Unit 1: Life Structure and Function

Content Area: **Science**
Course(s): **Science 7**
Time Period: **September**
Length: **6 weeks**
Status: **Published**

Transfer

Structure, Function, and Information Processing "How do the structures of organisms contribute to life's functions?"

CH1- Characteristics of Living Things and classification **(7 blocks)**

Dichotomous Key

CH2- Cell Structure and Function **(6** blocks)

Cell project

Enduring Understandings

The ability to carry out life functions determines is something is living or non-living. Living things have requirements to carry out their life functions.

Classification is a method of organizing information into a meaningful structure or system. In science, things are

Classified based upon the similarities of their shared characteristics.

The cell is the basic unit of all living things.

A cell is made up of structures that provide support and movement, process energy, and transport material into, within, and out of a cell.

An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).

Essential Questions

What characteristics do all living things have?

What are the needs of living things?

Why is maintaining homeostasis important in an organism?

What does it mean to be alive?

How do living things differ from each other based on their needs?

What methods are used to classify living things?

Why does every species have a scientific name?

How did scientists' understanding of cells develop?

What is the cell Theory?

How are prokaryotic and eukaryotic cells the same and different?

What are structures and functions in a cell that enable them to carry out life processes?

How are plant and animal cells the same and different?

What structure enable cells obtain energy, transport materials and provide structure?

Why do cells look different? Ex- blood, nerve, paramicum, bacteria

Critical Knowledge and Skills

Vocabulary

Vocabulary

Organism, Cell, Unicellular, Multicellular, Homeostasis, stimulus, Dichotomous key

Binomial nomenclature, Genus, Species, Compound microscope

½ Cell theory, organelle, Cell membrane, Cell wall, Cytoplasm, Nucleus,

Mitochondria, Chloroplast, Photosynthesis, Cell respiration, Active transport

Passive transport

Cell differentiation, Stem cell, Tissue, Organ, Organ System

Learning Objectives

Distinguish between living and nonliving things.

Identify what living things need to survive.

Identify and explain characteristics organisms must have in order to sustain life.

Infer how early scientists classified living things.

Identify the 6 Kingdoms and indicate the shared characteristics of each.

Explain the system of binomial nomenclature.

Demonstrate how to use a dichotomous key.

Create a system to classify a variety of organisms according to their structure and function.

Invent a devise to collect specimens.

Construct a system to calculate how organisms are counted. **Evaluate** the function of the devise by comparing the amount of organisms collected with other students **Justify** the results with data.

Describe the development of the cell theory.

Differentiate between prokaryotic and eukaryotic cells.

Identify names and functions of organelles within a cell. (2015- expand to include vacuole, ribosome, lysosome, golgi complex) and**create a model** connecting the function to a real world location or object. (Ex connect orgelle function to a towns function)

Describe the importance of the nucleus in a cell.

Differentiate between a plant and animal cells.

Compare and contrast active and passive transport.

Construct a scientific investigation showing how energy is transferred in and out of a cell.

Differentiate between photosynthesis and cell respiration.

Create a model to show how food releases energy.

Compare cells, tissues, organs, and organ systems.

Resources

Resources

iScience Integrated Course 2 https://connected.mcgraw-hill.com/connected/login.do

Chapters 1, 2 and 3 Science Notebook and Reading Essentials

Page Keeley- Claaification Systems, Basic Unit of Life

NEWSELA- Life Science- Structure and function

Brainpop quizzes and concept maps- Characteristic of life, Cells, Organelles

Cell foldable - Prokaryotic/Eukaryotic cells, Structure and function of Organelles

Microscope and specialism slides

Dichotomous Key- Fish identification- http://fergusonfoundation.org/btw-students/fish-identification/

Plant identification- http://fergusonfoundation.org/btw-students/plant-identification/

Dichotomous key project-
https://docs.google.com/document/d/1X3pyO__xdnKxCeWs9S1JJkbv8T36CAqMQgg358hUbdE/edit

Quizlet- Classification, Organelles -Structure and function

Cell Theory- https://classroom.google.com/u/0/c/MTU5NzgxMjAwNDVa

www.pbslearningmedia.org

https://www.khanacademy.org/science/biology

Standards

6-8.MS-ETS1-1	Define the criteria and constraints of a design problem with sufficient precision to ensure

	a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
6-8.MS-ETS1-1.1	Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.
6-8.MS-ETS1-1.1.1	Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.
6-8.MS-LS1-2	Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function.
6-8.MS-LS1	From Molecules to Organisms: Structures and Processes
6-8.MS-LS1-1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
6-8.MS-LS1-2.2	Developing and Using Models
6-8.MS-LS1-2.2.1	Develop and use a model to describe phenomena.
6-8.MS-LS1-1.3	Planning and carrying out investigations in 6-8 builds on K- 5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.
6-8.MS-LS1-1.3.1	Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.
6-8.MS-LS1-2.6	Structure and function.
6-8.MS-LS1-2.6.1	Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function.
6-8.MS-LS1-1.LS1.A	Structure and Function
6-8.MS-LS1-2.LS1.A	Structure and Function
6-8.MS-LS1-2.LS1.A.1	Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.
6-8.MS-LS1-1.LS1.A.1	All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).

Interdisciplinary Connections

NJSLS Companion Standards Grades 6-8 (Reading & Writing in Science)
RST.6-8.1. Cite specific textual evidence to support analysis of science and technical texts.
RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
RST.6-8.4. 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 6-8 texts and topics.
RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

WHST.6-8.1 Write arguments focused on discipline content.

WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

Mathematics –

6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

6.SP.B.4 Summarize numerical data sets in relation to their context.

NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.
NJSLSA.W8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

21st Century Life and Careers
CRP2. Apply appropriate academic and technical skills.
CRP4. Communicate clearly and effectively and with reason.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity.

Technology
8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.
8.2.12.D.6 Synthesize data, analyze trends and draw conclusions regarding the effect of a technology on the individual, society, or the environment and publish conclusions.
8.2.8.E.1 Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.