect the survival of organisms and populations. <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.D.1.e.	<p>Recognize that evolution accounts for the diversity of species.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> </ul>
STRAND / TOPIC / STANDARD	MD.6.O.	Environmental Science: Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.
TOPIC / INDICATOR	6.B.1.	Environmental Issues: Recognize and explain how human activities can accelerate or magnify many naturally occurring changes.
INDICATOR / PROFICIENCY LEVEL	6.B.1.a.	<p>Based on data from research identify and describe how natural processes change the environment: Cyclic climate change; Sedimentation in watersheds; Population cycles; Extinction.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> </ul>
INDICATOR / PROFICIENCY LEVEL	6.B.1.b.	<p>Identify and describe how human activities produce changes in natural processes: Climate change; Loss of habitat; Introduction of nonnative species; Cycling of matter.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> </ul>

### Maryland Content Standards

#### Science

#### Grade 9

STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC / INDICATOR	1.1.	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.
INDICATOR / PROFICIENCY LEVEL	1.1.1.	<p>The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC / INDICATOR	1.2.	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.
INDICATOR / PROFICIENCY LEVEL	1.2.1.	<p>The student will identify meaningful, answerable scientific questions.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>



		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.2.2.	<p>The student will pose meaningful, answerable scientific questions. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.2.4.	<p>The student will test a working hypothesis. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.2.5.	<p>The student will select appropriate instruments and materials to conduct an investigation.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC /	1.3.	The student will carry out scientific investigations effectively and employ the

INDICATOR		instruments, systems of measurement, and materials of science appropriately.
INDICATOR / PROFICIENCY LEVEL	1.3.1.	<p>The student will develop and demonstrate skills in using lab and field equipment to perform investigative techniques. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.3.2.	<p>The student will recognize safe laboratory procedures.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree</li> </ul>

		<p>to Analyze a Family Trait</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.3.3.</p>	<p>The student will demonstrate safe handling of the chemicals and materials of science. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.3.4.</p>	<p>The student will learn the use of new instruments and equipment by following instructions in a manual or from oral direction. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<b>STRAND / TOPIC / STANDARD</b>	<b>MD.1.</b>	<b>Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.</b>
<b>TOPIC / INDICATOR</b>	<b>1.4.</b>	<b>The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.4.1.</b>	<p>The student will organize data appropriately using techniques such as tables, graphs, and webs (for graphs: axes labeled with appropriate quantities, appropriate units on axes, axes labeled with appropriate intervals, independent and dependent variables on correct axes, appropriate title).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.4.2.</b>	<p>The student will analyze data to make predictions, decisions, or draw conclusions.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.4.4.</p>	<p>The student will determine the relationships between quantities and develop the mathematical model that describes these relationships.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing</li> </ul>

		<p>Electrophoresed DNA Profiles</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.4.5.</p>	<p>The student will check graphs to determine that they do not misrepresent results.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.4.6.</p>	<p>The student will describe trends revealed by data.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing</li> </ul>

		<p>Karyotypes</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.4.8.	<p>The student will use models and computer simulations to extend his/her understanding of scientific concepts. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	<p>Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.</p>
TOPIC / INDICATOR	1.5.	<p>The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.</p>
INDICATOR / PROFICIENCY LEVEL	1.5.1.	<p>The student will demonstrate the ability to summarize data (measurements/observations).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene</li> </ul>



		<p>Defect</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.2.	<p>The student will explain scientific concepts and processes through drawing, writing, and/or oral communication.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.3.	<p>The student will use computers and/or graphing calculators to produce the visual materials (tables, graphs, and spreadsheets) that will be used for communicating results. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.4.	<p>The student will use tables, graphs, and displays to support arguments and claims in both written and oral communication.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA</li> </ul>

		<p>Profiles to Solve a Mystery</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.5.	<p>The student will create and/or interpret graphics. (scale drawings, photographs, digital images, field of view, etc.)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.8.	<p>The student will describe similarities and differences when explaining concepts and/or principles.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.9.	<p>The student will communicate conclusions derived through a synthesis of ideas.</p>

LEVEL		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC / INDICATOR	1.6.	The student will use mathematical processes.
INDICATOR / PROFICIENCY LEVEL	1.6.2.	<p>The student will use computers and/or graphing calculators to perform calculations for tables, graphs, or spreadsheets. (NTB)</p> <ul style="list-style-type: none"> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC / INDICATOR	1.7.	The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.
INDICATOR / PROFICIENCY LEVEL	1.7.1.	<p>The student will apply the skills, processes, and concepts of biology, chemistry, physics, or earth science to societal issues.</p> <ul style="list-style-type: none"> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>• Teacher Resource CD: Biotechnology in Forensic Science</li> </ul>

		<ul style="list-style-type: none"> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.7.2.	<p>The student will identify and evaluate the impact of scientific ideas and/or advancements in technology on society.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>Teacher Resource CD: Biotechnology in Forensic Science</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.7.6.	<p>The student will explain how development of scientific knowledge leads to the creation of new technology and how technological advances allow for additional scientific accomplishments.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.	<p>Concepts Of Biology: The student will demonstrate the ability to use scientific skills and processes (Core Learning Goal 1) and major biological concepts to explain the uniqueness and interdependence of living organisms, their interactions with the environment, and the continuation of life on earth.</p>
TOPIC / INDICATOR	3.3.	<p>The student will analyze how traits are inherited and passed on from one generation to another.</p>
INDICATOR / PROFICIENCY LEVEL	3.3.1.	<p>The student will demonstrate that the sorting and recombination of genes during sexual reproduction has an effect on variation in offspring.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> </ul>

		<ul style="list-style-type: none"> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.3.2.	<p>The student will illustrate and explain how expressed traits are passed from parent to offspring.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>Teacher Resource CD: Biotechnology in Forensic Science</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.3.3.	<p>The student will explain how a genetic trait is determined by the code in a DNA molecule.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>Teacher Resource CD: Biotechnology in Forensic Science</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.3.4.	<p>The student will interpret how the effects of DNA alteration can be beneficial or harmful to the individual, society, and/or the environment.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.	<p>Concepts Of Biology: The student will demonstrate the ability to use scientific skills and processes (Core Learning Goal 1) and major biological concepts to</p>

		explain the uniqueness and interdependence of living organisms, their interactions with the environment, and the continuation of life on earth.
TOPIC / INDICATOR	3.5.	The student will investigate the interdependence of diverse living organisms and their interactions with the components of the biosphere.
INDICATOR / PROFICIENCY LEVEL	3.5.2.	The student will analyze the interrelationships and interdependencies among different organisms and explain how these relationships contribute to the stability of the ecosystem. <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.5.3.	The student will investigate how natural and man-made changes in environmental conditions will affect individual organisms and the dynamics of populations. <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.	Concepts Of Biology: The student will demonstrate the ability to use scientific skills and processes (Core Learning Goal 1) and major biological concepts to explain the uniqueness and interdependence of living organisms, their interactions with the environment, and the continuation of life on earth.
TOPIC / INDICATOR	3.6.	The student will investigate a biological issue and develop an action plan.
INDICATOR / PROFICIENCY LEVEL	3.6.2.	The student will investigate a biological issue and be able to defend their position on topics such as animal rights, drug and alcohol abuse, viral diseases (e.g., AIDS), genetic engineering, bioethics, biodiversity, population growth, global sustainability, or origin of life. (NTB) <ul style="list-style-type: none"> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>• Teacher Resource CD: Biotechnology in Forensic Science</li> <li>• Teacher Resource CD: Biotechnology in Medicine</li> </ul>
STRAND / TOPIC / STANDARD	MD.6.	Environmental Science: The student will demonstrate the ability to use the scientific skills and processes (Core Learning Goal 1) and major environmental science concepts to understand interrelationships of the natural world and to analyze environmental issues and their solutions.
TOPIC / INDICATOR	6.2.	The student will investigate the interdependence of organisms within their biotic environment.
INDICATOR / PROFICIENCY LEVEL	6.2.1.	The student will explain how organisms are linked by the transfer and transformation of matter and energy at the ecosystem level (At least - Photosynthesis/respiration; Producers, consumers, decomposers; Trophic levels; Pyramid of energy/pyramid of biomass). <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<b>STRAND / TOPIC / STANDARD</b>	<b>MD.6.</b>	<b>Environmental Science: The student will demonstrate the ability to use the scientific skills and processes (Core Learning Goal 1) and major environmental science concepts to understand interrelationships of the natural world and to analyze environmental issues and their solutions.</b>
<b>TOPIC / INDICATOR</b>	<b>6.3.</b>	<b>The student will analyze the relationships between humans and the earth's resources.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>6.3.2.</b>	<p>The student will evaluate the interrelationship between humans and water quality and quantity (At least - fresh water supply; point source/nonpoint source pollution; waste water treatment; thermal pollution; Chesapeake Bay and its watershed; eutrophication; human health).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> </ul>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>6.3.4.</b>	<p>The student will evaluate the interrelationship between humans and biological resources (At least - food production/agriculture; forest and wildlife resources; species diversity/genetic resources; integrated pest management; human health).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> </ul>
<b>STRAND / TOPIC / STANDARD</b>	<b>MD.6.</b>	<b>Environmental Science: The student will demonstrate the ability to use the scientific skills and processes (Core Learning Goal 1) and major environmental science concepts to understand interrelationships of the natural world and to analyze environmental issues and their solutions.</b>
<b>TOPIC / INDICATOR</b>	<b>6.4.</b>	<b>The student will develop and apply knowledge and skills gained from an environmental issue investigation to an action project which protects and sustains the environment.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>6.4.1.</b>	<p>Identify an environmental issue and formulate related research questions (Methods of gathering information may include: writing letters; performing a literature search; using the internet; interviewing experts).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case</li> </ul>

		<p>History of Baby Mike</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>6.4.2.</p>	<p>Design and conduct the research (Methods of data collection may include: field or laboratory; questionnaire/opinionnaire).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>



INDICATOR / PROFICIENCY LEVEL	6.4.3.	<p>Interpret the findings to draw conclusions and make recommendations to help resolve the issue.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	6.4.4.	<p>Apply the conclusions to develop and implement an action project (Methods of implementation may include: physical action; persuasion; consumer action; political action).</p> <ul style="list-style-type: none"> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>• Teacher Resource CD: Biotechnology in Forensic Science</li> <li>• Teacher Resource CD: Biotechnology in Medicine</li> </ul>

**Maryland Content Standards  
Science  
Grade 10**

STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC / INDICATOR	1.1.	The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.
INDICATOR / PROFICIENCY LEVEL	1.1.1.	<p>The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC / INDICATOR	1.2.	The student will pose scientific questions and suggest investigative approaches to provide answers to questions.
INDICATOR / PROFICIENCY LEVEL	1.2.1.	<p>The student will identify meaningful, answerable scientific questions.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.2.2.	<p>The student will pose meaningful, answerable scientific questions. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.2.4.	<p>The student will test a working hypothesis. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.2.5.	<p>The student will select appropriate instruments and materials to conduct an investigation.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	<p>Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and</p>

		communicate information.
TOPIC / INDICATOR	1.3.	The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.
INDICATOR / PROFICIENCY LEVEL	1.3.1.	<p>The student will develop and demonstrate skills in using lab and field equipment to perform investigative techniques. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.3.2.	<p>The student will recognize safe laboratory procedures.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family</li> </ul>

		<p>Secret</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.3.3.</p>	<p>The student will demonstrate safe handling of the chemicals and materials of science. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.3.4.</p>	<p>The student will learn the use of new instruments and equipment by following instructions in a manual or from oral direction. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<b>STRAND / TOPIC / STANDARD</b>	<b>MD.1.</b>	<b>Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.</b>
<b>TOPIC / INDICATOR</b>	<b>1.4.</b>	<b>The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.4.1.</b>	<p>The student will organize data appropriately using techniques such as tables, graphs, and webs (for graphs: axes labeled with appropriate quantities, appropriate units on axes, axes labeled with appropriate intervals, independent and dependent variables on correct axes, appropriate title).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>1.4.2.</b>	<p>The student will analyze data to make predictions, decisions, or draw conclusions.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p><b>INDICATOR / PROFICIENCY LEVEL</b></p>	<p><b>1.4.4.</b></p>	<p>The student will determine the relationships between quantities and develop the mathematical model that describes these relationships.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA</li> </ul>



		<p>Profiles to Solve a Mystery</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.4.5.</p>	<p>The student will check graphs to determine that they do not misrepresent results.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>1.4.6.</p>	<p>The student will describe trends revealed by data.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case</li> </ul>

		<p>History of Baby Mike</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.4.8.	<p>The student will use models and computer simulations to extend his/her understanding of scientific concepts. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	<p>Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.</p>
TOPIC / INDICATOR	1.5.	<p>The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.</p>
INDICATOR / PROFICIENCY LEVEL	1.5.1.	<p>The student will demonstrate the ability to summarize data (measurements/observations).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree</li> </ul>

		<p>to Analyze a Family Trait</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.2.	<p>The student will explain scientific concepts and processes through drawing, writing, and/or oral communication.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.3.	<p>The student will use computers and/or graphing calculators to produce the visual materials (tables, graphs, and spreadsheets) that will be used for communicating results. (NTB)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.4.	<p>The student will use tables, graphs, and displays to support arguments and claims in both written and oral communication.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> </ul>

		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.5.	<p>The student will create and/or interpret graphics. (scale drawings, photographs, digital images, field of view, etc.)</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.5.8.	<p>The student will describe similarities and differences when explaining concepts and/or principles.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> </ul>

INDICATOR / PROFICIENCY LEVEL	1.5.9.	<p>The student will communicate conclusions derived through a synthesis of ideas.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC / INDICATOR	1.6.	The student will use mathematical processes.
INDICATOR / PROFICIENCY LEVEL	1.6.2.	<p>The student will use computers and/or graphing calculators to perform calculations for tables, graphs, or spreadsheets. (NTB)</p> <ul style="list-style-type: none"> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
STRAND / TOPIC / STANDARD	MD.1.	Skills And Processes: The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.
TOPIC / INDICATOR	1.7.	The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.
INDICATOR / PROFICIENCY LEVEL	1.7.1.	<p>The student will apply the skills, processes, and concepts of biology, chemistry, physics, or earth science to societal issues.</p> <ul style="list-style-type: none"> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> </ul>

		<ul style="list-style-type: none"> <li>Teacher Resource CD: Biotechnology in Forensic Science</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.7.2.	<p>The student will identify and evaluate the impact of scientific ideas and/or advancements in technology on society.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>Teacher Resource CD: Biotechnology in Forensic Science</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	1.7.6.	<p>The student will explain how development of scientific knowledge leads to the creation of new technology and how technological advances allow for additional scientific accomplishments.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.	<p>Concepts Of Biology: The student will demonstrate the ability to use scientific skills and processes (Core Learning Goal 1) and major biological concepts to explain the uniqueness and interdependence of living organisms, their interactions with the environment, and the continuation of life on earth.</p>
TOPIC / INDICATOR	3.3.	<p>The student will analyze how traits are inherited and passed on from one generation to another.</p>
INDICATOR / PROFICIENCY LEVEL	3.3.1.	<p>The student will demonstrate that the sorting and recombination of genes during sexual reproduction has an effect on variation in offspring.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> </ul>

		<ul style="list-style-type: none"> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.3.2.	<p>The student will illustrate and explain how expressed traits are passed from parent to offspring.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>Teacher Resource CD: Biotechnology in Forensic Science</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.3.3.	<p>The student will explain how a genetic trait is determined by the code in a DNA molecule.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>Teacher Resource CD: Biotechnology in Forensic Science</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.3.4.	<p>The student will interpret how the effects of DNA alteration can be beneficial or harmful to the individual, society, and/or the environment.</p> <ul style="list-style-type: none"> <li>Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>Teacher Resource CD: Biotechnology in Medicine</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.	<p>Concepts Of Biology: The student will demonstrate the ability to use scientific skills and processes (Core Learning Goal 1) and major biological concepts to</p>

		explain the uniqueness and interdependence of living organisms, their interactions with the environment, and the continuation of life on earth.
TOPIC / INDICATOR	3.5.	The student will investigate the interdependence of diverse living organisms and their interactions with the components of the biosphere.
INDICATOR / PROFICIENCY LEVEL	3.5.2.	The student will analyze the interrelationships and interdependencies among different organisms and explain how these relationships contribute to the stability of the ecosystem. <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> </ul>
INDICATOR / PROFICIENCY LEVEL	3.5.3.	The student will investigate how natural and man-made changes in environmental conditions will affect individual organisms and the dynamics of populations. <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> </ul>
STRAND / TOPIC / STANDARD	MD.3.	Concepts Of Biology: The student will demonstrate the ability to use scientific skills and processes (Core Learning Goal 1) and major biological concepts to explain the uniqueness and interdependence of living organisms, their interactions with the environment, and the continuation of life on earth.
TOPIC / INDICATOR	3.6.	The student will investigate a biological issue and develop an action plan.
INDICATOR / PROFICIENCY LEVEL	3.6.2.	The student will investigate a biological issue and be able to defend their position on topics such as animal rights, drug and alcohol abuse, viral diseases (e.g., AIDS), genetic engineering, bioethics, biodiversity, population growth, global sustainability, or origin of life. (NTB) <ul style="list-style-type: none"> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>• Teacher Resource CD: Biotechnology in Forensic Science</li> <li>• Teacher Resource CD: Biotechnology in Medicine</li> </ul>
STRAND / TOPIC / STANDARD	MD.6.	Environmental Science: The student will demonstrate the ability to use the scientific skills and processes (Core Learning Goal 1) and major environmental science concepts to understand interrelationships of the natural world and to analyze environmental issues and their solutions.
TOPIC / INDICATOR	6.2.	The student will investigate the interdependence of organisms within their biotic environment.
INDICATOR / PROFICIENCY LEVEL	6.2.1.	The student will explain how organisms are linked by the transfer and transformation of matter and energy at the ecosystem level (At least - Photosynthesis/respiration; Producers, consumers, decomposers; Trophic levels; Pyramid of energy/pyramid of biomass). <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> </ul>



		<ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> </ul>
<b>STRAND / TOPIC / STANDARD</b>	<b>MD.6.</b>	<b>Environmental Science: The student will demonstrate the ability to use the scientific skills and processes (Core Learning Goal 1) and major environmental science concepts to understand interrelationships of the natural world and to analyze environmental issues and their solutions.</b>
<b>TOPIC / INDICATOR</b>	<b>6.3.</b>	<b>The student will analyze the relationships between humans and the earth's resources.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>6.3.2.</b>	<p>The student will evaluate the interrelationship between humans and water quality and quantity (At least - fresh water supply; point source/nonpoint source pollution; waste water treatment; thermal pollution; Chesapeake Bay and its watershed; eutrophication; human health).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> </ul>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>6.3.4.</b>	<p>The student will evaluate the interrelationship between humans and biological resources (At least - food production/agriculture; forest and wildlife resources; species diversity/genetic resources; integrated pest management; human health).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> </ul>
<b>STRAND / TOPIC / STANDARD</b>	<b>MD.6.</b>	<b>Environmental Science: The student will demonstrate the ability to use the scientific skills and processes (Core Learning Goal 1) and major environmental science concepts to understand interrelationships of the natural world and to analyze environmental issues and their solutions.</b>
<b>TOPIC / INDICATOR</b>	<b>6.4.</b>	<b>The student will develop and apply knowledge and skills gained from an environmental issue investigation to an action project which protects and sustains the environment.</b>
<b>INDICATOR / PROFICIENCY LEVEL</b>	<b>6.4.1.</b>	<p>Identify an environmental issue and formulate related research questions (Methods of gathering information may include: writing letters; performing a literature search; using the internet; interviewing experts).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case</li> </ul>

		<p>History of Baby Mike</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
<p>INDICATOR / PROFICIENCY LEVEL</p>	<p>6.4.2.</p>	<p>Design and conduct the research (Methods of data collection may include: field or laboratory; questionnaire/opinionnaire).</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>

INDICATOR / PROFICIENCY LEVEL	6.4.3.	<p>Interpret the findings to draw conclusions and make recommendations to help resolve the issue.</p> <ul style="list-style-type: none"> <li>• Biotechnology Applications: Unit 1 Lab 1 Activity 1: Genetically Modified Crops</li> <li>• Biotechnology Applications: Unit 1 Lab 2 Activity 1: Making Cheese the Biotech Way</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 1: Biodegrading a Simulated Oil Spill</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 2: Cleaning up Mini-Oil Spills in Various Shore Environments</li> <li>• Biotechnology Applications: Unit 1 Lab 3 Activity 3: Examining Oil-Degrading Microbes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 1: Taking a Case History of Baby Mike</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 2: Analyzing Karyotypes</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 3: The Blue People of Troublesome Creek</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 4: Uncovering a Family Secret</li> <li>• Biotechnology Applications: Unit 2 Lab 4 Activity 5: Creating a Pedigree to Analyze a Family Trait</li> <li>• Biotechnology Applications: Unit 2 Lab 5 Activity 1: Diagnosing a Gene Defect</li> <li>• Biotechnology Applications: Unit 3 Lab 6 Activity 1: Modeling DNA Profiles to Solve a Mystery</li> <li>• Biotechnology Applications: Unit 3 Lab 7 Activity 1: Comparing Electrophoresed DNA Profiles</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 1: Case of the Second Examination</li> <li>• Biotechnology Applications: Unit 4 Lab 8 Activity 2: Finding Out Who Is at Risk for SARS</li> <li>• Virtual Laboratory: Preparation and Analysis of a Human Karyotype</li> </ul>
INDICATOR / PROFICIENCY LEVEL	6.4.4.	<p>Apply the conclusions to develop and implement an action project (Methods of implementation may include: physical action; persuasion; consumer action; political action).</p> <ul style="list-style-type: none"> <li>• Teacher Resource CD: Biotechnology in Agriculture and the Environment</li> <li>• Teacher Resource CD: Biotechnology in Forensic Science</li> <li>• Teacher Resource CD: Biotechnology in Medicine</li> </ul>