Marietta City Schools
2023-2024 District Unit Planner

5th Grade

Topic Title:	*Unit #6 Cells and Microorganisms*	**Unit Duration**	*3 weeks*

Mastering content and skills through KNOWLEDGE-BUILDING (establishing the purpose of the unit):

What enduring understandings will students gain from this unit? All living things are made up of cells which can only be seen through a microscope.

GSE Standards

ELA

ELAGSE5RI2: Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

ELAGSE5RI3: Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

ELAGSE5RI6: Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.

ELAGSE5RI7: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

ELAGSE5W2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Science

S5L3. Obtain, evaluate, and communicate information to compare and contrast the parts of plant and animal cells.

a. Gather evidence by utilizing technology tools to support a claim that plants and animals are comprised of cells too small to be seen without magnification.

b. Develop a model to identify and label parts of a plant cell (membrane, wall, cytoplasm, nucleus, chloroplasts) and of an animal cell (membrane, cytoplasm, and nucleus).

c. Construct an explanation that differentiates between the structure of plant and animal cells.

S5L4. Obtain, evaluate, and communicate information about how microorganisms benefit or harm larger organisms. (Clarification statement: Possible microorganisms could include Tardigrades, Lactobacillus, Probiotics, Rotifers, Salmonella, Clostridium botulinum (Botox), E-coli, Algae, etc. Students are not expected to know these specific microorganisms. The list is provided to give teachers examples.)

a. Construct an argument using scientific evidence to support a claim that some microorganisms are beneficial.

b. Construct an argument using scientific evidence to support a claim that some microorganisms are harmful.

Essential Questions

Factual—

Are all living things made of cells? How do you know?

What is the difference between microorganisms and macroorganisms?

What are the distinguishable differences between animal cells and plant cells?

Inferential—

Which technological tools are used to gather evidence that plants and animals are composed of cells?

How are plants and animals structurally similar?

Are all microorganisms harmful to larger organisms? Why or why not?

Critical Thinking-

Which criteria are most essential to differentiating between harmful and beneficial bacteria? Why?

Tier II Words- High Frequency Multiple Meaning	**Tier III Words-** Subject/ Content Related Words
harmful, cell, structure, beneficial, part, system, function, technological advancement,	membrane, cell wall, cytoplasm, nucleus, chloroplasts, microscope

Assessments- 3rd-5th Social Studies and Science assessments are available through AMP. Please see your instructional coach for support if needed.

Transfer of Integrated Skills:

- Meet the Microbes with Selected and Constructed Responses
- ReadWorks- Uninvited Guests PDF

Content-Specific GSE/Skills:

- *Constructed Response: Comparing Cells*
- *Microbes Claim-Evidence-Reasoning CER*
- *Formative Assessment 1 - Comparing Cells*
- *Formative Assessment 2 - Basic Needs of Plants*
- *AMP Cells and Microorganisms Summative Assessment*

Writing Task and Rubric:

- *Students will create analogies regarding the relationship of an organism and its functioning parts.*

  Obtaining: Think about the way a body system works. We need a brain to direct energy and motion, a transport system to pump blood and spread nutrients around the body, a system for energy, we need water. Now think about a cell and all of the specialized structures that support life.

  Communicating: Produce a model (analogy) of a nonliving system (bicycle, restaurant, city government, store, etc.) to demonstrate how the structure of and function of a cell work together.

  The cell is like a _____. The nucleus is like the _____ since it is the control. The cytoplasm is like the _____, because _____. The cell membrane is like the _____, because it _____. In a plant cell the cell wall is like the _____, because it _____. In a plant cell the chloroplasts are like the _____, because they _____.

	Objective or Content	Learning Experiences	Differentiation Considerations
	Daily Lessons for Text Comprehension	*15-Day Plan: Cells and Microorganisms*	
	Connected SS/Sci Experiences *(omit this row if KBU does not contain SS or Sci connections)*	***Exploration I*** Plant or Animal Materials: For each small group: Microscope 2- Eye droppers Forceps 2- Microscope slides 2- Cover slips Prepared animal cell slide (i.e. human cheek cells) Pond water Elodea Paper and pencil for recording data and observations Gloves Note: Students should wear gloves whenever handling live specimens. Mention that gloves prevent the transmission of microorganisms, some of which can be harmful to people. Remind students not to touch their faces when wearing gloves. In this activity, students will observe the difference between plant and animal cells. Tell students today they are going to see what criteria scientists use to determine if something is a plant or an animal. Divide the class into groups of three. Each group should have a microscope, two microscope slides, a prepared cheek cell slide or small container of pond water, and a branch of Elodea. Have each group create a slide of the Elodea. A drop of freshwater should be placed on the slide with an eye dropper. A “leaf” of the Elodea should be used by removing it from the branch with forceps. The “leaf” should be placed on the water droplet and a cover slip applied over top. Each group should also observe the prepared animal cell slide or create a slide of pond water. This can be done by using the	

		other eye dropper to place a drop or two of the pond water on a microscope slide and then placing a cover slip over top of the water. Students examine each slide and draw a detailed picture of what they see. When they are done, students can clean the slides so they can be reused. Have students apply one drop of liquid soap to the slide. Then have students use their fingers to rub both sides of the slide. They should continue to rub the slide as they rinse it under running water. Students should use paper towels to pat the slide dry. To prevent scratching the surface, caution the students not to rub the paper towel on the slide. The same method can be used to clean the cover slips. ***Communicating and Evaluating*** Using the observational drawings the students made, lead the class in a discussion about the difference between plant cells and animal cells. (In this case, plant cells have a cell wall and chloroplasts.) Expand this discussion to include the difference in how plants and animals get their food and respond to the environment. This activity can be used as a formative assessment of the students' ability to collect information using a microscope. Tell the students that you will be observing them as they make detailed drawings of what they see.	
		Exploration II In this activity, students will investigate and make observations about different animal life cycles and stages of development. Materials Per group: • animals in different stages of development or containers to collect animals in the field • hand lens • metric ruler • microscope (optional) • collecting net • gloves Provide students with specimens of a single animal or insect species at different stages in its development. Kits containing organisms at different developmental stages can be purchased online. If	

		possible, use multiple kits so that students can work in small groups. Consider taking students outside to collect animals such as insects, small fish, tadpoles, or frogs. If you decide to do this, make sure to have permission to take students off campus and advise students on how to carefully collect animals. Provide students with the necessary tools to observe the organisms, such as hand lenses, microscopes and metric rulers. Demonstrate to students how to hold and move hand lenses to get an accurate viewing. Explain how microscopes work and how to handle them. Remind students how rulers are used to measure accurately and how to use them to find smaller measurements by looking at the millimeters. Also, remind students to wear gloves when handling animals. Divide students into small groups. Consider setting up the room in stations. You may choose to organize the stations by stages of growth so a few different animals are at each station. Or, organize the stations by animal, so that all the stages of development are shown for one animal at each station. Groups can then rotate through the stations and observe stages of different animal life cycles. Before students begin their observations, have them make an observations data table. For example, have students list the animal in the rows of the first column, the stages of the life cycle in rows of the second column, and then record observations such as length, color, movement, body parts in rows of the next columns in the table. Students should make observations about the different animals and different life stages. Encourage students to use the tools to observe, collect measurements, and describe as many things as they can about the organism at each stage (e.g., color, size, movement, body parts).]Remind students that observations that may seem obvious to a regular person may be very important to a scientist. Students should practice thinking like scientists, noting that it is important to record as many details as possible. To help guide observations and data collection, students may use the following questions for guidance: • What do you notice about the animal's body? • How is it shaped? • What color is it? • How big is it? • Does it have arms or legs, fins or wings, etc.? • Does it have skin or fur or scales or feathers?	

		• How does the animal move? • Does it crawl on legs or wriggle or fly? • Does it move a lot or a little? • Does it move quickly or slowly? After students have made observations and collected data, they should analyze their results and discuss how the characteristics of the organism at different stages are related. Students should include the name of the organism for each stage (especially if it changes, as insects sometimes do), and as many details about the features of the organism during that stage. After students have made observations and collected data, they should discuss how the characteristics of the organism at different stages are related. Are features at one life stage visible in another life stage? Is it possible to predict how the organism will change? Students may use the following questions for guidance: • How does the organism change at different stages in its life? • Does it go through metamorphosis and change shape? • Does it maintain its basic shape but grow larger? • Does it change color? • Does it grow legs or wings or fur? • Does the way it moves change at different stages in its life? ***Communicating and Evaluating*** 1. How does the size of each animal change during their life cycle? 2. How do the body parts of animals change during their life cycle? Give an example from your observations. [The caterpillar has many legs but after it changes into a butterfly it has six legs. The young tadpoles do not have legs, but as they get older they slowly start to grow legs. When they have grown into frogs they have 4 legs.] 3. Describe one animal's life cycle from your observations. [The butterfly life cycle starts with an egg, then the egg hatches into a caterpillar. The egg was very tiny, only about 2 mm long. The caterpillar had many legs, was yellow and black, and about 5 cm long. Then, the caterpillar makes a chrysalis and comes out as a butterfly. The chrysalis looked like a folded leaf hanging from a branch and was 2	

		cm long. And the butterfly had 6 legs, 4 wings, 2 antennae, was yellow and orange and black. It was about 8 cm long.] 4. Compare two of the animals you observed. Describe how their life cycles are different. [The life cycle of a butterfly and a tadpole are different because the butterfly has part of its life cycle in a chrysalis and a tadpole does not. The butterfly changes from an animal that cannot fly to an animal that can fly, and a tadpole changes from an animal that lives underwater to an animal that lives mainly on land. The butterfly has less legs as an adult than as a caterpillar and a frog has more legs as an adult because it doesn't have any legs as young tadpole.] 5. How do the animals grow the same? [Both the butterfly and the tadpole get bigger as they grow.]	

	Additional Planning Resources				
	MCS K-5 KBU Overview	KBU as a 15-day Plan (Template)	MCS Structured Literacy Repository	Berger Framework for Comprehension (Template)	The Writing Revolution (Templates)
	Additional Instructional Resources				
	Suggested High Quality Complex Texts **Suggested Experiential Resources**				