

6-8 SCIENCE

PERFORMANCE TASK

STUDENT INSTRUCTIONS



TASK TITLE

Cells, Cells Everywhere

INTRODUCTION¹

One characteristic of living things is that they are made up of one or more cells. Living things, whether unicellular or multicellular, display life functions. Some of the important life functions are:

- Obtaining food and water
- Disposing of waste
- Ability to grow and reproduce

In this task, you will use a microscope to observe a variety of slides. Then, you will match the slide with the image provided and determine if the sample comes from something living or nonliving. If the sample comes from a living organism provide evidence as to how you know it is a cell. If the sample comes from something non-living provide evidence supporting your conclusion. **You may use information from “What is a cell?” or “What are the main parts of the cell?” to help you gather supporting evidence.**

¹ After administering the task to students, the design team modified the second paragraph of the Introduction as follows:

In this task, you will use a microscope to observe a variety of slides. Then, you will match the slide with the image provided and determine if the samples come from something living or nonliving. If the samples comes from a living organism provide evidence as to how you know it is a cell. If the sample comes from something nonliving provide evidence supporting your conclusion. **You should use information from the videos (living and nonliving as well as multicellular and unicellular), and/or the readings “What is a cell?” and “What are the main parts of a cell?” to help you gather and cite supporting evidence.**

SCORING CRITERIA

| PERFORMANCE INDICATOR | BEGINNING | DEVELOPING | PROFICIENT | EXPANDING |
|---|--|--|---|--|
| #3 Life Sciences - Structure, Function, and Information Processing: A | Use a tool (e.g. Microscopes, diagrams, visuals) to | Make and record observations using various tools (e.g. Microscopes, | Conduct an investigation using various tools (e.g. Microscopes, diagrams, visuals) to | Analyze and draw conclusions based on evidence from observation to determine whether a given sample |



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| | | | | |
|--|---|--|---|---|
| <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>observe living things.</p> | <p>diagrams, visuals) to identify a cell.</p> | <p>collect evidence that living things are made of cell(s).</p> | <p>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>Identify types and structures (organelles) of a cell given a model.</p> | <p>Create a model to identify cell structures and functions.</p> | <p>Develop and use a model to identify parts of a cell, describe the function of a cell as a whole, and explain how parts of a cell contribute to the function.</p> | <p>Create 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>Identify or list some information from a source.</p> | <p>Select relevant information for the purpose.</p> <p>Summarize information gathered.</p> | <p>Select and analyze relevant information.</p> <p>Integrate relevant information into an argument, presentation, written text, or other work of communication to support a point or interpretation.</p> | <p>Evaluate the information gathered to determine which source is the best source.</p> <p>Analyze and integrate well-chosen and abundant information into a work of communication to support an original point or interpretation.</p> |

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

STUDENT DIRECTIONS AND MATERIALS

TASK DIRECTIONS

PART 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.

Directions ²

1. Work in pairs to make observations.
2. Observe each slide sample.
3. Make sure to look at each sample at low, medium, and high power.
4. After observing the sample at the different magnifications match the sample with an image on the data table (below).
5. State the power of magnification that the image of the sample was taken at
6. Independently decide if the sample is living
7. Independently provide quantitative and qualitative evidence as to how you know it is living and if it is non-living include evidence as to how you know it is non-living.

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$$\sqrt{\beta} \sqrt{e^-} \sqrt{100^\circ\text{C}} \sqrt{\Delta} \sqrt{p^+}$$

2 Modifications were also made to the student directions for Part 1. Steps 6 and 7 were adjusted and a step 8 was added.

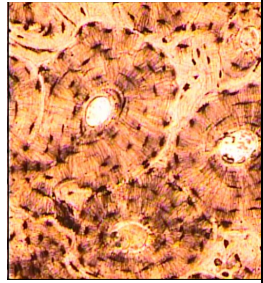
6. Independently decide if the sample is living or nonliving and provide quantitative and qualitative evidence as to how you know.
7. Independently decide if the sample is multicellular or unicellular and provide quantitative and qualitative evidence as to how you know.
8. For your evidence, cite your source from the reading and videos provided below for your research.

Materials You Will Need: **3**

1. Video on Living and Nonliving - [Is it Alive?](#)
2. [What are Cells?](#) Reading
3. [What are the Main Cell Parts?](#) Reading
4. Microscope
5. Prepared slides.

3 The design team included an additional resource, [Unicellular vs. Multicellular Organisms](#).

Collect Data and Provide Evidence: **4**

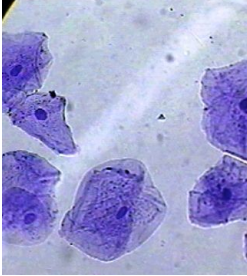
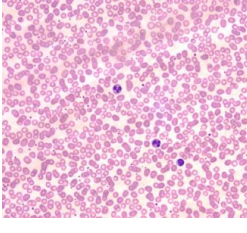
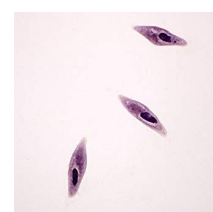
| | | |
|---|---|--|
| Image of samples | Match the image to slide. | Use your background knowledge to provide evidence if the sample is living. |
|  | Specimen: Magnification of Image: Living or Nonliving Unicellular or Multicellular | Evidence to support your claim: |

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$$\sqrt{\beta} \sqrt{e^-} \sqrt{100^\circ\text{C}} \sqrt{\Delta} \sqrt{p^+}$$

| | | |
|---|--|---|
|  | <p>Specimen:</p> <p>Magnification of Image:</p> <p>Living or Nonliving</p> <p>Unicellular or Multicellular</p> | <p>Evidence to support your claim:</p> |
|  | <p>Specimen:</p> <p>Magnification of Image:</p> <p>Living or Nonliving</p> <p>Unicellular or Multicellular</p> | <p>Evidence to support your claim:</p> |
|  | <p>Specimen:</p> <p>Magnification of Image:</p> <p>Living or Nonliving</p> <p>Unicellular or Multicellular</p> | <p>Evidence to support your claim:</p> |

4 The labels for the third column of the table were modified to support the student in citing evidence for both living/nonliving and multicellular/unicellular organisms

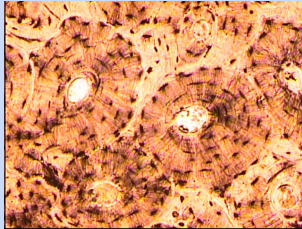
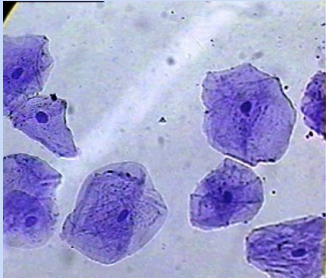
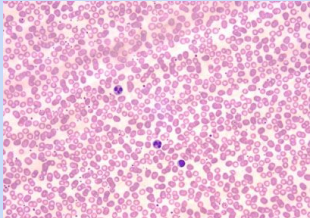

| | | |
|------------------|---------------------------|--|
| Image of samples | Match the image to slide. | Use your background knowledge to provide evidence if the sample is living. |
|------------------|---------------------------|--|

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$$\sqrt{\beta} \sqrt{e^-} \sqrt{100^\circ\text{C}} \sqrt{\Delta} \sqrt{p^+}$$

| | | |
|---|--|---|
|  | <p>Specimen:</p> <p>Magnification of Image:</p> <p>Living or Nonliving:</p> <p>Unicellular or Multicellular:</p> | <p>Evidence for living/nonliving:</p> <p>Cited source:</p> <p>Evidence multicellular</p> <p>Cited source:</p> |
|  | <p>Specimen:</p> <p>Magnification of Image:</p> <p>Living or Nonliving:</p> <p>Unicellular or Multicellular:</p> | <p>Evidence for living/nonliving:</p> <p>Cited source:</p> <p>Evidence multicellular</p> <p>Cited source:</p> |
|  | <p>Specimen:</p> <p>Magnification of Image:</p> <p>Living or Nonliving:</p> <p>Unicellular or Multicellular:</p> | <p>Evidence for living/nonliving:</p> <p>Cited source:</p> <p>Evidence multicellular</p> <p>Cited source:</p> |
|  | <p>Specimen:</p> <p>Magnification of Image:</p> <p>Living or Nonliving:</p> <p>Unicellular or Multicellular:</p> | <p>Evidence for living/nonliving:</p> <p>Cited source:</p> <p>Evidence multicellular</p> <p>Cited source:</p> |

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Part 2:

MacGyver Challenge

Introduction

Cells are made up of specific organelles that work together to keep the cell alive. You have had the opportunity to explore typical plant and animal cell parts to understand the function of each part.⁵ As you learned from looking at cell slides, cells come in different shapes. The structure and parts of the cell help the cell do its specific job.

A unicellular organism may have all parts since the one cell must complete all life process to keep itself alive, but in a multicellular organism the cells are specialized.⁶ For example, a muscle cell is long and will have a lot more mitochondria because it needs lots of energy to consistently contract and relax to create movement. A chloroplast will be found in a leaf cell but not in a root cell since its job is to photosynthesize and make chemical energy for the plant's use.

Each person will choose a cell that he/she has observed or one from the "Variety of Cell" sheet to investigate. Using information gathered through research, you will develop a model of the cell and demonstrate how the structure and parts of the cell contribute to cell function. Your model can be two- or three-dimensional.

Like Macgyver uses everyday items to solve his problem and complete his mission, your mission is to develop a model of your chosen cell using items that can be found around the house and explain it by comparing it to another system such as a **school, a sports stadium, mall, or car**.

Directions

1. Choose what type of cell you will build. You may choose a cell you observed during your investigation or from the "Variety of Cells" sheet.
2. Using household items make a three-dimensional model of the cell. (*Sample items to use for the three-dimensional cell can include: buttons, balloons, pipe cleaners, thread, mints, dried fruit, matches, shoe box, felt, clay, beads, pipe cleaners, etc.*)
3. Label each part of your model.
4. Choose an existing system such as a **school, a sports stadium, mall, car etc. to use as an analogy for the cell and** explain the function of each part of your cell model with a part of that system. (See example below.)
5. Present your model in the small group.
6. Reflect on the feedback provided from the group.⁷

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5 This sentence was modified as follows:
 You have had the opportunity to explore typical plant and animal cell parts to understand each part's function.

6 This sentence was modified as follows:
 A unicellular organism has all the parts to function, since the one cell must complete all life process to keep itself alive. However, in a multicellular organism the cells are specialized.

7 The design team modified and added steps beginning with step 4. These changes are as follows:

4. Complete the grid provided by choosing an existing system such as a school, a sports stadium, mall, car, etc. (See below.)
5. Use the system you chose to create an analogy for the cell.
6. Describe the function of the cell as a whole then explain the function of each part of your cell model with a part of that system. (See example below.)
7. For each organelle explain its function in that cell.
8. Present your model in the small group.
9. Reflect on the feedback provided by the group.

Materials:

1. [Variety of Cells](#)

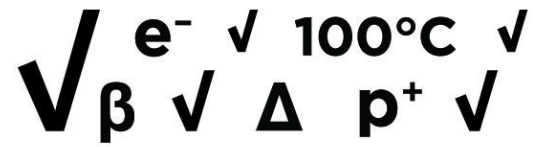
For example:

| Organelle/Part | Function | Comparing to a School |
|-----------------------|--|---|
| Endoplasmic Reticulum | Pathways in the cytoplasm through which materials in the cell move | This is similar to the hallways of the school because we use the hallways to get from one place to another the same way that materials are transported from one place to another in the cell. |

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This is the grid cited in step 4 of the modified directions.

Type of cell used for model:

System comparing the model to:

Description of the job of the cell in the organism:

Insert a Picture of Your Model Below

| Organelle/Part | Function | Comparing to a _____ |
|----------------|----------|----------------------|
| | | |
| | | |
| | | |
| | | |

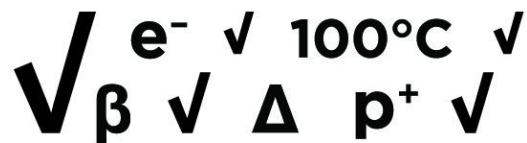
MATERIALS

NOTE

CHECKLIST

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STUDENT EVIDENCE

STUDENT REFLECTION AND/OR GOAL SETTING

Use feedback provided from the group as well as the feedback you gave your teammates to reflect on your work. Think about what you did well and what you would want to change for the next time.

1. State one thing that you did well and why.

2. State one thing that you would change and why.