

Unit 4 - Vertebrates (Life Science) Copied from: Zoology w/Lab (Life Science), Copied on: 12/15/21

Content Area: **Science**
Course(s): **Zoology w/Lab**
Time Period: **DecJan**
Length: **30 days = Grade 11-12**
Status: **Published**

Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

ZOOLOGY, GRADE 11-12

UNIT 4 - VERTEBRATES

Belleville Board of Education

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Unit Overview

Purpose of the Unit: Students will become familiar with the concept that the phylum of Chordata exhibits distinctive hallmarks- 1) dorsal, tubular nerve cord overlying 2) a supportive notochord 3) pharyngeal slits 4) endostyle for filter feeding, and 5) a post anal tail for propulsion. The further study of aquatic fish with distinctive gills, appendages, and if present in the form of fins, skin with scales of dermal origin. Fish are defined in the evolutionary sense as all vertebrates that are not tetrapods. The evolutionary transition between water to land leaves a series of alteration cumulatively fitted to vertebrate life on land. Amphibians have the only recorded transition from water to land in both their ontogeny and phylogeny. They are considered quasiterrestrial. Amphibians, with well-developed limbs, redesigned sensory and respiratory systems, and modifications of the postcranial skeleton for supporting the body in air, have completed the conquest to land. Though with the development of shell less eggs and gill-breathing larvae, they are still tied to the water for their life cycle. Students will become familiar with the concept that the vertebrate class, Aves, there are over 9000 species and outnumber all other vertebrates except fishes. These animals are known to inhabit every continent and climate. Birds unique feature that distinguishes them from all other animals are feathers. Despite over 150 million years of evolution, they have proliferated and adapted to specialized niches and ways of life. In addition to feathers, birds have forelimbs modified into wings and hind limbs specialized for walking, swimming, and perching. A bird's entire anatomy is organized around flight. They afford a rapidly adjusting digestive system to process energy-rich diets and a high pressure circulatory system and finely tuned nervous system. Culminating the study of Earth's organisms, Mammals, with their highly developed nervous system and numerous adaptations, occupy every environment on Earth that supports life. This class, Mammalia, are essentially adaptive, but have been influenced by humans along their evolutionary tract. This class will be studied from origin and evolution of structural and functional adaptations, migration, reproduction, and populations.

Enduring Understanding

- Animals have evolved over time which has led to animal diversity
- Scientists group animals based on shared characteristics
- Every species has a specific fundamental or realized niche
- Mammals and birds have evolved over time which allows for greater success in survival
- Mechanisms of speciation have led to greater diversity of vertebrates
- Every species has a specific fundamental or realized niche

Essential Questions

- How do structural differences in animals function to meet similar needs?
- How do vertebrates vary from invertebrates physiologically and anatomically?
- What characteristics influence survival rate?

Exit Skills

By the end of Unit 4 Students will know:

- The characteristics that define a vertebrate
- The differences between the two major classes of fish
- The differences between amphibians and reptiles
- The principles of evolution and classification
- The concept of species
- The evidence for evolution
- Learn skull anatomy and technical terminology

New Jersey Student Learning Standards (NJSL-S)

9-12.HS-LS1-1

Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

Interdisciplinary Connections

MA.S-ID.A

Summarize, represent, and interpret data on a single count or measurement variable

MA.S-ID.B

Summarize, represent, and interpret data on two categorical and quantitative variables

LA.RST.11-12.1

Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.

LA.RST.11-12.2

Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

MA.S-IC.A

Understand and evaluate random processes underlying statistical experiments

LA.RST.11-12.3

Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on

explanations in the text.

LA.RST.11-12.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LA.RST.11-12.5	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
MA.S-IC.B	Make inferences and justify conclusions from sample surveys, experiments, and observational studies
LA.RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LA.RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
LA.RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
LA.WHST.11-12.1	Write arguments focused on discipline-specific content.
LA.WHST.11-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
LA.WHST.11-12.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LA.WHST.11-12.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
LA.WHST.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
LA.WHST.11-12.9	Draw evidence from informational texts to support analysis, reflection, and research.
CS.9-12.8.2.12.ETW.1	Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation, and maintenance of a chosen product.
CS.9-12.8.2.12.ETW.2	Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment.
CS.9-12.8.2.12.ETW.3	Identify a complex, global environmental or climate change issue, develop a systemic plan of investigation, and propose an innovative sustainable solution.
CS.9-12.8.2.12.ITH.1	Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints.
CS.9-12.8.2.12.ITH.2	Propose an innovation to meet future demands supported by an analysis of the potential costs, benefits, trade-offs, and risks related to the use of the innovation.
CS.9-12.8.2.12.ITH.3	Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture.
CS.9-12.ETW	Effects of Technology on the Natural World
CS.9-12.ITH	Interaction of Technology and Humans
	Development and modification of any technological system needs to take into account how the operation of the system will affect natural resources and ecosystems. Impacts of technological systems on the environment need to be monitored and must inform

decision-making. Many technologies have been designed to have a positive impact on the environment and to monitor environmental change over time.

Decisions to develop new technology are driven by societal and cultural opinions and demands that differ from culture to culture.

Changes caused by the introduction and use of a new technology can range from gradual to rapid and from subtle to obvious, and can change over time. These changes may vary from society to society as a result of differences in a society's economy, politics, and culture.

Learning Objectives

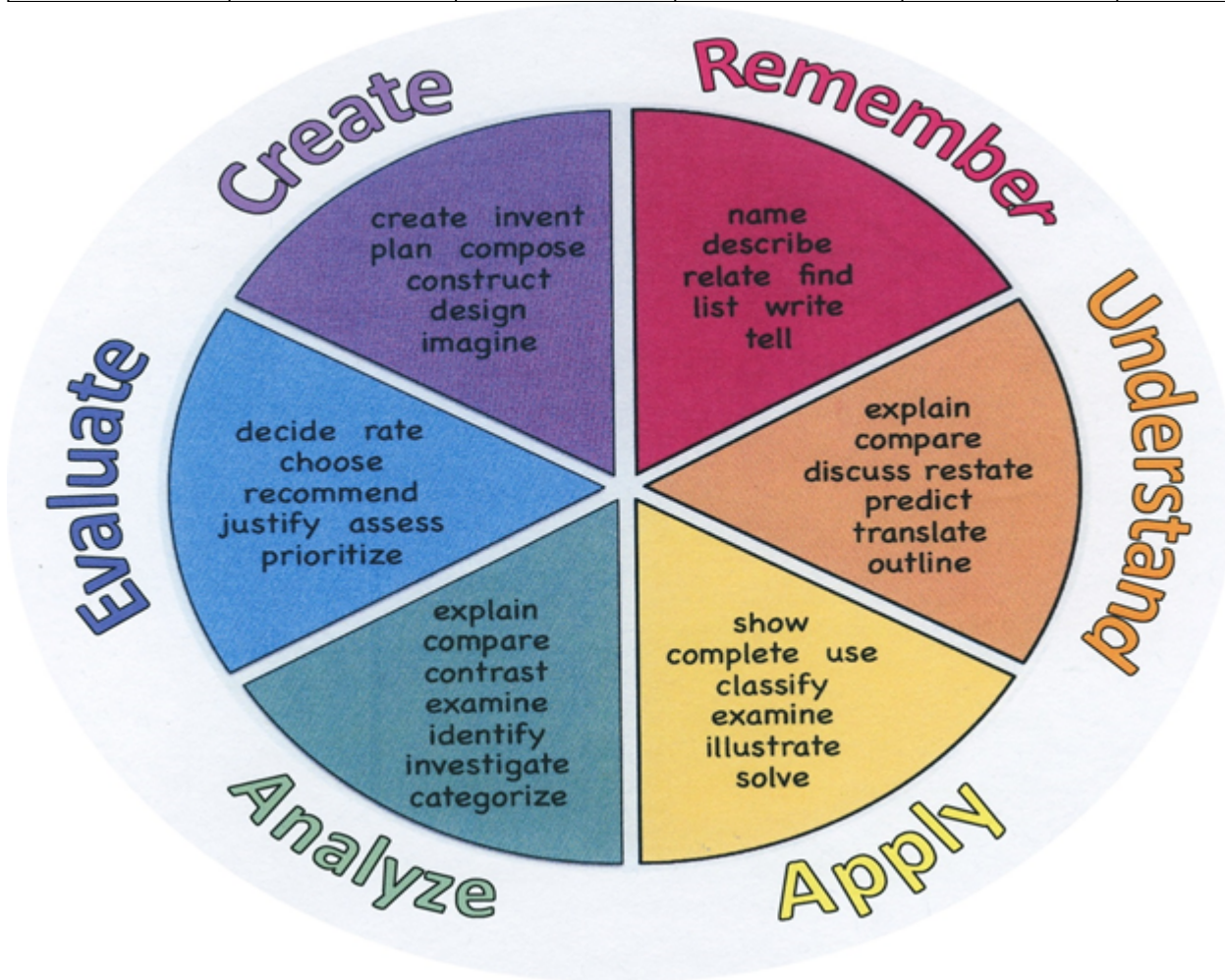
Students will be able to...

- Explain characteristics that differentiate vertebrates from invertebrates
- Compare and contrast the characteristics of fishes, amphibians, reptiles, birds and mammals
- Differentiate between the classes of vertebrates
- Explain the importance of Amphioxus
- Explain the difference between venomous and poisonous
- Apply knowledge to develop a common name for a fictitious species of mammals and apply the rules of binomial classification to provide specific evidence
- Apply concepts of micro- and macro- evolution to produce an evolutionary story for the fictitious animal
- Interpret simple data sets and make inferences and conclusions from that data
- Practice making primary observations on archaeologically observed phenomena
- Make logical arguments linking present-day observations on objects to past behaviors
- Understand the definition of domestication and the difference between captive and domestic animals
- Differentiate between observations and interpretations

Action Verbs: Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize

Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive
Outline	Represent	Calculate	Diagram	Support	Devise
Point	Restate	Change	Discriminate	Test	Generate
Quote	Rewrite	Classify	Illustrate		Integrate
Recall	Select	Complete	Outline		Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct
Reproduce	Tell	Divide			Revise
	Translate	Examine			Rewrite
	Associate	Graph			Transform
	Compute	Interpolate			
	Convert	Manipulate			
	Discuss	Modify			
	Estimate	Operate			
	Extrapolate	Subtract			
	Generalize				
	Predict				



Suggested Activities & Best Practices

- Crash Course Videos with associated questions
- Lab- Perch Dissection
- Lab- Dogfish Shark Dissection
- Lab- Frog Dissection
- Lab- Turtle Dissection
- Lab- Pigeon Dissection
- Lab- Fetal Pig Dissection
- Group research project - Animal Behavior
- Understanding taxonomic principles, binomial nomenclature, and cladograms
- Address the contributions of African-American zoologists to science and society
- Address the contributions of LGBTQ+ zoologists to science and society

Assessment Evidence - Checking for Understanding (CFU)

Google Classroom Assignment (Formative)

QUIA Quiz (Summative)

Pear Deck (Alternate)

Lab Reports (Alternate)

Common, Department Quarterly Benchmarks (Benchmark)

Oncourse Assessment Tools (Formative)

Unit Test/Quiz (Summative)

"Do Now/Exit Ticket" Activity (Formative)

- Admit Tickets
- Compare & Contrast
- Crash Course Video Questions
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Illustration
- Journals
- KWL Chart
- Lab- Dogfish Shark Dissection
- Lab- Fetal Pig Dissection
- Lab- Frog Dissection
- Lab- Perch Dissection
- Lab- Pigeon Dissection
- Lab- Turtle Dissection
- Multimedia Reports
- Outline
- Quarterly Benchmarks
- Quizzes
- Self- assessments
- Study Guide
- Surveys
- Teacher Observation Checklist
- Think, Pair, Share
- Unit review/Test prep
- Unit tests
- Web-Based Assessments
- Written Reports

Primary Resources & Materials

Textbook: *Biology*, Miller and Levine

Chromebook: Online access to textbook and digital resources from *Biology*, Miller and Levine

Ancillary Resources

YouTube videos - Crash Course series with associated question worksheets

Animal models

Diagram package

Compound light microscopes

Selection of prepared slides showing properties of tissue types

Dissection kits

Various preserved animal specimens

Technology Infusion

Student-issued Chromebooks will be used to access Pearson online course materials for use in the classroom and from home

Interactive digital content available through Pearson EasyBridge will serve as in class material, at home learning, and extension activities for differentiated use

YouTube videos for lesson enhancement and differentiation (Crash Course video series with associated question worksheets)

Google Classroom will be used to disseminate course information and better communicate with students and parents beyond the classroom walls

Google Suite will be used to help drive the Google Classroom experience and better integrate it into every-day use

Prezi will be used to serve as an alternative to Google Slides or MS PowerPoint to give students an option for presentation software

Subscription to Defined STEM website will help students make choices in their own educational journey by selecting topics they are interested in and collaborate with like-minded students in a group project

Use MS Word, Excel, PowerPoint, OneNote will help students become tech savvy as they prepare for their journey into adulthood

Alignment to 21st Century Skills & Technology

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP5.1	Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP7.1	Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of

problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

CRP.K-12.CRP10

Plan education and career paths aligned to personal goals.

CRP.K-12.CRP10.1

Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

CRP.K-12.CRP11

Use technology to enhance productivity.

CRP.K-12.CRP11.1

Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

CRP.K-12.CRP12

Work productively in teams while using cultural global competence.

CRP.K-12.CRP12.1

Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

CAEP.9.2.12.C.1

Review career goals and determine steps necessary for attainment.

CAEP.9.2.12.C.2

Modify Personalized Student Learning Plans to support declared career goals.

CAEP.9.2.12.C.3

Identify transferable career skills and design alternate career plans.

TECH.8.1.12

Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

TECH.8.1.12.A

Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.

TECH.8.1.12.A.1

Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.

TECH.8.1.12.A.3

Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

TECH.8.1.12.A.CS2

Select and use applications effectively and productively.

TECH.8.1.12.B

Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.

TECH.8.1.12.B.2

Apply previous content knowledge by creating and piloting a digital learning game or tutorial.

TECH.8.1.12.B.CS1

Apply existing knowledge to generate new ideas, products, or processes.

TECH.8.1.12.B.CS2

Create original works as a means of personal or group expression.

TECH.8.1.12.C

Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

TECH.8.1.12.C.CS1

Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.

TECH.8.1.12.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.12.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.12.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.12.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.12.F.CS1	Identify and define authentic problems and significant questions for investigation.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.

21st Century Skills/Interdisciplinary Themes

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

- Civic Literacy
- Environmental Literacy
- Global Awareness

Differentiation

Students will be arranged in groups based on results of multiple intelligence surveys and behavioral analysis to allow for collegial collaboration in the classroom.

Students will participate in review games each section using the Kahoot! platform and their Chromebooks to help solidify each section's learning activities.

Students will utilize the Pearson online module to have access to the digital textbook and the alternate versions of the textbook as needed to adjust to the students' current reading levels.

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Study guides
- Teacher reads assessments allowed
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts

- Project-based learning
- Problem-based learning
- Tiered activities/assignments
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

Special Education Learning (IEP's & 504's)

Students with IEP's or 504's will be granted the following accommodations (as examples, but not limited to additional accommodations as deemed necessary):

- additional time will be granted to students with special needs to complete all dissection activities in the Unit (as listed in above recommended activities) either before or after school

- standardized chapter/unit tests will be modified in OnCourse Connect to limit answer choices and simplify vocabulary as necessary for better understanding and facility of use

- in the dissection laboratory exercises, students with special needs will be offered an abbreviated procedure to accommodate their levels of understanding

- printed copy of board work/notes provided
- additional time for skill mastery
- behavior management plan
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multi-sensory presentation
- multiple test sessions
- preferential seating
- preview of content, concepts, and vocabulary
- Provide modifications as dictated in the student's IEP/504 plan
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

English Language Learning (ELL)

To assist ELL students, the following are examples of modifications to instruction (including, but limited to):

-ELL students will be paired with students who are bilingual to assist in translation of English to the students' native language to ease the transition into the exclusive use of English in the classroom setting

-ELL students will be offered videos or illustrations of laboratory procedures to facilitate the understanding of those procedures (ex. pictures of the dissection specimens with labels in two languages)

-ELL students will be offered the Biology textbook written in Spanish, if they are a native Spanish speaker, which aligns to the English-language version of the textbook to facilitate translations and understanding

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

At Risk

To assist At Risk students, the following are examples of modifications to instruction (including, but limited to):

-students will be presented with a streamlined curriculum removing non-essential information for ease of understanding

-Pearson EasyBridge multisensory lessons can be employed to facilitate knowledge

-At Risk students will be allowed to take tests open book

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices

- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

To assist T&G students, the following are examples of modifications to instruction (including, but limited to):

-students can research dinosaurs and compare them to modern-day reptiles

-students can perform additional procedures during pig dissection to model what an autopsy would look like

-students can research animal behavior and present findings to the class

- Above grade level placement option for qualified students
- Advanced problem-solving
- Allow students to work at a faster pace
- Cluster grouping
- Complete activities aligned with above grade level text using Benchmark results
- Create a plan to solve an issue presented in the class or in a text
- Debate issues with research to support arguments
- Flexible skill grouping within a class or across grade level for rigor
- Higher order, critical & creative thinking skills, and discovery
- Multi-disciplinary unit and/or project
- Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities
- Utilize exploratory connections to higher-grade concepts
- Utilize project-based learning for greater depth of knowledge

Sample Lesson

Unit Name: History and General Anatomy of Animals

NJSLS: see Standards below

Interdisciplinary Connection: see Standards below

Statement of Objective: SWBAT research the effect of the Holocaust on the science of zoology and present his/her contribution to science and society as a small group project

Anticipatory Set/Do Now: Entrance ticket (MC&T/F): review of research techniques

Learning Activity: group research and oral/multimedia presentation activity

Student Assessment/CFU's: Entrance ticket, observation of research/visual presentation techniques using teacher checklist, rubric for presentation

Materials: Chromebooks with Google Classroom, posted lab activity worksheet, posted Use of Microscope refresher, microscopes, various slides of muscle tissue, sketch paper, pencils

21st Century Themes and Skills: see list below

Differentiation/Modifications: see list below

Integration of Technology: Chromebooks, internet access, Google Classroom, microscopes

21st Century Themes and Skills:

- Small group setting and instruction
- Preview content and concepts
- Group investigations
- Multisensory approach
- Behavior management plans
- Project-based learning
- Open-ended activities

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Teacher reads assessments allowed
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner

- Small group setting

Hi-Prep Differentiations:

- Group investigations
- Independent research and projects
- Multiple intelligence options
- Project-based learning
- Tiered activities/assignments

Lo-Prep Differentiations

- Exploration by interest
- Flexible grouping
- Goal setting with students
- Open-ended activities

LA.RST.11-12.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
9-12.HS-LS1-1.LS1.A.1	Systems of specialized cells within organisms help them perform the essential functions of life.
9-12.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
9-12.HS-LS1-2.2.1	Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.
9-12.HS-LS1-2.LS1.A.1	Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.
9-12.HS-LS1-2.4.1	Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions— including energy, matter, and information flows—within and between systems at different scales.
LA.RST.11-12.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LA.RST.11-12.5	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
LA.WHST.11-12.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LA.WHST.11-12.1	Write arguments focused on discipline-specific content.
LA.WHST.11-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.