

Unit 05: Classification

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

New Jersey Student Learning Standards

LS4: Biological Evolution: Unity and Diversity

LS4.A: Evidence of Common Ancestry and Diversity

Genetic information provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence. (HS-LS4-1)

LS4.B: Natural Selection

Natural selection occurs only if there is both (1) variation in the genetic information between organisms in a population and (2) variation in the expression of that genetic information—that is, trait variation—that leads to differences in performance among individuals. (HS-LS4-2), (HS-LS4-3)

The traits that positively affect survival are more likely to be reproduced, and thus are more common in the population. (HS-LS4-3)

LS4.C: Adaptation

Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment. (HS-LS4-2)

Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. (HS-LS4-3), (HS-LS4-4)

Adaptation also means that the distribution of traits in a population can change when conditions change. (HS-LS4-3)

Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline—and sometimes the extinction—of some species. (HS-LS4-5), (HS-LS4-6)

Species become extinct because they can no longer survive and reproduce in their altered environment. If members cannot adjust to change that is too fast or drastic, the opportunity for the species' evolution is lost. (HS-LS4-5)

LS4.D: Biodiversity and Humans

Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (secondary to HS-LS2-7)

Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution,

introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (secondary to HS-LS2-7)(HS-LS4-6)

LA.K-12.NJSLSA.R3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
LA.K-12.NJSLSA.R5	Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
LA.K-12.NJSLSA.R10	Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
LA.RST.9-10	Reading Science and Technical Subjects
LA.RST.9-10.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
LA.RST.9-10.5	Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LA.RST.9-10.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
SCI.2.LS4.D	Biodiversity and Humans
SCI.3.LS4.A	Evidence of Common Ancestry and Diversity
SCI.3.LS4.B	Natural Selection
SCI.3.LS4.C	Adaptation
2-LS4	Biological Evolution: Unity and Diversity

Integration of Career Readiness, Life Literacies and Key Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale

Unit Rationale

The purpose of this unit...

Meaning

Essential Questions

Essential Questions

- What is classification?
- How are living organisms classified?

- How has the process of classifying living organisms changed over the centuries?
- How do vertebrates and invertebrates differ from each other?
- How are types of invertebrates similar and different in terms of physical characteristics and reproduction?
- How are bacteria, protists, and fungi different from each other?
- What are the roles of bacteria, protists, and fungi in the environment?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

Students will understand that:

- Classification, also known as taxonomy, is a method of arranging organisms into orderly categories based on their biological and physical characteristics.
- Living things are classified based on their structural and evolutionary properties. Binomial nomenclature is the most common type of scientific classification.
- Classification has changed over the centuries with advancements in genetic research we've more or less stopped going by how animals/plants/etc look or act, but more on what/who they are more closely genetically related to.
- Animals can be classified as either invertebrates or vertebrates; The main difference between the two groups is that invertebrates do not have a backbone or a spinal column.
- Invertebrates differ vastly from each other in terms of both physical characteristics and reproductive strategies.
- Bacteria, proties and fungi are all types of microorganisms, however they differ from each other in terms of cellular structure, classification and their roles in the environment.

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know...

- How living things are classified
- How the process of classification has changed since the time of Aristotle
- The 3 domain and 6 kingdom classification system
- The difference between vertebrates and invertebrates
- All of the phylum's in the Animal kingdom
- The similarities and differences between the invertebrates of the animal kingdom
- How microorganisms such as bacteria, protists and fungi differ from one another
- The roles that bacteria, protists and fungi play in the environment

Skills

Skills

Student will be skilled at ...

- Classifying living organisms
- Understanding the difference between eukaryotes and prokaryotes
- Knowing the 3 domains and 6 kingdoms in Domain Eukarya
- Naming and classifying the major phylums in the animal kingdom
- Understanding the difference between invertebrates and vertebrates
- Understanding the difference between microorganisms classified as bacteria, fungi and protists
- Knowing and understanding the important roles bacteria, fungi and protists play in our environment

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

- Glencoe Biology Textbook
- Powerpoint lecture and exit slip
- Homework
- Vocabulary
- tests/quizzes
- lab materials
- visual powerpoint quiz
- earthworm dissection
- starfish dissection

Formative Assessment Strategies

Formative Assessment Strategies

exit slips

tests/quizzes

lab assessments

lab write-ups

worksheets

quick thoughts

class discussion

writing assignments

Learning Activities/Unit of Study

Learning Activities/Unit of Study

classification

1 classification lecture and exit slip

2 classification lecture and exit slip

3 classification concept map

4 classification quest

5 classification quiz

invertebrates

8 review of bacteria, protists and fungus

7 porifera lecture and exit slip

8 porifera worksheet

9 cnidaria lecture and exit slip

10 cnidaria worksheet

11 quiz

12 nematoda lecture and exit slip

13 nematoda worksheet

14 platyhelminthes lecture and exit slip

15 platyhelminthes worksheet

16 quiz

17 mollusca lecture and exit slip

18 mollusca worksheet

19 annelida lecture and exit slip

20 annelida dissection

21 arthropoda lecture and exit slip

22 arthropoda lecture and exit slip

23 arthropoda worksheet

24 echinodermata lecture and exit slip

25 echinodermata dissection

26 quiz

vertebrates

27 phylum chordata - fish and sharks

28 phylum chordata - amphibians

29 phylum chordata - reptiles

30 phylum chordata - birds

31 phylum chordata - mammals

32 quiz

animal reports

33 research

34 research

35 research

36 research

37 research

38 presentations

assessments

39 review

40 bingo

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, Gifted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how

much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just

may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.