

Black Horse Pike Regional School District Curriculum Template

Life Skills Science Curriculum – Biology

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Number: 154000

Unit 1: Intro to Biological Practices

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Life Skills Sciences - Biology/Intro to Biological Practices</p>	<p>Unit Summary:</p> <ol style="list-style-type: none"> In this unit students will learn how to utilize the scientific method to follow a laboratory experiment from hypothesis development to drawing conclusions. Specific emphasis will be placed on the proper usage of microscopes and other simple laboratory equipment. Students will also learn the major themes of biology in an effort to define “life” as a system in which organisms use energy, reproduce, maintain homeostasis and evolve.
<p>Grade Level(s): 9-12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none"> What does Safety First demand of us in each setting? What are the procedures to safely operate laboratory equipment? What constitutes useful scientific evidence? When do you know you have enough evidence? How do we build models that describe and explain the natural world, and how can this be communicated to society? How do science and technology influence one another? What constitutes life? 	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none"> Safety First! Ensure that instruments and specimens are properly cared for, and treated responsibly, humanly, and ethically. Evidence is used for building, refining and/or critiquing scientific explanations Scientific inquiry involves asking scientifically oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying explanations. Scientific knowledge builds on itself over time and the growth of scientific knowledge involves critique and communication - social practices that are governed by a core set of values and norms. Technology evolves at an ever-accelerating pace based on the demands of society. Life can be defined by a series of qualities that organisms possess or utilize to carry out basic everyday functions.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

*****NOTE: students who are enrolled in this course have significant cognitive disabilities, and are assessed and taught based on what they are capable of learning. Each student has an IEP and is provided a tailored path to learn new academic skills. Therefore, not all students will be able to achieve or learn each target stated below. There is a balance between challenging the student and attainability. As a result, all students will be assessed and placed into the appropriate learning target below and progress accordingly.**

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
Themes of Biology	1.) <u>Science:</u> 5.3.12.A.3
1. List, define, and discuss the characteristics common to all living things	2.) <u>Science:</u> 5.1.12.D.1, 5.1.12.D.3
	3.) <u>Science:</u> 5.1.12.D.1, 5.1.12.D.3
	4.) <u>Science:</u> 5.1.12.D.1, 5.1.12.D.3
Lab Safety	5.) <u>Science:</u> 5.1.12.A.1, 5.1.12.A.2, 5.1.12.A.3, 5.1.12.B.1, 5.1.12.B.2, 5.1.12.C.1, 5.1.12.C.2, 5.1.12.C.3, 5.1.12.D.1, 5.1.12.D.2
2. Identify and properly use safety equipment	6.) <u>Science:</u> 5.1.12.A.1, 5.1.12.A.2, 5.1.12.A.3, 5.1.12.B.1, 5.1.12.B.2, 5.1.12.B.4, 5.1.12.C.1, 5.1.12.C.2, 5.1.12.C.3, 5.1.12.D.1, 5.1.12.D.2
3. Safely use equipment in a laboratory or field setting	7.) <u>Science:</u> 5.1.12.A.1, 5.1.12.A.2, 5.1.12.A.3, 5.1.12.B.1, 5.1.12.B.2, 5.1.12.B.3, 5.1.12.B.4, 5.1.12.C.1, 5.1.12.C.2, 5.1.12.C.3, 5.1.12.D.1, 5.1.12.D.2
4. Properly use a microscope to view biological specimens	8.) <u>Science:</u> 5.1.12.A.1, 5.1.12.A.2, 5.1.12.A.3, 5.1.12.B.1, 5.1.12.B.2, 5.1.12.B.3, 5.1.12.B.4, 5.1.12.C.1, 5.1.12.C.2, 5.1.12.C.3, 5.1.12.D.1, 5.1.12.D.2
Experimental Design	9.) <u>Science:</u> 5.1.12.A.1, 5.1.12.A.2, 5.1.12.A.3, 5.1.12.B.1, 5.1.12.B.2, 5.1.12.B.3, 5.1.12.B.4, 5.1.12.C.1, 5.1.12.C.2, 5.1.12.C.3, 5.1.12.D.1, 5.1.12.D.2
5. Develop hypotheses	
6. Design and conduct controlled experiments to test a hypothesis	
7. Communicate experimental results through creation and analysis of tables, graphs, charts, etc.	
8. Distinguish between pure science and technology	
9. Explain and discuss the role of science in the development of new technologies.	

Inter-Disciplinary Connections:

Experience of laboratory skills to be used in real life situations at home and in the work place, including problem solving skills .

Students will engage with the following text:

1. *Life Sciences*, 1999, Glencoe

Minimal use of text supplemented by teacher made materials, and web based information and videos.

On a daily basis, students will enrich their reading, writing, and interpretation skills through the use of Cornell notes supplied by the teacher.

Accommodations and/or modifications will be made on a case by case basis in accordance with individual student needs. They may include but not be limited to: read aloud directions to help students understand the chapter/unit, read aloud specific paragraphs to assist auditory learners, read captions in the book that describe concepts being discussed.

Students will write:

Students will write and fill in the blanks in the notes provided, they will also summarize the lesson, do warm-ups, short answer responses and open-ended responses.

Accommodations and/or modifications will be made on a case by case basis in accordance with individual student needs.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

The following instructional strategies are utilized on an as needed basis throughout the year:

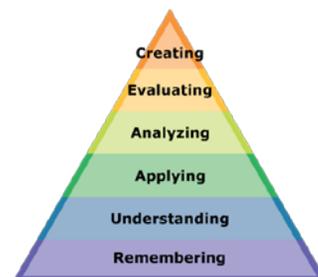
1. Direct Instruction
2. Cornell Note-Taking, guided
3. Scaffolding
4. Project Based Learning
5. Peer Based Learning/Review
6. Student presentations with peer review in addition to teacher assessment
7. Modeling
8. Drawing
9. Guided Discussion with analysis/prediction/defense of conclusions
10. Directed Reading
11. Guided Notes
12. Outlining
13. Technology: Microsoft Excel, PowerPoint, Word, SmartBoard, LCD Projectors
14. Media Resources: [Gizmos](#), Discovery Streaming, commercial video resources, YouTube, course websites (i.e. OnCourse and eBoards)

Once per quarter students are given a topical presentation assignment to research, present, and review.]

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

The effectiveness of the instructional program will be based on teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record keeping, quizzes, warm ups, class discussion, individual conferences, journal writing and performance tasks.]

Accommodations/Modifications:

- Use multimedia equipment (iPads, laptops, etc....) to lessen reliance on text.
- Incorporate experiential and community based activities related to lesson theme.
- Include "hands-on" activities (games, projects) within lectures/activities.
- Emphasize sensory experiences reflecting student's learning style: auditory, multisensory, visual, physical movement/kinesthetic.
- Use graphic organizers.
- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Extend time limits for tests and assignments.
- Read test items that do not assess reading skills to students.
- Use models, manipulatives and other concrete materials to demonstrate concepts and solve problems.
- Have student repeat or rephrase assignments.
- Check for understanding frequently
- Provide multiple practice sessions to reinforce a new skill/concept.
- Provide guided notes/handouts.

Summative Assessments:

State assessments, hands-on tests and written tests

Accommodations/Modifications:

- Use Pass/Fail Option.
- Provide checklists for solving problems.
- Allow students to use calculator when applicable.
- Read test items that do not assess reading skills to students.
- Extend time limits.
- Break test sections into smaller chunks

Performance Assessments:

Projects, presentations, display of student work.
 Drawing and labeling a microscope, looking at slides with the light microscope.

Accommodations/Modifications:

- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Allow students extra time to complete projects.
- Provide students with an example of project for reference.
- Provide a clear rubric for students to understand exactly what is expected.

Black Horse Pike Regional School District Curriculum Template Life Skills Science Curriculum – Biology

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Unit 2: Ecology

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Life Skills Sciences - Biology/Ecology</p>	<p>Natural Systems and Interactions (Ecology) Unit Summary:</p>
<p>Grade Level(s): 9 – 12</p>	<p>1. In this unit students will be able to discuss the interconnectedness of all living things, from a cellular level all the way up to the magnitude of an ecosystem. As part of this organisms must be able to obtain and use both energy and matter in various forms. Specific emphasis will be placed on the cycling of energy through the various trophic levels of an environment, as well as the continuous cycling of matter such as water, carbon, and nitrogen.</p> <p>Furthermore students will explore the various types of ecosystems or biomes of the Earth. They will be able to discuss the population growth, limiting factors,</p>

	and investigate human impact on this natural world.
<p>Essential Question(s):</p> <ul style="list-style-type: none"> • What is ecology? • What are biotic and abiotic factors and how do they compare? • How is matter and energy transferred and transformed in a living system? • How does competition shape a community? • How can change in one part of an ecosystem affect change in other parts of the ecosystem? • How do ecosystems change over time? • What is a biome and how are they classified? • What factors affect populations? • How can we study and compare the growth of various populations? • What is the relationship between resource use and sustainable development? • How do humans impact the diversity and stability of ecosystems? 	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none"> • Organisms and their physical environment affect each other and impact the balance of the overall environment. • There are multiple components of a community that are both living and non living. • All organisms must transfer matter and convert energy from one form to another in order to maintain stability and ensure survival of both an organism and its environment. • Biological communities in ecosystems are based on stable interrelationships and interdependence of organisms. • Changes in one part of the system will affect other parts of the system, and stability can be disrupted by natural or human interactions. • Succession in may be impacted by natural or human events resulting in changes both temporary and permanent depending on the severity. • Biological communities in ecosystems are based on stable interrelationships and interdependence of organisms, as well as a multitude of abiotic factors such as climate or soil. • Growth of a population tends to change based limiting factors of an ecosystem • Previous events or evidence as well as systematic observations may be used to predict the outcome of future generations of a population. • Sustainable development provides for human needs while preserving ecosystems that provide necessary natural resources. <p>Humans can alter the living and non-living factors within an ecosystem, thereby creating changes in the overall system.</p>

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

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and attainability. As a result, all students will be assessed and placed into the appropriate learning target below and progress accordingly.

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
<p>Natural Systems and Interactions</p> <ol style="list-style-type: none"> 1. Develop a working definition of ecology and identify the components of an ecosystem 2. Identify and describe biotic and abiotic factors of an environment 3. Explain how consumers obtain and use nutrients. 4. Classify and explain different trophic levels within an ecosystem 5. Explain and create diagrams tracing the flow of energy through an ecosystem 6. Describe how nitrogen and water are recycled within ecosystems 7. Explain the niche of an organism 8. Discuss the affect of climate on a community 9. Compare and contrast the seven major biomes 10. Compare exponential and logistic growth patterns 11. Identify limiting factors of a population’s growth 12. Develop a timeline of, and explain what happens during ecological succession 13. Discuss and explain the ways in which humans disrupt ecosystems 14. List the major sources of environmental pollution and devise methods to alleviate their effects 15. Compare and contrast renewable and nonrenewable resources 16. Develop solutions to combat environmental problems. 	<ol style="list-style-type: none"> 1. Science:5.3.12.B.1, 5.3.12.B.3, 5.3.12.C.1 2. Science:5.3.12.B.1, 5.3.12.B.3, 5.3.12.C.1 3. Science:5.3.12.B.2, 5.3.12.B.3, 5.3.12.B.4, 5.3.12.B.5, 5.1.12.C.1 4. Science:5.3.12.B.2, 5.3.12.B.3, 5.3.12.B.4, 5.3.12.B.5, 5.1.12.C.1 5. Science: 5.3.12.B.1, 5.3.12.B.2, 5.3.12.B.3, 5.3.12.B.4, 5.3.12.B.5, 5.1.12.C.1 6. Science: 5.3.12.B.2, 5.3.12.B.3, 5.3.12.B.4, 5.3.12.B.5, 5.3.12.B.6 5.1.12.C.1 7. Science:5.3.12.C.1 8. Science: 5.1.12.C.3, 5.4.12.F.1 9. Science: 5.3.12.B.4, 5.3.12.C.1 10. Science: 5.3.12.C.1 11. Science: 5.3.12.C.1 12. Science: 5.3.12.C.1 3, 4, 5, 9, 10 13. Science: 5.3.12.B.1, 5.3.12.B.3, 5.3.12.B.4, 5.3.12.B.5, 5.3.12.C.2, 5.1.12.C.3, 5.1.12.D.1 14. Science: 5.3.12.C.2 15. Science: 5.3.12.C.2 16. Science: 5.3.12.B.1, 5.3.12.B.3, 5.3.12.B.4, 5.3.12.B.5, 5.3.12.C.2, 5.1.12.C.3, 5.1.12.D.1

Inter-Disciplinary Connections:

Experience of laboratory skills to be used in real life situations at home and in the work place, including problem solving skills

Students will engage with the following text:

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Accommodations and/or modifications will be made on a case-by-case basis in accordance with individual student needs. They may include but not be limited to: read aloud directions to help students understand the chapter/unit, read aloud specific paragraphs to assist auditory learners, read captions in the book that describe concepts being discussed.

Students will write:

In addition to the usual warm ups, closing activities, lab reports, example(s) of student activities requiring them to write are as follows:

- 1. Personal reflections to discussions**
- 2. Writing Prompts used as introductions to current subject matter**
- 3. Daily Summaries to Cornell Note-Taking**

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

The following instructional strategies are utilized on an as needed basis throughout the year:

- 1. Direct Instruction**
- 2. Cornell Note-Taking, guided**
- 3. Scaffolding**
- 4. Project Based Learning**
- 5. Peer Based Learning/Review**
- 6. Student presentations with peer review in addition to teacher assessment**
- 7. Modeling**
- 8. Drawing**
- 9. Guided Discussion with analysis/prediction/defense of conclusions**
- 10. Directed Reading**
- 11. Guided Notes**
- 12. Outlining**
- 13. Technology: Microsoft Excel, PowerPoint, Word, SmartBoard, LCD Projectors**
- 14. Media Resources: [Gizmos](#), Discovery Streaming, commercial video resources, YouTube, course websites**

(i.e. OnCourse and eBoards)

Once per quarter students are given a topical presentation assignment to research, present, and review

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

The effectiveness of the instructional program will be based on teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record keeping, quizzes, warm ups, class discussion, individual conferences, journal writing and performance tasks.

Accommodations/Modifications:

- Use multimedia equipment (iPads, laptops, etc....) to lessen reliance on text.
- Incorporate experiential and community based activities related to lesson theme.
- Include "hands-on" activities (games, projects) within lectures/activities.
- Emphasize sensory experiences reflecting student's learning style: auditory, multisensory, visual, physical movement/kinesthetic.
- Use graphic organizers.
- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Extend time limits for tests and assignments.
- Read test items that do not assess reading skills to students.
- Use models, manipulatives and other concrete materials to demonstrate concepts and solve problems.
- Have student repeat or rephrase assignments.
- Check for understanding frequently
- Provide multiple practice sessions to reinforce a new skill/concept.
- Provide guided notes/handouts.

Summative Assessments:

Hands-on tests and written tests
Measurement of every day items: length, weight.

Accommodations/Modifications:

- Use Pass/Fail Option.
- Provide checklists for solving problems.
- Allow students to use calculator when applicable.
- Read test items that do not assess reading skills to students.
- Extend time limits.
- Break test sections into smaller chunks

Performance Assessments:

Projects, presentations, display of student work.
Students will create a 3-D of their chosen ecological system.

Accommodations/Modifications:

- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Allow students extra time to complete projects.
- Provide students with an example of project for reference.
- Provide a clear rubric for students to understand exactly what is expected.

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Life Skills Science Curriculum – Biology

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Unit 3: Cell

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Life Skills Sciences - Biology/Cell</p> <hr/> <p>Grade Level(s): 9 - 12</p>	<p>The Living Cell Unit Summary:</p> <ol style="list-style-type: none"> 1. <i>Cell Theory and History</i> – Students will discover the historical evolution of cell theory and be able to discuss the ideas of the scientists who have significant contributions to the field. This unit will also investigate how ideals have changed as new technologies are discovered and developed. 2. <i>Prokaryotic vs. Eukaryotic Cells</i> – Students will investigate the similarities and differences between prokaryotic and eukaryotic cells. The structure and functional complexities will be discussed and compared. Students will also be asked to distinguish between these types of organisms by both description and visual cues. 3. <i>Eukaryotic Structure and Function</i> – Students will learn to identify and discuss the basic structural organization of eukaryotic cells as well as the function of each organelle. I. Students will also be able to distinguish between plant and animal cells. 4. <i>Transport (osmosis, diffusion, active transport)</i> – Students will identify the structure and function of the cell membrane and recognize its significance to the survival of the cell. 5. <i>Communication and Multi-Cellularity</i> –Most organisms benefit from being composed of billions of various types of cells. In order for these cells to function as a single entity thy must be able to communicate with one another, become organized, and specialized to carry out a specific function. Students will explore how cells complete these tasks as well as be able to identify and discuss the advantages of multi-cellularity.
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Essential Question(s):	Enduring Understanding(s):
<ul style="list-style-type: none"> • How has cell theory evolved and what are some of its most imperative discoveries? • Why a single cell is considered the basis of life? • How do prokaryotic and eukaryotic cells compare? • How does structure relate to function in living systems from the organismal to the cellular level? • How do active and passive transport help organisms to maintain homeostasis? • How can a single cell become the basis for multi-cellular organisms? 	<ul style="list-style-type: none"> • Scientific knowledge builds on itself overtime, leading to new discoveries and technological developments. • Living organisms must be able to perform a variety of functions to ensure their survival. At the cellular level there are minimal requirements that must be met to carry out basic life function. • Organisms can be classified based on different qualities including age and complexity. • Living systems from the cellular to organismal level demonstrate a commentary nature of both structure and function to ensure survival. • In order for living organisms to maintain stable environments they must be able obtain and utilize both matter and energy. • As the complexity of organisms increase, so does the need for growth, development, and specialization of various cells.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

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<u>Learning Target</u>	<u>NJCCCS or CCS</u>
Cell Theory and History 1. List the parts of the cell theory and explain how it	1.) Science :5.1.12.C.1, 5.1.12.C.2, 5.1.12.C.3, 5.1.12.D.2

<p>was derived.</p> <p>Prokaryotic vs. Eukaryotic cells</p> <ol style="list-style-type: none"> 2. Compare and contrast the differences between prokaryotic and eukaryotic cells <p>Eukaryotic Structure and Function</p> <ol style="list-style-type: none"> 3. Compare and contrast plant and animal cells 4. List and describe organelles and their functions <p>Transport</p> <ol style="list-style-type: none"> 5. Identify the cell membrane as selectively permeable and describe the movement of molecules across a membrane when placed in various solutions 6. Define, discuss, compare and contrast osmosis and diffusion 7. Differentiate between active and passive transport 	<ol style="list-style-type: none"> 2.) <u>Science:</u> 5.1.12.C.1, 5.1.12.C.2 3.) <u>Science:</u> 5.1.12.D.3 4.) <u>Science:</u> 5.3.12.A.1, 5.3.12.A.3 5.) <u>Science:</u> 5.3.12.A.2, 5.3.12.A.3 6.) <u>Science:</u> 5.3.12.A.3 7.) <u>Science:</u> 5.3.12.A.2, 5.3.12.A.3
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Inter-Disciplinary Connections:

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Students will engage with the following text:

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Students will write:

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Accommodations and/or modifications will be made on a case by case basis in accordance with individual student needs.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

The following instructional strategies are utilized on an as needed basis throughout the year:

15. Direct Instruction
16. Cornell Note-Taking, guided
17. Scaffolding
18. Project Based Learning
19. Peer Based Learning/Review
20. Student presentations with peer review in addition to teacher assessment
21. Modeling
22. Drawing
23. Guided Discussion with analysis/prediction/defense of conclusions
24. Directed Reading
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27. Technology: Microsoft Excel, PowerPoint, Word, SmartBoard, LCD Projectors
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PART IV: EVIDENCE OF LEARNING

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IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

The effectiveness of the instructional program will be based on teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record keeping, quizzes, warm ups, class discussion, individual conferences, journal writing and performance tasks.]

Accommodations/Modifications:

- Use multimedia equipment (iPads, laptops, etc....) to lessen reliance on text.
- Incorporate experiential and community based activities related to lesson theme.
- Include "hands-on" activities (games, projects) within lectures/activities.
- Emphasize sensory experiences reflecting student's learning style: auditory, multisensory, visual, physical movement/kinesthetic.
- Use graphic organizers.
- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Extend time limits for tests and assignments.
- Read test items that do not assess reading skills to students.
- Use models, manipulatives and other concrete materials to demonstrate concepts and solve problems.
- Have student repeat or rephrase assignments.
- Check for understanding frequently
- Provide multiple practice sessions to reinforce a new skill/concept.
- Provide guided notes/handouts.

Summative Assessments:

Hands-on tests and written tests.

Accommodations/Modifications:

- Use Pass/Fail Option.
- Provide checklists for solving problems.
- Allow students to use calculator when applicable.
- Read test items that do not assess reading skills to students.
- Extend time limits.
- Break test sections into smaller chunks

Performance Assessments:

Projects, presentations, display of student work.

Lab: looking at slides of cells and distinguishing between plant cells and animal cells.

Accommodations/Modifications:

- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Allow students extra time to complete projects.
- Provide students with an example of project for reference.
- Provide a clear rubric for students to understand exactly what is expected.

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Unit 4: DNA

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Life Skills Sciences - Biology/ DNA</p>	<p>Unit Summary:</p> <ol style="list-style-type: none"> The components that make up the structure of the nucleic acids, DNA and RNA, will be examined. They will learn about the experiments that helped reveal the structure and function of DNA as well as how DNA replicates. The students will be looking at the community of the scientists such as Watson, Crick, Franklin and Chargaff who contributed to the breakthroughs in our understanding of the natural world. The processes of DNA replication, transcription and translation in protein synthesis will be explained using the base-pairing rule. Transcription and translation will connect the process of protein synthesis, and the students will follow this process from the original DNA sequence to the final synthesized protein by specifying the sequence of amino acids in the proteins.
<p>Grade Level(s): 9 - 12</p>	
<p>Essential Question(s):</p> <ul style="list-style-type: none"> What is the structure of DNA, and how does it function in genetic inheritance? How was the structure of DNA / RNA discovered? How does DNA replicate? What role does DNA polymerase play in copying DNA? 	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none"> DNA is the universal code for life that enables an organism to transmit hereditary information. Along with the environment, this will determine an organism’s characteristics. The genes act as a set of instructions, encoded in the DNA sequence of nucleotides of each organism. This will specify the sequence of amino acids in proteins which will form the traits of an organism. It has the ability to store, copy and transmit the genetic information. Scientists build on the work of others to discover the structure of DNA. Rosalind Franklin built on the work of Chargoff and Watson and Crick built on the work of Franklin. As technology developed and advanced, so did the human ability to further explore the cell at the molecular level. This connection can be seen in Franklin’s work using the X-ray diffraction technology. This enabled Watson and Crick to build a model that explained the specific structure and properties of DNA. The function of DNA polymerase uses the base-pairing rule. It is like putting a puzzle together, because nucleotides fit together only in certain ways. The double-helix model explains Chargaff’s rule of base pairing and how the two strands of DNA are held together.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

*****NOTE: students who are enrolled in this course have significant cognitive disabilities, and are assessed and taught based on what they are capable of learning. Each student has an IEP and is provided a tailored path to learn new academic skills. Therefore, not all students will be able to achieve or learn each target stated below. There is a balance between challenging the student and attainability. As a result, all students will be assessed and placed into the appropriate learning target below and progress accordingly.**

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
1. Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code.	(1,2) Science: 5.1.12 A1, 3 5.1.B1,2,4
2. Identify the chemical components of DNA.	5.1.12 C1,2,3
3. Summarize the events of DNA replication.	5.3.12 A1
4. Compare DNA replication in prokaryotes with that of eukaryotes.	(3-8) Science: 5.3.12 A3, A5
5. Contrast RNA with DNA.	5.3.12 D1, 2,3
6. Explain the process of transcription.	5.1.12 D1,2
7. Identify the genetic code and explain how it is read.	
8. Summarize the process of translation.	

Inter-Disciplinary Connections:

Experience of laboratory skills to be used in real life situations at home and in the work place, including problem solving skills.

Students will engage with the following text:

1. *Life Science*, 1999, Glencoe

Minimal use of text supplemented by teacher made materials, and web based information and videos.

On a daily basis, students will enrich their reading, writing, and interpretation skills through the use of Cornell notes supplied by the teacher.

Accommodations and/or modifications will be made on a case by case basis in accordance with individual student needs. They may include but not be limited to: read aloud directions to help students understand the chapter/unit, read aloud specific paragraphs to assist auditory learners, read captions in the book that describe concepts being discussed.

Students will write:

Students will write and fill in the blanks in the notes provided, they will also summarize the lesson, do warm-ups, short answer responses and open-ended responses.
Accommodations and/or modifications will be made on a case by case basis in accordance with individual student needs.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

The following instructional strategies are utilized on an as needed basis throughout the year:

29. Direct Instruction
30. Cornell Note-Taking, guided
31. Scaffolding
32. Project Based Learning
33. Peer Based Learning/Review
34. Student presentations with peer review in addition to teacher assessment
35. Modeling
36. Drawing
37. Guided Discussion with analysis/prediction/defense of conclusions
38. Directed Reading
39. Guided Notes
40. Outlining
41. Technology: Microsoft Excel, PowerPoint, Word, SmartBoard, LCD Projectors
42. Media Resources: [Gizmos](#), Discovery Streaming, commercial video resources, YouTube, course websites (i.e. OnCourse and eBoards)

Once per quarter students are given a topical presentation assignment to research, present, and review.]

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

The effectiveness of the instructional program will be based on teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record keeping, quizzes, warm ups, class discussion, individual conferences, journal writing and performance tasks.]

Accommodations/Modifications:

- Use multimedia equipment (iPads, laptops, etc....) to lessen reliance on text.
- Incorporate experiential and community based activities related to lesson theme.
- Include "hands-on" activities (games, projects) within lectures/activities.
- Emphasize sensory experiences reflecting student's learning style: auditory, multisensory, visual, physical movement/kinesthetic.
- Use graphic organizers.
- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Extend time limits for tests and assignments.
- Read test items that do not assess reading skills to students.
- Use models, manipulatives and other concrete materials to demonstrate concepts and solve problems.
- Have student repeat or rephrase assignments.
- Check for understanding frequently
- Provide multiple practice sessions to reinforce a new skill/concept.
- Provide guided notes/handouts.

Summative Assessments:

State assessments, hands-on tests and written tests

Make models of DNA and RNA

Accommodations/Modifications:

- Use Pass/Fail Option.
- Provide checklists for solving problems.
- Allow students to use calculator when applicable.
- Read test items that do not assess reading skills to students.
- Extend time limits.
- Break test sections into smaller chunks

Performance Assessments:

Projects, presentations, display of student work.

Sample: Creating a large paper representation of the periodic table in color. Researching an element and creating a card of the atomic number, weight, etc. as shown on periodic table, then presenting the use of that particular element in our world.

Accommodations/Modifications:

- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Allow students extra time to complete projects.
- Provide students with an example of project for reference.
- Provide a clear rubric for students to understand exactly what is expected.

Black Horse Pike Regional School District Curriculum Template

Life Skills Science Curriculum – Biology

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Unit 4: Genetics

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<p>Course/Unit Title: Life Skills Sciences – Biology/Genetics</p> <p>Grade Level(s): 9-12</p>	<p>Unit Summary:</p> <ol style="list-style-type: none"> Students will be introduced to the experiments of Gregor Mendel. By outlining the garden pea plant experiment, Mendel’s approach allowed him to reach his conclusions. So the students can observe the patterns of inheritance, they will distinguish between genotype and phenotype and give examples of each. Using the Punnett squares, they can recognize the relationship between probability and inheritance. The students will identify the gene as a set of instructions for the cells and ultimately for the organism. With knowledge of genetics, a pedigree can be used to predict the genotype of the ancestors by observing the phenotype of the offspring. The students will have an opportunity to create a pedigree of their family to describe how the genetic information was passed through their family.
<p>Essential Question(s):</p> <ul style="list-style-type: none"> Based on his observations of his pea plant experiments, how was Gregor Mendel able to contribute to our understanding of genetics? How is genetic information passed through the generations? How do alleles segregate when more than one gene is involved? How can the information learned from pedigrees determine the nature of genes and alleles associated with inherited human traits? Does the environment have a role in how genes determine traits? 	<p>Enduring Understanding(s):</p> <ul style="list-style-type: none"> Organisms get their traits from genetic material that is held in the DNA of the genes. This can be passed to future generations in a systematic manner. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction. There are predictable patterns of inheritance that can be determined by using Punnett squares. The DNA is the universal code for life, and it enables an organism to transmit its hereditary material to future generations. Independent assortment helps account for the many genetic variations observed in plants, animals and other organisms, even when they have the same parents. The pedigree will help trace the inheritance pattern by looking at the known phenotype of a single trait. With pedigree analysis, it is possible to apply the principles of Mendelian genetics to humans. There are potential impacts on the organism due to a change in the DNA that is caused by mutations due to environmental conditions. The value and potential application of the Genome project will open up discoveries to find cures, treatments for genetic disorders.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the NJCCCS or Common Core Standards that are applicable

*****NOTE: students who are enrolled in this course have significant cognitive disabilities, and are assessed and taught based on what they are capable of learning. Each student has an IEP and is provided a tailored path to learn new academic skills. Therefore, not all students will be able to achieve or learn each target stated below. There is a balance between challenging the student and attainability. As a result, all students will be assessed and placed into the appropriate learning target below and progress accordingly.**

<u>Learning Target</u>	<u>NJCCCS or CCS</u>
<ol style="list-style-type: none"> 1. Using the traits of dominant and recessive, explain how Mendel's experiment contributed to the Laws of Heredity. Using the results of Mendel's experiment on garden peas, describe how his data could be explained by scientific knowledge of genes and chromosomes. 2. Identify genes as a set of instructions, coded in the DNA sequence of each organism. 3. Explain how probability is used to predict the results of monohybrid and dihybrid crosses. Define and distinguish between complete dominance, incomplete dominance and co-dominance. 4. Explain how a testcross is used to show the genotype of an individual whose phenotype is dominant. 	<p>(1-2) Science: 5.1.12 A1, A2, A3 5.2.12 A1, B1, B2 5.3.12 A1</p> <p>(3-4) Science: 5.1.12 A1,2,3 5.1.12 B1,2,3 5.3.12 D.1 5.3.12 A1 5.1.12 C1,2,3 5.5.12C1, 3 5.3.12C1, D1</p>

Inter-Disciplinary Connections:

Experience of laboratory skills to be used in real life situations at home and in the work place, including problem solving skills .

Students will engage with the following text:

1. *Physical Science*, 1999, Glencoe

Minimal use of text supplemented by teacher made materials, and web based information and videos.

On a daily basis, students will enrich their reading, writing, and interpretation skills through the use of Cornell notes supplied by the teacher.

Accommodations and/or modifications will be made on a case by case basis in accordance with individual

student needs. They may include but not be limited to: read aloud directions to help students understand the chapter/unit, read aloud specific paragraphs to assist auditory learners, read captions in the book that describe concepts being discussed.

Students will write:

Students will write and fill in the blanks in the notes provided, they will also summarize the lesson, do warm-ups, short answer responses and open-ended responses.

Accommodations and/or modifications will be made on a case by case basis in accordance with individual student needs.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

The following instructional strategies are utilized on an as needed basis throughout the year:

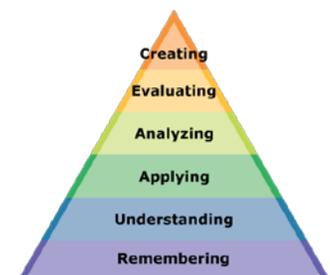
43. Direct Instruction
44. Cornell Note-Taking, guided
45. Scaffolding
46. Project Based Learning
47. Peer Based Learning/Review
48. Student presentations with peer review in addition to teacher assessment
49. Modeling
50. Drawing
51. Guided Discussion with analysis/prediction/defense of conclusions
52. Directed Reading
53. Guided Notes
54. Outlining
55. Technology: Microsoft Excel, PowerPoint, Word, SmartBoard, LCD Projectors
56. Media Resources: [Gizmos](#), Discovery Streaming, commercial video resources, YouTube, course websites (i.e. OnCourse and eBoards)

Once per quarter students are given a topical presentation assignment to research, present, and review.]

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.

IDENTIFY BLOOM'S LEVELS.



Formative Assessments:

The effectiveness of the instructional program will be based on teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record keeping, quizzes, warm ups, class discussion, individual conferences, journal writing and performance tasks.

Accommodations/Modifications:

- Use multimedia equipment (iPads, laptops, etc....) to lessen reliance on text.
- Incorporate experiential and community based activities related to lesson theme.
- Include "hands-on" activities (games, projects) within lectures/activities.
- Emphasize sensory experiences reflecting student's learning style: auditory, multisensory, visual, physical movement/kinesthetic.
- Use graphic organizers.
- Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.
- Extend time limits for tests and assignments.
- Read test items that do not assess reading skills to students.
- Use models, manipulatives and other concrete materials to demonstrate concepts and solve problems.
- Have student repeat or rephrase assignments.
- Check for understanding frequently
- Provide multiple practice sessions to reinforce a new skill/concept.
- Provide guided notes/handouts.

Summative Assessments:

Hands-on tests and written tests.

Accommodations/Modifications:

- Use Pass/Fail Option.
- Provide checklists for solving problems.
- Allow students to use calculator when applicable.
- Read test items that do not assess reading skills to students.
- Extend time limits.
- Break test sections into smaller chunks

Performance Assessments:

Projects, presentations, display of student work.
Sample Lab: observing physical and chemical changes using clay.

Accommodations/Modifications:

- **Complete assignments through oral reports, tapes, projects or other means to lessen amount of writing.**
- **Allow students extra time to complete projects.**
- **Provide students with an example of project for reference.**
- **Provide a clear rubric for students to understand exactly what is expected.**