

Kinesiology I

PEIMS Code: N1302104

Abbreviation: KINES1

Grade Level(s): 9–10

Award of Credit: 1.0

State Approved Innovative Course

- Districts must have local board approval to implement innovative courses.
- In accordance with Texas Administrative Code (TAC) §74.27, school districts must provide instruction in all essential knowledge and skills identified in this innovative course.
- Innovative courses may only satisfy elective credit toward graduation requirements.
- Please refer to [TAC §74.13](#) for guidance on endorsements.

Course Description:

This course is designed to introduce students to the basic concepts of kinesiology. Students will gain an understanding of body mechanics, physiological functions of muscles and movements, the history of kinesiology, and the psychological impact of sports and athletic performance.

Students will also explore careers within the kinesiology field and be able to explain the societal demand for kinesiology-related jobs. Students will develop a foundation in *Kinesiology I* that will prepare them for upper-level courses that will dive deeper into the anatomical and physiological functions of the body and provide opportunities for an industry-certified exam such as a certified personal trainer.

Essential Knowledge and Skills:

- (a) General Requirements. This course is recommended for students in grades 9 or 10. Students shall be awarded one credit for successful completion of this course.
- (b) Introduction.
 - (1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
 - (2) The Health Science Career Cluster focuses on planning, managing, and providing therapeutic services, diagnostics services, health informatics, support services, and biotechnology research and development.
 - (3) This course is designed to introduce students to the basic concepts of Kinesiology. Students will gain an understanding of body mechanics, physiological functions of muscles and movements, the history of kinesiology, and the psychological impact of sports and athletic performance.
 - (4) To pursue a career in the health science industry, students should learn to reason,

think critically, make decisions, solve problems, and communicate effectively. Students should recognize that quality health care depends on the ability to work well with others.

- (5) The health science industry is comprised of diagnostic, therapeutic, health informatics, support services, and biotechnology research and development systems that function individually and collaboratively to provide comprehensive health care. Students should identify the employment opportunities, technology, and safety requirements of each system. Students are expected to learn the knowledge and skills necessary to pursue a health science career through further education and employment.
- (6) Professional integrity in the health science industry is dependent on acceptance of ethical and legal responsibilities. Students are expected to employ their ethical and legal responsibilities, recognize limitations, and understand the implications of their actions.
- (7) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.
- (8) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.

- (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:
 - (A) express ideas in a clear, concise, and effective manner;
 - (B) exhibit the ability to cooperate, contribute, and collaborate as a member of a team; and
 - (C) identify employer expectations such as punctuality, attendance, time management, communication, organizational skills, and productive work habits.
- (2) The student demonstrates communication skills using the terminology applicable to the health science industry. The student is expected to:
 - (A) demonstrate appropriate verbal and written strategies such as correct pronunciation of medical terms and spelling in a variety of health science scenarios;
 - (B) employ increasingly precise language to communicate; and
 - (C) translate technical material related to the health science industry.
- (3) The student uses verbal and nonverbal communication skills. The student is expected to:
 - (A) identify components of effective and non-effective communication;
 - (B) demonstrate effective communication skills for responding to the needs of individuals in a diverse society;
 - (C) evaluate the effectiveness of conflict-resolution techniques in various situations; and
 - (D) accurately interpret, transcribe, and communicate medical vocabulary

- using appropriate technology.
- (4) The student implements the leadership skills necessary to function in a democratic society. The student is expected to:
 - (A) identify traits of a leader;
 - (B) demonstrate leadership skills, characteristics, and responsibilities of leaders such as goal setting and team building; and
 - (C) demonstrate the ability to effectively conduct and participate in meetings.
 - (5) The student discusses various careers in kinesiology-related fields, the diversity of knowledge that characterizes the field of kinesiology, and how societal changes have increased the demand for kinesiology graduates. The student is expected to:
 - (A) compare the educational requirements for associate's, bachelor's, and master's degrees';
 - (B) differentiate between a certification, registration, and licensure;
 - (C) describe kinesiology-related careers by including a definition of the career, three duties, educational requirements, and employment opportunities; and
 - (D) explain what changes in society have increased Kinesiology employment.
 - (6) The student explains the importance of early exposure to physical activity for optimal growth, motor development, and physical literacy. The student is expected to:
 - (A) define kinesiology and explain its importance of human motion;
 - (B) define growth, motor development, and physical literacy and outline the various stages of development;
 - (C) describe the various factors affecting optimal growth, motor development, and physical literacy across the life cycle; and
 - (D) demonstrate an understanding of individual differences in growth and motor development and how they affect the design of movement-based activities.
 - (7) The student examines the skeletal framework and its movements as the foundation for all movement. The student is expected to:
 - (A) classify joints according to structure and explain the relationship between a joint structure and its capacity for movement;
 - (B) identify the factors, including joint structure, age and gender, and muscle size that contribute to joint range of motion (ROM) and stability;
 - (C) explain a joint's range of motion, evaluate the range, and describe desirable procedures for changing when indicated;
 - (D) define the orientation positions and planes of the body and the axes of motion, including sagittal, transverse, frontal; and
 - (E) demonstrate and name fundamental movement patterns using correct movement terminology.
 - (8) The student investigates the structure and function of the muscular system. The student is expected to:

- (A) describe the structure and properties of the whole muscle, fast and slow twitch muscle fibers, and the myofibril;
 - (B) define the roles a muscle may play such as agonist, antagonist, and synergist and explain the interdependence between them and their roles in a specified movement;
 - (C) define the types of muscular contraction, including concentric, eccentric, and static, and name and demonstrate each type of action; and
 - (D) analyze the force-velocity and length-tension relationships of muscular contraction and explain the significance of these relationships in static and dynamic movements.
- (9) The student investigates the structure and function of the muscular system and describe the neuromuscular basis of human motion. The student is expected to:
- (A) define and describe the functions of the basic structures of the nervous system;
 - (B) explain how graduations in strength of muscle contraction and precision of movement occur;
 - (C) define the receptors that are important in musculoskeletal movement;
 - (D) explain how the various receptors function and describe the effect each has on musculoskeletal movement;
 - (E) describe reflex action and enumerate and differentiate among the reflexes that affect musculoskeletal action; and
 - (F) demonstrate a basic understanding of volitional movement by describing the nature of the participation of the anatomical structures and mechanisms involved.
- (10) The student investigates the structure and function of the shoulder region. The student is expected to:
- (A) define, locate, and describe the structure and ligamentous reinforcements of the articulations of the shoulder region;
 - (B) define and demonstrate the movements possible in the joints of the shoulder region;
 - (C) define and locate the muscles and muscle groups of the shoulder region, and name their primary actions as agonists, stabilizers, neutralizers, or antagonists;
 - (D) analyze the fundamental movements of the arm and trunk with respect to joint and muscle actions; and
 - (E) describe the common injuries of the shoulder region.
- (11) The student investigates the structure and function of the elbow, forearm, wrist, and arm. The student is expected to:
- (A) define, locate, and describe the structure and ligamentous reinforcements of the articulations of the elbow, forearm, wrist, and hand;
 - (B) define and demonstrate the movements possible in the joints of the elbow, forearm, wrist, and hand regardless of starting position;
 - (C) define and locate the muscles and muscle groups of the elbow, forearm,

- wrist, and hand, and name their primary actions as agonists, stabilizers, neutralizers, or antagonists;
 - (D) analyze the fundamental movements of the forearm, hand, and fingers with respect to joint and muscle actions; and
 - (E) describe the common athletic injuries of the forearm, elbow, wrist, and fingers.
- (12) The student investigates the structure and function of the hip region. The student is expected to:
- (A) define, locate, and describe the structure and ligamentous reinforcements of the articulations of the pelvic girdle and hip joint;
 - (B) define and demonstrate the movements possible in the pelvic girdle and hip joint, regardless of starting position;
 - (C) define and locate the muscles and muscle groups of the pelvis and hip, and name their primary actions as agonists, stabilizers, neutralizers, or antagonists;
 - (D) analyze the fundamental movements of the pelvis and thigh with respect to joint and muscle actions; and
 - (E) describe the common athletic injuries of the pelvis, hip, and thigh.
- (13) The student investigates the structure and function of the knee, ankle, and foot. The student is expected to:
- (A) define, locate, and describe the structure and ligamentous reinforcements of the articulations of the knee, ankle, and foot;
 - (B) define and demonstrate the movements possible in the knee, ankle, and foot, regardless of starting position;
 - (C) define and locate the muscles and muscle groups of the knee, ankle, and foot, and name their primary actions as agonists, stabilizers, neutralizers, or antagonists;
 - (D) analyze the fundamental movements of the knee, ankle, and foot with respect to joint and muscle actions; and
 - (E) describe the common athletic injuries of the knee, ankle, and foot.
- (14) The student investigates the structure and function of the spinal column and thorax. The student is expected to:
- (A) locate, and describe the structure and ligamentous reinforcements of the articulations of the spinal column and thorax;
 - (B) define and demonstrate the movements possible in the joints of the spinal column and thorax including the muscles and muscle groups regardless of starting position;
 - (C) analyze the fundamental movements of the spinal column and thorax with respect to joint and muscle actions; and
 - (D) describe the common injuries of the spinal column and thorax.
- (15) The student examines the fundamental principles of biomechanics, take measurements, and perform calculations. The student is expected to:

- (A) compare the terms mechanics and biomechanics and explain the difference;
 - (B) define the terms kinematics, kinetics, statics, and dynamics, and state how each relates to the structure of biomechanics of study; and
 - (C) solve problems that identify different units of measurement related to kinesiology.
- (16) The student demonstrates knowledge of the skeletomuscular and neuromuscular mechanisms involved in the standing position. The student is expected to:
- (A) identify the physiological functions of the skeletomuscular and neuromuscular systems in regard to standing posture;
 - (B) discuss the role of genetics and lifestyle choices on the effects of our skeletomuscular and neuromuscular systems in relation to standing posture;
 - (C) distinguish the factors that affect stability and energy cost of the erect position; and
 - (D) analyze the posture of individuals of different ages and body builds using static and dynamic movements such as overhead squat assessment.
- (17) The student describes the fundamentals of human motion. The student is expected to:
- (A) identify the kinds of motion experienced by the human body and describe the factors that cause and modify motions;
 - (B) create a scenario that uses the terms that describe linear and rotary motion: position, displacement, distance, speed, velocity, and acceleration; and
 - (C) describe the relationship between linear and rotary movement and explain the significance of this relationship to human motion.
- (18) The student demonstrates knowledge of a selected motor skill, breaking down into component phases and identifying starting and ending points. The student is expected to:
- (A) identify the muscle groups active in a variety of motor skills;
 - (B) analyze the joint actions and planes of motion for a selected motor skill by observing and recording via video dynamic movement patterns;
 - (C) explain the skill acquisition process and describe the stages of learning a skill;
 - (D) describe the types of feedback and their roles in skill learning; and
 - (E) design a learning environment using effective practice methods.

Recommended Resources and Materials:

Hamilton, N., Luttgens, K. (2002). *Kinesiology: Scientific Basis of Human Motion*. (Tenth Edition). New York, NY. McGraw-Hill.

Klavora, P. (2016). *Scientific Foundations of Kinesiology: Studying Human Movement and*

Klavora, P. (2019). Foundations of Kinesiology: Studying Human Movement and Health 3rd Edition. Toronto, ON: Kinesiology Books Publisher.

Klavora, P. (2019). Introduction to Kinesiology: A Biophysical Perspective 2nd Edition. Toronto, ON: Kinesiology Books Publisher

Peter Kloavora has online resources available from his three textbooks. Once the instructor or student logs in they have access to worksheets, power points, and study guides.

Hamilton, N., Luttgens, K. (2002). Kinesiology: Scientific Basis of Human Motion. (Tenth Edition). New York, NY. McGraw-Hill.

Recommended Course Activities:

- Skeletal Muscle Model
 - Have the students create a model of the skeletal muscle and label each structure
 - Students will write a paragraph describing how a skeletal muscle works
- Muscle placement
 - Teacher will provide the students with a copy of the human skeleton and a copy of major muscles, that can be cut out.
 - The students will cut out the muscles and place them properly on the skeleton.
 - They will label the muscles and provide the origin and insertion for each muscle provided.
- Muscle movement
 - Students will create a 3D muscle model of the arm with supplies provided by the teacher.
 - Students will label the humerus, ulna, radius, biceps, and triceps. They will also label which muscle is agonist and which one is antagonist.
 - They will write a paragraph explaining how the muscles work together to move the arm.
- Muscle Fatigue
 - Students will pair up and each group will have a stopwatch.
 - One student will perform up to 3 exercises such as wall sits, calf raises, and push ups. Each exercise will be done continuously for 5 minutes. After each exercise, the student will record how their muscles felt at each minute.
 - They will also answer questions about what muscles were being used for each exercise and questions about lactic acid buildup.
- Create a Plan
 - Each student will be given some type of sports injury
 - The student will need to identify the muscle/tendons/ligaments injured. They will then create a rehabilitation exercise plan for the injury.
 - Students will need to show different exercises that need to be done as the athlete gradually gets stronger.

The activities mentioned above relate to the course because they cover the basic anatomy and

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physiology of the skeletal muscle and body mechanics. They will be able to observe the movement of muscles, fatigue muscles, and injured muscles.

Suggested methods for evaluating student outcomes:

- Daily Assessments
- An exit question about the lesson that was taught
- Quizzes
- Weekly Assessments
- Chapter Tests
- Projects

Teacher qualifications:

An assignment for Kinesiology I is allowed with one of the following certificates:

- Health Science: Grades 6-12.
- Health Science Technology Education Certification 8-12 with a background in kinesiology.
- Vocational Health Occupations.
- Vocational Health Science Technology.

Additional information: