

# 6-8 SCIENCE

## PERFORMANCE TASK

### TEACHER INSTRUCTIONS



## TASK OVERVIEW

TITLE	GRADE LEVEL	SUBJECT AREA	INSTRUCTIONAL UNIT	TIME FRAME: HOW LONG TO ADMINISTER THE TASK?
Cells, Cells Everywhere	6-8	Life Science	Cells	(50 minute) class periods for each task/3 weeks in between each task.

## CONTENT AREA

### PROFICIENCIES AND PERFORMANCE INDICATORS

GRADUATION PROFICIENCY	GRADUATION PROFICIENCY DESCRIPTION	PERFORMANCE INDICATOR	PERFORMANCE INDICATOR DESCRIPTION
#3 Life Sciences - Structure, Function, and Information Processing	Students will demonstrate an understanding of how organisms live, grow, respond to their environment, and reproduce using molecular, structural, and chemical biology (LS1) through the integration of scientific and engineering practices and crosscutting concepts.	A	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (MS-LS1-1)
#3 Life Sciences - Structure, Function, and Information Processing	Students will demonstrate an understanding of how organisms live, grow, respond to their environment, and reproduce using molecular, structural, and chemical biology (LS1) through the integration of scientific and engineering practices and crosscutting concepts.	D	Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (MS-LS1-2)

## CROSS-CURRICULAR

### PROFICIENCIES AND PERFORMANCE INDICATORS

GRADUATION PROFICIENCY	GRADUATION PROFICIENCY DESCRIPTION	PERFORMANCE INDICATOR	PERFORMANCE INDICATOR DESCRIPTION
Communication	Students will demonstrate communication	2	Communicate understanding



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	through using a variety of modes to convey meaning to and seek understanding from others.		and interpretation of information.
Problem Solving and Critical Thinking	Students will demonstrate problem solving and critical thinking by applying processes to define problems, evaluating possible outcomes, and persevering in solving complex problems.	2	Identify, collect and analyze relevant information.
Research	Students will ask questions and gather and synthesize information in order to further their knowledge and support ideas.	5	Use evidence and reasoning to justify claims or conclusions.

#### NEXT GENERATION SCIENCE STANDARDS

##### Disciplinary Core Ideas

- 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). (MS-LS1-1)
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2)

##### Cross-Cutting Concepts

- Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1)
- Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS1-1)
- 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. (MS-LS1-2)

##### Science and Engineering Practices

- Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (MS-LS1-1)
- Develop and use a model to describe phenomena. (MS-LS1-2)

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### SCORING CRITERIA

PERFORMANCE INDICATOR	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
<p>#3 Life Sciences - Structure, Function, and Information Processing: A</p> <p>Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (MS-LS1-1)</p>	<p><b>Use</b> a tool (e.g. Microscopes, diagrams, visuals) to <b>observe</b> living things.</p>	<p><b>Make and record</b> observations using various tools (e.g. Microscopes, diagrams, visuals) to identify a cell.</p>	<p><b>Conduct</b> an investigation <b>using</b> various tools (e.g. Microscopes, diagrams, visuals) to collect evidence that living things are made of cell(s).</p>	<p><b>Analyze and draw conclusions</b> based on evidence from observation to determine whether a given sample represents a single celled or multicellular organism.</p>
<p>#3 Life Sciences - Structure, Function, and Information Processing: D</p> <p>Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (MS-LS1-2)</p>	<p><b>Identify</b> types and structures (organelles) of a cell given a model.</p>	<p><b>Create</b> a model to <b>identify</b> cell structures and functions.</p>	<p><b>Develop</b> and use a model to <b>identify</b> parts of a cell, <b>describe</b> the function of a cell as a whole, and <b>explain</b> how parts of a cell contribute to the function.</p>	<p><b>Create</b> an analogy that relates cellular structures and functions to another type of system (e.g. school, stadium, mall, family, etc.).</p>
<p>Communication: 2</p> <p>Communicate understanding and interpretation of information.</p>	<p><b>Identify</b> or list some information from a source.</p>	<p><b>Select</b> relevant information for the purpose.</p> <p><b>Summarize</b> information gathered.</p>	<p><b>Select</b> and <b>analyze</b> relevant information.</p> <p><b>Integrate</b> relevant information into an argument, presentation, written text, or other work of</p>	<p><b>Evaluate</b> the information gathered to <b>determine</b> which source is the best source.</p> <p><b>Analyze</b> and <b>integrate</b> well-chosen and abundant information into a work of communication to</p>

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			communication to support a point or interpretation.	support an original point or interpretation.
<b>Problem Solving and Critical Thinking: 2</b>  Identify, collect and analyze relevant information.	<b>Find information</b> in sources provided and <b>describe</b> the information/data gathered.	<b>List</b> resources relevant to the plan or process of approach, <b>identify</b> simple patterns and trends in information/data, and <b>determine</b> whether information is sufficient or if more is needed.	<b>Identify</b> relevant information/data from resources and <b>analyze</b> patterns and trends to identify relationships.	<b>Identify</b> information/data crucial to the problem and <b>identify</b> and <b>prioritize</b> patterns and trends in information/data most relevant to the problem.
<b>Research: 5</b>  Use evidence and reasoning to justify claims or conclusions.	<b>Identify</b> evidence to support a claim.	<b>Use</b> reasoning to <b>explain</b> how evidence supports claim or conclusion.	<b>Support</b> claims or conclusions with evidence and reasoning.	<b>Integrate</b> evidence and reasoning to support claims or conclusions.

## CONNECTIONS TO INSTRUCTIONAL UNIT

### UNIT SUMMARY

May include big ideas, authentic context, enduring understandings, essential questions.

This unit of study begins with assessing students ability to use the characteristics of living things to differentiate between living and nonliving things. Specifically focusing on cell as the building block of all life. Students will conduct investigations examining unicellular organisms in a drop of pond water and variety of human tissue slides using a microscope.

The focus of the investigation is on developing observational skills through identifying similarities and differences among the cells. Emphasis is on students beginning to understand the cell theory by developing evidence that living things are made of cells, distinguishing between living and nonliving things, and understanding that living things may be made of one cell or many and varied cells. They will conduct a short research project to further explore a type of cell from the tissues they observed to determine the connection between the structure of the cell and the function they perform in the human body.

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<p><b>What will students know as a result of instruction in this unit in order to complete the task?</b></p>	<p><b>What will students be able to do as a result of instruction in this unit in order to complete the task?</b></p>
<ul style="list-style-type: none"> <li>● Characteristics of living things</li> <li>● All living things are made up of cells</li> <li>● Organism can be made of one or more than one cells.</li> <li>● Cell organelles and function of             <ul style="list-style-type: none"> <li>○ nucleus</li> <li>○ cytoplasm</li> <li>○ mitochondria</li> <li>○ chloroplast</li> </ul> </li> <li>● Cell structures             <ul style="list-style-type: none"> <li>○ cell membrane - forms boundaries that controls what enters and exits the cell.</li> <li>○ cell wall</li> </ul> </li> <li>● Invention of microscope has led to discovery of cells.</li> </ul>	<ul style="list-style-type: none"> <li>● Conduct an investigation             <ul style="list-style-type: none"> <li>○ Make observations</li> <li>○ Ask questions that arise from careful observation</li> <li>○ Collect data (labeled drawings/diagrams based on observation(s).</li> <li>○ Develop a claim</li> </ul> </li> <li>● Develop a cell model to describe structures (organelles)             <ul style="list-style-type: none"> <li>○ Use microscope to see things at different scale</li> </ul> </li> </ul>
<p><b>How will teachers know what students know and can do prior to the task? Which relevant concepts and skills have students struggled with, had misconceptions about or missed entirely?</b></p>	<p><b>What background knowledge do students need (cultural, language, etc)? Have both content goals and language demands for ELL students been considered? Have the needs of diverse learners been considered?</b></p>
<p>Open Response: Group and class discussion “What makes something living?”</p> <p>Student Struggles</p> <ul style="list-style-type: none"> <li>● Students need a working understanding of the microscope (parts, use and care).</li> <li>● Apply human qualities/characteristics to ALL organisms</li> <li>● Confused about scale of cells</li> <li>● Confuse materials that are not specimen with the specimen they should be looking at. This can be avoided by actually showing pictures of what to look for.</li> <li>● Confuse different parts of cells</li> <li>● Miss connection that cells work together to</li> </ul>	<ul style="list-style-type: none"> <li>● Characteristics of living things</li> <li>● To develop familiarity of unit vocabulary provide access to kahoot or quizlet. (Play quizlet live.)</li> <li>● Multiple opportunities (reading, video, group discussion, think, pair, share etc.)</li> <li>● Small group or individual work</li> <li>● Modified assessments (word banks, clear language)</li> </ul>

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keep an organism alive.

## CULMINATING TASK

### TASK SUMMARY

Cells: Building Blocks of Life assesses students' skill in using models and analyzing evidence to construct an explanation that describes the role of a cell in a unicellular organism in comparison to a multicellular organism.

In this task, students will conduct an investigation using microscopes to observe and differentiate between cells that make up a unicellular organism from cells that make up a multicellular organism. Then using information gathered through research, develop a model of a cell and demonstrate how the parts of the cell contribute to cell function.

- Task 1: Given samples slides of unicellular, multicellular or nonliving materials students will identify using evidence to conclude whether the sample is living or nonliving and if it is living then is it single or multicellular.
- Task 2: Develop a model using an observed cell in previous task to demonstrate how the parts of the cell contribute to the function.

**Anchoring Phenomenon:** We are all made up of cells. But are all cells the same? Explore the video attached to each image to investigate the similarities and differences between the cells that make up plants, animals and single cell organisms?

Unicellular organism(2:40)



Plants (2:50)



Animals (3:22)



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#### STUDENT ACTIVITY

1. [Anchoring Phenomenon](#) - To engage students in the unit and formatively assess their knowledge of living vs. nonliving.
2. [Card Sort](#)- In groups students use pictures to differentiate between **biotic (living or comes from living) and abiotic (nonliving and never was living)**. Make a list of characteristics that living things have in common. Share with class. During class discussion identify the characteristics of all living things.
3. CER- Use characteristic of living things to model how to write a CER.  
[Student Notes Sheet](#)
4. [Use and care of microscope Student Sheet](#) (Working in pairs)
5. To get comfortable using microscopes and develop diagramming and writing observational skills, for a minimum of two days students will look at random slides such as fruit fly, feathers, hair, etc. On the first day they will diagram and label what they see. On the second day students will diagram, label and write their observations.

#### Developing the concept of Unicellular vs. Multicellular

1. [Anchoring Phenomenon](#) - purpose is to generate interest and build background information.
2. [What are Cells?](#) reading activity  
[What are the Main Cell Parts?](#) reading activity
3. [Cells Equal Living](#): (Adapted for Stemscope Lesson) Students look at multiple examples of nonliving, unicellular and multicellular samples. Differentiate between living and nonliving, unicellular and multicellular, provide evidence to support living through use of content from their reading.
4. [Cell Function](#) (Adapted from Stemscope Lesson) In functions of cell activity students identify and compare the function of plant and animal cells to understand that cells in multicellular organisms perform specific functions while comparing it to a unicellular organism.

#### Modeling a Cell

1. [Comparing Plant and Animal Cell](#). Students will use a Gizmo (computer simulation) to explore parts and functions of a typical plant and animal cell. They will use this to determine the difference between plant and animal cells. Reading for homework:  
[Prokaryotic and Eukaryotic Cells.](#)  
[How Do Plant and Animal Cells Differ?](#)  
[Why do Cells Have Different Shapes?](#)

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2. [MacGyver Challenge](#) - Students will create a model of a cell to demonstrate their understanding of cell structure and function.
3. Students present their models to their small groups. Peers provide feedback on the models. Students reflect on the feedback provided by their peers.
4. Students reflect on their performance for both parts of the task by responding to two questions.

#### CONSIDERATIONS FOR DIFFERENTIATION AND ACCESSIBILITY

- Have students write on a small whiteboard and share answers with each other before going to whole group.
- [Card Sort](#) Formative
- [Provide chart\(s\) \(living/nonliving\)](#)
- Assign roles to students to make sure all students are involved.
- Provide formatted claim, evidence, reasoning worksheet to scaffold work.
- Give worksheet with all parts of microscope labeled to executive functioning students.
- Students reading below grade level or ELL students may do better in a small group with the teacher.

#### Developing the concept of Unicellular vs. Multicellular

- For Anchoring Phenomenon add comment/choice at end: i.e. use T chart, Venn diagram, bulleted list.
- Small group or individual work with teacher
- Decrease number of organisms to identify
- Groups should be structured with varying ability level with attention given to balance between personalities of quiet vs outspoken, leader vs. followers etc.
- To make sure all students are participating each student should record group responses on their own sheet.

#### Modeling a Cell

- Presentation and/or feedback templates could be made available for those students with organizational challenges.

#### ADMINISTRATION NOTES AND DIRECTIONS

1. Have students record their thoughts in the [student response sheet](#).  
Lead a class discussion by posing specific questions to students to formatively assess understanding in whole class format.

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Examples:

Why do you think it is living?

What is your evidence?

Why do you think it is nonliving?

What is your evidence?

2. Walk around and observe group work. Listen for gaps and misconceptions. During share-out address misconceptions through getting students to defend their ideas with evidence. Help connect science vocabulary (biotic, and abiotic with living and nonliving). Follow through with [reading \(What are Living Things?\)](#) and [videos](#) on characteristics of living things depending upon the needs of the students.
3. [CER Model Google Slide](#) to be used in conjunction with the student sheet to model CER expectations.
4. Google form data and fill in the diagram to be used for formative assessment.  
Alternative form of assessment:  
Powerpoint -The slides use turning point technology to gather data on student. Can be used as [Formative Assessment or Pre-assessment](#).
5. Teacher will remind students how to handle a microscope and how to set up a paper for diagramming. Teacher will walk around assisting students as needed. Formatively assess student diagrams. Collect good sample to share with class. Display these on bulletin board. Use student communication from day two to differentiate between observation and inference/opinion. To emphasize the point, video on "[Inference and Observation](#)" can be used.

#### Developing the concept of Unicellular vs. Multicellular

1. Pose the Anchoring phenomenon. Give students 15 minutes to complete the sheet and 10 minutes for group discussion. Then rotate students to put their group response on chart paper. Keep chart response as reference to look back on throughout the lesson.
2. Reading Activity - Google Form Formative Assessment. Use to check for understanding.(PI-C2)
3. [First Assessment Task](#)
4. Teacher will introduce the task by brainstorming with the students evidence that supports the presence of cells (e.g. compartments that create patterns; individual cell with cell membrane creating clear boundary with a nucleus in the middle).
5. Teachers will introduce the activity by reading together the direction on the [activity sheet](#). (Review Cooperative Group etiquette established for your class.) Then pass out the [cards](#) for each group and have them follow the procedure outlined in the activity sheet to complete the activity. Remind groups that some function cards may be used for more than one function.

#### Modeling a Cell

1. This activity should take 2-3 days. Teacher should monitor student responses and assist students that may be struggling. Make sure students check for accuracy after completing each section before moving on to the next. Teacher should use warm-ups, closings and readings for homework to emphasize the parts students will need to have in depth knowledge of such as: mitochondria, chloroplast, vacuole, cell membrane, cell

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wall, and nucleus. Additional Resources to be used as needed:

[Cells and Organelles](#)

[Modeling a Cell System](#)

2. [Task 2](#) - Teacher should introduce the task prior to students starting their investigation into parts and function of plant animal cell. This will give students the opportunity to start thinking of objects that may be used to represent parts of the cell. They should be told to start accumulating the material if they are going to make a three dimensional model.
3. Provide time for students to present their models to their small groups. Discuss how to provide actionable feedback.
4. Provide time for students to complete the two questions for the task reflection.

## MATERIALS AND RESOURCES<sup>1</sup>

<https://www.cellsalive.com/>

[Living or Nonliving Card Sort - CPalms](#)

[www.readworks.org](http://www.readworks.org)

Readworks articles:

“Life Finds a Way”

“The Cells that Make Us”

[www.newsela.com](http://www.newsela.com)

“All the cells in the human body”

“The facts about cells”

Whole class video: Living vs Nonliving- [Is it Alive?](#)

[Robin Williams on What is Alive](#) (More tongue in cheek/comedy)

Brainpop videos

Quizlet

Fossweb

Learning Gizmos

<sup>1</sup>The design team supplied these additional resources: [Variety of Cells](#) and [Unicellular vs. Multicellular Organisms](#).