

9-12 SCIENCE

PERFORMANCE TASK

TEACHER INSTRUCTIONS



TASK OVERVIEW

TITLE	GRADE LEVEL	SUBJECT AREA	INSTRUCTIONAL UNIT	TIME FRAME: HOW LONG TO ADMINISTER THE TASK?
Tissue Dysfunction aka "Tissue Issues"	11-12	Anatomy and Physiology	Tissues	1 week in class/ 1 week outside class

CONTENT AREA¹

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.	B	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
#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.	C	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

¹ After administering the task to students, the design team decided to delete the Performance Indicator C as a requirement for the task.



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CROSS-CURRICULAR PROFICIENCIES AND PERFORMANCE INDICATORS

GRADUATION PROFICIENCY	GRADUATION PROFICIENCY DESCRIPTION	PERFORMANCE INDICATOR	PERFORMANCE INDICATOR DESCRIPTION
Communication	Students will demonstrate communication through using a variety of modes to convey meaning to and seek understanding from others.	3	Choose and apply an appropriate communication strategy according to audience and purpose.
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.	4	Implement a plan or process of approach using tools and information.
Research	Students will ask questions and gather and synthesize information in order to further their knowledge and support ideas.	1	Analyze the relevance, bias, and usefulness of information.

NEXT GENERATION SCIENCE STANDARDS

Disciplinary Core Ideas

LS1.A: Structure and Function

- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.
- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range.

Cross-Cutting Concepts

Stability and Change

- Feedback (negative or positive) can stabilize or destabilize a system.

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and

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interactions—including energy, matter, and information flows—within and between systems at different scales.

Science and Engineering Practices

Developing and Using Models:

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.

Planning and Carrying Out Investigations:

Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

- Plan an investigation or test a design individually and collaboratively to produce data to serve as the basis for evidence as part of building and revising models, supporting explanations for phenomena, or testing solutions to problems. Consider possible variables or effects and evaluate the confounding investigation's design to ensure variables are controlled.

SCORING CRITERIA²

PERFORMANCE INDICATOR	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
<p>#3 Life Sciences-Structure, Function, and Information Processing: B</p> <p>Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</p>	<p>Identify the components of the model.</p> <p>Identify systems in multicellular organisms.</p>	<p>Describe the relationships between components of the model.</p> <p>Explain the function(s) of the systems in multicellular organisms.</p>	<p>Develop and use a model to explain the relationship among its components.</p> <p>Illustrate how the hierarchical organization of systems interact to provide specific functions in multicellular organisms.</p>	<p>Distinguish between the accuracy of the model and the actual body system/function it represents by identifying limitations of the model.</p>

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<p>#3 Life Sciences- Structure, Function, and Information Processing: C</p> <p>Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p>	<p>Plan an investigation to collect data about how feedback mechanisms maintain homeostasis.</p>	<p>Plan and conduct an investigation to collect data that demonstrates that feedback mechanisms maintain homeostasis.</p>	<p>Plan and conduct an investigation that identifies and measures internal and external environmental conditions and explain why the evidence demonstrates that feedback maintains homeostasis.</p>	<p>Plan another investigation that identifies and measures internal and external environmental conditions to collect evidence of how feedback maintains homeostasis in a different living system in a real-world scenario.</p>
<p>Communication: 3</p> <p>Choose and apply an appropriate communication strategy according to audience and purpose.</p>	<p>Identify audience and purpose of communication.</p> <p>Use a method of communication (e.g., written, oral, visual, graphic, audio, and/or interactive) to present ideas.</p>	<p>Use some appropriate aspects of style, tone and language to partially address the needs of the audience and purpose.</p> <p>Select and use a method of communication (e.g., written, oral, visual, graphic, audio, and/or interactive) to present ideas.</p>	<p>Use appropriate style, tone, and language to address intended audience and purpose.</p> <p>Select and use a method of communication (e.g., written, oral, visual, graphic, audio, and/or interactive) that fits the audience and purpose.</p>	<p>Use strategic, engaging, and creative style, tone, and language to effectively address the intended audience and purpose.</p> <p>Select and use a strategic method of communication (e.g., written, oral, visual, graphic, audio, and/or interactive) that effectively addresses the audience and purpose.</p>
<p>Research: 1</p> <p>Analyze the relevance, bias, and usefulness of information.</p>	<p>Locate information that pertains to the topic researched.</p>	<p>Select and categorize information according to relevance and usefulness.</p>	<p>Analyze information and sources to determine the relevance, bias and usefulness of information.</p>	<p>Seek out additional information to ensure a comprehensive representation of the topic.</p>

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² As mentioned above, the design team decided to delete the Performance Indicator C as a requirement for the task.

CONNECTIONS TO INSTRUCTIONAL UNIT

UNIT SUMMARY

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

In this unit, students will be introduced to human body tissues. They will learn the four major types: epithelial, connective, muscle, and nerve tissue. They will become familiar with the structure, function, and classification of each type. Students will also learn about tissue damage, repair and the effects of aging on tissues.

Anchoring Phenomena: “Why are tissues so important? What diseases may happen if a tissue is not functioning properly?”

[What is celiac disease](#)

[Celiac disease symptoms](#)

[Celiac Disease Foundation](#)

What will students know as a result of instruction in this unit in order to complete the task?	What will students be able to do as a result of instruction in this unit in order to complete the task?
<ul style="list-style-type: none"> ● Definition of homeostasis ● Structure, Function, Location and Classification of epithelial tissue, connective tissue, muscle tissue and nervous tissue ● Function and Location of tissue membranes ● Tissue Damage and Repair 	<ul style="list-style-type: none"> ● Develop a model to differentiate between healthy and damaged tissue(s) and relate to the body system(s) that a particular disease affects ● Plan an investigation that identifies and measures internal and external environmental conditions to collect evidence of how feedback maintains homeostasis in a different living system in a real-world scenario using a list of diseases that involve damaged tissue. ● Present findings via Powerpoint presentation, Prezi, pamphlet, infographic, lab report, or other method.
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?	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?

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- Various tissue labs
- quiz on tissues
- formative assessments

- understanding of homeostasis and feedback loops
- knowledge of cell structure and function
- knowledge of cell division (mitosis)

CULMINATING TASK

TASK SUMMARY

Students will complete a case study about celiac disease as the introduction to the task. Students will pick a disease of the human body involving tissue damage and research the disease in terms of symptoms and how the healthy tissue is affected. After researching, students will plan an investigation that will allow them to determine if a patient has the disease based on tissue samples.

Anchoring Phenomenon: Provide a description of the anchoring phenomenon of the task and link any useful resources. Why are tissues so important? What diseases may happen if a tissue is not functioning properly?

STUDENT ACTIVITY³

Part 1:

- Students will work in small groups and read a case study and answer questions about a child who can't eat his birthday cake because of Celiac Disease.

Part 2:

- Groups choose a disease
- Research the disease
 - Symptoms, tissues involved, specific effects on tissue, body systems involved
- Fill out research template/graphic organizer

Part 3:

- Plan an investigation, using their research, that includes a test for their disease by analyzing tissue samples
 - Students will write a step by step procedure, come up with a list of materials, consider safety concerns, list and describe data and observations that would need to be collected
- Students will describe how data and/or observations would be analyzed in order to determine if tissue damage is showing their disease.

Part 4:

- Make a model of healthy tissue vs damaged tissue and show a feedback loop for each

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Part 5:

- Present their findings in a format of their choice

3 The design team made the following modifications to the Student Activity section based on their experience administering the task to students:

- **Part 3: Planning the Investigation:** This portion of the directions was deleted by the team. As a result of this, **Part 4: Making a Model** becomes Part 3 and **Part 5: Presentation** becomes Part 4.

CONSIDERATIONS FOR DIFFERENTIATION AND ACCESSIBILITY

Part 1:

- Provide a graphic organizer as needed to organize and summarize ideas

Part 2:

- Provide graphic organizer as needed to organize and summarize ideas

Part 3:

- Provide a template and or checklist for students to fill in.

Part 5:

- Considerations for students having an IEP or a 504 plan in terms of presentations.

ADMINISTRATION NOTES AND DIRECTIONS⁴

Part 1:

- Provide students with the case study
- Have each group share out answers and use questioning techniques as necessary to facilitate discussion

Part 2:

- Provide students with a list of possible diseases to research (Sjogren's syndrome, lupus, scleroderma, rheumatoid arthritis, systemic sclerosis, vasculitis, polymyositis, pulmonary fibrosis)
- Provide copies of CRAAP test to go over valid sources
- Check in with groups as they conduct research

Part 3:

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- Give students directions on lab format
- Check in with students throughout process and monitor student progress

Part 4:

- Monitor student models providing feedback as needed

Part 5:

- Facilitate presentations

4 To reflect the modifications made to the Student Activity, the Administration Notes and Directions are changed as follows:

- **Part 3: Planning the Investigation:** This portion of the directions was deleted by the team. As a result of this, **Part 4: Making a Model** becomes Part 3 and **Part 5: Presentation** becomes Part 4.

MATERIALS AND RESOURCES⁵

- [CRAAP Test Worksheet](#)
- [Case study w/graphic organizer](#)
- [List of tissue diseases to research](#)
- [Graphic organizer for research](#)
- [Lab format graphic organizer](#)
- [Presentation Checklist](#)
- Reflection Survey
- Celiac Disease Links:
 - [What is celiac disease](#)
 - [Celiac disease symptoms](#)
 - [Celiac Disease Foundation](#)

[Tissue Identification](#)

[Histology](#)

5 The original link to the CRAAP test sheet is no longer active. As a replacement, please follow one of these links:

- <https://www.utwente.nl/en/lisa/library/miscellaneous/docs-ad/craap.pdf>
- <http://southcentral.edu/webdocs/library/CRAAP%20Test%20Worksheet.pdf>

Also, the design team decided to eliminate the use of the Lab Format Graphic Organizer.