

Title: The Musculoskeletal System

Objectives Students will understand the roles of bones, muscles, and joints in the human body.										Time frame to Complete 60 minutes											
										NRS EFL 4											
Stackable Cert.	Documentation	Technology	Study / Life skills	EL-Civics	Career Pathways	Police	Paramedic	Fire Rescue	Medical Asst.	EKG / Cardio	Phlebotomy	Practical Nursing	Healthcare Admin	Pharmacy Tech	IMT	AMT	HVAC	Welding	Other:	STNA	
							X		X			X								X	
Standard(s) Addressed in Lesson Read with Understanding																					
Benchmark(s) Addressed in Lesson R.4.1. Identify purposes for reading R.4.16. Construct meaning from text by evaluating relevance of prior knowledge and applying appropriate knowledge to new information read.																					
Materials <i>The Musculoskeletal System</i> packet including: <i>The Musculoskeletal System</i> reading <i>Human Skeleton</i> vocabulary list <i>Human Skeleton</i> word find Muscles diagram available from: http://upload.wikimedia.org/wikipedia/commons/e/e5/Muscles_anterior_labeled.png <i>Muscle action terms</i>																					
Learner Prior Knowledge Basic body vocabulary																					
Activities <u>Step 1</u> Ask students what they think the musculoskeletal system is - What is it made of? What are its functions? Briefly discuss muscles, bones, and joints. <u>Step 2</u> Distribute the packet <i>The Musculoskeletal System</i> . Students read the handout, paying close attention to the highlighted vocabulary. The teacher can clarify meaning and check for comprehension as the students read the passages aloud. <u>Step 3</u> Students study the diagrams and define the words in each list (using a dictionary). <u>Step 4</u> Students complete the vocabulary word find. <u>Step 5</u> Check work together.																					

Assessment/Evidence

Completion of handout

Adaptations for Beginning Students

One-on-one reading assistance from a teacher or aide. Beginning students should also have a modified (shortened) version of vocabulary words to define.

Adaptations for Advanced Students

Advanced students should also study the vocabulary list of the actions of the skeleton muscles.

Teacher Reflection/Lesson Evaluation

This lesson was created by Middletown ABLE.

The Musculoskeletal System

BONES, MUSCLES, and JOINTS

What are the bones and what do they do?

The human skeleton has 206 bones. Our bones begin to develop before birth. When the skeleton first forms, it is made up of flexible cartilage, but within a few weeks it begins the process of ossification. Ossification is when the cartilage is replaced by hard deposits of calcium phosphate and stretchy collagen, the two main components of bone.

Bone building continues throughout your life. Bone contains three types of cells: **osteoblasts**, which make new bone and help repair damage; **osteocytes** which carry nutrients and waste products to and from blood vessels in the bone; and **osteoclasts** which break down bone and help to sculpt and shape it.

Bones are made up of calcium, phosphorus, sodium, and other minerals, as well as the protein collagen. Calcium is needed to make bones hard, which allows them to support your weight.

Long bones are found in the thigh, lower leg, and upper and lower arm. These bones are very strong, and are broad at the ends.

Short bones are found in the wrist and ankle and are small with irregular shapes.

Bones are fastened to other bones by long, fibrous straps called **ligaments**.

Cartilage, a flexible, rubbery substance in our joints, supports bones and protects them where they rub against each other.

What are the muscles and what do they do?

Bones don't work alone-they need help from the muscles and joints. Muscles pull on the joints allowing us to move. They also help the body perform other

functions so we can grow and remain strong, such as chewing food and then moving through the digestive system.

The human body has more than 650 muscles, which make up half of a person's body weight. They are connected to bones by tough, cord-like tissues called **tendons**, which allow the muscles to pull on bones. If you wiggle your fingers, you can see the tendons on the back of your hand move as they do their work.

Humans have three different kinds of muscles:

- **Skeletal muscle** is attached to bone, mostly in the legs, arms, abdomen, chest, neck and face. These muscles hold the skeleton together, give the body shape, and help it with everyday movements including controlling facial expression and eye movements.
- **Smooth, or involuntary,** muscle is also made of fibers, but this type of muscle looks smooth. These muscles are controlled by the nervous system automatically. Examples of smooth muscles are the walls of the stomach and intestines.
- **Cardiac** muscle is found in the heart. The walls of the heart's chambers are composed almost entirely of muscle fibers. Cardiac muscle is also an involuntary type of muscle.

Muscles and Movement

Even when you are perfectly still, there are muscles throughout your body that are constantly moving. Muscles allow your heart to beat, your chest to rise and fall as you breathe, and your blood vessels to help regulate the pressure and flow of blood through your body. The movements your muscles make are coordinated and controlled by the brain and nervous system.

What are the Joints and What Do They Do?

Joints allow our bodies to move in many ways. Some joints open and close like hinge (such as knees and elbows), whereas others allow for more complicated movement-a shoulder or hip joint, for example, allows for backward, forward, sideways and rotating movement.

Freely movable or synovial joints move in many directions. The main joints of the body-found at the hip, shoulders, elbows, knees, wrists, and ankles- are freely movable. They are filled with synovial fluid, which acts like a lubricant to help the joints move easily. There are three kinds of freely movable joints:

- **Hinge** joints allow movement in one direction, as seen in the knees and elbows.
- **Pivot** joints allow a rotating or twisting motion, like that of the head moving from side to side.
- **Ball and socket** joints allow the greatest freedom of movement. The hips and shoulders have this type of joint, in which the round end of a long bone fits into the hollow of another bone.

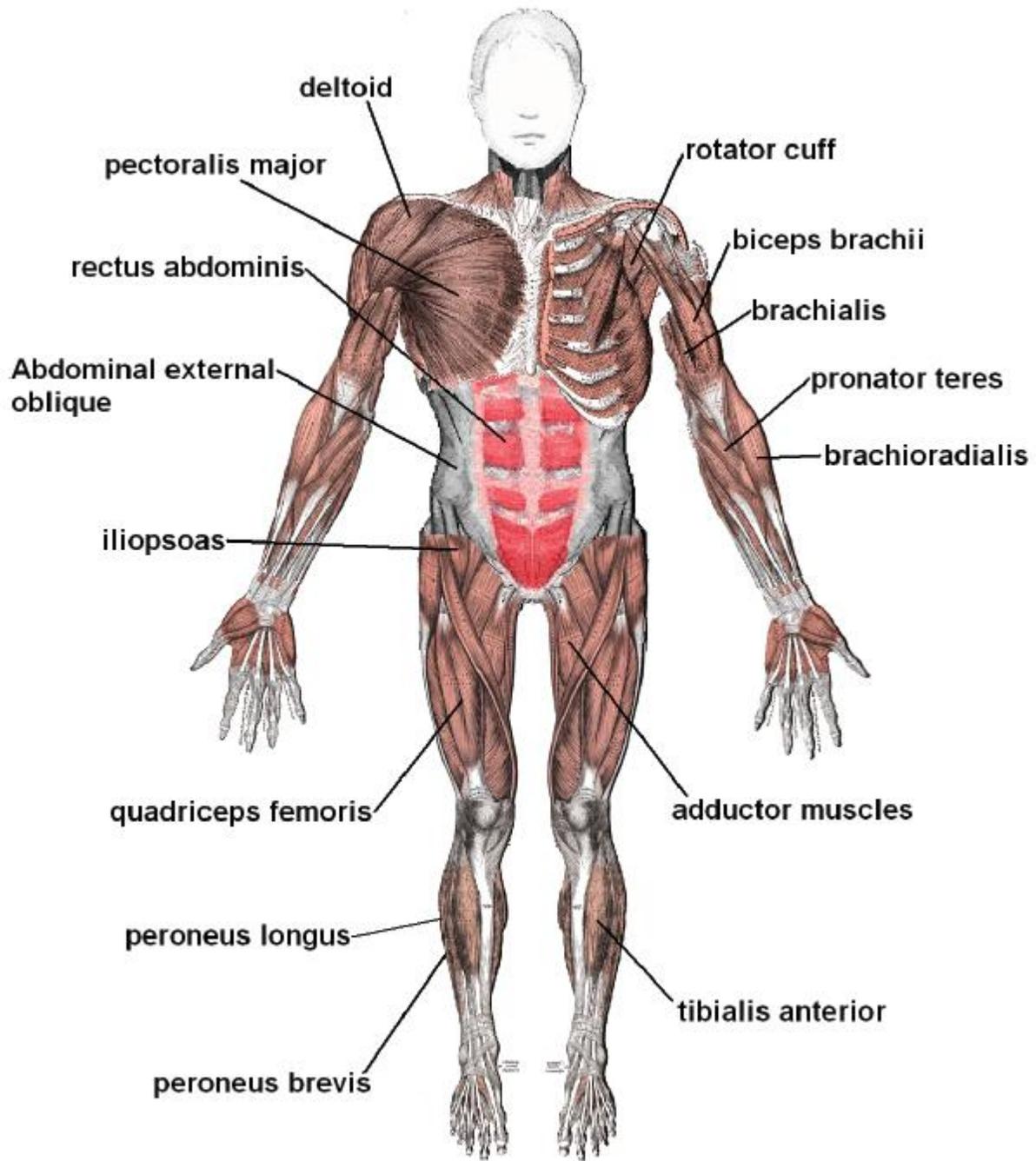
Together, our bones, muscles, and joints- along with tendons, ligaments, and cartilage- form our musculoskeletal system and enable us to perform everyday activities.

THE HUMAN SKELETON VOCABULARY LIST

Calcaneus
Carpals
Clavicle
Cranium
Femur
Fibula
Humerus
Maxilla
Mandible
Metacarpals
Metatarsals
Patella
Pelvic girdle
Phalanges
Radius
Ribs
Scapula
Skull
Sternum
Tarsals
Tibia
Ulna
Vertebrae
Vertebral column

The Human Skeleton Vocabulary Word Find

C A L C A N E U S S B I L B O L B O N C C Y V E C
O F I B U N M U L O C L A R B E T R E V E R O E O
S U F P E L B O N C R A N M A F X P H A L S N T C
T X R A D I U S T E R N U M Z I S N L U L O S O C
A X O T I B V E R P A R O S C B O N F A B R A E Y
L Y N C O L U M F R O N T A R U W A P L L A E Y X
C C T Z Y G M A R E C A R P A L S R A S T E R N U
A C A C O S T M U R C A S A L A A T G I R D L L A
R S L R I S B U H U M R E U S C I R T A L I G E S
T L B B O N R I T A R S A M A P X Y C C N M U A R
I A O F R O N N R E H G V T I P H C L A V I C L E
L S N F I B L A U C L A E C V I P L E C S K U L L
A R E F E M U R C R A M C N I U E M F R M E U I R
G A H U T M E C R U S O M A X U L N A I T L L X A
E T M A N A D I B L E M E T A C V E R T E B R A E
S A A R P A R L S M E T A T A R I S A L M S P M A
T T E L L A P S E L V I C G O S C O X A P I R D L
E E P H A L A N A G E S R A D I G U S R O I B S S
S M A N D I B L E L C A U L A P I S K U R L T L S
T E R N U M T A R S S A H U M E R U S L A S I T I
Z Y G O M A T I C B O N E B I A D U L N L A B V E
S C A P U L A R T E B R A E V E L R T E B B I R A
A L L E T A P L Z Y G O M A T I E C B O O N A E S
A C E N O B L A T E I R A P T E M P O R N A L B O
N E C O S T A P H A L A N G E S L C A R E T I L A



Muscle action terms and their meanings:

- Flexion: Decreasing the angle between two bones; bending a limb.
- Extension: Increasing the angle between two bones; straightening out a limb.
- Abduction: Movement away from the midline of the body.
- Adduction: Movement toward the midline of the body.
- Rotation: Circular movement around an axis.
- Dorsiflexion: Decreasing the angle of the ankle joint so that the foot bends upward. This is the opposite movement of stepping on the gas pedal.
- Plantar flexion: Motion that extends the foot downward toward the ground as when pointing toes or stepping on the gas pedal.
- Supination: As applied to the hand and forearm, the act of turning the palm forward or up.
- Pronation: As applied to the hand and forearm, the act of turning the palm backward, or down.