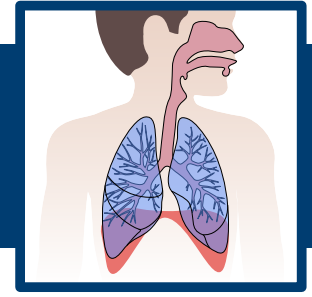


PULMO PARK

LESSON 2: RESPIRATORY EXPLORATORY

Activity 2A: Expansion and Contraction



TEXAS BIOMEDICAL
RESEARCH INSTITUTE
HEALTH STARTS WITH SCIENCE

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

ACTIVITY 2A: EXPANSION AND CONTRACTION | 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

(3) Scientific hypotheses and theories. Students are expected to know that:

(A) hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories

(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

High School | Anatomy & Physiology | Knowledge & Skills

(10) The student investigates environmental factors that affect the human body. The student is expected to:

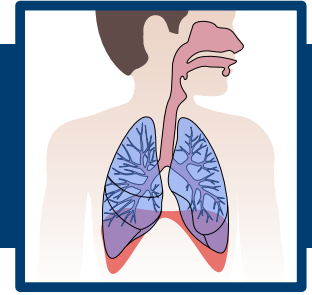
(A) identify the effects of environmental factors such as climate, pollution, radioactivity, chemicals, electromagnetic fields, pathogens, carcinogens, and drugs on body systems; and

(B) explore measures to minimize harmful environmental factors on body systems.

PULMO PARK

LESSON 2: RESPIRATORY EXPLORATORY

Activity 2A: Expansion and Contraction



- (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

ACTIVITY 2A: EXPANSION AND CONTRACTION | 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: *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-LS1-2)

Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Clarification Statement: *Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.*

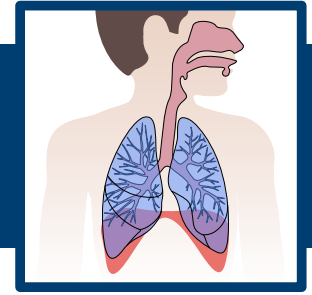
Assessment Boundary: *Assessment does not include interactions and functions at the molecular or chemical reaction level.*

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

PULMO PARK

LESSON 2: RESPIRATORY EXPLORATORY

Activity 2A: Expansion and Contraction



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 \[Link\]](#)