UNIT OVERVIEW

BODY SYSTEMS

Unit Issue: How interactions between body systems can be affected by disease, medications, and other factors.

Anchoring Phenomenon: How body systems function and interact in a healthy person and when a person is sick.

Listed below is a summary of the activities in this unit. Note that the total teaching time is listed as 21–26 periods of approximately 45–50 minutes (approximately 5–6 weeks). There are no suggested activities to skip in this unit as skipping an activity in this case would mean losing key NGSS elements of the unit, e.g. the opportunity to practice elements of the PE prior to the activity that assesses it.

Activity Description	Topics	Advance Preparation	Assessment	Teaching Periods
1. **View and Reflect: The Pellagra Story** Students learn about how scientists gather evidence on the functioning of the human body through a video segment on pellagra and a short reading about modern clinical trials.	Pellagra, investigating human health, clinical trials, data, evidence, hypothesis, inference, informed consent, observations, trade-offs LITERACY	Preview the video. Copy Student Sheets.	E&T A3	1–2
2. **Modeling: Parts of a Whole** Students begin to learn about major organs and systems in the human body. First, they complete an activity that exposes their current knowledge and ideas about the sizes and locations of specific organs. They then create a three-dimensional model of selected organs and structures and revisit their ideas about the human body.	Body systems, organs, organ systems, function, structure	Obtain chart paper, balances, and markers; copy Student Sheet; line torso models with plastic.	QUICK CHECK Proc.	2
3. **Investigation: What's Happening Inside?** Students learn about systems in the human body and their functions. Students group Organ or Structure Cards into systems and explore the function of organs and their associated body systems.	Organs, structures, body systems, levels of organization LITERACY	Copy Student Sheet.	QUICK CHECK A1, A3	1
4. **Reading: Digestion: An Absorbing Tale** Students read about functions and structures of the human digestive system. The reading also introduces the idea of system interactions between the muscular and circulatory systems.	Digestive system, stomach, intestine, system interactions, digestion, nutrients LITERACY	Copy Student Sheets. Gather string and tape.	EXP QUICK CHECK A2 MOD A2 EXP A4	1

BODY SYSTEMS (continued)

Activity Description	Topics	Advance Preparation	Assessment	Teaching Periods
5. **Modeling: Food Breakdown** Students use information provided in the text to develop physical models of proteins and carbohydrates. They use these models to explore the breakdown of food during digestion and the use of the resulting subunits as building blocks for human proteins (in the case of amino acids) or for generating usable energy (in the case of sugars). They create drawn models to represent the use of food as a source for matter and energy.	Matter and energy from food, carbohydrate, cell, energy, fat, matter, model, protein.	Copy Student Sheets. Divide pop beads into sets.	MOD A3	1–2
6. **Laboratory: Observing Organisms** Students investigate the behavior of living organisms (blackworms) in response to touch (stimulus response).	Stimulus, response LITERACY	Order blackworms two weeks ahead. Gather fish food, plastic bin, unbleached paper towels, microscopes, spring water.	QUICK CHECK A1	1–2
7. **Laboratory: Can You Feel the Difference?** In Part A, students explore their individual sensitivity to touch. They test their abilities to feel the difference between one and two points on different parts of their hands and arms. In Part B, students further investigate human sensitivity to touch by determining the smallest distance at which they can still feel two points. This experience reinforces the concept of sensory limitations and explores the phenomenon of variation among individuals.	Interpreting stimuli, control, variable.	Copy Student Sheets.	AID A1 EXP A5	2
8. **Reading: Finding the Nerve** Students read more about the human nervous system, how it functions, and how it interacts with other systems in the human body.	Nervous system, interneuron, motor neuron, nerves, neuron, sensory neuron, touch receptors. LITERACY	Copy Student Sheet.	EXP A4 (Assessment of PE MS-LS1-8)	1
9. **Laboratory: Heartily Fit** Students collect data on their heart and respiratory rates by measuring their pulses and breathing rates before and after moderate-impact exercises. They analyze the data to establish the relationship between circulatory and respiratory function during exercise. As an Extension, students can measure the effect on recovery time of regular exercise performed over a month-long period.	Circulatory system, respiratory system, effects of exercise, pulse, range. LITERACY, MATHEMATICS	Copy Student Sheets.	AID QUICK CHECK A3	1–2

BODY SYSTEMS (continued)

Activity Description	Topics	Advance Preparation	Assessment	Teaching Periods
10. **Laboratory: Gas Exchange** This activity explores the role of the respiratory system in the regulation of gases in the blood. Students investigate how to quantitatively measure the amount of carbon dioxide in their exhaled breath by using an indicator to perform a titration.	Exchange of oxygen and carbon dioxide, indicator. SENSEMAKING	Copy Student Sheet. Gather chart paper, sponge, carbonated water, chemical splash goggles. Arrange access to wall clock or watch that displays seconds.	QUICK CHECK A5	2
11. **Reading: Interacting Systems** Students use the Stop to Think strategy as they read about levels of organization in the circulatory and respiratory systems, and how these systems and subsystems interact with each other and the digestive system to maintain life.	Interactions between circulatory, respiratory, and digestive systems, alveoli, artery, atrium, blood, blood vessels, capillaries, cardiovascular system, circulatory system, heart, lungs, respiratory system, veins, ventricle. LITERACY	Copy Student Sheets.	EXP A3	2
12. **Modeling: The Circulation Game** As a class, students model the path of blood as it travels through the human circulatory system to the lungs and other organs. The activity emphasizes the transport function of blood, particularly the transport of gases, nutrients, and wastes, and how the circulatory system interacts with other body systems.	Circulatory system, gas exchange, waste removal LITERACY	Copy Student Sheets. Gather drum.	ARG A4 (Assessment of PE MS-LS1-3)	2
13. **Investigation: Testing Medicines: A Clinical Trial** Students simulate a clinical trial to investigate how medicines are tested. In this model, students participate in a taste test to stimulate the clinical trial of a new headache medicine. The class pools results and draws conclusions based on their data.	Clinical trials	Copy Student Sheets. Gather large stirring spoon, permanent marker, 1 2-quart container, 2 1-quart containers, sugar, water.	AID A2 E&T A4	3
14. **Talking it Over: Evaluating Clinical Trials** Students work together to analyze the clinical trial results of three new headache medicines that a company is testing. Students look at effectiveness of the drugs and reported side effects. Students use this information to decide which drug should be put forward for further testing and development.	Clinical trials, evaluating medicines, side effects of medicines LITERACY	Copy Student Sheets.	ARG A1	1–2