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2020
Teacher Resource
Guide for MS AAAS
for the Alternate
Science Elements II



2020

Teacher Resource Guide for
Mississippi Alternate Academic
Achievement Standards for
the Alternate Science Elements II

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The Standards

The *2020 Mississippi Alternate Academic Achievement Standards for the Alternate Science Elements II* include the following strands: Anatomy and Physiology, Earth and Space Science, Botany, Zoology, and Physical Science. Each of these strands were selected for inclusion in this course. A synopsis of each strand is provided below:

Anatomy and Physiology core content emphasizes the structure and function of cells, tissues, and organs; organization of the human body; the skeletal, muscular, digestive, respiratory, cardiovascular, and reproductive systems; and the impact of diseases on certain systems. Laboratory activities, research, the use of technology, and the effective communication of results through various methods are integral components in this course.

Earth and Space Science core content provides opportunities for students to continue to develop and communicate a basic understanding of the Earth and its place in the universe. Natural hazards and other geologic events that impact the earth and human society are covered. Human impact on the Earth through resource extraction and land use is included. A major focus is becoming responsible stewards of Earth's natural resources.

Zoology core content includes morphological characteristics of each division and variations in their reproduction, physiology, taxonomy, evolution, and the interactions of human society and animals. Laboratory activities, research, the use of technology, and the effective communication of results through various methods are integral components in this course.

Physical Science core content includes the characteristics and structure of matter, Newton's Laws of Motion, thermal energy, and thermal energy transfer.

The standards and performance objectives do not have to be taught in the order presented in this document. The performance objectives are intentionally broad to allow school districts and teachers the flexibility to create a curriculum that meets the needs of their students.

Remaining Material in the Teacher Resource Guide

The remaining materials in the teacher resource guide (performance objectives, real-world connections, vocabulary, and resources) were developed through a collaboration of Mississippi teachers, administrators, the Mississippi Department of Education (MDE) Office of Special Education staff, and the Mississippi State University Research and Curriculum Unit staff.

Introduction

The MDE is dedicated to student success, improving student achievement in science and establishing communication skills within a technological environment. The Mississippi Alternate Academic Achievement Standards provides a consistent, clear understanding of what students are expected to know and be able to do by the end of each grade level or course. The purpose of the Alternate Standards is to build a bridge from the content in the general education science framework to academic expectations for students with the most significant cognitive disabilities. The standards are designed to be rigorous and relevant to the real world, reflecting the knowledge and skills that students need for success in postsecondary settings.

Purpose

In an effort to closely align instruction for students with significant cognitive disabilities who are progressing toward postsecondary settings, the *MS AAAS for the Alternate Science Elements II* include course-specific standards for science. This document is designed to provide a resource for special education teachers with a basis for curriculum development and instructional delivery.

The *Teacher Resource Guide for MS AAAS for the Alternate Science Elements II* contains prioritized content, which is presented as a matrix to show the continuum of the concept across complexity levels. The matrix shows varying access points to the prioritized content. A student's progression through content contained in the matrix is intended to be fluid. It is not the intent, nor should it be practice, for a student to be exposed to content in a straight vertical line through one of the columns. Every student, regardless of disability, comes to the learning environment with a different set of prior knowledge and experience. For this reason, a student may be able to access some content from the middle complexity level and access other concepts at the more complex level. Teachers should evaluate a student's ability in relation to the content and select the entry point based on that evaluation. Students should not be locked into receiving exposure to all content at the same entry point.

Support Documents and Resources

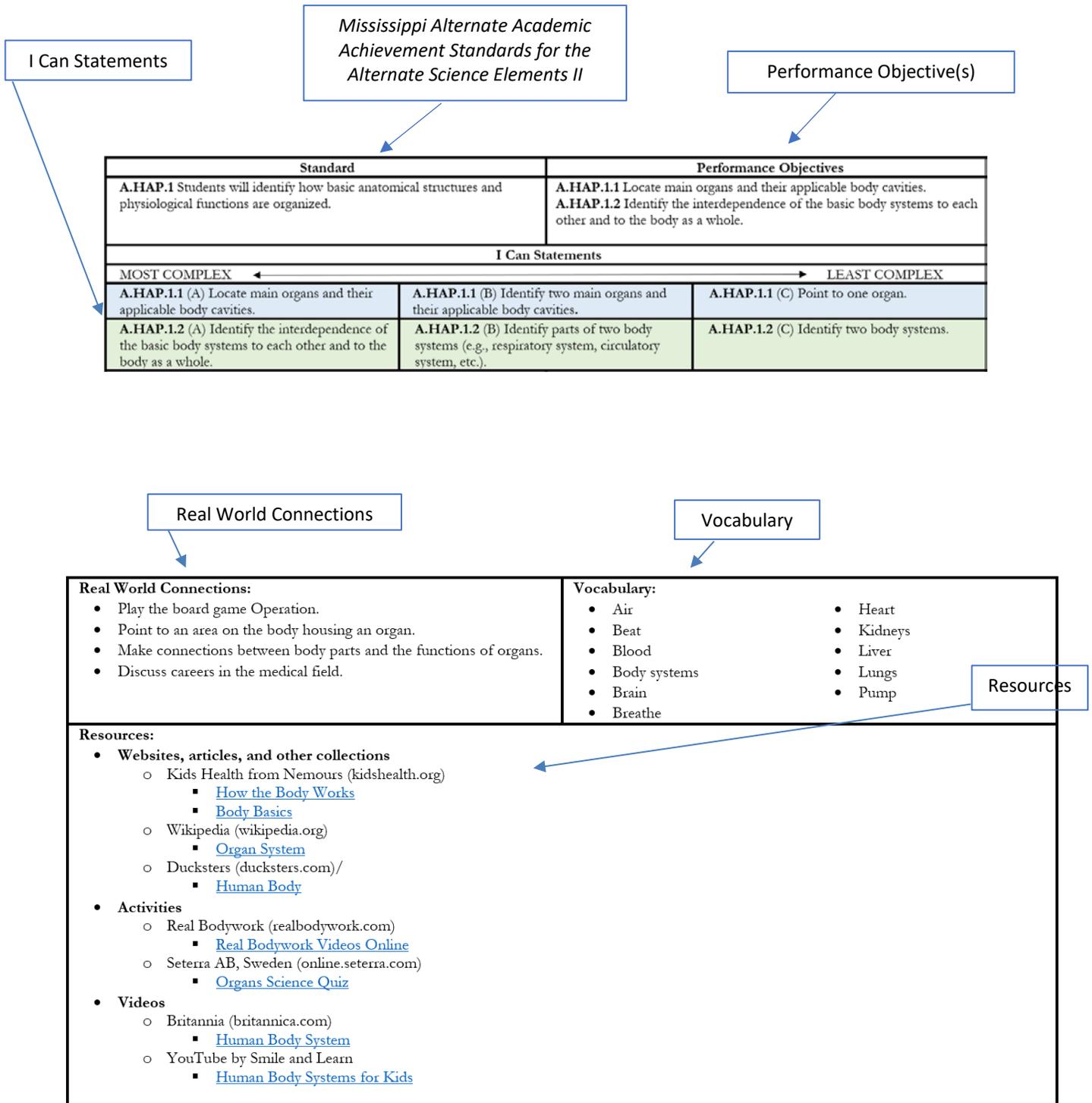
The MDE Office of Special Education aims to provide local districts, schools, and teachers supporting documents to construct standards-based instruction and lessons, allowing them to customize content and delivery methods to fit each student's needs. The teacher resource guide includes suggested resources, instructional strategies, sample lessons, and activities. Additional sample activities and resources for selected standards may be added; this shall be a living document with ongoing updates based on educator feedback. The intent of these resources is to assist teachers in linking their instruction to the prioritized content. The teacher resource guide includes activity adaptations for students with a varying range of abilities within the classroom. There are many ways in which skills and concepts can be incorporated based on students' individual learning styles and needs. Professional development efforts are aligned to the *MS AAAS for the Alternate Science Elements II* and delivered in accord with teacher resources to help expand expertise in delivering student-centered lessons.

Structure of the *Teacher Resource Guide for MS AAAS for the Alternate Science Elements II*

The *MS AAAS for the Alternate Science Elements II* is a general statement of what students with significant cognitive disabilities should know and be able to do because of instruction. This guide includes statements that describe in precise, measurable terms what learners will be able to do at the end of an instructional sequence; ways educators can link theory to real world activities; focused vocabulary banks; and additional teaching resources.

- **I Can Statement(s):** These statements include the Performance Objective(s) as the *Most Complex* and scaffolds the performance objectives two additional levels (B) and (C) to *Least Complex*. This matrix demonstrates the continuum of the concept across complexity levels. The purpose is to assist teachers in modifying to meet the unique diverse needs of learners with significant cognitive disabilities.
- **Real World Connections:** These items help facilitate learning that is meaningful to students and prepares them for their professional lives outside of school. When teachers move beyond textbook or curricular examples and connect content learned in the classroom to real people, places, and events, students can see a greater relevance to their learning. Real-world connections are used to help students see that learning is not confined to the school, allow them to apply knowledge and skills in real world situations, and personalize learning to increase and sustain student engagement.
- **Vocabulary:** These lists include difficult or unfamiliar words students need to know and understand.
- **Resources:** These resources include instructional strategies, lessons, and activities. Additional sample activities and resources for selected standards may be added; this shall be a living document with ongoing updates based on educator feedback. The intent of these activities is to assist teachers in linking their instruction to the prioritized content.

**Structure of the *Teacher Resource Guide for MS AAAS for the Alternate Science Elements II*
(Graphic)**



Levels of Support (LOS)

Students with significant cognitive disabilities require varying LOS to engage in academic content. The goal is to move the student along the continuum of assistance toward independence by decreasing the LOS provided and increasing student accuracy within the context of content to demonstrate progress.

The following chart describes the continuum of LOS. Appropriate LOS are important to increase student engagement and student independence and to track student achievement and progress.

| Level of Assistance | Definition | Example | Non-Example |
|--------------------------------|---|--|---|
| Non-Engagement (N) | The student requires assistance from the teacher to initiate, engage, or perform; however, the student actively refuses or is unable to accept teacher assistance. | The student resists the teacher's physical assistance toward the correct answer. | The student does not look at the activity. |
| Physical Assistance (P) | The student requires physical contact from the teacher to initiate, engage, or perform. | The teacher physically moves the student's hand to the correct answer. | The teacher taps the correct answer and expects the student to touch where he/she tapped. |
| Gestural Assistance (G) | The student requires the teacher to point to the specific answer. | When presenting a choice of three pictures and asking the student which picture is a triangle, the teacher will point to or tap on the correct picture to prompt the student to indicate that picture. | The teacher moves the student's hand to gesture toward the right answer. |
| Verbal Assistance (V) | The student requires the teacher to verbally provide the correct answer to a specific item. | The teacher says, "Remember, the main character was George. Point to the picture of the main character." | The teacher says "Who is the main character?" without providing the information verbally. |
| Model Assistance (M) | The student requires the teacher to model a similar problem/opportunity and answer prior to performance. | The teacher models one-to-one correspondence using manipulatives and then asks the student to perform a similar item. | The teacher completes the exact same activity as the student is expected to perform. |
| Independent (I) | The student requires no assistance to initiate, engage, or perform. The student may still require other supports and accommodations to meaningfully engage in the content but does not require assistance to participate and respond. | The teacher asks the student, "Who is the main character of the book?" and the student meaningfully responds without any prompting or assistance. | The teacher asks the student, "Who is the main character?" and points to the picture of the main character. |

Teacher Resource Guide for MS AAAS for the Alternate Science Elements II

COURSE: Alternate Science Elements II

STRAND: Anatomy and Physiology

CONCEPT: Physiological Functions/Anatomical Structure

| Standard | | Performance Objectives | |
|--|---|---|--|
| A.HAP.1 Students will identify how basic anatomical structures and physiological functions are organized. | | A.HAP.1.1 Locate main organs and their applicable body cavities. A.HAP.1.2 Identify the interdependence of the basic body systems to each other and to the body as a whole. | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| A.HAP.1.1 (A) Locate main organs and their applicable body cavities. | A.HAP.1.1 (B) Identify two main organs and their applicable body cavities. | A.HAP.1.1 (C) Point to one organ. | |
| A.HAP.1.2 (A) Identify the interdependence of the basic body systems to each other and to the body as a whole. | A.HAP.1.2 (B) Identify parts of two body systems (e.g., respiratory system, circulatory system, etc.). | A.HAP.1.2 (C) Identify two body systems. | |
| Real World Connections: <ul style="list-style-type: none"> • Play the board game Operation. • Point to an area on the body housing an organ. • Make connections between body parts and the functions of organs. • Discuss careers in the medical field. | | Vocabulary: <ul style="list-style-type: none"> <li style="width: 50%;">• Air <li style="width: 50%;">• Heart <li style="width: 50%;">• Beat <li style="width: 50%;">• Kidneys <li style="width: 50%;">• Blood <li style="width: 50%;">• Liver <li style="width: 50%;">• Body systems <li style="width: 50%;">• Lungs <li style="width: 50%;">• Brain <li style="width: 50%;">• Pump <li style="width: 50%;">• Breathe | |
| Resources: <ul style="list-style-type: none"> • Websites, articles, and other collections <ul style="list-style-type: none"> ○ Kids Health from Nemours (kidshealth.org) <ul style="list-style-type: none"> ▪ How the Body Works ▪ Body Basics ○ Wikipedia (wikipedia.org) <ul style="list-style-type: none"> ▪ Organ System ○ Ducksters (ducksters.com)/ <ul style="list-style-type: none"> ▪ Human Body • Activities <ul style="list-style-type: none"> ○ Real Bodywork (realbodywork.com) | | | |

COURSE: Alternate Science Elements II

STRAND: Anatomy and Physiology

CONCEPT: Physiological Functions/Anatomical Structure

- [Real Bodywork Videos Online](#)
- Seterra AB, Sweden (online.seterra.com)
 - [Organs Science Quiz](#)
- **Videos**
 - Britannia (britannica.com)
 - [Human Body System](#)
 - YouTube by Smile and Learn
 - [Human Body Systems for Kids](#)

COURSE: Alternate Science Elements II
 DOMAIN: Human Anatomy and Physiology
 CONCEPT: Skeletal System

| Standard | Performance Objectives | |
|---|---|--|
| A.HAP.4 Students will identify the basic structures and function of the skeletal system. | A.HAP.4.1 Identify the basic function of the skeletal system. A.HAP.4.2 Match major bones (e.g., skull, pelvis, humerus, ulna, radius, femur, tibia, fibula, vertebrae, phalanges, ribs, etc.) to corresponding parts of the appendicular or axial skeleton (e.g., the femur, tibia, fibula are bones of the leg, etc.). A.HAP.4.3 Identify activities that pose threat to bones or joints of the skeletal system. A.HAP.4.6 Identify common skeletal diseases and disorders (e.g., arthritis, osteoporosis, Osteogenesis imperfecta-brittle bone disease, etc.). A.HAP.4.7 Identify appropriate first aid immediate responses to common injuries (i.e., a bone fracture - call 911, notify an adult, report to nearest emergency medical facility). | |
| I Can Statements | | |
| MOST COMPLEX ← | ↔ | → LEAST COMPLEX |
| A.HAP.4.1 (A) Identify the basic function of the skeletal system. | A.HAP.4.1 (B) Complete a model of a skeleton using the major bones of the body. | A.HAP.4.1 (C) Locate a body part on a model or image of a body. |
| A.HAP.4.2 (A) Match major bones (e.g., skull, pelvis, humerus, ulna, radius, femur, tibia, fibula, vertebrae, phalanges, ribs, etc.) to corresponding parts of the appendicular or axial skeleton (e.g., the femur, tibia, fibula are bones of the leg, etc.). | A.HAP.4.2 (B) Match four major bones (e.g., skull, pelvis, humerus, ulna, radius, femur, tibia, fibula, vertebrae, phalanges, ribs, etc.) to corresponding parts of the appendicular or axial skeleton (e.g., the femur, tibia, fibula are bones of the leg, etc.). | A.HAP.4.2 (C) Match two major bones with a diagram of a body (e.g., skull=head). |
| A.HAP.4.3 (A) Identify activities that pose threat to bones or joints of the skeletal system. | A.HAP.4.3 (B) Name two bones and activities that could damage bones or joints. | A.HAP.4.3 (C) Name a bone that may be broken by an activity. |
| A.HAP.4.6 (A) Identify common skeletal diseases and disorders (e.g., arthritis, osteoporosis, Osteogenesis imperfecta-brittle bone disease, etc.). | A.HAP.4.6 (B) Select two common skeletal diseases and/or disorders (e.g., arthritis, osteoporosis, Osteogenesis imperfecta-brittle bone disease, etc.). | A.HAP.4.6 (C) Recall a common skeletal disease or disorder (e.g., arthritis, osteoporosis, Osteogenesis imperfecta-brittle bone disease, etc.). |
| A.HAP.4.7 (A) Identify appropriate first aid immediate responses to common injuries (i.e., a | A.HAP.4.7 (B) Role-play connecting to 911 using the correct information. | A.HAP.4.7 (C) Demonstrate how to report an injury to an adult. |

COURSE: Alternate Science Elements II
DOMAIN: Human Anatomy and Physiology
CONCEPT: Skeletal System

| | | |
|---|--|--|
| bone fracture - call 911, notify an adult, report to nearest emergency medical facility). | | |
| Real World Connections: <ul style="list-style-type: none">• Practice making a 911 call.• Put together a first aid kit.• Demonstrate how to put on a band aid and a sling.• Listen to guest speakers (911 operators, school nurse, Boy/Girl Scouts, health science students, first responders). | Vocabulary: <ul style="list-style-type: none">• 911• Appendicular skeleton• Axial skeleton• Body• Bones• Broken• Disorder | <ul style="list-style-type: none">• Emergency• First aid• Hurt• Injury• Phone call• Skeleton system |
| Resources: <ul style="list-style-type: none">• Websites, articles, and other collections<ul style="list-style-type: none">○ Kids Health from Nemours (kidshealth.org)<ul style="list-style-type: none">▪ How to Handle an Emergency▪ Arthritis○ Mayo Clinic<ul style="list-style-type: none">▪ First Aid○ Wikihow.com<ul style="list-style-type: none">▪ Call 911• Activities<ul style="list-style-type: none">○ ABCYA (abcya.com)<ul style="list-style-type: none">▪ Skeletal System○ Teachengineering.org<ul style="list-style-type: none">▪ Skeleton System Activity• Videos<ul style="list-style-type: none">○ YouTube by flemingmedical<ul style="list-style-type: none">▪ Practical First Aid – Sprains and Strains▪ Basic First Aid: How to Treat a Closed Fracture During First Aid○ Kidshealth (kidshealth.org)<ul style="list-style-type: none">▪ Bones and Skeleton System | | |

COURSE: Alternate Science Elements II
 DOMAIN: Human Anatomy and Physiology
 CONCEPT: Muscular System

| Standard | | Performance Objectives | |
|---|---|--|--|
| A.HAP.5 Students will identify the basic structures and function of the muscular system. | | A.HAP.5.1 Identify a muscle structure of the body. A.HAP.5.2 Use models to locate the major muscles (i.e., pectorals, biceps, abdominal, quadriceps, hamstring, and triceps) and investigate the movements controlled by each muscle. A.HAP.5.7 Identify common muscular diseases and disorders (e.g., muscle cramps or strains related to muscular dystrophy and/or cerebral palsy) that affect the muscular system. | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| A.HAP.5.1 (A) Identify a muscle structure of the body. | A.HAP.5.1 (B) Recognize that some muscle movements are voluntary (e.g., walking) and some are involuntary (e.g., beating heart). | A.HAP.5.1 (C) Identify a muscle. | |
| A.HAP.5.2 (A) Use models to locate the major muscles (i.e., pectorals, biceps, abdominal, quadriceps, hamstring, and triceps) and investigate the movements controlled by each muscle. | A.HAP.5.2 (B) Recognize six major muscles (i.e., pectorals, biceps, abdominal, quadriceps, hamstring, and triceps) and investigate the movements controlled by each muscle. | A.HAP.5.2 (C) Identify a major muscle. | |
| A.HAP.5.7 (A) Identify common muscular diseases and disorders (e.g., muscle cramps or strains related to muscular dystrophy and/or cerebral palsy) that affect the muscular system. | A.HAP.5.7 (B) Discuss common muscular diseases and disorders (e.g., muscle cramps or strains related to muscular dystrophy and/or cerebral palsy) that affect the muscular system. | A.HAP.5.7 (C) Recall a muscular disease or disorder. | |
| Real World Connections: <ul style="list-style-type: none"> • Use muscles to pick up objects. • Participate in stretching activities. | | Vocabulary: <ul style="list-style-type: none"> • Abdominal • Arm • Bicep • Cardiac • Cramp • Disease • Hamstring • Leg • Muscle • Pectoral • Quadriceps • Skeletal muscle • Smooth muscle • Triceps | |

- Hurt
- Involuntary muscle
- Voluntary muscle

Resources:

- **Websites, articles, and other collections**

- Kids Health from Nemours
 - [Your Muscles](#)
- Ducksters (ducksters.com)
 - [Muscular System](#)
- Kids Kiddle (kids.kiddle.co)
 - [Muscular System Facts for Kids](#)
- Teach Engineering STEM Curriculum for K-12
 - [Hands-on Activity: Muscles, Muscles Everywhere](#)
- BrainPop Educators (educators.brainpop.com)
 - [Muscle Activity for Kids](#)
- Living Life and Learning (livinglifeandlearning.com)
 - [Awesome Muscular System Hand Craft for Kids](#)

- **Activities**

- Play a game of “Simon Says” and have students point to different muscles in their bodies. For example, you might say, “Simon says to point to the hamstrings” or “Simon says flex your biceps.” You might challenge them with an instruction like, “Simon says use your quadriceps and hamstrings” and see what activities or exercises they come up with. Then have student volunteers act as Simon and call out instructions.
- There are over 600 muscles in the human body! Some are voluntary muscles and others are involuntary muscles. Assign pairs of students a region of the body such as the face, head, chest, abdomen, hands, feet, or even the ears. Then have the pairs research to find about different muscles in their region and present the information to the whole class. What muscles help you wiggle your toes? What muscles help you hear?

- **Videos**

- Public Broadcasting Service (<https://www.pbs.org>)
 - [Science Trek Video: Muscles](#)
- Kids Health from Nemours (kidshealth.org)
 - [Movie: Muscular System](#)

COURSE: Alternate Science Elements II
 DOMAIN: Human Anatomy and Physiology
 CONCEPT: Male and Female Reproductive Systems

| Standard | Performance Objectives | |
|--|---|---|
| A.HAP.8 Students will identify the basic structures and functions of the male and female reproductive system, including the cause and effect of diseases and disorders. | A.HAP.8.1 Identify the basic structure and function of the male and female reproductive systems. A.HAP.8.2 Identify basic male reproductive anatomy and relate structure to sperm production. A.HAP.8.3 Identify basic female reproductive anatomy and relate structure to egg production. A.HAP.8.4 Examine the negative influences on personal decision making for responsible sexual behavior. A.HAP.8.5 Identify various contraceptive methods. A.HAP.8.6 Describe the basic changes that occur during embryonic/fetal development, birth, and the growth and development from infancy, childhood, and adolescence to adult. A.HAP.8.7 Identify the basic causes and effects of various reproductive diseases and disorders (e.g., infertility, sexually transmitted diseases, ectopic pregnancy, etc.). | |
| I Can Statements | | |
| MOST COMPLEX ← | → LEAST COMPLEX | |
| A.HAP.8.1 (A) Identify the basic structure and function of the male and female reproductive systems. | A.HAP.8.1 (B) Identify structures of the reproductive system in a model or visual representation. | A.HAP.8.1 (C) Identify male and female differences. |
| A.HAP.8.2 (A) Identify basic male reproductive anatomy and relate structure to sperm production. | A.HAP.8.2 (B) Discuss basic male reproductive anatomy and relate structure to sperm production. | A.HAP.8.2 (C) Recall basic male reproductive anatomy. |
| A.HAP.8.3 (A) Identify basic female reproductive anatomy and relate structure to egg production. | A.HAP.8.3 (B) Discuss basic female reproductive anatomy and relate structure to egg production. | A.HAP.8.3 (C) Recall basic female reproductive anatomy. |
| A.HAP.8.4 (A) Examine the negative influences on personal decision making for responsible sexual behavior. | A.HAP.8.4 (B) Discuss the negative influences on personal decision making for responsible sexual behavior. | A.HAP.8.4 (C) Recall a negative influence on personal decision making for responsible sexual behavior. |

COURSE: Alternate Science Elements II
 DOMAIN: Human Anatomy and Physiology
 CONCEPT: Male and Female Reproductive Systems

| | | |
|---|--|--|
| A.HAP.8.5 (A) Identify various contraceptive methods. | A.HAP.8.5 (B) Discuss various contraceptive methods. | A.HAP.8.5 (C) Define a contraceptive. |
| A.HAP.8.6 (A) Describe the basic changes that occur during embryonic/fetal development, birth, and the growth and development from infancy, childhood, and adolescence to adult. | A.HAP.8.6 (B) Discuss the basic changes that occur during embryonic/fetal development, birth, and the growth and development from infancy, childhood, and adolescence to adult. | A.HAP.8.6 (C) Recall a basic change that occurs during embryonic/fetal development and a growth/development that occurs from infancy to adult. |
| A.HAP.8.7 (A) Identify the basic causes and effects of various reproductive diseases and disorders (e.g., infertility, sexually transmitted diseases, ectopic pregnancy, etc.). | A.HAP.8.7 (B) Discuss the basic causes and effects of various reproductive diseases and disorders (e.g., infertility, sexually transmitted diseases, ectopic pregnancy, etc.). | A.HAP.8.7 (C) Recall there are various reproductive diseases (e.g., infertility, sexually transmitted diseases, and ectopic pregnancy, etc.). |
| Real World Connections: <ul style="list-style-type: none"> • Correctly label themselves as male or female. • Correctly label pictures as boy/girl/man/woman. • Identify private parts of the body. • Identify the major cycles of development (i.e., embryo/fetus/baby/toddler/child/adolescent/adult). | | Vocabulary: <ul style="list-style-type: none"> • Adolescent • Baby • Birth control • Child • Contraceptive • Ectopic pregnancy • Female • Infant • Infertility • Male • Pregnant • Reproductive system • Sexually transmitted disease • Toddler |
| Resources: <ul style="list-style-type: none"> • Websites, articles, and other collections <ul style="list-style-type: none"> ○ Kids Health from Nemours <ul style="list-style-type: none"> ▪ Reproduction ▪ Puberty in Boys ▪ Puberty in Girls ○ Sexuality Resource Center for Parents (srcp.org) <ul style="list-style-type: none"> ▪ Parent Resources ○ Seattle Children’s Center for Children with Special Needs (cshcn.org) <ul style="list-style-type: none"> ▪ Sexuality and Puberty • Activities <ul style="list-style-type: none"> ○ Discuss appropriate names for the reproductive anatomy. | | |

COURSE: Alternate Science Elements II

DOMAIN: Human Anatomy and Physiology

CONCEPT: Male and Female Reproductive Systems

- Read a book on good and bad touching and how to tell someone.
- Play the game “Truth and Consequences.”
- **Videos**
 - YouTube.com by Eleanor Stein
 - [Sex for Middle School Basics](#)
 - YouTube by Centers for Disease Control and Prevention (CDC)
 - [What is Sexual Violence?](#)
 - YouTube by Air Force Productions
 - [Live Our Values - Sexual Assault Prevention](#)

COURSE: Alternate Science Elements II
 DOMAIN: Human Anatomy and Physiology
 CONCEPT: Blood

| Standard | | Performance Objectives | |
|---|---|---|--|
| A.HAP.9 Students will identify the basic functions of blood and its role in maintaining homeostasis. | | A.HAP.9.1 Identify the basic roles of blood in the body (i.e., transports oxygen and other elements throughout the body and removes waste products) which result in homeostasis. A.HAP.9.2 Identify the four major blood type groups (i.e., A, B, AB, and O). A.HAP.9.3 Identify various inherited pathological conditions of blood in the body (e.g., anemia, leukemia, sickle cell, hemophilia, etc.). | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| A.HAP.9.1 (A) Identify the basic roles of blood in the body (i.e., transports oxygen and other elements throughout the body and removes waste products) which result in homeostasis. | A.HAP.9.1 (B) Define homeostasis. | A.HAP.9.1 (C) State that our bodies contain blood. | |
| A.HAP.9.2 (A) Identify the four major blood type groups (i.e., A, B, AB, and O). | A.HAP.9.2 (B) Identify two of the four major blood type groups (i.e., A, B, AB, and O). | A.HAP.9.2 (C) Recall there are different blood groups. | |
| A.HAP.9.3 (A) Identify various inherited pathological conditions of blood in the body (e.g., anemia, leukemia, sickle cell, hemophilia, etc.). | A.HAP.9.3 (B) Identify two inherited pathological conditions of blood in the body (e.g., anemia, leukemia, sickle cell, hemophilia, etc.). | A.HAP.9.3 (C) Identify one inherited pathological condition of blood in the body (e.g., anemia, leukemia, sickle cell, hemophilia, etc.). | |
| Real World Connections: <ul style="list-style-type: none"> • State blood type. • Point to visible veins in one's body. • Have Mississippi Blood Services visit the class. • Host a school blood drive. • Have the school nurse to speak to the class. | | Vocabulary: <ul style="list-style-type: none"> • Anemia • Blood • Body • Disease • Hemophilia • Homeostasis • Inherited • Leukemia • Sickle cell • Type • Vein | |
| Resources: <ul style="list-style-type: none"> • Websites, articles, and other collections <ul style="list-style-type: none"> ○ About Kids Health (https://www.aboutkidshealth.ca) | | | |

COURSE: Alternate Science Elements II
DOMAIN: Human Anatomy and Physiology
CONCEPT: Blood

- [Blood](#)
- Kids Health from Nemours (kidshealth.org)
 - [Sickle Cell Disease](#)
 - [What's Anemia?](#)
- The Nobel Prize Organization | Educational Games (educationalgames.nobelprize.org)
 - [The Blood Typing Game](#)
- **Videos**
 - YouTube by makemeagenius
 - [Blood Type Video](#)
 - Study.com
 - [Homeostasis Video](#)
 - [Homeostasis Video](#)
 - [How Blood Works](#)
 - Onlinemathlearning.com (onlinemathlearning.com)
 - [How to type blood](#)
 - Khan Academy (khanacademy.org)
 - [Hematologic System](#)

| Standard | | Performance Objectives | |
|---|---|--|--|
| <p>A.HAP.10 Students will identify the basic organs, functions of those organs, and the circulation of blood through the cardiovascular system. Students will describe ways to maintain and monitor cardiovascular health.</p> | | <p>A.HAP.10.1 Identify the organs in the cardiovascular system (e.g., heart, blood vessels, veins, arteries, capillaries, etc.) and their location in the body. A.HAP.10.2 Identify the main functions of the organs of the cardiovascular system. A.HAP.10.3 Describe the direction of the flow of blood through the cardiovascular system. A.HAP.10.4 Describe ways to maintain and monitor the cardiovascular system (e.g., exercise, healthy diet, check pulse and blood pressure, etc.).</p> | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| <p>A.HAP.10.1 (A) Identify the organs in the cardiovascular system (e.g., heart, blood vessels, veins, arteries, and capillaries) and their location in the body.</p> | <p>A.HAP.10.1 (B) Discuss the organs in the cardiovascular system (e.g., heart, blood vessels, veins, arteries, and capillaries).</p> | <p>A.HAP.10.1 (C) Locate the heart on a diagram/picture.</p> | |
| <p>A.HAP.10.2 (A) Identify the main functions of the organs of the cardiovascular system.</p> | <p>A.HAP.10.2 (B) Discuss the functions of the organs of the cardiovascular system.</p> | <p>A.HAP.10.2 (C) Identify the heart as a muscle that pumps blood.</p> | |
| <p>A.HAP.10.3 (A) Describe the direction of the flow of blood through the cardiovascular system.</p> | <p>A.HAP.10.3 (B) Use a model to discuss the direction of the flow of blood through the cardiovascular system.</p> | <p>A.HAP.10.3 (C) Recall the direction of the flow of blood through the cardiovascular system.</p> | |
| <p>A.HAP.10.4 (A) Describe ways to maintain and monitor the cardiovascular system (e.g., exercise, healthy diet, check pulse and blood pressure, etc.).</p> | <p>A.HAP.10.4 (B) Recognize ways to maintain and monitor the cardiovascular system (e.g., exercise, healthy diet, check pulse and blood pressure, etc.).</p> | <p>A.HAP.10.4 (C) Discuss the connection to exercise and the heart.</p> | |
| <p>Real World Connections:</p> <ul style="list-style-type: none"> • Feel a pulse. • Count and compare heart rates. • Identify and practice basic exercises recommended by the American Heart Association. • Take their blood pressure. | | <p>Vocabulary:</p> <ul style="list-style-type: none"> • Artery • Beat • Blood • Blood pressure • Blood vessels • Count • Heart • Heartbeat • Muscle • Organ | |

- Body
- Capillaries
- Pulse
- Vein

Resources:

- **Websites, articles, and other collections**

- Wikipedia (wikipedia.org)
 - [Cardiology](#)
- American Heart Association (heart.org)
 - [Professional Heart Daily](#)
- The Health Engine Network, Australia (healthengine.com)
 - [Cardiovascular System \(Heart\) Anatomy](#)

- **Activities**

- Compose a haiku about the cardiovascular system that describes something about how this system works. A haiku has five syllables on the first line, seven on the middle line, and five on the last line. After you've completed your haiku, illustrate it.
- Conduct several experiments to determine how the heart rate is affected by physical activity and record the results on a data table.
- Form a group with four other classmates (there should be five of you in all). Each of you has a special job: VEIN, HEART, LUNGS, ARTERY, and BODY. Pretend a beanbag or ball is the blood. The VEIN will send blood to the HEART. The HEART will send blood to the LUNGS for oxygen. The LUNGS will send blood back to the HEART. Then the HEART will send the blood through the ARTERY. The ARTERY will send the blood to the rest of the BODY. The BODY will return the blood through the VEIN. Practice tossing the beanbag or ball in this circulation. When you think you're ready, ask your teacher to time you for 1 minute. How many times can your group circulate the beanbag or ball in the correct order in 1 minute?

- **Videos**

- Kids Health from Nemours (kidshealth.org)
 - [How the Body Works](#)
 - [How the Heart Works](#)
- YouTube by Happy Learning English
 - [The Circulatory System](#)
- YouTube by Mayo Clinic
 - [Kids! Small Steps to a Healthy You](#)
- Hip Hop Public Health (hhph.org/americanhearthealthmonth)
 - [A Head Start to a Healthy Heart](#)

| Standard | | Performance Objectives | |
|---|---|---|--|
| <p>A.HAP.12 Students will identify the basic organs, the functions of those organs, the flow of oxygen through the respiratory system, the basic symptoms of illness(es) of the respiratory system, and ways to maintain a healthy respiratory system.</p> | | <p>A.HAP.12.1 Identify the basic organs of the respiratory system and their essential functions (e.g., nose, mouth, esophagus/windpipe, lungs, etc.). A.HAP.12.2 Identify the basic symptoms of pathological conditions of the respiratory system (e.g., asthma, bronchitis, influenza, pneumonia, COPD, etc.). A.HAP.12.3 Identify new environmental causes of respiratory distress (e.g., e-cigarettes, environmental pollutants, changes in inhaled gas composition, etc.). A.HAP.12.4 Describe ways to maintain a healthy respiratory system (e.g., no smoking, exercising, maintaining a healthy weight, avoid exposure to environmental pollutants and irritants, etc.).</p> | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| <p>A.HAP.12.1 (A) Identify the basic organs of the respiratory system and their essential functions (e.g., nose, mouth, esophagus/windpipe, lungs, etc.).</p> | <p>A.HAP.12.1 (B) Identify that breathing is the act of taking in oxygen and expelling carbon dioxide.</p> | <p>A.HAP.12.1 (C) Identify the lungs in a model or diagram of the body.</p> | |
| <p>A.HAP.12.2 (A) Identify the basic symptoms of pathological conditions of the respiratory system (e.g., asthma, bronchitis, influenza, pneumonia, COPD, etc.).</p> | <p>A.HAP.12.2 (B) Indicate the basic symptoms of pathological conditions of the respiratory system (e.g., asthma, bronchitis, influenza, pneumonia, COPD, etc.).</p> | <p>A.HAP.12.2 (C) Identify a basic symptom of pathological conditions of the respiratory system (e.g., asthma, bronchitis, influenza, pneumonia, COPD, etc.).</p> | |
| <p>A.HAP.12.3 (A) Identify new environmental causes of respiratory distress (e.g., e-cigarettes, environmental pollutants, changes in inhaled gas composition, etc.).</p> | <p>A.HAP.12.3 (B) Define new environmental causes of respiratory distress (e.g., e-cigarettes, environmental pollutants, etc.).</p> | <p>A.HAP.12.3 (C) Name new environmental causes of respiratory distress (e.g., e-cigarettes, environmental pollutants, etc.).</p> | |
| <p>A.HAP.12.4 (A) Describe ways to maintain a healthy respiratory system (e.g., no smoking, exercising, maintaining a healthy weight, avoid exposure to environmental pollutants and irritants, etc.).</p> | <p>A.HAP.12.4 (B) Define ways to maintain a healthy respiratory system (e.g., no smoking, exercising, maintaining a healthy weight, avoid exposure to environmental pollutants and irritants, etc.).</p> | <p>A.HAP.12.4 (C) Recall ways to be healthy.</p> | |

COURSE: Alternate Science Elements II
DOMAIN: Human Anatomy and Physiology
CONCEPT: Respiratory System

Real World Connections:

- Compare breathing after sitting vs. exercising.
- Make a poster with items that hinder breathing.
- Have a health care professional speak to the class.
- Visit a health care facility.

Vocabulary:

- Air
- Asthma
- Bronchitis
- Carbon dioxide
- Diagram
- Environmental pollutants
- Esophagus
- Exercise
- Influenza
- Irritant
- Lungs
- Mouth
- Nose
- Oxygen
- Pathological condition
- Pneumonia
- Respiratory distress
- Respiratory system
- Ribs
- Smoke
- Throat
- Vape

Resources:

- **Websites, articles, and other collections**
 - Kids Health from Nemours (kidshealth.org)
 - [Your Lungs & Respiratory System](#)
 - Kids Health from Nemours (<http://www.kidshealth.org/>)
 - [Asthma](#)
 - Teach Engineering STEM Curriculum for K-12 (teachengineering.org)
 - [Breathe In, Breathe Out](#)

Activities

- Create a vision board of careers that may be pursued in the health field.
- Complete an obstacle course checking your pulse and breathing. Enter data input into a data table.
- Make a model of the respiratory system.

Videos

- YouTube by Osmosis
 - [Anatomy and Physiology of the Respiratory System](#)
- YouTube by Christopher E. Gaw
 - [How Does Asthma Work?](#)
- YouTube by World Health Organization

COURSE: Alternate Science Elements II
DOMAIN: Human Anatomy and Physiology
CONCEPT: Respiratory System

- [WHO: Breathe Life - How air pollution impacts your body](#)
- YouTube by Osmosis
 - [Pneumonia – causes, symptoms, diagnosis, treatment, pathologica](#)
- YouTube by MD Anderson Center
 - [Dangers of E-cigarettes, Vaping and JUULs: How to talk to kids](#)

| Standard | Performance Objectives | |
|--|--|--|
| A.HAP.13 Students will identify the basic structures and functions of the digestive system, including basic symptoms of illness(es), common pathological conditions, and basic treatment of symptoms. | A.HAP.13.1 Identify primary organs of the digestive system (e.g., mouth, esophagus, stomach, large intestines, small intestines, colon, etc.) and their basic functions. A.HAP.13.2 Identify basic symptoms of illness(es) of the digestive system (e.g., upset stomach, stomach pain, nausea, diarrhea, etc.). A.HAP.13.3 Identify common pathological conditions of the digestive system (e.g., stomach virus, lactose intolerance, GERD/acid reflux, etc.) and treatment responses (e.g., staying hydrated, taking over-the-counter medication, knowing when to seek medical attention, etc.). | |
| I Can Statements | | |
| MOST COMPLEX ← | → LEAST COMPLEX | |
| A.HAP.13.1 (A) Identify primary organs of the digestive system (e.g., mouth, esophagus, stomach, large intestines, small intestines, colon, etc.) and their basic functions. | A.HAP.13.1 (B) Discuss primary organs of the digestive system (e.g., mouth, esophagus, stomach, large intestines, small intestines, colon, etc.) and their basic functions. | A.HAP.13.1 (C) Identify one or two primary organs of the digestive system (e.g., mouth, esophagus, stomach, large intestines, small intestines, and colon) and their basic functions. |
| A.HAP.13.2 (A) Identify basic symptoms of illness(es) of the digestive system (e.g., upset stomach, stomach pain, nausea, diarrhea, etc.). | A.HAP.13.2 (B) Discuss basic symptoms of illness(es) of the digestive system (e.g., upset stomach, stomach pain, nausea, diarrhea, etc.). | A.HAP.13.2 (C) Point to the area of the body where basic symptoms of illness(es) of the digestive system occur (e.g., upset stomach, stomach pain, nausea, diarrhea, etc.). |
| A.HAP.13.3 (A) Identify common pathological conditions of the digestive system (e.g., stomach virus, lactose intolerance, GERD/acid reflux, etc.) and treatment responses (e.g., staying hydrated, taking over-the-counter medication, knowing when to seek medical attention, etc.). | A.HAP.13.3 (B) Discuss common pathological conditions of the digestive system (e.g., stomach virus, lactose intolerance, GERD/acid reflux, etc.) and treatment responses (e.g., staying hydrated, taking over-the-counter medication, knowing when to seek medical attention, etc.). | A.HAP.13.3 (C) Recall one reason your stomach may hurt. |
| Real World Connections: <ul style="list-style-type: none"> • Eat a healthy snack. • Create a “care kit” with pictures of over-the-counter medications used for stomach pains. | Vocabulary: <ul style="list-style-type: none"> • Acid reflux • Chew • Diarrhea • Large intestines • Mouth • Nausea | |

- Have a guest speaker about the digestive system and ways to keep healthy.

- Digestive system
- Eat
- Esophagus
- Food
- Hurt
- Lactose intolerance

- Over-the-counter medication
- Pain
- Small intestines
- Stomach
- Stomach virus

Resources:

- **Websites, articles, and other collections**

- Kids Health from Nemours (kidshealth.org)
 - [Your Digestive System](#)
- Science Kids | Fun science and technology for kids (sciencekids.co.nz)
 - [Human Body Facts | Digestive System Facts](#)

- **Activities**

- Digestion - Place a sugar cube in a cup of water. Place about a spoonful of granulated sugar in the other cup of water. Observe what happens.
- Carbohydrate digestion - Have the students chew two unsalted soda crackers for two minutes without swallowing.
- Digestion simulation:
 - Materials: Meatball-size lump of hamburger, plastic baggie, 1 M of HCL, three eyedroppers full of digestive Juice A (pepsin, trypsin, and water) and two eyedroppers full of digestive Juice B (bile salts, pancreatin enzyme, and water)
 - Procedures: Place the hamburger in the plastic baggie. Add 1M HCL, three eyedroppers full of digestive Juice A, and two eyedroppers full of digestive Juice B into the plastic baggie. Knead the bag with your hands for 10-15 minutes to simulate the muscular contractions of the stomach. After kneading the contents of the baggie, observe the hamburger and open the bag slightly to detect any odors.
- How do villi aid the small intestine in absorption? Compare how one, two, three, and four folded paper towels absorb. Dip each paper towel into a cup of water (use the same amount of water in each cup). Record the volume of water left in the cup (using a graduated cylinder).
- A digestive system simulation
 - Procedure: Make the following ahead of time:
 - FOOD TUBE: Lay out two parallel lines of tape on the floor, 3' apart and long enough for half the class to stand shoulder-to-shoulder on one side of the parallel lines.

- **FOOD PARTICLE:** The food particle consists of M&Ms placed in small zip-lock bags. These are placed in wadded newspapers in small paper sacks. Place the small sacks in larger sacks with added newspaper. Place all sacks and add newspaper until the large plastic bag is full. This bag is then taped or tied closed to complete the food particle.
- **Action:**
 - **Peristaltic movement:** Put the food particle to be eaten at one end of the food tube and a large trash can at the other. Have students line up on both sides, facing each other, and squeeze the food particle the length of the food tube.
 - **Digestion:** Label and/or instruct the players. As the food comes to a student, they should narrate what they are doing and why.
 - Teeth - tear food apart (break plastic bag)
 - Saliva - use spray bottles to moisten food particle
 - Stomach - tear small bags apart
 - Pancreatic juices - spray food
 - Small intestine - absorbs food; find bags of candy and pass to blood (the teacher can play the role of the blood)
 - Large intestine - reabsorbs water; sponge up water on the floor
 - Rectum/Anus - puts the waste papers in the trash can

- **Videos**

- YouTube by Emma Bryce
 - [How Your Digestive System Works](#)
- YouTube by Happy Learning English (happylearning.tv)
 - [The Digestive System and Digestion | Educational video for kids](#)
- Teacher Planet (teacherplanet.com)
 - [Human Digestive System](#)
 - [The Digestive System](#)

COURSE: Alternate Science Elements II

DOMAIN: Botany

CONCEPT: Plant Morphology, Cell Structure, and Function

| Standard | | Performance Objectives | |
|---|--|---|--|
| <p>A.BOT.1 Students will develop a basic understanding of the anatomy and growth of plants.</p> | | <p>A.BOT.1.1 Identify the basic needs of native plants (specific to the region). A.BOT.1.2 Identify growing seasons, sunlight requirements, and water needs of native food-bearing plants (e.g., corn, carrots, turnip greens, potatoes, tomatoes, squash, watermelons, cantaloupe, bell pepper, etc.). A.BOT.1.3 Identify the basic process of seed germination for a variety of native plants. (e.g., soil, seed, sprout, flower, fruit, etc.). A.BOT.1.4 Identify the needs of native plants at various stages of development (e.g., pole beans require a stake or trellis to grow on, tomatoes require shoots that grow out of the joint of a branch to be removed, etc.). A.BOT.1.5 Identify poisonous (harmful) plants. (e.g., poison ivy, holly berries, poison oak, sumac, etc.). A.BOT.1.6 Identify various methods, including technology, of harvesting native plants (e.g., fruits, vegetables, grains, hay, etc.).</p> | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| A.BOT.1.1 (A) Identify the basic needs of native plants (specific to the region). | A.BOT.1.1 (B) Identify a native plant (specific to the region). | A.BOT.1.1 (C) Name a basic need of plants. | |
| A.BOT.1.2 (A) Identify growing seasons, sunlight requirements, and water needs of native food-bearing plants (e.g., corn, carrots, turnip greens, potatoes, tomatoes, squash, watermelons, cantaloupe, bell pepper, etc.). | A.BOT.1.2 (B) Name three native food-bearing plants. | A.BOT.1.2 (C) Identify the four seasons verbally or by picture or drawing. | |
| A.BOT.1.3 (A) Identify the basic process of seed germination for a variety of native plants. (e.g., soil, seed, sprout, flower, fruit, etc.). | A.BOT.1.3 (B) Draw a seed germination. | A.BOT.1.3 (C) State that a seed becomes a plant. | |
| A.BOT.1.4 (A) Identify the needs of native plants at various stages of development (e.g., pole beans require a stake or trellis to grow on, tomatoes require shoots that grow out of the | A.BOT.1.4 (B) Identify two of the needs of native plants at various stages of development (e.g., pole beans require a stake or trellis to grow on, tomatoes require shoots that grow out of | A.BOT.1.4 (C) Identify one need of native plants at various stages of development (e.g., pole beans require a stake or trellis to grow on, tomatoes require shoots that grow out of the joint of a | |

COURSE: Alternate Science Elements II

DOMAIN: Botany

CONCEPT: Plant Morphology, Cell Structure, and Function

| | | |
|---|--|---|
| joint of a branch to be removed, etc. | the joint of a branch to be removed, etc.). | branch to be removed, etc.). |
| A.BOT.1.5 (A) Identify poisonous (harmful) plants. (e.g., poison ivy, holly berries, poison oak, sumac, etc.). | A.BOT.1.5 (B) Match poisonous plants. | A.BOT.1.5 (C) Discuss a plant that is harmful to humans. |
| A.BOT.1.6 (A) Identify various methods, including technology, of harvesting native plants (e.g., fruits, vegetables, grains, hay, etc.). | A.BOT.1.6 (B) Identify two ways to harvest native plants. | A.BOT.1.6 (C) Recall how to harvest a plant. |
| <p>Real World Connections:</p> <ul style="list-style-type: none"> • Plant a vegetable seed. • Grow a flower. • Participate in a field trip to a garden. • Eat fruits and vegetables. • Discuss careers in growing or selling plants. • Have someone from Mississippi State University’s horticulture department speak to the class. • Visit the Mississippi State Fair exhibit on agriculture. • Virtually visit the Mississippi Ag Museum. • Visit a greenhouse. • Visit a local farm or have a local urban farmer speak to the class. | | <p>Vocabulary:</p> <ul style="list-style-type: none"> • Flower • Grow • Light • Plant • Root • Soil • Sprout • Stem • Sun • Vegetable • Water |
| <p>Resources:</p> <ul style="list-style-type: none"> • Websites, articles, and other collections <ul style="list-style-type: none"> ○ Ducksters (ducksters.com) <ul style="list-style-type: none"> ▪ Biology for Kids: Plants ▪ Biology for Kids: Photosynthesis ○ Beyond Penguins and Polar Bears Oklahoma State University (beyondpenguins.ehe.osu.edu) <ul style="list-style-type: none"> ▪ All about plants • Activities <ul style="list-style-type: none"> ○ Have a class garden. ○ Reteach jobs in the horticultural field. ○ Draw or design a garden on a poster board or presentation if you cannot do a class garden. | | |

COURSE: Alternate Science Elements II

DOMAIN: Botany

CONCEPT: Plant Morphology, Cell Structure, and Function

- **Videos**

- YouTube by SciShow Kids
 - [How Does a Seed Become a Plant?](#)
 - [Grow Your Own Plants](#)
- YouTube by Learning Junction
 - [Parts of a Plant for Kids](#)
- YouTube by Trillium
 - [Poisonous Plants Identification – Pt.1](#)

COURSE: Alternate Science Elements II

DOMAIN: Earth and Space Science

CONCEPT: Earth's Resources and Human Activity

| Standard | | Performance Objectives | |
|---|--|--|--|
| <p>A.ESS.4 Students will develop a basic understanding of Earth's resources and the impact of human activities and methods to preserve the Earth.</p> | | <p>A.ESS.4.1 Identify Earth's most basic natural resources (e.g., oil, minerals, soil, water, etc.).</p> <p>A.ESS.4.2 Identify how humans impact Earth's systems and natural resources (e.g., deforestation, pollution, erosion, etc.).</p> <p>A.ESS.4.3 Identify everyday consumable products that are environmentally friendly and those products that contribute to polluting environments (e.g., reusable grocery bags, products made from recycled material, car emissions, factory emissions, chemical run off from farms, aerosol, etc.).</p> <p>A.ESS.4.4 Identify models to aid in the responsible management of natural resources (e.g., recycling, composting, energy usage, etc.).</p> | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| <p>A.ESS.4.1 (A) Identify Earth's most basic natural resources (e.g., oil, minerals, soil, water, etc.).</p> | <p>A.ESS.4.1 (B) Match four of the Earth's basic resources (e.g., oil, minerals, soil, water, etc.).</p> | <p>A.ESS.4.1 (C) Define resource.</p> | |
| <p>A.ESS.4.2 (A) Identify how humans impact Earth's systems and natural resources. (e.g., deforestation, pollution, erosion, etc.).</p> | <p>A.ESS.4.2 (B) Discuss how humans impact Earth's systems and natural resources. (e.g., deforestation, pollution, erosion, etc.).</p> | <p>A.ESS.4.2 (C) Recognize and identify the impact of pollution.</p> | |
| <p>A.ESS.4.3 (A) Identify everyday consumable products that are environmentally friendly and those products that contribute to polluting environment. (e.g., reusable grocery bags, products made from recycled material, car emissions, factory emissions, chemical run off from farms, aerosol, etc.).</p> | <p>A.ESS.4.3 (B) Discuss everyday consumable products that are environmentally friendly and those products that contribute to polluting environments (e.g., reusable grocery bags, products made from recycled material, car emissions, factory emissions, chemical run off from farms, aerosol, etc.).</p> | <p>A.ESS.4.3 (C) Define environment.</p> | |
| <p>A.ESS.4.4 (A) Identify models to aid in the responsible management of natural resources (e.g., recycling, composting, energy usage, etc.).</p> | <p>A.ESS.4.4 (B) Understand ways humans can work to preserve natural resources (e.g.,</p> | <p>A.ESS.4.4 (C) Discuss the diagram of recycling.</p> | |

COURSE: Alternate Science Elements II

DOMAIN: Earth and Space Science

CONCEPT: Earth's Resources and Human Activity

recycling, conservation of water, carpooling, etc.).

Real World Connections:

- Participate in field trip to a recycling center.
- Recycle classroom waste.
- Sort paper from plastic.
- Participate in a cleaning project to clean the school campus.

Vocabulary:

- Air
- Consumable
- Impact
- Land
- Natural resource
- Oil
- Plastic
- Pollution
- Recycle
- Resources
- Save
- Soil
- Water

Resources:

- **Websites, articles, and other collections**
 - Ducksters (ducksters.com)
 - [The Environment](#)
 - Britannica Kids (kids.britannica.com)
 - [Natural Resource](#)
 - Earth Resources Recycling (Earthresourcesrecycling.com)
 - [Recycling Guidelines Chart of Accepted Material Types](#)
- **Activities**
 - Create a recycling program.
 - Create posters and post around campus of ways to help the environment.
 - Paint garbage cans to show recycling symbols.
 - Create a recycling guide for your classroom.
- **Videos**
 - Britannica Kids (kids.britannica.com)
 - [Natural Resource](#)
 - YouTube by SciShow
 - [How Recycling Works](#)
 - U.S. Forest Service (fs.usda.gov)
 - [Managing the Land: Natural Resources](#)

COURSE: Alternate Science Elements II

DOMAIN: Zoology

CONCEPT: Phylum Chordata, Classes Chondrichthyes and Osteichthyes

| Standard | | Performance Objectives | |
|--|---|--|--|
| <p>A.ZOO.7 Students will understand the basic structure and function of fish and how they demonstrate the characteristics of living things.</p> | | <p>A.ZOO.7.1 Students will identify changes that fish have made over time to adapt to the different aquatic environments.</p> <p>A.ZOO.7.2 Identify common freshwater fish (e.g., bass, bream, catfish, white perch, etc.) and saltwater fish (e.g., shark, flounder, red snapper, red fish, mahi mahi, etc.) and their differences.</p> <p>A.ZOO.7.3 Identify interaction dangers between humans and fish.</p> | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| <p>A.ZOO.7.1 (A) Students will identify changes that fish have made over time to adapt to the different aquatic environments.</p> | <p>A.ZOO.7.1 (B) Match fish with aquatic environments.</p> | <p>A.ZOO.7.1 (C) Recognize different types of fish.</p> | |
| <p>A.ZOO.7.2 (A) Identify common freshwater fish (e.g., bass, bream, catfish, white perch, etc.) and saltwater fish (e.g., shark, flounder, red snapper, red fish, mahi mahi, etc.) and their differences.</p> | <p>A.ZOO.7.2 (B) Match freshwater fish (e.g., bass, bream, catfish, white perch, etc.) and saltwater fish (e.g., shark, flounder, red snapper, red fish, mahi mahi, etc.).</p> | <p>A.ZOO.7.2 (C) Recognize different kinds of fish (i.e., saltwater and freshwater).</p> | |
| <p>A.ZOO.7.3 (A) Identify interaction dangers between humans and fish.</p> | <p>A.ZOO.7.3 (B) Describe ways humans endanger fish.</p> | <p>A.ZOO.7.3 (C) Match pictures of ways humans cause danger to fish.</p> | |
| <p>Real World Connections:</p> <ul style="list-style-type: none"> • Take care of a fish for a class pet. • Participate in a field trip to a catfish farm. • Go fishing. • Invite an agent from the Department of Wildlife and Fisheries to come speak to the class. • Explore jobs in the commercial fishing industry. • Invite a fisherman to talk to the class. | | <p>Vocabulary:</p> <ul style="list-style-type: none"> • Aquatic • Bass • Bream • Catfish • Fish • Food • Freshwater • Saltwater • Shark • Water | |
| <p>Resources:</p> <ul style="list-style-type: none"> • Websites, articles, and other collections <ul style="list-style-type: none"> ○ Ducksters (ducksters.com) | | | |

COURSE: Alternate Science Elements II

DOMAIN: Zoology

CONCEPT: Phylum Chordata, Classes Chondrichthyes and Osteichthyes

- [Fish](#)

- **Activities**

- Identify types of fish.
- Identify only saltwater fish.
- Identify only freshwater fish.

- **Videos**

- UK Aquatic Plant Society (ukaps.org)
 - [Freshwater Natural Aquarium Documentary](#)
- Sciencing.com
 - [What is the Difference Between Freshwater vs. Saltwater Fish?](#)
- YouTube by National Geographic Kids
 - [Behind the Scenes: Coral Reef Episode from “Weird but True!” | Weirdest, Bestest, Truest](#)

COURSE: Alternate Science Elements II

DOMAIN: Zoology

CONCEPT: Phylum Chordata, Classes Amphibia and Reptilia

| Standard | | Performance Objectives | |
|---|--|---|--|
| Standard: A.ZOO.8 Students will understand the basic structure and function of amphibians and reptiles and how they demonstrate the characteristics of living things. | | Performance Objectives: A.ZOO.8.1 Identify that amphibians live part of their lives in water and part on land. A.ZOO.8.2 Identify common amphibians (e.g., frogs, salamanders, etc.) and reptiles (e.g., turtles, lizards, snakes, etc.). A.ZOO.8.3 Identify common amphibians and reptiles as well as their dangers and benefits to humans. | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| A.ZOO.8.1 (A) Identify that amphibians live part of their lives in water and part on land. | A.ZOO.8.1 (B) Associate habitats with amphibians (i.e., water and land). | A.ZOO.8.1 (C) Recognize an amphibian. | |
| A.ZOO.8.2 (A) Identify common amphibians (e.g., frogs, salamanders, etc.) and reptiles (e.g., turtles, lizards, snakes, etc.). | A.ZOO.8.2 (B) Discuss similarities between amphibians and reptiles. | A.ZOO.8.2 (C) Name an amphibian and reptile. | |
| A.ZOO.8.3 (A) Identify common amphibians and reptiles as well as their dangers and benefits to humans. | A.ZOO.8.3 (B) Discuss common amphibians and reptiles as well as their dangers and benefits to humans. | A.ZOO.8.3 (C) Recall a danger or benefit of amphibians and/or reptiles. | |
| Real World Connections: <ul style="list-style-type: none"> Care for a class pet such as a frog or turtle. Observe a tadpole grow into a frog. Take a class trip to the zoo. Visit the natural science museum (virtual or actual). Invite an agent from the Department of Wildlife and Fisheries to come speak to the class. | | Vocabulary: <ul style="list-style-type: none"> Amphibians Frog Land Lizard Reptile Snake Turtle Water | |
| Resources: <ul style="list-style-type: none"> Websites, articles, and other collections <ul style="list-style-type: none"> Ducksters (ducksters.com) <ul style="list-style-type: none"> Amphibians Reptiles | | | |

COURSE: Alternate Science Elements II

DOMAIN: Zoology

CONCEPT: Phylum Chordata, Classes Amphibia and Reptilia

- **Activities**

- Create a Venn diagram comparing amphibians and reptiles.
- Create a habitat for a reptile or amphibian.
- Research and present an example of either a reptile or amphibian, answering the question, “Which one is the best pet?”

- **Videos**

- YouTube by CT Naturalist
 - [What's the Difference Between Reptiles and Amphibians?](#)
- National Geographic (video.nationalgeographic.com)
 - [Amphibians](#)
- Daily Motion (dailymotion.com)
 - [Animal Planet - The Secret Life of Amphibians \(Monster Frogs/Toads\)](#)

COURSE: Alternate Science Elements II
 DOMAIN: Zoology
 CONCEPT: Phylum Chordata, Class Aves

| Standard | | Performance Objectives | |
|---|---|---|--|
| A.ZOO.9 Students will understand the structure and function of birds and how they demonstrate the characteristics of living things. | | A.ZOO.9.1 Identify how birds have adapted to their changing environment. A.ZOO.9.2 Identify common birds (e.g., hummingbird, mockingbird, hawk, etc.). A.ZOO.9.3 Identify birds of prey and how they use their keen sense of sight to locate and attack prey. A.ZOO.9.4 Identify parenting behavior of different birds in order to incubate their eggs and care for hatchlings. A.ZOO.9.5 Identify basic reasons for bird migration. | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| A.ZOO.9.1 (A) Identify how birds have adapted to their changing environment. | A.ZOO.9.1 (B) Identify different environments of birds. | A.ZOO.9.1 (C) Point to a picture of birds. | |
| A.ZOO.9.2 (A) Identify common birds (e.g., hummingbird, mockingbird, hawk, etc.). | A.ZOO.9.2 (B) Discuss common birds (e.g., hummingbird, mockingbird, hawk, etc.). | A.ZOO.9.2 (C) State a common bird. | |
| A.ZOO.9.3 (A) Identify birds of prey and how they use their keen sense of sight to locate and attack prey. | A.ZOO.9.3 (B) State birds of prey and how they use their keen sense of sight to locate and attack prey. | A.ZOO.9.3 (C) Define prey. | |
| A.ZOO.9.4 (A) Identify parenting behavior of different birds in order to incubate their eggs and care for hatchlings. | A.ZOO.9.4 (B) Discuss parenting behavior of different birds in order to incubate their eggs and care for hatchlings. | A.ZOO.9.4 (C) Use a picture to identify the parent bird and the offspring. | |
| A.ZOO.9.5 (A) Identify basic reasons for bird migration. | A.ZOO.9.5 (B) Using a map identify a migrant route. | A.ZOO.9.5 (C) Discuss birds' migration. | |
| Real World Connections: <ul style="list-style-type: none"> • Make a bird feeder. • Watch birds. • Invite a park ranger to come speak to the class. • Search for a bird nest. | | Vocabulary: <ul style="list-style-type: none"> • Bird • Egg • Environment • Feather • Fly • Incubate • Migration • Mother • Nest • Prey | |

- Food

Resources:

- **Websites, articles, and other collections**
 - Ducksters (ducksters.com)
 - [Birds](#)
 - Audubon (audubon.org)
 - [Guide to North American Birds](#)
 - All About Birds (allaboutbirds.org)
 - [Online Guide to Birds and Bird Watching](#)
- **Activities**
 - Create a bird guide.
 - Build a bird environment diorama.
 - Count and chart birds in your schoolyard.
- **Videos**
 - U.S. Fish and Wildlife Services (fws.gov)
 - [A Sanctuary for At-Risk Birds](#)
 - YouTube by Paul Dinning
 - [Video for Cats to Watch: Birds of Many Colours](#)
 - Daily Motion (dailymotion.com)
 - [Birds: Educational Video for Kids](#)

COURSE: Alternate Science Elements II

DOMAIN: Zoology

CONCEPT: Phylum Chordata, Class Mammalia

| Standard | | Performance Objectives | |
|--|--|--|--|
| <p>A.ZOO.10 Students will understand the structure and function of mammals and how they demonstrate the characteristics of living things.</p> | | <p>A.ZOO.10.1 Identify characteristics and behaviors that distinguish mammals from other classes of living things.</p> <p>A.ZOO.10.2 Identify how human impact has changed the environments of other organisms.</p> <p>A.ZOO.10.3 Identify common mammals (e.g., raccoon, feral pig, fox, squirrel, deer, etc.) and the differences in caring for their offspring.</p> <p>A.ZOO.10.4 Identify dangerous interactions and best practice responses between humans and mammals (i.e., black bears).</p> | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| <p>A.ZOO.10.1 (A) Identify characteristics and behaviors that distinguish mammals from other classes of living things.</p> | <p>A.ZOO.10.1 (B) Discuss characteristics and behaviors that distinguish mammals from other classes of living things.</p> | <p>A.ZOO.10.1 (C) Point to a picture of a mammal.</p> | |
| <p>A.ZOO.10.2 (A) Identify how human impact has changed the environments of other organisms.</p> | <p>A.ZOO.10.2 (B) Identify factors that can harm organisms in an environment (e.g., pollution, deforestation, hunting, habitat loss, etc.).</p> | <p>A.ZOO.10.2 (C) Discuss that humans can change their environment.</p> | |
| <p>A.ZOO.10.3 (A) Identify common mammals (e.g., raccoon, feral pig, fox, squirrel, deer, etc.) and the differences in caring for their offspring.</p> | <p>A.ZOO.10.3 (B) Discuss common mammals (e.g., raccoon, feral pig, fox, squirrel, deer, etc.) and the differences in caring for their offspring.</p> | <p>A.ZOO.10.3 (C) Select a mammal and offspring from a photo selection.</p> | |
| <p>A.ZOO.10.4 (A) Identify dangerous interactions and best practice responses between humans and mammals (i.e., black bears).</p> | <p>A.ZOO.10.4 (B) Discuss what happens when a dangerous mammal (i.e., a black bear) approaches a human.</p> | <p>A.ZOO.10.4 (C) Identify a dangerous mammal.</p> | |
| <p>Real World Connections:</p> <ul style="list-style-type: none"> • Participate in a virtual field trip to a zoo. • Participate in a field trip to a petting zoo. • Invite a park ranger to come speak to the class. | | <p>Vocabulary:</p> <ul style="list-style-type: none"> • Bird • Egg • Environment • Feather • Fly • Food • Incubate • Migration • Mother • Nest • Prey | |

COURSE: Alternate Science Elements II

DOMAIN: Zoology

CONCEPT: Phylum Chordata, Class Mammalia

Resources:

- **Websites, articles, and other collections**

- Ducksters (ducksters.com)
 - [Mammals](#)
- U. S. Wildlife and Fisheries (fws.gov)
 - [Fish and Aquatic Conservation](#)
- Education World (educationworld.com)
 - [Drought Threatens Huge Man-Made Lake](#)
 - [Shark Attack Quiz](#)

- **Activities**

- Design your own fish.
- Create a diorama of a fish habitat.
- Research jobs in the fish and wildlife area.

- **Videos**

- NOAA (fisheries.noaa.gov)
 - [Ecosystems videos](#)
- YouTube by U.S. Department of State
 - [Sustainable Fisheries](#)

COURSE: Alternate Science Elements II
 DOMAIN: Physical Science
 CONCEPT: Nature of Matter

| Standard | | Performance Objectives | |
|---|---|--|--|
| A.PHS.1 Students will identify and investigate the states of matter. | | A.PHS.1.1 Examine the properties of solids, liquids, and gases. A.PHS.1.2 Measure mass, volume, length, and temperature. A.PHS.1.3 Identify symbols that portray dangerous or hazardous materials. | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| A.PHS.1.1 (A) Examine the properties of solids, liquids, and gases. | A.PHS.1.1 (B) Identify the three properties (i.e., solid, liquid and gas). | A.PHS.1.1 (C) Use pictures to identify the three properties. | |
| A.PHS.1.2 (A) Measure mass, volume, length, and temperature. | A.PHS.1.2 (B) Identify tools used to measure length, volume, mass, and temperature. | A.PHS.1.2 (C) Identify a thermometer. | |
| A.PHS.1.3 (A) Identify symbols that portray dangerous or hazardous materials. | A.PHS.1.3 (B) Match symbols that portray dangerous or hazardous materials. | A.PHS.1.3 (C) Select a symbol that portrays danger. | |
| Real World Connections: <ul style="list-style-type: none"> • Fill ice trays and freeze them. • Take a person's temperature. • Measure the length of items. • Invite the school custodial staff to come talk with students regarding hazardous materials. • Follow a recipe. • Look for hazardous symbols on products such as bleach. | | Vocabulary: <ul style="list-style-type: none"> • Air • Danger • Gas • Hazard • Length • Liquid • Mass • Ruler • Scale • Sign • Solid • Symbol • Temperature • Thermometer • Volume • Weight | |
| Resources: <ul style="list-style-type: none"> • Websites, articles, and other collections <ul style="list-style-type: none"> ○ Ducksters (ducksters.com) <ul style="list-style-type: none"> ▪ Solids, Liquids and Gases ▪ Melting and Boiling • Activities | | | |

COURSE: Alternate Science Elements II

DOMAIN: Physical Science

CONCEPT: Nature of Matter

- Create properties of matter stations.
- Have a hazardous symbols scavenger hunt.

- **Videos**
 - YouTube by Manocha Academy
 - [State of Matter: Solid Liquid Gas](#)
 - Khan Academy (khanacademy.org)
 - [States of Matter and Intermolecular Forces](#)
 - Brain Pop (brainpop.com)
 - [States of Matter: basic games](#)
 - YouTube by Sriddle8119
 - [Matter Study Jams](#)

COURSE: Alternate Science Elements II
 DOMAIN: Physical Science
 CONCEPT: Newton's Laws of Motion

| Standard | Performance Objectives | |
|---|---|--|
| A.PHS.5 Students will investigate motion, force, and work. | A.PHS.5.1 Investigate the motion of an object using properties such as displacement, time of motion, velocity, and acceleration. A.PHS.5.2 Identify the different types of simple machines (e.g., incline plane, wedge, pulley, lever, etc.). A.PHS.5.3 Demonstrate an understanding of the similarities and differences of everyday machines and identify how they have improved and impacted society (e.g., electrical appliances, transportation vehicles, etc.). | |
| I Can Statements | | |
| MOST COMPLEX ←—————→ LEAST COMPLEX | | |
| A.PHS.5.1 (A) Investigate the motion of an object using properties such as displacement, time of motion, velocity, and acceleration. | A.PHS.5.1 (B) Make a prediction of the fall rate of two objects that have significantly different masses and surface areas. | A.PHS.5.1 (C) Recognize that projectiles have movement in both horizontal and vertical directions. |
| A.PHS.5.2 (A) Identify the different types of simple machines (e.g., incline plane, wedge, pulley, lever, etc.). | A.PHS.5.2 (B) Discuss how a simple machine (e.g., incline plane, wedge, pulley, lever, etc.) is used to reduce the amount of force needed for work. | A.PHS.5.2 (C) Select functions of simple machines (e.g., reduce the force required to lift something, move a heavy object from one place to another, etc.). |
| A.PHS.5.3 (A) Demonstrate an understanding of the similarities and differences of everyday machines and identify how they have improved and impacted society (e.g., electrical appliances, transportation vehicles, etc.). | A.PHS.5.3 (B) Describe a simple machine and how it is used to solve problems. | A.PHS.5.3 (C) Match a simple machine to its function. |
| Real World Connections: <ul style="list-style-type: none"> • Roll a ball up and down a hill. • Raise the flag on a flagpole. • Move boxes with a dolly. | Vocabulary: <ul style="list-style-type: none"> • Force • Incline plane • Lever • Machine • Motion • Pull • Pulley • Push • Speed • Wedge • Work | |

COURSE: Alternate Science Elements II
DOMAIN: Physical Science
CONCEPT: Newton's Laws of Motion

Resources:

- **Websites, articles, and other collections**

- Ducksters (ducksters.com)
 - [Physics for Kids: Simple Machines](#)
 - [Physics for Kids: Laws of Motion](#)
- Physics4kids.com ([physics4kids.com](#))
 - [Mechanics and Motion](#)
- Explain That Stuff (explainthatstuff.com)
 - [Forces and Motion](#)

- **Activities**

- Have a simple machine scavenger hunt.
- Practice using simple machines in the classroom (e.g., scissors, wedge for a door, screw on a bottle cap, etc.).
- Create a simple machines collage using magazine pictures.

- **Videos**

- YouTube by Clarendon Learning
 - [Simple Machines for Kids | Learn all about the 6 simple machines!](#)
- Generation Genius (generationgenius.com)
 - [Simple Machines for Kids](#)
- Public Broadcasting Service (pbs.org)
 - [Science Trek: Simple Machines](#)

COURSE: Alternate Science Elements II
 DOMAIN: Physical Science
 CONCEPT: Thermal Energy

| Standard | | Performance Objectives | |
|---|--|--|--|
| A.PHS.8 Identify characteristics of temperature scales, heat, and thermal energy transfer. | | A.PHS.8.1 Identify characteristics of freezing point, melting point, boiling point, vaporization, and condensation of different substances. A.PHS.8.2 Identify temperature of freezing point and boiling point. | |
| I Can Statements | | | |
| MOST COMPLEX ← | | → LEAST COMPLEX | |
| A.PHS.8.1 (A) Identify characteristics of freezing point, melting point, boiling point, vaporization, and condensation of different substances. | A.PHS.8.1 (B) Describe freezing point, melting point, boiling point, vaporization, and condensation through discussion, drawing, or experiment. | A.PHS.8.1 (C) Recognize hot and cold temperatures. | |
| A.PHS.8.2 (A) Identify temperature of freezing point and boiling point. | A.PHS.8.2 (B) Match items that would reach either the temperature of boiling point or freezing point. | A.PHS.8.2 (C) Recognize hot and cold items. | |
| Real World Connections: <ul style="list-style-type: none"> • Use a food thermometer to measure the temperature of various dishes. • Fill ice trays and freeze them. • Allow ice to melt. • Use a diffuser in the classroom. | | Vocabulary: <ul style="list-style-type: none"> • Air • Boil • Cold • Fahrenheit • Freeze • Hot • Ice • Melt • Temperature • Thermometer | |
| Resources: <ul style="list-style-type: none"> • Websites, articles, and other collections <ul style="list-style-type: none"> ○ Ducksters (ducksters.com) <ul style="list-style-type: none"> ▪ Physics for Kids: Temperature ▪ Physics for Kids: Science of Heat ○ Teachers Workstation (teacherworkstation.com) <ul style="list-style-type: none"> ▪ Week Four Lessons: Boiling Points and Freezing/Melting Points | | | |

COURSE: Alternate Science Elements II

DOMAIN: Physical Science

CONCEPT: Thermal Energy

- **Activities**

- Compare the amount of liquid in a cup with and without ice.
- Create properties of water foldables.
- Compare different food temperatures using a chart.
- Research the temperature that should be set for a home freezer.
- Measure the temperature of hot and cold water.
- Create a visual list of hot and cold items.

- **Videos**

- National Geographic ([nationalgeographic.com](https://www.nationalgeographic.com)) (subscription required)
 - [Frozen Bubbles, Instant Ice, and Other Winter Weather Stunts Explained](#)
- YouTube by ABC News (abcnews.com)
 - [People throw boiling water into freezing air to prove how cold it is.](#)
- NPR (npr.org)
 - [Three Cold-Weather Experiments](#)

APPENDIX A: Vocabulary

911: An emergency telephone number for the North American Numbering Plan (NANP), one of eight N11 codes. Like other emergency numbers around the world, this number is intended for use in emergency circumstances only, and using it for any other purpose (such as making false or prank calls) is a crime in most jurisdictions.

Acid reflux: A common condition that features a burning pain, known as heartburn, in the lower chest area. It happens when stomach acid flows back up into the food pipe.

Adolescent: A transitional stage of physical and psychological development that generally occurs during the period from puberty to legal adulthood. Adolescence is usually associated with the teenage years, but its physical, psychological, or cultural expressions may begin earlier and end later. For example, puberty now typically begins during preadolescence, particularly in females. Physical growth and cognitive development can extend into the early twenties. Thus, age provides only a rough marker of adolescence, and scholars have found it difficult to agree upon a precise definition of adolescence.

Abdominal: Of the abdomen, which is the part of the body that lies between the thorax and the pelvis and encloses the stomach, intestines, liver, spleen, and pancreas in humans and other mammals. Also called the belly.

Air: The invisible gaseous substance surrounding the earth, a mixture mainly of oxygen and nitrogen

Amphibians: Ectothermic, tetrapod vertebrates of the class Amphibia. Modern amphibians are all Lissamphibia. They inhabit a wide variety of habitats, with most species living within terrestrial, fossorial, arboreal, or freshwater aquatic ecosystems. Thus, amphibians typically start out as larvae living in water, but some species have developed behavioral adaptations to bypass this.

Anemia: A condition in which you lack enough healthy red blood cells to carry adequate oxygen to your body's tissues. Having anemia can make you feel tired and weak.

Appendicular Skelton: The portion of the skeleton of vertebrates consisting of the bones that support the appendages. The appendicular skeleton includes the skeletal elements within the limbs, as well as supporting shoulder girdle pectoral and pelvic girdle. The word appendicular is the adjective of the noun appendage, which itself means a part that is joined to something larger.

Aquatic: Growing or living in or frequenting water

Arm: Each of the two upper limbs of the human body from the shoulder to the hand

Artery: Any of the muscular-walled tubes forming part of the circulation system by which blood (mainly that which has been oxygenated) is conveyed from the heart to all parts of the body.

Asthma: A common long-term inflammatory disease of the airways of the lungs. It is characterized by variable and recurring symptoms, reversible airflow obstruction, and easily triggered bronchospasms. Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath. These may occur a few times a day or a few times per week. Depending on the person, asthma symptoms may become worse at night or with exercise.

Axial Skelton: The part of the skeleton that consists of the bones of the head and trunk of a vertebrate. In the human skeleton, it consists of 80 bones and is composed of six parts; the skull, the ossicles of the middle ear, the hyoid bone, the rib cage, the sternum, and the vertebral column. The

axial skeleton together with the appendicular skeleton form the complete skeleton. Another definition of axial skeleton is the bones including the vertebrae, sacrum, coccyx, ribs, and sternum.

Baby: An extremely young child

Bass: Any of a number of fish similar to or related to the perch

Bicep: A muscle on the front part of the upper arm. The biceps include a “short head” and a “long head” that work as a single muscle.

Bird: A warm-blooded egg-laying vertebrate distinguished by the possession of feathers, wings, and a beak and (typically) by being able to fly

Birth control: Also known as contraception and fertility control, it is a method or device used to prevent pregnancy. Birth control has been used since ancient times, but effective and safe methods of birth control only became available in the 20th century.

Blood: A body fluid in humans and other animals that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products away from those same cells.

Blood pressure: The pressure of circulating blood on the walls of blood vessels. Most of this pressure is due to work done by the heart pumping blood through the circulatory system. Used without further specification, blood pressure usually refers to the pressure in large arteries of the systemic circulation. Blood pressure is usually expressed in terms of the systolic pressure (maximum during one heartbeat) over diastolic pressure (minimum in between two heartbeats) and is measured in millimeters of mercury (mmHg) above the surrounding atmospheric pressure.

Blood vessels: A tubular structure carrying blood through the tissues and organs; a vein, artery, or capillary

Body: The structure of a human being. It is composed of many different types of cells that together create tissues and subsequently organ systems. They ensure homeostasis and the viability of the human body.

Body systems: The main systems of the human body are the circulatory, digestive, excretory, endocrine, integumentary, exocrine, immune, lymphatic, muscular, nervous, renal, urinary, reproductive, respiratory, and skeletal systems.

Boil: Reach or cause to reach the temperature at which it bubbles and turns to vapor

Bones: Any of the pieces of hard, whitish tissue making up the skeleton in humans and other vertebrates

Brain: An organ of soft nervous tissue contained in the skull of vertebrates, functioning as the coordinating center of sensation and intellectual and nervous activity.

Bream: A greenish-bronze deep-bodied freshwater fish native to Europe that is popular with anglers.

Breathe: To draw air into and expel it from the lungs. To take in oxygen and give out carbon dioxide through natural processes.

Broken: Separated into parts. Damaged or altered by or as if by breaking. Having undergone or been subjected to fracture.

Bronchitis: An inflammation of the bronchial tubes, the airways that carry air to your lungs. It causes a cough that often brings up mucus. It can also cause shortness of breath, wheezing, a low fever, and chest tightness. There are two main types of bronchitis: acute and chronic.

Capillaries: Any of the minute blood vessels that form networks throughout the bodily tissues. It is through the capillaries that oxygen, nutrients, and wastes are exchanged between the blood and the tissues. The capillary networks are the ultimate destination of arterial blood from the heart and are the starting point for flow of venous blood back to the heart. Between the smallest arteries, or arterioles, and the capillaries are intermediate vessels called precapillaries or metarterioles, that, unlike the capillaries, have muscle fibers that permit them to contract; thus, the precapillaries are able to control the emptying and filling of the capillaries.

Carbon Dioxide: A colorless, odorless gas produced by burning carbon and organic compounds and by respiration. It is naturally present in air (about 0.03%) and is absorbed by plants in photosynthesis.

Cardiac: Relating to the heart

Catfish: A diverse group of ray-finned fish. Named for their prominent barbels, which resemble a cat's whiskers, catfish range in size and behavior. Despite their name, not all catfish have prominent barbels or "whiskers." Catfish are of considerable commercial importance; many of the larger species are farmed or fished for food. Many of the smaller species, particularly the genus *Corydoras*, are important in the aquarium hobby. Many catfish are nocturnal, but others are crepuscular or diurnal.

Chew: To perform the act of crushing or grinding with the teeth

Child: A young human being below the age of puberty or below the legal age of majority

Cold: The common cold, also known simply as a cold, is a viral infectious disease of the upper respiratory tract that primarily affects the nose. The throat, sinuses, and larynx may also be affected. Signs and symptoms may appear less than two days after exposure to the virus. These may include coughing, sore throat, runny nose, sneezing, headache, and fever. People usually recover in seven to 10 days, but some symptoms may last up to three weeks. Occasionally those with other health problems may develop pneumonia.

Contraceptive: A device or drug serving to prevent pregnancy

Count: Determine the total number of (a collection of items)

Cramp: Painful involuntary contraction of a muscle or muscles, typically caused by fatigue or strain

Danger: The possibility of suffering harm or injury

Diagram: A symbolic representation of information using visualization techniques. Diagrams have been used since ancient times but became more prevalent during the Enlightenment. Sometimes, the technique uses a three-dimensional visualization which is then projected onto a two-dimensional surface. The word graph is sometimes used as a synonym for diagram.

Diarrhea: The condition of having at least three loose, liquid, or watery bowel movements each day. It often lasts for a few days and can result in dehydration due to fluid loss. Signs of dehydration

often begin with loss of the normal stretchiness of the skin and irritable behavior. This can progress to decreased urination, loss of skin color, a fast heart rate, and a decrease in responsiveness as it becomes more severe. Loose but non-watery stools in babies who are exclusively breastfed, however, are normal.

Digestive system: The human digestive system consists of the gastrointestinal tract plus the accessory organs of digestion (the tongue, salivary glands, pancreas, liver, and gallbladder). Digestion involves the breakdown of food into smaller and smaller components, until they can be absorbed and assimilated into the body.

Disease: A disorder of structure or function in a human, animal, or plant, especially one that produces specific signs or symptoms or that affects a specific location and is not simply a direct result of physical injury

Disorder: A functional abnormality or disturbance or a psychological disorder, a psychological pattern associated with distress or disability that occurs in an individual and is not a part of normal development or culture. Anxiety disorder—different forms of abnormal and pathological fear and anxiety. Conversion disorder—neurological symptoms, such as numbness, blindness, paralysis, or fits, where no neurological explanation is possible. Obsessive–compulsive disorder—an anxiety disorder characterized by repetitive behaviors aimed at reducing anxiety. Obsessive–compulsive personality disorder—obsession with perfection, rules, and organization. Personality disorder—an enduring pattern of inner experience and behavior that deviates markedly from the expectations of the culture of the individual who exhibits it.

Eat: Put (food) into the mouth and chew and swallow it

Ectopic pregnancy: A pregnancy in which the fetus develops outside the uterus, typically in a fallopian tube

Egg: The female reproductive cell in animals and plants; an ovum. Or an oval or round object laid by a female bird, reptile, fish, or invertebrate, usually containing a developing embryo. The eggs of birds are enclosed in a chalky shell, while those of reptiles are in a leathery membrane.

Emergency: A serious, unexpected, and often dangerous situation requiring immediate action

Environment: The surroundings or conditions in which a person, animal, or plant lives or operates

Environmental pollutants: Environmental pollution has existed for centuries, but only started to be significant following the industrial revolution in the 19th century. Pollution occurs when the natural environment cannot destroy an element without creating harm or damage to itself. The elements involved are not produced by nature, and the destroying process can vary from a few days to thousands of years (that is, for instance, the case for radioactive pollutants). In other words, pollution takes place when nature does not know how to decompose an element that has been brought to it in an unnatural way.

Esophagus: The esophagus, or oesophagus, informally known as the food pipe or gullet, is an organ in vertebrates through which food passes, aided by peristaltic contractions, from the pharynx to the stomach. The esophagus is a fibromuscular tube, about 25 cm long in adults, which travels behind the trachea and heart, passes through the diaphragm and empties into the uppermost region of the stomach. During swallowing, the epiglottis tilts backwards to prevent food from going down the larynx and lungs. The word oesophagus is the Greek word oisophagos, meaning "gullet."

Exercise: Activity requiring physical effort, carried out to sustain or improve health and fitness

Fahrenheit: Of or denoting a scale of temperature on which water freezes at 32° and boils at 212° under standard conditions

Feather: Any of the flat appendages growing from a bird's skin and forming its plumage, consisting of a partly hollow horny shaft fringed with vanes of barbs

Female: Of or denoting the sex that can bear offspring or produce eggs, distinguished biologically by the production of gametes (ova) which can be fertilized by male gametes.

First aid: Help given to a sick or injured person until full medical treatment is available

Fish: A limbless cold-blooded vertebrate animal with gills and fins and living wholly in water

Flower: The seed-bearing part of a plant, consisting of reproductive organs (stamens and carpels) that are typically surrounded by a brightly colored corolla (petals) and a green calyx (sepals)

Fly: As in a bird, bat, or insect moving through the air using wings

Food: Any nutritious substance that people or animals eat or drink or that plants absorb in order to maintain life and growth

Force: Make a way through or into by physical strength; break open by force

Freeze: Turning into ice or another solid as a result of extreme cold

Freshwater: Water that is not salty. Consisting of or containing fresh water; not of the sea. Inland and usually provincial.

Frog: Any member of a diverse and largely carnivorous group of short-bodied, tailless amphibians composing the order Anura

Gas: A substance or matter in a state in which it will expand freely to fill the whole of a container, having no fixed shape (unlike a solid) and no fixed volume (unlike a liquid)

Grow: Undergo natural development by increasing in size and changing physically; progress to maturity

Hamstring: Any of five tendons at the back of a person's knee

Hazard: A danger or risk

Heart: A muscular organ about the size of a fist, located just behind and slightly left of the breastbone. The heart pumps blood through the network of arteries and veins called the cardiovascular system.

Heartbeat: The cycle of contraction of the heart muscle; it begins with an electrical impulse in the sinoatrial node, which serves as the normal pacemaker for the heart

Hemophilia: A medical condition in which the ability of the blood to clot is severely reduced, causing the sufferer to bleed severely from even a slight injury. The condition is typically caused by a hereditary lack of a coagulation factor, most often factor VIII.

Homeostasis: The tendency toward a relatively stable equilibrium between interdependent elements, especially as maintained by physiological processes

Hot: Having a high degree of heat or a high temperature

Hurt: Cause physical pain or injury to

Ice: Frozen water, a brittle transparent crystalline solid

Incline plane: Also known as a ramp, it is a flat supporting surface tilted at an angle, with one end higher than the other, used as an aid for raising or lowering a load. The inclined plane is one of the six classical simple machines defined by Renaissance scientists. Inclined planes are widely used to move heavy loads over vertical obstacles; examples vary from a ramp used to load goods into a truck, to a person walking up a pedestrian ramp, to an automobile or railroad train climbing a grade.

Incubate: A bird sits on eggs to keep them warm and bring them to hatching.

Infant: A very young child or baby

Influenza: A highly contagious viral infection of the respiratory passages causing fever, severe aching, and catarrh, and often occurring in epidemics. Also called flu.

Inherited: A quality, characteristic, or predisposition derived genetically from one's parents or ancestors

Injury: Harm or damage that is done or sustained. Any wrong or violation of the rights, property, reputation, etc., of another for which legal action to recover damages may be made.

Infertility: The inability to become pregnant after one year of intercourse without contraception involving a male and female partner. There are many causes of infertility, including some that medical intervention can treat.

Involuntary muscle: Smooth muscle, usually within an organ or blood vessel, that contracts under the influence of unconscious processes mediated by the autonomic nervous system rather than by the conscious will

Irritant: A substance that causes slight inflammation or other discomfort to the body

Kidneys: Two bean-shaped organs found in vertebrates. They are located on the left and right in the retroperitoneal space, and in adult humans are about 12 cm in length. They receive blood from the paired renal arteries; blood exits into the paired renal veins. Each kidney is attached to a ureter, a tube that carries excreted urine to the bladder.

Lactose intolerance: When a person has symptoms due to a decreased ability to digest lactose, a sugar found in dairy products. Those affected vary in the amount of lactose they can tolerate before symptoms develop. Symptoms may include abdominal pain, bloating, diarrhea, gas, and nausea. These symptoms typically start 30 minutes to 2 hours after eating or drinking milk-based food. Their severity typically depends on the amount a person eats or drinks. Lactose intolerance does not cause damage to the gastrointestinal tract.

Land: Comprises all naturally occurring resources as well as geographic land. Examples include particular geographical locations, mineral deposits, forests, fish stocks, atmospheric quality, geostationary orbits, and portions of the electromagnetic spectrum. Supply of these resources is fixed.

Large intestines: Also known as the large bowel, this is the last part of the gastrointestinal tract and of the digestive system in vertebrates. Water is absorbed here, and the remaining waste material is stored as feces before being removed by defecation.

Leg: Each of the limbs on which a person or animal walks and stands

Length: The measurement or extent of something from end to end; the greater of two or the greatest of three dimensions of a body

Leukemia: A blood cancer caused by a rise in the number of white blood cells in your body. Those white blood cells crowd out the red blood cells and platelets that your body needs to be healthy. The extra white blood cells don't work right.

Lever: A simple machine consisting of a beam or rigid rod pivoted at a fixed hinge, or fulcrum. A lever is a rigid body capable of rotating on a point on itself. On the basis of the locations of fulcrum, load and effort, the lever is divided into three types. It is one of the six simple machines identified by Renaissance scientists. A lever amplifies an input force to provide a greater output force, which is said to provide leverage. The ratio of the output force to the input force is the mechanical advantage of the lever. As such, the lever is a mechanical advantage device, trading off force against movement.

Light: The natural agent that stimulates sight and makes things visible

Liquid: A substance that flows freely but is of constant volume, having a consistency like that of water or oil

Liver: An organ only found in vertebrates that detoxifies various metabolites, synthesizes proteins, and produces biochemicals necessary for digestion and growth. In humans, it is located in the right upper quadrant of the abdomen, below the diaphragm. Its other roles in metabolism include the regulation of glycogen storage, decomposition of red blood cells, and the production of hormones.

Lizard: A widespread group of squamate reptiles, with over 6,000 species, ranging across all continents except Antarctica, as well as most oceanic island chains. The group is paraphyletic as it excludes the snakes and Amphisbaenia; some lizards are more closely related to these two excluded groups than they are to other lizards.

Lungs: The primary organs of the respiratory system in humans and many other animals, including a few fish and some snails. In mammals and most other vertebrates, two lungs are located near the backbone on either side of the heart. Their function in the respiratory system is to extract oxygen from the atmosphere and transfer it into the bloodstream, and to release carbon dioxide from the bloodstream into the atmosphere, in a process of gas exchange. Respiration is driven by different muscular systems in different species.

Machine: An apparatus using or applying mechanical power and having several parts, each with a definite function and together performing a particular task

Male: Of or denoting the sex that produces small, typically motile gametes, especially spermatozoa, with which a female may be fertilized or inseminated to produce offspring

Mass: A coherent, typically large body of matter. A property of a physical body and a measure of its resistance to acceleration (a change in its state of motion) when a net force is applied. An object's mass also determines the strength of its gravitational attraction to other bodies.

Melt: To become liquefied by warmth or heat, as ice, snow, butter, or metal. To become liquid; dissolve

Migration: Seasonal movement of animals from one region to another

Mother: A woman in relation to her child or children

Motion: The action or process of moving or being moved

Mouth: The opening in the lower part of the human face, surrounded by the lips, through which food is taken in and from which speech and other sounds are emitted

Muscle: A band or bundle of fibrous tissue in a human or animal body that has the ability to contract, producing movement in or maintaining the position of parts of the body

Nausea: A diffuse sensation of unease and discomfort, often perceived as an urge to vomit. While not painful, it can be a debilitating symptom if prolonged and has been described as placing discomfort on the chest, upper abdomen, or back of the throat.

Nest: A structure or place made or chosen by a bird for laying eggs and sheltering its young

Nose: A protuberance in vertebrates that houses the nostrils, or nares, which receive and expel air for respiration alongside the mouth. Behind the nose are the olfactory mucosa and the sinuses. Behind the nasal cavity, air next passes through the pharynx, shared with the digestive system, and then into the rest of the respiratory system. In humans, the nose is located centrally on the face and serves as an alternative respiratory passage, especially during suckling for infants.

Organ: A part of an organism that is typically self-contained and has a specific vital function, such as the heart or liver in humans

Over-the-counter medication: Medicines sold directly to a consumer without a requirement for a prescription from a health care professional, as opposed to prescription drugs which may be supplied only to consumers possessing a valid prescription

Oxygen: A colorless, odorless reactive gas, the chemical element of atomic number 8 and the life-supporting component of the air

Pain: Physical suffering or discomfort caused by illness or injury

Pathological condition: Any medical term can be used in everyday settings like the doctor's office or hospital. Some, such as those listed here, specifically detail the different kinds of pathological conditions associated with root words.

Pectoral: Relating to the breast or chest

Phone call: A connection over a telephone network between the called party and the calling party

Plant: A living organism of the kind exemplified by trees, shrubs, herbs, grasses, ferns, and mosses, typically growing in a permanent site, absorbing water and inorganic substances through its roots, and synthesizing nutrients in its leaves by photosynthesis using the green pigment chlorophyll

Pneumonia: Lung inflammation caused by bacterial or viral infection, in which the air sacs fill with pus and may become solid. Inflammation may affect both lungs (double pneumonia), one lung (single pneumonia), or only certain lobes (lobar pneumonia).

Pregnant: A woman or female animal having a child or young developing in the uterus

Prey: An animal that is hunted and killed by another for food

Pull: A wheel with a grooved rim around which a cord passes. It acts to change the direction of a force applied to the cord and is chiefly used (typically in combination) to raise heavy weights.

Pulse: A rhythmical throbbing of the arteries as blood is propelled through them, typically as felt in the wrists or neck

Pump: A mechanical device using suction or pressure to raise or move liquids, compress gases, or force air into inflatable objects such as tires

Push: Exert force on (someone or something), typically with one's hand, in order to move them away from oneself or the origin of the force

Quadriceps: The large muscle at the front of the thigh, which is divided into four distinct portions and acts to extend the leg

Reproductive system: Organ system by which humans reproduce and bear live offspring

Reptile: A vertebrate animal of a class that includes snakes, lizards, crocodiles, turtles, and tortoises. They are distinguished by having a dry, scaly skin and typically laying soft-shelled eggs on land.

Respiratory distress: Difficulty in breathing, and the psychological experience associated with such difficulty, even if there is no physiological basis for experiencing such distress

Respiratory system: A biological system consisting of specific organs and structures used for gas exchange in animals and plants. The anatomy and physiology that make this happen varies greatly depending on the size of the organism, the environment in which it lives, and its evolutionary history.

Ribs: Each of a series of slender, curved bones articulated in pairs to the spine (12 pairs in humans), protecting the thoracic cavity and its organs

Root: The part of a plant which attaches it to the ground or to a support, typically underground, conveying water and nourishment to the rest of the plant via numerous branches and fibers.

Ruler: A straight strip or cylinder of plastic, wood, metal, or other rigid material, typically marked at regular intervals, to draw straight lines or measure distances

Saltwater: Water (as of the ocean) that naturally contains a significant amount of salt. Water to which salt (as sodium chloride) has been added.

Scale: An instrument for weighing, originally a simple balance (a pair of scales) but now usually a device with an electronic or other internal weighing mechanism

Sexually transmitted disease: Infections that are passed from one person to another through sexual contact. The causes of STDs are bacteria, parasites, and viruses. There are more than 20 types of STDs, including chlamydia, genital herpes, gonorrhea, HIV/AIDS, HPV, syphilis, and trichomoniasis.

Shark: A long-bodied chiefly marine fish with a cartilaginous skeleton, a prominent dorsal fin, and toothlike scales. Most sharks are predatory, although the largest kinds feed on plankton, and some can grow to a large size.

Sickle cell: A group of blood disorders typically inherited from a person's parents. The most common type is known as sickle cell anemia (SCA). It results in an abnormality in the oxygen-carrying protein hemoglobin found in red blood cells.

Sign: An object, quality, or event whose presence or occurrence indicates the probable presence or occurrence of something else.

Skeletal muscle: A muscle that connects to the skeleton to form part of the mechanical system that moves the limbs and other parts of the body.

Skeleton system: Provides support and protection for the body's internal organs and gives the muscles a point of attachment. Humans have an endoskeleton, where our bones lie underneath our skin and muscles. In other animals, such as insects, there is an exoskeleton on the outside of the body.

Small intestines: The part of the intestine that runs between the stomach and the large intestine; the duodenum, jejunum, and ileum collectively

Smoke: A visible suspension of carbon or other particles in air, typically one emitted from a burning substance

Smooth muscle: Muscle tissue in which the contractile fibrils are not highly ordered, occurring in the gut and other internal organs and not under voluntary control. Often contrasted with striated muscle.

Snake: Elongated, legless, carnivorous reptiles of the suborder Serpentes. Like all other squamates, snakes are ectothermic, amniote vertebrates covered in overlapping scales.

Soil: The upper layer of earth in which plants grow, a black or dark brown material typically consisting of a mixture of organic remains, clay, and rock particles

Solid: Firm and stable in shape; not liquid or fluid

Speed: Speed has the dimensions of distance divided by time. The speed of an object is the magnitude of the change of its position; it is thus a scalar quantity. The average speed of an object in an interval of time is the distance traveled by the object divided by the duration of the interval; the instantaneous speed is the limit of the average speed as the duration of the time interval approaches zero.

Sprout: A shoot of a plant

Stem: The main body or stalk of a plant or shrub, typically rising above ground but occasionally subterranean

Stomach: The internal organ in which the major part of the digestion of food occurs, being (in humans and many mammals) a pear-shaped enlargement of the alimentary canal linking the esophagus to the small intestine.

Stomach virus: Inflammation of the gastrointestinal tract (the stomach and small intestine). Symptoms may include diarrhea, vomiting, and abdominal pain. Fever, lack of energy, and dehydration may also occur. This typically lasts less than two weeks.

Sun: The star at the center of the solar system. It is a nearly perfect sphere of hot plasma.

Symbol: A mark or character used as a conventional representation of an object, function, or process (e.g., the letter or letters standing for a chemical element or a character in musical notation).

Temperature: A physical property of matter that quantitatively expresses hot and cold. It is the manifestation of thermal energy, present in all matter, which is the source of the occurrence of heat, a flow of energy, when a body is in contact with another that is colder.

Thermometer: An instrument for measuring and indicating temperature, typically one consisting of a narrow, hermetically sealed glass tube marked with graduations and having at one end a bulb containing mercury or alcohol that expands and contracts in the tube with heating and cooling

Throat: The passage which leads from the back of the mouth of a person or animal

Toddler: A young child who is just beginning to walk

Triceps: A large muscle on the back of the upper limb of many vertebrates. It is the muscle principally responsible for extension of the elbow joint.

Turtle: A slow-moving reptile enclosed in a scaly or leathery domed shell into which it can retract its head and thick legs.

Type: A category of people or things having common characteristics

Vape: Using an electronic device that simulates tobacco smoking

Vegetable: A plant or part of a plant used as food, typically as an accompaniment to meat or fish, such as a cabbage, potato, carrot, or bean.

Vein: Any of the tubes forming part of the blood circulation system of the body that carry, in most cases, oxygen-depleted blood toward the heart. Compare with an artery.

Volume: The amount of space that a substance or object occupies, or that is enclosed within a container, especially when great

Voluntary muscle: Muscle whose action is normally controlled by an individual's will; mainly skeletal muscle, composed of parallel bundles of striated, multinucleate fibers

Water: A colorless, transparent, odorless liquid that forms the seas, lakes, rivers, and rain and is the basis of the fluids of living organisms

Wedge: A piece of a substance (such as wood or iron) that tapers to a thin edge and is used for splitting wood and rocks, raising heavy bodies, or for tightening by being driven into something

Weight: A body's relative mass or the quantity of matter contained by it, giving rise to a downward force; the heaviness of a person or thing

Work: Activity involving mental or physical effort done in order to achieve a purpose or result

References

- ACT. (2014). *ACT college and career readiness standards—Science*. Retrieved from <http://www.act.org/content/dam/act/unsecured/documents/CCRS-ScienceStandards.pdf>
- Alabama State Department of Education. (2015). *Alabama course of study: Science*. Montgomery, AL: Author.
- Alabama State Department of Education (2016). *Alabama extended standards: Science*. Manuscript in preparation. Montgomery, AL: Author.
- Florida Department of Education, Special Education. (2016). *FSA datafolio teacher resource guide*. FL: Florida Department of Education.
- Indiana Department of Education. (2016). *Indiana's academic standards for science—2016*. Retrieved from <http://www.doe.in.gov/standards/science-computer-science>
- Massachusetts Department of Elementary and Secondary Education. (2016). *2016 Massachusetts science and technology/engineering curriculum framework*. Malden, MA: Author.
- Mississippi Department of Education. (2010). *2010 Mississippi science framework*. Jackson, MS: Author.
- Mississippi Department of Education. (2018). *2018 Mississippi college- and career-readiness standards for science*. Jackson, MS: Author.
- Mullis, I. V. S., & Martin, M. O. (Eds.). (2015). *TIMSS 2015 assessment frameworks*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.
- National Assessment Governing Board. (2015). *Science framework for the 2015 National Assessment of Educational Progress* (Contract No. ED-04-CO-0148). Washington, DC: U.S. Government Printing Office.
- National Research Council. (2012). *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. Washington, DC: The National Academies Press.
- National Science Teachers Association. (2013). *Safety in the science classroom, laboratory, or field sites*. Retrieved from <http://www.nsta.org/docs/SafetyInTheScienceClassroomLabAndField.pdf>
- Next Generation Science Standards Lead States. (2013). *Next Generation science standards: For states, by states*. Washington, DC: The National Academies Press.
- Schrock, K. (2013, Nov. 9). Resources to support the SAMR model [Blog post]. Retrieved from <http://www.schrockguide.net/samr.html>
- South Carolina Department of Education. (2014). *South Carolina academic standards and performance indicators for science*. Columbia, SC: Author.
- South Carolina Department of Education. (n.d.) *The South Carolina Alternate Assessment (SC-Alt): Science assessment and instructional support guide*. Columbia, SC: Author.

Virginia Department of Education. (2010). *Science standards of learning for Virginia public schools*.
Richmond, VA: Author.