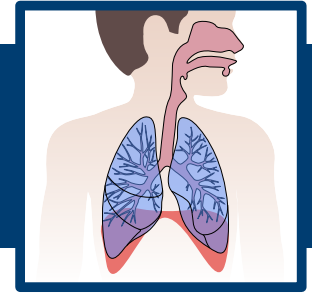


### PULMO PARK

### LESSON 2: RESPIRATORY EXPLORATORY

#### Activity 2B: Under Pressure



TEXAS BIOMEDICAL  
RESEARCH INSTITUTE  
HEALTH STARTS WITH SCIENCE

**NEXT GENERATION SCIENCE STANDARDS (NGSS)**  
**TEXAS ESSENTIAL KNOWLEDGE AND SKILLS (TEKS)**

### ACTIVITY 2B: UNDER PRESSURE | TEKS

#### High School | Biology | Process Skills

**(4)** Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:

**(A)** analyze, evaluate, and critique scientific explanations and solutions by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student;

**(6)** Science consists of recurring themes and making connections between overarching concepts. Recurring themes include systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide a tool for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

#### High School | Biology | Knowledge & Skills

**(1)** Scientific and engineering practices. The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The student is expected to:

**(A)** ask questions and define problems based on observations or information from text, phenomena, models, or investigations;

#### High School | Principles of Health Science | Knowledge & Skills

**(2)** The student applies mathematics, science, English language arts and social studies in health science. The student is expected to:

**(A)** convert units between systems of measurement;

**(B)** apply data from tables, charts, and graphs to provide solutions to health-related problems;

**(C)** interpret technical material related to the health science industry;

**(D)** organize, compile, and write ideas into reports and summaries;

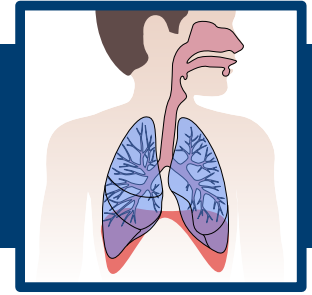
**(E)** plan and prepare effective oral presentations;

## Education Standards

### PULMO PARK

### LESSON 2: RESPIRATORY EXPLORATORY

#### Activity 2B: Under Pressure



- (F) formulate responses using precise language to communicate ideas;
- (G) describe biological and chemical processes that maintain homeostasis;
- (H) identify and analyze principles of body mechanics and movement such as forces and the effects of movement, torque, tension, and elasticity on the human body;
- (K) identify the concepts of health and wellness throughout the life span

#### High School | Anatomy & Physiology | Knowledge & Skills

- (7) The student examines the body processes that maintain homeostasis. The student is expected to:
  - (A) investigate and describe the integration of the chemical and physical processes, including equilibrium, temperature, pH balance, chemical reactions, passive transport, active transport, and biofeedback, that contribute to homeostasis; and
  - (B) determine the consequences of the failure to maintain homeostasis.
- (9) The student explores the body's transport systems. The student is expected to:
  - (A) analyze the physical, chemical, and biological properties of transport systems, including circulatory, respiratory, and excretory;
  - (B) determine the factors that alter the normal functions of transport systems; and
  - (C) contrast the interactions among the transport systems.
- (10) The student investigates environmental factors that affect the human body. The student is expected to:
  - (A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and
  - (B) explore measures to minimize harmful environmental factors on body systems.
- (11) The student investigates the structure and function of the human body. The student is expected to:
  - (A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, muscular, cardiovascular, respiratory, digestive, urinary, immune, endocrine, and reproductive systems;
  - (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems;
  - (C) research technological advances and limitations in the treatment of system disorders

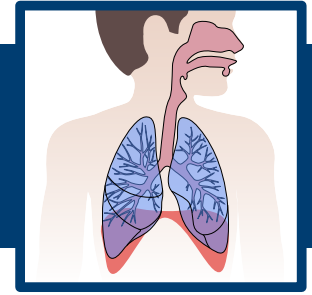
#### High School | Pathophysiology | Knowledge & Skills

- (7) The student examines a variety of human diseases. The student is expected to:
  - (A) describe the nature of diseases, including the etiology, signs and symptoms, diagnosis, prognosis, and treatment options for diseases;
  - (B) explore advanced technologies for the diagnosis and treatment of disease;

### PULMO PARK

### LESSON 2: RESPIRATORY EXPLORATORY

#### Activity 2B: Under Pressure



- (C) examine reemergence of diseases such as malaria, tuberculosis, and polio;
  - (D) differentiate between hospital-acquired infections and community-acquired infections;
  - (E) examine antibiotic-resistant diseases such as methicillin resistant *Staphylococcus aureus*;
  - (F) differentiate between congenital disorders and childhood diseases; and
  - (G) investigate ways diseases affect multiple body systems.
- (8) The student integrates the effects of disease prevention and control. The student is expected to:
- (A) evaluate public health issues related to asepsis, isolation, immunization, and quarantine;
  - (B) analyze the effects of stress and aging on the body;
  - (C) evaluate treatment options for diseases;
  - (D) investigate diseases that threaten world health and propose intervention strategies

### ACTIVITY 2B: UNDER PRESSURE | NGSS

#### Middle School | (MS-LS1-3)

**Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.**

**Clarification Statement:** *Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.*

**Assessment Boundary:** *Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.*

**NGSS: Observable Features of Student Performance** [\[Link\]](#)

#### High School | (HS-LS1-3)

**Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.**

**Clarification Statement:** *Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.*

**Assessment Boundary:** *Assessment does not include the cellular processes involved in the feedback mechanism.*

**Observable Features of Student Performance** [\[Link\]](#)