

# Structures of Life

Content Area: **Science**  
Course(s):  
Time Period: **Marking Period 3**  
Length: **5 weeks**  
Status: **Published**

## Course Pacing Guide

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Unit	MP/Trimester	Weeks
Water and Climate	1	5
Motion and Matter	2	5
Structures of Life	3	5

## Unit Overview

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Human life is unique, as far as we can tell, because humans have the capacity to design, plan, use history, imagine non-existent objects, and devise systems of laws and codes of behavior.

We have power unknown in other life-forms. But we still share the most fundamental requirements with all other life-forms— nourishment, water, air, space, and suitable environment. Students must understand these facts so that they are prepared to assume responsibility for the well-being of the system of life on Earth.

The Structures of Life Module consists of four investigations dealing with big ideas in life science—plants and animals are organisms and exhibit a variety of strategies for life, organisms are complex and have a variety of observable structures and behaviors, organisms have varied but predictable life cycles and reproduce their own kind, and individual organisms have variations in their traits that may provide an advantage in surviving in the environment.

## Enduring Understandings

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### Unit Enduring Understandings

- Seeds develop in the plant part called a fruit.
- Different kinds of fruits have different kinds and numbers of seeds; seeds have a variety

of properties.

- A seed is an organism, a living thing.
- Seeds undergo changes in the presence of water.
- A seed contains the embryo plant and stores food. A seed grows into a new plant (reproduction).
- Seed-dispersal mechanisms (wind, water, and animals) move seeds away from parent plants.
- Germination is the onset of a seed's development.
- Plants need water, light, space, and nutrients to grow.
- The life cycle is the sequence of stages during which a seed grows into an adult (mature) plant and produces seeds, which in turn produce new plants of the same kind.
- The fruit of the plant develops from the flower.
- Roots function to take up water and nutrients so they can be transported to other parts of the plant. Different kinds of plants have different root systems.
- Crayfish have observable structures and behaviors that serve various functions in growth, survival, and reproduction.
- Different organisms can live in different environments; organisms have adaptations that allow them to survive and reproduce in those environments.
- Organisms are related in feeding relationships called food chains.
- Difference in characteristics between individuals of the same species may provide an advantage in surviving.
- Some animals claim a territory that they defend against others of their kind. Some organisms live in social groups that many help the individuals in the group survive.
- A skeleton is a system of interacting bones. Humans have about 206 bones. Bones have several functions: support, protection, and movement.
- The number and kinds of bones in an organism are characteristics inherited from the parents of the organism.
- Muscles attach across joints to move bones.
- Fossils are important evidence about extinct organisms and past environments.
- Fingerprints can be sorted into three groups based on basic pattern: whorl, arch, and loop.

## Essential Questions

### Unit Essential Questions

- How are seeds alike and different?
- What effect does water have on seeds?
- How much water does a seed soak up?
- How do seeds disperse away from the parent plant?
- What structures does a seedling have to help it grow and survive?
- What is the sequence of the bean plant's life cycle?
- How do the roots of schoolyard plants compare to the roots of bean plants?
- What are the structures of a crayfish?
- How do crayfish structures and behaviors help crayfish survive?
- What kind of behavior do crayfish display in their habitat?
- How are the structures of crayfish and other animals alike and different?

- What is needed to sustain a food chain?
- What are the functions of the skeletal system?
- In what ways are the skeletons of a rodent and a human similar?
- What makes our skeletal system flexible?
- How are fingerprints alike and different?

## **New Jersey Student Learning Standards (No CCS)**

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### **LS1.A: Structure and function**

All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.

All organisms have external parts. Plants have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (extended from grade 1)

### **LS1.B: Growth and development of organisms**

Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.

### **LS3A: Inheritance of traits**

Many characteristics of organisms are inherited from their parents.

Other characteristics result from individuals' interactions the environment. Many characteristics involve both inheritance and environment.

### **LS2.C: Ecosystem dynamics, functioning, and resilience**

When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.

### **LS2.D: Social interactions and group behavior**

Being part of a group helps animals ain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size.

### **LS3.B: Variation of traits**

Different organisms vary in how they look and function because they have different inherited information.

The environment also affects the traits that an organisms develops.

### **LS4.A: Evidence of common ancestry and diversity**

Some kinds of plants and animals that once lived on earth are no longer found anywhere.

Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their

environments.

#### **LS4.B: Natural selection**

Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.

#### **LS4.C: Adaptation**

For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

#### **LS4.D: Biodiversity and humans**

Populations live in a variety of habitats, and change in those habitats affects the organisms living there.

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### **Amistad Integration**

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### **Holocaust/Genocide Education**

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### **Interdisciplinary Connections**

#### **Unit Summary:**

Human life is unique, as far as we can tell, because humans have the capacity to design, plan, use history, imagine non-existent objects, and devise systems of laws and codes of behavior.

#### **Primary interdisciplinary connections:**

ELA/Literacy –

RI 1: Ask and answer questions to demonstrate understanding of a text.

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RI 2: Determine the main idea of a text.

RI 2: Determine the main idea of a text; recount the key details.

RI 3: Describe the relationship between scientific ideas, using language that pertains to cause and effect.

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RI 4: Determine the meaning of domain-specific words and phrases in text.

RI 5: Use text features to locate information.

RI 6: Distinguish your own point of view from that of the author of a text.

RI 7: Use information gained from illustrations and words to demonstrate understanding of the text.

RI 7: Use information gained from illustrations.

RI 8: Describe the logical connection in a text (cause and effect).

RI 9: Compare and contrast two texts on the same topic.

RI 10: Read and comprehend informational text.

RF 3: Apply word analysis skills in decoding words.

RF 4: Read with fluency.

W 1: Write opinion pieces.

W 2: Write informative text.

W 3: Write a narrative.

W 7: Conduct short research projects.

W 8 : Recall from experience and gather information from print; take brief notes and sort evidence into provided categories.

L 1: Produce compound and complex sentences.

L 4: Determine the meaning of unknown words. .

L 4c: Use a known root word as a clue to the meaning of an unknown word.

L 6: Use domain-specific words.

L 6: Acquire and use domain-specific words.

L 5: Demonstrate understanding of word relationships.

SL 1: Engage in collaborative discussions.

SL 1: Engage in collaborative discussions, building on others' ideas.

SL 2: Determine the main idea from information presented orally.

SL 3: Ask and answer questions, offering appropriate elaboration and detail.

SL 4: Recount an experience with appropriate facts and relevant descriptive details.

SL 4: Report on a topic.

SL 6: Speak in complete sentences.

## Mathematics

MP.4 Model with mathematics. (3-LS1-1), (3-LS4-1),(3-LS4-2),(3-LS4-3),(3-LS4-4)

MP.2 Reason abstractly and quantitatively. (3-LS3-1),(3-LS3-2) (3-LS4-1),(3-LS4-2),(3-LS4-3),(3-LS4-4)

MP.5 Use appropriate tools strategically. (3-LS4-1)

3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less”

problems using information presented in scaled bar graphs. (3-LS4-2),(3-LS4-3)

3.NBT Number and Operations in Base Ten (3-LS1-1)

3.NF Number and Operations—Fractions (3-LS1-1)

3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal

scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1),(3-LS3-2)

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## Technology Standards

TECH.8.1.5.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.5.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.8.1.5.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

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## 21st Century Themes/Careers

Digital media will be used incorporated in project presentations. This module will develop students’ abilities to do and understand scientific inquiry. Students will identify questions, design and conduct scientific investigations to answer those questions, employ tools to gather, analyze, and interpret data. They will use data to construct reasonable explanations, develop and communicate investigations and evidence and understand that scientists use different kinds of investigations and tools to develop explanations using evidence and knowledge. This module will develop and extend students’ understandings about science and technology. Students will work collaboratively in teams and use tools and scientific techniques to make better observations.

## Financial Literacy Integration

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## Instructional Strategies & Learning Activities

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- Start with review
- Present new material in small steps
- Think Aloud/ modeling
- Guided Practice
- State the objective
- Use graphic organizers/ anchor charts
- Concept sorting
- Check for understanding
- Provide feedback
- Workshop model
- Gradual release of responsibility
- Student-led discussion strategies
- Cooperative learning
- Tiered instructional activities
- Differentiation
- Small group instruction

Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
Construct an argument that some animals form groups that help members survive.
Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
Use evidence to support the explanation that traits can be influenced by the environment.
Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

## **Differentiated Instruction**

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- Curriculum Map
- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Sentence & Discussion Stems
- Tiered Learning Targets
- Learning through play
- Meaningful Student Voice & Choice
- Relationship-Building & Team-Building
- Self-Directed Learning
- Choice Boards
- Debate
- The Hot Seat/Role-Play
- Student Data Inventories
- Mastery Learning (feedback toward goal)
- Goal-Setting & Learning Contracts
- Game-Based Learning
- Grouping
- Genius Hour
- Rubrics
- Learning Menus
- Jigsaws
- Learning Through Workstations
- Concept Attainment
- Flipped Classroom
- Mentoring
- Assessment Design & Backwards Planning
- Student Interest & Inventory Data

## **Formative Assessments**

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### **Embedded Assessments:**

- Response Sheets
- Performance Assessments
- Science Notebook Entries



## **Summative Assessment**

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### **Benchmark Assessments:**

- Investigation I-Checks
- Surveys
- Post-Test

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## **Alternate Assessments**

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## **Resources & Technology**

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Foss structures of Life and FossWeb.com

## **BOE Approved Texts**

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Foss Structures of Life Textbook

## **Closure**

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- Snowstorm - Students write down what they learned on a piece of scratch paper and wad it up. Given a signal, they throw their paper snowballs in the air. Then each learner picks up a nearby response and reads it aloud.
- Parent Hotline - Give students an interesting question about the lesson without further discussion. Email their guardians the answer so that the topic can be discussed over dinner.
- DJ Summary - Learners write what they learned in the form of a favorite song. Offer to let one or two sing thier summary.
- Gallery Walk - On chart paper, small groups of students write and draw what they learned. After the completed works are attached to the classroom walls, others students affix post-its to the posters to extend on the ideas, add questions.
- Sequence It - create timelines of major events discussed
- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Question Stems - Have students write questions about the lesson on cards, using [question stems framed around Bloom's Taxonomy](#). Have students exchange cards and answer the question they have acquired.
- Kids answer the following prompts: "What takeaways from the lesson will be important to know three years from now? Why?"
- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade would get it.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.
- Kids write notes to peers describing what they learned from them during class discussions.
- Ask students to summarize the main idea in under 60 seconds to another student acting as a well-known personality who works in your discipline. After summarizing, students should identify why the famous person might find the idea significant.
- Have students complete the following sentence: "The [concept, skill, word] is like \_\_\_\_\_ because \_\_\_\_\_."
- Ask students to write what they learned, and any lingering questions on an "exit ticket". Before they leave class, have them put their exit tickets in a folder or bin labeled either "Got It," "More Practice, Please," or "I Need Some Help!"
- After writing down the learning outcome, ask students to take a card, circle one of the following options, and return the card to you before they leave: "Stop (I'm totally confused. Go (I'm ready to move on.)" or "Proceed with caution (I could use some clarification on . . .)"

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## ELL

- Alternate Responses
- Advance Notes
- Extended Time

- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- E-Dictionaries
- Google Translate

## **Special Education**

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- Shorten assignments to focus on mastery of key concepts.
- Shorten spelling tests to focus on mastering the most functional words.
- Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc.)
- Specify and list exactly what the student will need to learn to pass.
- Evaluate the classroom structure against the student's needs (flexible structure, firm limits, etc.).
- Keep workspaces clear of unrelated materials.
- Keep the classroom quiet during intense learning times.
- Reduce visual distractions in the classroom (mobiles, etc.).
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Use a study carrel. (Provide extras so that the student is not singled out.)
- Provide an unobstructed view of the chalkboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Maintain adequate space between desks.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Provide a vocabulary list with definitions.
- Permit as much time as needed to finish tests.
- Allow tests to be taken in a room with few distractions (e.g., the library).
- Have test materials read to the student, and allow oral responses.
- Divide tests into small sections of similar questions or problems.
- Allow the student to complete an independent project as an alternative test.
- Give progress reports instead of grades.
- Grade spelling separately from content.
- Allow take-home or open-book tests.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).
- Stand near the student when giving directions or presenting a lesson.
- Mark the correct answers rather than the incorrect ones.
- Permit a student to rework missed problems for a better grade.
- Average grades out when assignments are reworked, or grade on corrected work.
- Use a pass-fail or an alternative grading system when the student is assessed on his or her own growth.

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

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**At Risk**

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- Use of mnemonics
- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Use of a study carrel
- Assistance in maintaining uncluttered space
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Peer or scribe note-taking
- Lab and math sheets with highlighted instructions
- Graph paper to assist in organizing or lining up math problems
- Use of manipulatives
- No penalty for spelling errors or sloppy handwriting
- Follow a routine/schedule
- Teach time management skills
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Visual daily schedule
- Immediate feedback
- Work-in-progress check
- Pace long-term projects
- Preview test procedures
- Film or video supplements in place of reading text
- Pass/no pass option

- Cue/model expected behavior
- Use de-escalating strategies
- Use peer supports and mentoring
- Have parent sign homework/behavior chart
- Chart progress and maintain data

## **Gifted and Talented**

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Focus on effort and practice

Offer the Most Difficult First

Offer choice

Speak to Student Interests

Allow G/T students to work together

Encourage risk taking