

Unit 01: The Study of Science

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

Standards Alignment

New Jersey Student Learning Standards

LS1: From Molecules to Organisms: Structures and Processes

LS1.A: Structure and Function

Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1)

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. (HS-LS1-2)

LS1.B: Growth and Development of Organisms

In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HS-LS1-4)

Key Ideas and Details

LA.K-12.NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

LA.K-12.NJSLSA.R2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

LA.K-12.NJSLSA.R3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

LA.K-12.NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

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.RST.9-10.1 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.9-10.2 Determine the central ideas, themes, or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

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.

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|---------------|---|
| LA.RST.9-10.4 | 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 9-10 texts and topics. |
| 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). |
| SCI.1.LS1.A | Structure and Function |
| SCI.1.LS1.B | Growth and Development of Organisms |
| 1-LS1 | From Molecules to Organisms: Structures and Processes |

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 Literacy

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

1. Why is learning biology important to you?
2. How do you know if something is alive?
3. What makes something science?
4. How do biologists study living organism?
5. How does a question or problem lead to an experiment?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

Students will understand that:

- Describe how biology is essential in improving our lives
- Relate the 7 properties of life to a living organisms

- Determine what is science, what is not science and how scientists practice science
- Describe and use the steps of the scientific method
- Understand the importance and use of the metric system

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know...

- The role biology plays in our lives
- The characteristics of living organisms
- The difference between science and pseudoscience
- The steps of the scientific method
- How to do unit conversions in the metric system

Skills

Skills

Student will be skilled at ...

- Explain how biology has improved our lives
- Identify if something is alive or not
- Determine if a practice is scientifically based or not
- Design an experiment using the steps of the scientific method
- Convert between units in the metric system

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

- Lab Materials
- Worksheets
- Quick Thoughts
- Exit Slips
- Powerpoints
- Glencoe Biology

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

What is science

1 - Introduction

2 - Syllabus, classroom procedures, safety

3 - Lecture and Exit Slips

4 - what is science

5 - what is not science

Jobs in science

6 - science job research paper

7 - science job research paper

8 - science job research paper

9 - science job presentations

what is life

10 - characteristics of life lecture and exit slip

11 - characteristics of life lab

12 - nature of science vocabulary

metric system

13 - metric system lecture

14 - metric system lab

15 - metric system lab

16 - graphing

17 - the study of science quiz

experiments

18 - scientific method lecture and exit slip

19 - parts to an experiment lecture and exit slip

20 - create an experiment

Assessment

21 - the study of science review day

22 - create a test

23- take a student made test

24 - the study of science benchmark

[hirsh-bio1-cycle3.doc](#)

[hirsh-biol-cycle2.doc](#)

[hirsh-biol-cycle4.doc](#)

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.