North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 1 **Period(s):**

Topic: Cellular Biology

21st Century Graduation Expectation(s):
- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:
- HS-LS1-1
- HS-LS1-2
- HS-LS1-3

Common Core State Standards:
- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):
- How does the structure of DNA determine the structure of proteins used to carry out the essential functions of life?
- How does the hierarchal organization of interacting systems provide specific functions to multicellular organisms?
- How do feedback mechanisms maintain homeostasis?

Content Topics:
- Form and function of proteins, organelles and cells within multicellular organisms
- Homeostasis and feedback mechanisms

Student Learning Tasks and Opportunities:
- The student will construct an evidence based explanation of how the structure of DNA determines the structure of proteins used to carry out the essential functions of life
- The student will explain how the hierarchal organization of interacting systems provide specific functions to multicellular organisms
- The student will assess how feedback mechanisms maintain homeostasis

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 1 **Period(s):**

Topic: Growth and Development of Organisms

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS1-4

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- How does the role of cellular division (mitosis) and differentiation produce and maintain complex organisms?

Content Topic(s):

- Mitosis
- Differentiation

Student Learning Tasks and Opportunities:

- The student will summarize how the role of cellular division (mitosis) and differentiation produce and maintain complex organisms

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs

- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 1 **Period(s):**

Topic: Photosynthesis and Cellular Respiration

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS1-5
- HS-LS1-6
- HS-LS1-7

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- In what way does photosynthesis transform light energy into stored chemical energy?
- What amino acids and/or other large carbon based molecules are created using carbon, hydrogen and oxygen from sugar molecules?
- What is cellular respiration and how is it utilized in the transfer of energy?

Content Topic(s):

- Photosynthesis
- Cellular respiration
- Creation of amino acids and other carbon based molecules

Student Learning Tasks and Opportunities:

- The student will analyze how photosynthesis transform light energy into stored chemical energy
- The student will summarize how amino acids and/or other large carbon based molecules are created using carbon, hydrogen and oxygen from sugar molecules
- The student will summarize the concept of cellular respiration and the transfer of energy

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 2 **Period(s):**

Topic: Structure and Function of DNA & Inheritance of Traits

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS3-1

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- What is the relationship between the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring?

Content Topic(s):

- Traits/genes/alleles
- Genetic variation
- DNA replication
- Transcription/translation

Student Learning Tasks and Opportunities:

- The student will explain the relationship between DNA/chromosomes and coding for characteristics passed from parents to offspring.

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 2 **Period(s):**

Topic: Variation of Traits

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS3-2
- HS-LS3-3

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- How does evidence support that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors?
- How do statistics and probability explain the variation and distribution of expressed traits in a population?

Content Topic(s):

- Sexual reproduction
- Chromosomes
- Meiosis
- Mutations
- Punnett squares
- Patterns of inheritance
- Pedigrees

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 3 **Period(s):**

Topic: Evidence of Common Ancestry and Diversity

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS4-1
- HS-LS4-2

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- How is common ancestry and biological evolution supported by multiple lines of empirical evidence?
- What four lines of evidence contribute to the explanation of the process of evolution?

Content Topic(s):

- Common ancestry via DNA/Amino Acid comparisons
- Embryological evidence of evolution
- Heritable genetic variation
- Competition

Student Learning Tasks and Opportunities:

- The student will communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
- The student will construct an explanation based on evidence that the process of evolution primarily result from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals

in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 3 **Period(s):**

Topic: Mechanisms of Selection

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS4-3
- HS-LS4-4

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- How do statistics and probability support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait?
- What explanation, based on evidence, determines how natural selection leads to adaptation of populations?

Content Topic(s):

- Mechanisms of evolution
- Natural selection
- Types of selection

Student Learning Tasks and Opportunities:

- The student will apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
- The student will construct an explanation based on evidence for how natural selection leads to adaptation of populations.

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 3 **Period(s):**

Topic: Environmental Impact on Evolutionary Adaptation

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS4-5

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- How does evidence support claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species

Content Topic(s):

- Species adaptation
- Population diversion
- Extinction vs. diversion

Student Learning Tasks and Opportunities:

- The student will evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 3 **Period(s):**

Topic: Biodiversity and Humans

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS4-6

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- What solution could be created/revised and tested to mitigate adverse impacts of human activity on biodiversity?

Content Topic(s):

- Biodiversity
- Overpopulation
- Overexploitation
- Habitat destruction
- Pollution
- Introduction of invasive species
- Climate change

Student Learning Tasks and Opportunities:

- The student will create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 4 **Period(s):**

Topic: Interdependent Relationships in Ecosystems

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS2-1
- HS-LS2-2

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- What mathematical and/or computational representations are used to support explanations of factors that affect carrying capacities of ecosystems at different scales?
- What mathematical representations are used to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales?

Content Topic(s):

- Carrying capacity
- Independent factors affecting carrying capacity (i.e. boundaries, resources, climate and competition)
- Mathematical representations of carrying capacity

Student Learning Tasks and Opportunities:

- The student will use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
- The student will use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 4 **Period(s):**

Topic: Cycles of Matter and Energy Transfer in Ecosystems

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS2-3
- HS-LS2-4
- HS-LS2-5

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- What evidence lends to the explanation of cycling of matter and flow of energy in aerobic and anaerobic conditions?
- How do mathematical representations support claims for the cycling of matter and flow of energy among organisms in an ecosystem?
- How does the role of photosynthesis and cellular respiration play into the cycling of carbon among the biosphere, atmosphere, hydrosphere and geosphere?

Content Topic(s):

- Aerobic vs. anaerobic conditions via photosynthesis/cellular respiration
- Trophic levels
- Food chain
- Food web
- Conservation of matter and energy
- Carbon cycle (i.e. exchange of carbon within the biosphere, atmosphere, oceans and geosphere using chemical, physical, geological and biological processes)

Student Learning Tasks and Opportunities:

- The student will construct and revise and explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.
- The student will use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
- The student will develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere and geosphere.

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects

North Providence High School Science Department
Standards – Based Instructional Curriculum Guide

Course: Biology **Grade Level:** 10 **Quarter:** 4 **Period(s):**

Topic: Ecosystem Dynamics, Functioning and Resilience

21st Century Graduation Expectation(s):

- 1.1 Acquiring and applying knowledge and skills within and across the curriculum
- 1.2 Analyzing and evaluating information
- 1.3 Applying technology as a learning tool across all disciplines
- 2.1 Working cooperatively and/or independently
- 2.2 Applying problem solving strategies
- 2.3 Utilizing resources and time effectively
- 2.4 Accessing, compiling, interpreting and presenting data and information
- 3.1 Making informed life and career decisions
- 3.2 Recognizing and respecting the diversity and individuality of others
- 3.3 Understanding and accepting the benefits and consequences of his/her behavior
- 4.1 Reading widely and critically
- 4.2 Writing clearly, concisely and persuasively
- 4.3 Speaking, listening and interpreting effectively

Next Generation Science Standards:

- HS-LS2-6
- HS-LS2-7
- HS-LS2-8

Common Core State Standards:

- RST.9-10.1
- RST.9-10.2
- RST.9-10.3
- RST.9-10.4
- RST.9-10.5
- RST.9-10.6
- RST.9-10.7
- RST.9-10.8
- RST.9-10.9
- RST.9-10.10
- WHST.9-10.1
- WHST.9-10.2
- WHST.9-10.3
- WHST.9-10.4
- WHST.9-10.5
- WHST.9-10.6
- WHST.9-10.9
- WHST.9-10.10

Essential Question(s):

- What claims, evidence and reasoning explain that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem?
- What solution can be designed, evaluated and refined to reduce the impacts of human activities on the environment and biodiversity?
- What evidence evaluates the role of group behavior on individual and species' chances to survive and reproduce?

Content Topic(s):

- Population ecology
- Ecosystem disruption
- Animal behavior (social interactions and group behavior)
- Speciation
- Extinction

Student Learning Tasks and Opportunities:

- The student will evaluate claims, evidence and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
- The student will design, evaluate and refine a solution for reducing the impacts of human activities on the environment and biodiversity
- The student will evaluate evidence for the role of group behavior on individual and species' chances to survive and reproduce.

Instructional Resources and Equipment:

- Student text
- Complementary texts
- Charts and graphs
- Labs and demonstrations
- Simulated demonstrations
- PowerPoint presentations
- Interactive white board
- Video clips
- Documentaries

Assessment Task(s):

- Entrance/exit slips, etc.
- Class discussions
- Homework
- Quizzes
- Lab activities/reports
- Teacher generated tests
- Presentations/projects