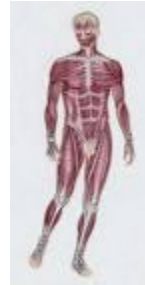


# Skeletal System Muscular System



Seventh Grade Health

Ms. Janell Brown

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## Unit Description

Seventh Grade

Growth and Development-Body Systems: Skeletal and Muscular Systems

**Skills:** Advocacy, Decision Making, Goal Setting, Accessing Valid Health Information

**Lessons:** 6 Lessons, 7 days

50 minute class periods

## Unit Rationale

Bone density reaches peak density by the age of twenty-five. According to the National Osteoporosis Foundation (NOF) “About 85-90% of adult bone mass is acquired by age 18 in girls and 20 in boys. Building strong bones during childhood and adolescence can help to prevent osteoporosis later in life.” As well the NOF states that, Osteoporosis is a major public health threat for an estimated 44 million Americans or 55 percent of the people 50 years of age and older. Many people break a bone from osteoporosis after a fall. In 2005, a total of 15,802 persons aged >65 years died as a result of injuries from falls. Fractures due to osteoporosis lower a patient’s quality of life. (www.nof.org) According to Healthy People 2010 Objective 19-11 is to increase the proportion of persons aged two years and older who meet dietary recommendations for calcium. (www.healthypeople.gov) Therefore since we know that osteoporosis is a major health threat and we reach maximum bone density at young age, it is crucial to teach students the value of their skeletal system and what they can do to promote wellness in their bones. In this unit students will gain an understanding of how to take care of bones through exercise, diet and safety.

Many young children are involved in sports and physical activity outside; therefore they are away from adults for a significant portion of their day. If children are playing with friends at the park and a friend trips in a hole, hurting themselves, many do not know how to get help for their friends. Through this unit students will gain understanding and practice skills to aid them in dealing with injuries. Young students many times are unaware of the direct effects exercise and diets have on their body systems. In this unit students will explore directly how their diet and physical activity

affect the skeletal and muscular systems. They will set goals to improve their muscular system and practice decision making. Students will also become advocates for health issues related to the unit. Healthy People 2010 in Indiana: Reduce the proportion of adults who engage in no leisure time physical activity to 20% ([www.healthypeople.gov](http://www.healthypeople.gov)). Through this unit we will encourage and show students the importance of daily physical activity.

## Unit Goals

### **Content:**

Students will define the purposes of the skeletal and muscular system.

Students will comprehend terms and concepts related to the muscular and skeletal systems.

### **Skill:**

Students will advocate for health practices to enhance the skeletal and muscular systems.

Students will practice health skills related to enhancing the health of the muscular and skeletal systems.

# Unit Objectives

## **Lesson 1:**

Objective 1: Students will be able to explain how proper care of the skeletal system can improve their overall health, by answering questions during class.

Health Standard Addressed: 1.8.6. Explain how appropriate health care can promote personal health.

Objective 2: Students will be able to find and use a resource outside the classroom that they can use on the skeletal worksheet.

Health Standard Addressed: 3.8.2. Access valid health information from home, school, and community.

## **Lesson 2:**

Objective 1: Students will be able to formulate a goal to improve their muscular system using the goal setting process.

Health Standard Addressed: 6.8.2 Develop a goal to adopt, maintain or improve a personal health practice.

Objective 2: Students will be able to describe the three types of muscle in the body and relate their function to their type during the closure.

Health Standard Addressed: 1.8.1. Analyze the relationship between healthy behaviors and personal health.

## **Lesson 3:**

Objective 1: Students will search the internet for resources to complete the web quest: How it Works using valid internet sites (.net, .gov, .org)

Health Standard Addressed: 3.8.5. Locate valid and reliable health products and services.

Objective 2: Students will be able to explain how muscles and bones work together during the lecture/ discussion.

Health Standard Addressed: 1.8.8. Examine the likelihood of injury or illness if engaging in unhealthy behaviors.

## **Lesson 4:**

Objective 1: Students will be able to create a poster that they will hang in the hallway that discusses ideas to promote strong and healthy bones.

Health Standard Addressed: 8.8.2 Demonstrate how to influence and support others to make positive health choices.

Objective 2: Students will be able to explain how eating healthy and exercising leads to healthy bones.

Health Standard Addressed: 7.8.2 Demonstrate healthy practices and behaviors that will maintain or improve the health of self and others.

## **Lesson 5:**

Objective 1: Students will identify terms and definitions of muscular injuries during a quiz.

Health Standard Addressed: 1.8.4 Describe how family history can affect personal health.

Objective 2: Students will identify a muscular system injury and disease during a role play of situations, while a classmate acts out the situation.

Health Standard Addressed: 3.8.4. Describe situations that may require professional health services.

**Lesson 6:**

Objective 1: Students will be able to work with the rest of the class to work through the decision making process and apply the right type of treatment to injuries of role play.

Health Standard Addressed: 5.8.6 Choose healthy alternatives over unhealthy alternatives when making a decision

Objective 2: Students will be able to explain what each letter in PRICE stands for and what they should do for each step.

Health Standard Addressed: 1.8.6. Explain how appropriate health care can promote personal health.



# National Health Education Standards Performance Indicators

**Standard 1:** Students will comprehend concepts related to health promotion and disease prevention to enhance health.

\*Lesson 1-6

**Standard 2:** Students will analyze the influence of family, peers, culture, media, technology and other factors on health behaviors.

**Standard 3:** Students will demonstrate the ability to access valid information and products and services to enhance health.

\*Lesson 1 and 3

**Standard 4:** Students will demonstrate the ability to use interpersonal communication skills to enhance health and avoid or reduce health risks.

**Standard 5:** Students will demonstrate the ability to use decision-making skills to enhance health.

\*Lesson 5

**Standard 6:** Students will demonstrate the ability to use goal-setting skills to enhance health.

\*Lesson 2

**Standard 7:** Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

\*Lessons 1-6

**Standard 8:** Students will demonstrate the ability to advocate for personal, family and community health.

\*Lesson 4

## Unit Block Plan

Day	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
<b>Content</b>	Skeletal System	Muscular System	Skeletal System and Muscular System Working	Skeletal System Injuries and Diseases	Muscular System Injuries and Diseases	Skeletal and Muscular Systems treatment of Injuries- First Aid	UNIT EXAM
<b>Skill</b>	Accessing valid health information	Goal Setting	Accessing Valid health information	Advocacy	Decision Making	Decision Making	
<b>Activity</b>	Skeletal System Worksheet	Muscular System Worksheet	How it works- Web quest	Advocacy Posters	Role Play Injury	First Aid Care of Injuries	
<b>Assessment</b>	Quiz/Worksheet	Quiz/Worksheet	Quiz/Web quest	Quiz/Posters	Quiz	Quiz	
<b>Standard</b>	3 – Students will Demonstrate the ability to access valid information and products and services to enhance health.	6 – Students will Demonstrate the ability to use goal-setting skills to enhance health.	3 – Students will Demonstrate the ability to access valid information and products and services to enhance health.	8 – Students will Demonstrate the ability to advocate for personal, family and community health.	1 – Students will comprehend concepts related to health promotion and disease prevention to enhance health.	6 – Students will Demonstrate the ability to use goal-setting skills to enhance health.	
<b>Performance Indicator</b>	3.8.2. Access valid health information from home, school, and community.	6.8.2 Develop a goal to adopt, maintain or improve a personal health practice	3.8.5. Locate valid and reliable health products and services.	8.8.2 Demonstrate how to influence and support others to make positive health choices.	1.8.4 Describe how family history can affect personal health.	5.8.6 Choose healthy alternatives over unhealthy alternatives when making a decision	

## Unit Special Considerations

Huntington County is a rural farming community which is growing constantly.

Huntington is located just southwest of the fourth largest city in Indiana, Fort Wayne.

Huntington supports a population of almost 38,000, with 17.9% of the population ranging ages five to seventeen. 98 % of the population is white. 26.4% of adults are married with children, where 8% are single parents. ([www.stats.indiana.edu](http://www.stats.indiana.edu))

Most residents of Huntington County are considered white, about 98%. Most residents would be considered middle class, with some in the lower class. The median income for Huntington is \$43,945. The poverty rate for Huntington is 8.4%.

([www.stats.indiana.edu](http://www.stats.indiana.edu))

Huntington County has eight elementary schools, three middle schools and one high school, together as one large corporation. The schools are scattered around the county. Recently the corporation has saw cutbacks of spending due to the struggling economy. The technology is usually a step behind or right with surrounding schools. Teachers all have computers in the classroom and computer labs are available throughout the schools.

Huntington schools academically are successful. The schools test at the state average or above for standardized state tests. The corporation has a graduation rate of 80%. Therefore the students can typically be pushed to do well in their classes. Likewise with a large corporation there are many students, with many different capabilities and learning styles. When teaching health education in the schools a teacher must teach with caution as many of the students have different beliefs and morals. A teacher would need to adapt a curriculum to reach both the highest and lowest achiever in a single class, as many of the students are mainstreamed into classes. ([mustang.doe.state.in.us](http://mustang.doe.state.in.us))

Huntington County YMCA just recently opened a brand new facility in conjunction with the Huntington Parkview Hospital. The PAL (Police Athletic League) has a large support for athletics in Huntington County, as well as the baseball/softball complex at Homier Park. These facilities provide Huntington County children with ample opportunities for participation in sports. Huntington County has many local parks that provide playground equipment.

Huntington county residents all live within twenty miles of a large hospital. Huntington has one major hospital on the northeast side of the county. Fort Wayne also has multiple hospitals within a short distance of many county residents. Each county surrounding Huntington contains a hospital. Emergency services are spread around the county and within a fifteen minute drive from each county home.

Huntington has some local health clinics but not many are convenient for the use by middle school students without the parents. Agencies providing information to students are not prevalent in the county.

To have productive classroom time for all students, teachers would need to plan for fifty minute class periods on a daily basis. Teachers would expect to see the students for nine weeks, everyday of the week.

Middle school students vary as students came from all over the county, but most are consider average learners. Students entering the middle school will have received minimal health education classes at the elementary level, typically presented during the science portion of a daily schedule. At the most students will have touched on basic health content, but not significantly and thoroughly studied all the content and skills of health education. Middle school students are required to take at least one nine weeks of

health, before leaving the middle school. Then students are required to take one nine weeks at the high school.

Technology is readily available to teachers in the school, as there is a computer, overhead and chalkboard in each room. Each room is equipped with a television and VHS/DVD combo player. As well there are large media centers located in the schools. Other technological equipment is available upon request of the teachers. Likewise many teachers can write grants to get the technology resources they need.

Concerning some health topics teachers would need to seek approval of the parents, as the schools of Huntington County are supported by abstinence-only sex education funding, which would not affect the topics covered in this unit. There are many grey-area topics in health, teachers would need to teach and approach with caution.

Adaptations which need to be considered for students in this unit would include reading level, as the students are taking notes during lectures and doing daily readings outside of class time. The teacher would need to be available to help students with the content outside of the regular class time.

Teachers would need to accommodate to all level learners and learning styles, as all students will be mainstreamed into the health classroom. A teaching approach in this unit for visual learners would be the use of PowerPoint and overheads. The hands on learner would get to see some actual practice with injury treatment and looking at real-life examples or using skeletons.

# Lesson Plans

## Lesson 1

**Name:** Janell Brown

**Grade Level:** Seventh Grade

**Unit / Content Area:** Body Systems-Skeletal

**Lesson Title:** Getting to know your skeletal system

### Objectives

Objective 1: Students will be able to explain how proper care of the skeletal system can improve their overall health, by answering questions during class.

Health Standard Addressed: 1.8.6. Explain how appropriate health care can promote personal health.

Objective 2: Students will be able to find and use a resource outside the classroom that they can use on the skeletal worksheet.

Health Standard Addressed: 3.8.2. Access valid health information from home, school, and community.

### Lesson Overview

Content Outline	Methods / Strategy	Estimated Time Needed	Necessary Materials
I. Skeletal System and Components a. Define b. Purpose c. Components d. Nutrition and Care e. Training and physical activity f. Fun facts	Lecture / Discussion	20 minutes	Skeleton
II. Skeletal System	Skeletal Worksheet	15 minutes	Worksheet
III. Pin the skeleton	Hands on	10 minutes	Skeleton Tape
IV. Review	Discussion	5 minutes	

### Teaching Steps

#### Introduction

*Review of Previous Material*

Review previous unit.

### *Overview & Rationale for Today's Lesson*

Today we are going to be starting our skeletal and muscular body systems unit. We are going to be talking about what the systems do for our body and us. We are going to be discussing how to take care of the systems, as well as how to treat injuries to the two systems. It is important for us to study the skeletal and muscular systems because they are victim to many teenage injuries. Likewise, the care we give to them growing up affects the health we are in we get 'old'. Today we will be starting with the skeletal system. We are going to first discuss the components, uses, care and training. We will also learn some fun facts about the skeletal system.

### Necessary Teaching Steps

Discuss: What is the skeletal system?

### Define

**the system of the body that serves as a support framework, protects vital organs, works with muscles to produce movement and produces blood cells**

### Purpose

What is the purpose of the skeletal system?

- protection
- Frame for body structure
- movement (with muscles)
- produce blood cells

### Components

What are the components of the skeletal system?

-206 bones in the adult body

**-bone:** is the structural material of the skeletal system

-All bones are covered with an outer layer of hard, densely packed, compact bone.

Beneath the compact bone is spongy bone that is less dense with a network of cavities filled with bone marrow.

-Ossification is the process by which bone is formed, renewed, and repaired

- Types
  - Long
    - Arms
    - Legs
  - Short
    - Wrist
    - Ankle
  - Irregular
    - Spinal column
  - Flat
    - Ribs
    - Collar bone
    - Scapula

**-periosteum:** a thin sheet of outer tissue that covers bone; it contains nerves and blood vessels, which causes us to feel pain when our bones are hit

**-bone marrow:** the soft tissue in the hollow center area of most bones, where red blood cells are produced

**-cartilage:** a soft, connective tissue on the ends of some bones; it acts as a cushion where bones meet or a shock absorber

Examples: vertebrae, knee, hip, ribs

**-ligament:** a tough fiber that connects bones together

- ACL-Anterior Cruciate Ligament, PCL-Posterior Cruciate Ligament, MCL-Medial Collateral Ligament are examples

**-joint:** the point where two bones meet, but not all bones are connected at a joint;

- Ball and socket: round head of one bone fits into the rounded cavity of an adjoining bone
  - Hip
  - Shoulder
- Hinge: a joint that works with muscle to promote rotation
  - Elbow
  - Knee
  - Toes
  - Fingers
- Pivot: allow limited rotation
  - Head
- Ellipsoidal: oval-shaped end of a bone fits into a curved space of an adjoining bone
  - Wrist

### Nutrition and Care

Calcium is essential to bone growth.

- childhood and teenage years are most crucial for developing strong bones, a deficiency in the teen years can lead to osteoporosis (a decrease in bone density; causes fractures in bones easily) later in life
  - bones reach maximum density around the age of twenty, making it most important to develop strong bones at a young age
- Dairy products provide a large source of calcium to the body

What food are dairy products? –milk, yogurt, ice cream

- Green leafy vegetables provide calcium to the body
  - Four to five servings a day of calcium rich foods

How can you get more green leafy vegetables into your diet?

### Training and Physical Activity

Weight bearing physical activity is essential for normal skeletal development in children and teens; helps to reach maximum bone density

Weight bearing activities include: volleyball, walking, running, roller blading

Physical activity helps to control weight, which can strengthen the bones, by not carrying around extra fat and causing them to work harder at routine activities.

### Skeletal System Fun Facts

- There are 206 in adults and up to 350 for infants
- Of the 206 bones in the adult human body, just slightly over half are in the hands and feet; 52 are in the feet and 54 are in the hands



- Infants may have from 300- 350 bones at birth. Some fuse (become one) together as they grow up. (examples are in the skull, sacrum and hip bones)
- The adult skeleton consists of 206 bones . . .
- 28 skull bones (8 cranial, 14 facial, and 6 ear bones);
- the horseshoe-shaped hyoid bone of the neck;
- 26 vertebrae (7 cervical or neck, 12 thorax, 5 lumbar or loins, the sacrum which is five fused vertebrae, and the coccyx, our vestigial tail, which is four fused vertebrae);
- 24 ribs plus the sternum or breastbone; the shoulder girdle (2 clavicles, the most frequently fractured bone in the body, and 2 scapulae);
- the pelvic girdle (2 fused bones);
- 30 bones in our arms and legs (a total of 120);
- There are also a few partial bones, ranging from 8-18 in number, which are related to joints.
- Basically, there are 7 vertebrae and the hyoid bone in the neck.
- The human hand has 27
- The longest bone in your body? Your thigh bone, the femur -- it's about 1/4 of your height. The smallest is the stirrup bone in the ear which can measure 1/10 of an inch.
- Did you know that humans and giraffes have the same number of bones in their necks? Giraffe neck vertebrae are just much, much longer!
- You have over 230 moveable and semi-moveable joints in your body.

### Skeletal System Activity

Now we are going to do some skeletal system identifications. Each person will have a worksheet of the human skeletal system. You need to find a resource to identify each bone numbered on the worksheet. You will also identify the lettered joints. You will finish this tonight as homework. When searching for a source to fill out the worksheet you need to find a valid resource to help you out. Valid information is important because a person could tell you a wrong thing and never know the difference. Finding these helpful sources can help people when they search for information later in life. If you finish I want you to study the different bones we have talked about and you studied on the worksheet. You may also take a look at the skeleton in the front of the classroom. (see attached worksheet)

### Pin the bones

Each of you will pick a bone and write it on a piece of paper. You will then take turns going to the skeleton and taping it on the skeleton. If someone picks the same bone you must write down a new bone to pin on the skeleton.

### Summarize and Debrief

Today we learned a lot about the skeletal system.

Ask:

Can someone tell me how many bones are in the body? 206

What is the purpose of the skeletal system? Protection for vital organs, framework, produce blood cells, movement

What are the four types of joints? Hinge, pivot, ball and socket, ellipsoidal

What are the four types of bones? Short, long, irregular, flat

What nutrient do you need in your diet to keep strong bones? Calcium

When do you have maximum bone density? Around age twenty

Which physical activities are best for building strong bones? Weight bearing

Tell:

Tonight I would like you to read the chapter over the skeletal system. I want you to take home the worksheet and look over the bones. The worksheet will be handed in when you enter the classroom tomorrow, please make sure all of your answers correspond with the number and letter on the above diagram. We will have a short quiz tomorrow on the skeletal system at the beginning of the class period.

Tomorrow we will be starting the muscular system. The next day we will discuss more how the muscular and skeletal system work. After that we will be talking about injuries and treatment of injuries to the skeletal and muscular systems.

### **Assessment Strategy**

Students will complete a short quiz at the beginning of the next class period.  
(see attached)

## Lesson 2

**Name:** Janell Brown

**Grade Level:** Seventh Grade

**Unit / Content Area:** Body Systems-Muscular

**Lesson Title:** Getting to know your muscular system

### Objectives

Objective 1: Students will be able to formulate a goal to improve their muscular system using the goal setting process.

Health Standard Addressed: 6.8.2 Develop a goal to adopt, maintain or improve a personal health practice.

Objective 2: Students will be able to describe the three types of muscle in the body and relate their function to their type during the closure.

Health Standard Addressed: 1.8.1. Analyze the relationship between healthy behaviors and personal health.

### Lesson Overview

Content Outline	Methods / Strategy	Estimated Time Needed	Necessary Materials
I. Skeletal System	Quiz	10 minutes	Quiz Handout
II. Muscular System g. Define h. Purpose i. Components j. Types k. Nutrition l. Training, Care, Physical Activity m. Facts	Lecture / Discussion	20 minutes	Muscle Diagram
III. Muscular System	Muscular Worksheet	5 minutes	Worksheet
IV. Pin the muscles	Hands on	10 minutes	Skeleton
V. Review	Discussion	5 minutes	

### Teaching Steps

#### Introduction

#### *Review of Previous Material*

Yesterday we learned about the skeletal system. Can anyone tell me the purpose of the skeletal system? (protection for organs, movement, produce blood cells, frame for body structure) There are four types of bones, as well as four types of joints. What is

important about our diet for building strong bones? (calcium) As well weight bearing exercises are good to help build strong bones.

### *Overview & Rationale for Today's Lesson*

Today we will be discussing the muscular system. The muscular system is important because it provides the movement we need for everyday living. We will talk about the purpose and components of the muscular system, as well as nutrition, training and care. In the next few days we will also discuss injuries to the muscular system and how to treat them. Many of you may have experienced a strained muscle or a muscle cramp at one point in time.

### Necessary Teaching Steps

#### Muscular System

Define: **the system of the body that consists of muscles that provide motion and maintain posture**

#### Purpose

- provides motion
- helps to maintain posture
- help you to lift things
- pump blood
- act as levers to the bones
- \***muscles work in pairs to move the body: as one muscle contracts and shortens, another muscle relaxes and lengthens**

#### Components

- myofibrils:** small fibers that run through each muscle fiber; contracting element of muscle, contain myofilaments (proteins used for contractions)
- muscle fibers:** the cells of muscle
- muscle fascicles:** a bundle of muscle cells
- tendons:** tough tissue fiber that attaches muscle to bones

#### Types

**Involuntary-** a muscle that functions without the person's control

Ex: stomach, internal organs

**Voluntary-** a muscle a person can control

Ex: arms, legs, face

1. **Smooth:** involuntary muscle tissue found in many internal organs; sheets/layers of muscle behind each other

Ex: eyes, bladder, esophagus, stomach

2. **Skeletal:** muscle tissue that is attached to bone; makes up most of the muscles of the body; creates movement in the body; stretch across a joint to attach to two bones with the help of the tendon

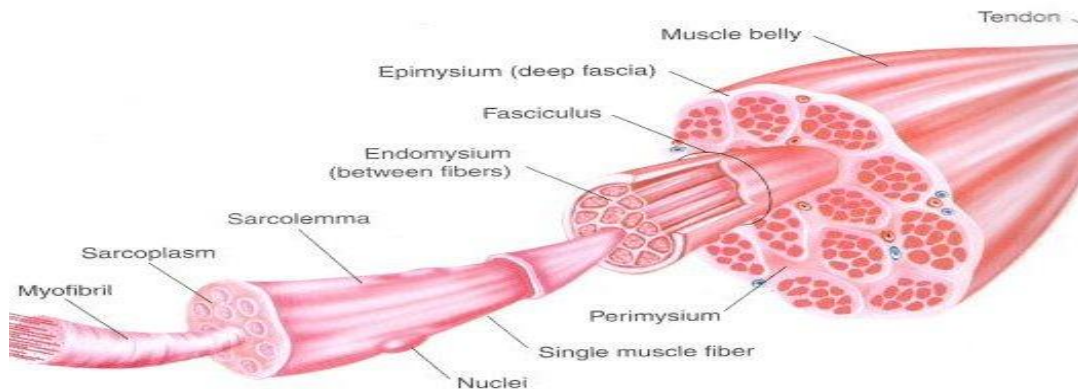
-**flexor:** closes a joint by the contraction/relaxation of muscle; decreases the angle at a joint

-**extensor:** opens a joint by the contraction/relaxation of muscle; increases the angle at a joint

Demonstrate flexion and extension with students.

\*many sizes and shapes

- A MUSCLE is bound in FASCIA
  - Fascia comes together to form a TENDON which attaches the muscle to bone
  - A MUSCLE is bound into compartments called FASCICLES
  - Fascicles contain many MUSCLE CELLS or MUSCLE FIBERS. These are multinucleated cells and are very long (as long as the muscle)
  - Muscle cells contain many MYOFIBRILS, which are bundles of MYOFILAMENTS (ACTIN and MYOSIN).
  - Myofibrils are divided into segments known as sarcomeres
  - SARCOMERES are the basic unit of contraction, and there are many along each myofibril. A sarcomere is the distance from one Z disc to another. Each sarcomere will shorten during contraction, thus shortening the entire cell (and the entire muscle).
- (Show below diagram on the overhead or PowerPoint)



**Figure 1: Muscle belly split into various component parts (from Essentials of Strength Training & Conditioning, National Strength & Conditioning Association)**

**Fast-twitch:** identified by a quick contraction time and a low resistance to fatigue

**Slow-twitch:** identified by a slow contraction time and a high resistance to fatigue

3. **Cardiac:** found only in the heart; contractions are generated by nerve stimulation; contract to move blood out of the heart, and then relax to allow blood into the heart

### Nutrition

Protein in the diet helps to provide amino acids to the muscles to repair and build muscle

Protein can be found in foods like:

red meat, nuts, fish, poultry, eggs, milk, cheese, soy, legumes

Hydration is important, as muscles need to be repaired by the water flushing out toxins and waste each day.

### Training and Care

Regular physical activity helps to build muscles

- atrophy: wasting or loss of muscle tissue resulting from disease or lack of use

- hypertrophy: an increase in muscle mass and cross-sectional area, due to increase in the size of the fibers in response to exercise

- hyperplasia: an increase in the number of cells or fibers; limited in the human body as formation of new fibers is limited

Muscle Tone: natural tension in the fibers of a muscle

Weight lifting is not beneficial to young people until they have gone through puberty.

- calisthenics

Stretching increases the flexibility of a muscle

\*increased flexibility helps to prevent injury and increase range of motion around a joint

\*stretching is important before an athletic event because it warms the muscle up to be able to contract and relax quickly

- Ballistic- rapidly stretching the muscle with a bouncing movement
  - \*used specifically to train for a certain sport
  - \*not recommended for daily stretching
- Static-stretching the muscle to a point where a pull is felt and holding the stretch for fifteen to thirty seconds

Ask: How can you personally increase your flexibility on a daily basis?

\*write ideas on the board/overhead

-stretch when you get up

-stretch when you go to bed

-stretch anywhere you go during the day

-stretch after exercise and before if you warm the muscles up a little before stretching

- Lactic Acid-a waste product of exercise from muscles
  - Getting rid of preventing the lactic acid from settling in the muscles helps to prevent soreness in the muscles the next day after a bout of exercise
  - Lactic Acid can be rid from the muscles by properly cooling down and stretching
- Isometric- exercise that involves the muscle tightening for about five to eight seconds with no body movement; no change in muscle length during a contraction
- Isokinetic- exercise using special machines that provide weight resistance through the full range of motion
- Isotonic- exercise in which a muscle or muscles move a moderate amount of weight eight to fifteen times; muscle shorten during a contraction
- Eccentric: a contraction that causes the muscles to lengthen
- Concentric: a contraction that causes the muscles to shorten

### Facts

- There are over 600 muscles in the body.
- Muscles pull, but never push
- Approximately 40% of your body weight is muscles
- 30 facial muscles, which create different facial expressions
- The muscles in the eye move about 100,000 times a day
- Smallest muscle in the body is the stapedius: the muscle that activates the stirrup, the small bone that sends vibrations from the eardrum to the inner ear. It measures just 0.05 inch (0.13 centimeter) in length.
- Largest muscle in the body is latissimus dorsi: the large, flat muscle pair that covers the middle and lower back.
- Longest muscle in the body is sartorius: the straplike muscle that runs diagonally from the waist down across the front of the thigh to the knee.
- Strongest muscle in the body is gluteus maximus: the muscle pair of the hip that form most of the flesh of the buttocks.

- Faster reacting muscle in the body is the orbicularis oculi: the muscle that encircles the eye and closes the eyelid. It contracts in less than 0.01 second.
- Seventeen muscles used to make a smile.
- Forty-three muscles used to make a frown

Tell: Setting goals help us to improve upon a desired action

### Goal Setting Process

If we want to set a goal there are some steps we need to go through to make reaching that goal a success.

- 1) state your goal
- 2) make an action plan
- 3) identify obstacles to goal (time, resources, etc.)
- 4) set up a time line
- 5) keep a record toward your goal (diary, chart, etc.)
- 6) build a support system (friend, family, accountability partner, etc.)
- 7) revise your goal, plan or time line if needed

What goal could we specifically set to improve our muscular system?

- drink more water
- stretch more each day
- eat foods rich in protein
- exercise daily

You are going to take time to develop a goal for improving your muscular system. I have a worksheet you are going to fill out with each step. Be as descriptive as possible for each step.

(see attached worksheet)

### Worksheet

We are going to do a worksheet with the muscular system. There are muscles on the worksheet, using your book you are going to find each of the labeled muscles and put the correct answer in the blank next to the number.

(see attached worksheet)

### Pin the muscles

Each of you will pick a muscle and write it on a piece of paper. You will then take turns going to the skeleton and taping it on the skeleton. If someone picks the same muscle you must write down a new muscle to pin on the skeleton.

### Summarize and Debrief

Today we learned about the muscular system. Are there any questions concerning the muscular system?

Ask:

What is the purpose/definition of the muscular system?

- **the system of the body that consists of muscles that provide motion and maintain posture**

- **provides motion**
- **helps to maintain posture**
- **help you to lift things**
- **pump blood**
- **act as levers to the bones**
- **muscles work in pairs to move the body: as one muscle contracts and shortens, another muscle relaxes and lengthens**

What are the three types of muscles?

- Cardiac
- Skeletal
- Smooth

How many muscles are in the body?

-over 600 muscles

What are two kinds of stretching for muscles?

-static

-ballistic

Why is it important to stretch?

-warm muscles up

-cool muscles down

-prevent lactic acid from settling

-increase flexibility

Do muscles push?

-NO!!!

Protein helps muscles do what?

-build amino acids to help repair and build muscle

What is the most important muscle in the body?

-HEART-without the heart beat the rest of the body dies, because it stops pumping the blood which is needed to live

Tonight I would like everyone to take home the worksheet to finish if you did not get it done. Worksheets will be due when arriving to class. I also want you to read the muscular system chapter and be ready for a muscular system quiz at the beginning of class tomorrow.

Now that we have learned about the muscular and skeletal system, tomorrow we will discuss how the two systems work together.

### **Assessment Strategy**

Students will complete a short quiz at the beginning of the next class period.  
(see attached)



## Lesson 3

**Name:** Janell Brown

**Grade Level:** Seventh Grade

**Unit / Content Area:** Body Systems

**Lesson Title:** The team'work' of skeletal and muscular systems

### Objectives

Objective 1: Students will search the internet for resources to complete the web quest: How it Works using valid internet sites (.net, .gov, .org).

Health Standard Addressed: 3.8.5. Locate valid and reliable health products and services.

Objective 2: Students will be able to explain how muscles and bones work together during the lecture/ discussion.

Health Standard Addressed: 1.8.8. Examine the likelihood of injury or illness if engaging in unhealthy behaviors.

### Lesson Overview

Content Outline	Methods / Strategy	Estimated Time Needed	Necessary Materials
I. Quiz	Quiz	5 minutes	Quiz Handout
II. Skeletal System a.Ligaments b.Joints	Lecture / Discussion	5 minutes	None
III. Muscular System a.Flexors/Extensors b.Tendons c.Skeletal Muscles they are the only muscles to attach to bones	Lecture/Discussion	10 minutes	None
IV. How it works. Web quest	Computer Lab	30 minutes	Computer Lab

### Teaching Steps

#### Introduction

##### *Review of Previous Material*

The last two days we have learned about the skeletal system and the muscular system. When talking about the two we heard some things that told us how the two worked together to create movement.

### *Overview & Rationale for Today's Lesson*

Today we are going to be discussing how the two systems work together to create movement. We will look at each system separately again and how they create movement, and then we will discuss how the two work together. We will individually be looking at movement forms during a web quest at the computer lab.

### Necessary Teaching Steps

#### Skeletal System

**Ligaments:** a tough fiber that connects bones together

**Joints:** the point where two bones meet, but not all bones are connected at a joint

- Ball and socket: round head of one bone fits into the rounded cavity of an adjoining bone
  - Hip
  - Shoulder
- Hinge: a joint that works with muscle to promote rotation
  - Elbow
  - Knee
  - Toes
  - Fingers
- Pivot: allow limited rotation
  - Head
- Ellipsoidal: oval-shaped end of a bone fits into a curved space of an adjoining bone
  - Wrist

#### Muscular System

**-flexor:** closes a joint by the contraction/relaxation of muscle; decreases the angle at a joint

**-extensor:** opens a joint by the contraction/relaxation of muscle; increases the angle at a joint

**-tendons:** tough tissue fiber that attach muscle to bones

\*Only skeletal muscle attach to bones

\*one end of a muscle is attached to part of the skeleton, which moves by the action of the muscle, while the other end of the muscle is attached to a fixed place on the skeleton that does not move

-attached end of the muscle to the part of the skeleton that moves is the **insertion**

-other end of the muscle that is attached to part of the skeleton that does not move is the **origin**

**Adductor:** moves a bone closer to the midline

**Abductor:** moves a bone away from the midline

\*arranged opposite to each other at joints, will switch roles as the movement changes

**Levator:** produces an upward movement

**Depressor:** produces a downward movement

Have students demonstrate some movements and go through the muscles being used and how they are being used.

Biceps curl:

Up

Biceps-adductor

Triceps-abductor

Biceps are attached to the radius of the forearm; biceps contract to pull the radius up to **adduction**; brings arm into **flexion**; triceps are relaxing to allow movement

Down

Triceps-adductor

Biceps-abductor

Biceps lengthen from their insertion at the scapula to lower the radius; triceps contract to pull the radius down, while biceps are relaxing

\*all of this is happening over the elbow, which is the joint

### How it works-Web quest

We are going to the computer lab to do some research on how the muscles and bones work together. Each person will choose an action, such as kicking, lifting, and running. You will then spend time in the computer lab researching the movement and how the movement is produced. Each person will fill out a worksheet with information about the movement.

When you are researching you must use credible, valid sources. What is a credible and valid source?

From a website that is

-educational

-from a health organization

-others cite their sources from a health organization or a educational institution

-so use URLs ending in : .gov, .org, .edu

Not .com are usually provided by someone that has no knowledge of the content (see attached)

### Summarize and Debrief

Today we learned more about how each system works and how they work together. Are there any questions about how they work, something you may need more explanation for?

What are extensors and flexors?

-**flexor**: closes a joint by the contraction/relaxation of muscle; decreases the angle at a joint

-**extensor**: opens a joint by the contraction/relaxation of muscle; increases the angle at a joint

What is the difference between abductor and adductor?

**Adductor**: moves a bones closer to the midline

**Abductor**: moves a bone away from the midline

If I were to raise my foot, is this flexion or extension?

-**flexion**

What attaches bone to muscle?

-**tendons**

What are the four types of joints?

- hinge**
- ball and socket**
- pivot**
- ellipsoidal**

**Assessment Strategy**

Students will complete a short quiz at the beginning of the next class period.  
(see attached)

## Lesson 4

Name: Janell Brown

Grade Level: Seventh Grade

Unit / Content Area: Body Systems

Lesson Title: Skeletal Injuries/Diseases

### Objectives

Objective 1: Students will be able to create a poster that they will hang in the hallway that discusses ideas to promote strong and healthy bones.

Health Standard Addressed: 8.8.2 Demonstrate how to influence and support others to make positive health choices.

Objective 2: Students will be able to explain how eating healthy and exercising leads to healthy bones.

Health Standard Addressed: 7.8.2 Demonstrate healthy practices and behaviors that will maintain or improve the health of self and others.

### Lesson Overview

Content Outline	Methods / Strategy	Estimated Time Needed	Necessary Materials
V. Injuries a. Fractures b. Shin Splints	Lecture / Discussion	10 minutes	- pictures of fractures
VI. Diseases a. Osteoporosis b. Scoliosis c. Bone cancer d. Arthritis e. Leukemia	Lecture/Discussion	15 minutes	
VII. Advocacy	Discussion/Poster	20 minutes	-poster -markers -magazines -colored pencils -glue

### Teaching Steps

#### Introduction

*Review of Previous Material*

The last few days we have learned about both the skeletal and muscular systems. Yesterday we learned how the two systems work together to create movements we make each day.

### *Overview & Rationale for Today's Lesson*

Today we are going to be discussing injuries and diseases of the skeletal system. I am sure each of you knows someone that either has had an injury or disease of the skeletal system. We are going to learn all the different kinds of injuries, then another day we will learn about how to treat the injuries. We also know proper nutrition and physical activity to keep the system strong, so now we will see what happens when we do not keep the skeletal system strong.

### Necessary Teaching Steps

#### Skeletal System Injuries

Ask: What do you think of when you hear skeletal system injuries?

-broken bones

-fractures

Has anyone had a skeletal system injury? (let students respond)

The first injury we are going to talk about is fractures.

**Fracture:** is any type of break in the bone structure

- **hairline fracture** -a thin break in the bone
- **complete fracture**-when the bone has broken into two pieces
- **greenstick fracture**-when the bone cracks on one side only, not all the way through
- **single fracture**-when the bone is broken in one place
- **comminuted fracture**-when the bone is broken into more than two pieces or crushed
- **bowing fracture**-when the bone bends but does not break; only happens in children
- **open fracture**-when the bone is sticking through the skin

Show examples of each type of fracture. Have pictures of fractures.

**Shin splints**- inflammation of the periosteum of the tibia; causes pain to the front of the lower leg

\*also may be associated with muscular injury as tightening of the calf muscles can cause the same pain for shin splints; shin splints may also be misdiagnosed for a stress fracture in the bone

#### Skeletal System Diseases

**Osteoporosis**- a condition in which the bones become thin and brittle; bones weaken when you have low levels of calcium, phosphorus and other minerals in your bones.

-common result of osteoporosis is fractures — most of them in the spine, hip or wrist.

-more common in females than males

Symptoms

- Back pain, which can be severe if you have a fractured or collapsed vertebra

- Loss of height over time, with an accompanying stooped posture
- Fracture of the vertebrae, wrists, hips or other bones

Three factors that you can influence are essential for keeping your bones healthy throughout your life:

- Regular exercise
- Adequate amounts of calcium
- Adequate amounts of vitamin D, which is essential for absorbing calcium

**Scoliosis**- a deformity of the spine in which the spine shows either a lateral or an S-shaped curvature

Signs and symptoms of scoliosis may include:

- Uneven shoulders
- One shoulder blade that appears more prominent than the other
- Uneven waist
- One hip higher than the other
- Leaning to one side
- Fatigue

Schools typically do a scoliosis testing in grades 5-12.

### **Bone Cancer**

- Cancer that originates in the bone, primary bone cancer, is rare.
- Fewer than 2,500 Americans are diagnosed with this type of cancer each year.
- The condition affects more children than adults.
- most frequently occurs in the long bones of your arms and legs

Symptoms

- Pain is the most common bone cancer symptom
- Weakened bones, sometimes leading to fractures
- Joint swelling and tenderness (for tumors in or near joints)
- Fatigue
- Fever
- Unintended weight loss
- Anemia

### **Arthritis**-painful inflammation of the joints

Juvenile rheumatoid arthritis (JRA) — which causes joint inflammation for at least six weeks in children 16 years old or younger — is the most common type of childhood arthritis. In most cases, symptoms of juvenile rheumatoid arthritis may fade after several months or years.

Signs and symptoms of juvenile rheumatoid arthritis may include:

- Joint swelling, with pain and stiffness.
- Fever and rash.
- Swelling of lymph nodes.
- Eye inflammation.

([www.mayoclinic.com](http://www.mayoclinic.com))

**Leukemia**- cancer of the blood-forming cells, which reside in the bone marrow

Symptoms:

- Fever or chills
- Persistent fatigue, weakness

- Frequent infections
- Loss of appetite or weight
- Swollen lymph nodes, enlarged liver or spleen
- Easy bleeding or bruising
- Shortness of breath when you're physically active, as while climbing steps
- Tiny red spots in your skin (petechiae)
- Excessive sweating, especially at night
- Bone pain or tenderness

Speed of progression helps to classify leukemia

- Acute leukemia. In acute leukemia, the abnormal blood cells are immature blood cells (blasts). They can't carry out their normal work, and they multiply rapidly, so the disease worsens quickly. Acute leukemia requires aggressive, timely treatment.
- Chronic leukemia. This type of leukemia involves more mature blood cells. These blood cells replicate or accumulate more slowly and can function normally for a period of time. Some forms of chronic leukemia initially produce no symptoms and can go unnoticed or undiagnosed for years.

One type of treatment for leukemia is a bone marrow transplant.

Bone marrow transplant. This process replaces your leukemic bone marrow with leukemia-free marrow. In this treatment, you receive high doses of chemotherapy or radiation therapy, which destroys your leukemia-producing bone marrow. This marrow is then replaced by bone marrow from a compatible donor. In some cases, you may also be able to use your own bone marrow for transplant (autologous transplant). This is possible if you go into remission and then save healthy bone marrow for a future transplant, in case the leukemia returns.

### Advocacy

Now that we know many different skeletal injuries and diseases, we know how they are caused; therefore we understand that many of the injuries and diseases can be prevented by our diet and physical activity. Part of understanding a health concept is when we are able to advocate or promote health behaviors related to a health issue.

We are going to be making advocacy posters to promote the health of strong bones and skeletal system. Each person will make a poster. When advocating there are some steps to consider before we get started.

- 1) Select a health-related concern.
  - you can decide which injury or disease you want to focus on for your poster, whether it be osteoporosis or preventing fractures when skating
- 2) Gather reliable information.
  - you know what reliable sources are, when using the internet
  - you can use your text to gather stats and definitions
- 3) Identify your purpose and target audience.
  - are you going to target teens, parents, younger kids?
  - your audience will determine how much writing, what kinds of pictures that you use to get their attention drawn to your poster
  - why should they look at it



4) Develop a convincing and appropriate message.

-you can use a slogan

-does the information make sense without being too detailed

-is it easy to understand what the poster is promoting/advocating

I have provided each of you with a poster, markers, colored pencils, magazines and other art supplies. If you want to take it home or you do not finish in class, you need to take it home and bring it back tomorrow.

(see attached rubric)

### Summarize and Debrief

So today we learned about skeletal injuries as well diseases of the skeletal system. We also learned how to be advocates for a health related issue. Can you be a health advocate without making a poster? You can tell your family, friends about the different issues and content we talk about in health class everyday.

What makes a fracture a hairline fracture?

-a thin break in the bone

What makes a fracture complete?

-when the bone has broken into two pieces

What are some strategies to prevent the developing of osteoporosis?

-regular physical activity

-calcium rich diet

-vitamin D in the diet

Name a treatment often used for leukemia patients.

-Bone marrow transplant

Name some symptoms of arthritis.

- Joint swelling, with pain and stiffness.
- Fever and rash.
- Swelling of lymph nodes.
- Eye inflammation.

What is scoliosis?

-a deformity of the spine in which the spine shows either a lateral or an S-shaped curvature

What is an open fracture?

- when the bone is sticking through the skin

Tonight you need to read the section over skeletal injuries and diseases. We will have a quiz at the beginning of class tomorrow. You can finish your advocacy poster if you were not able to finish it today. You will hand in your advocacy poster at the beginning of class tomorrow. Tomorrow we will discuss muscular system injuries and diseases.

### **Assessment Strategy**

Students will complete a short quiz at the beginning of the next class period.

(see attached)

## Lesson 5

Name: Janell Brown

Grade Level: Seventh Grade

Unit / Content Area: Body Systems

Lesson Title: Muscular System Injuries and Diseases

### Objectives

Objective 1: Students will identify terms and definitions of muscular injuries during a quiz.

Health Standard Addressed: 1.8.4 Describe how family history can affect personal health.

Objective 2: Students will identify a muscular system injury and disease during a role play of situations, while a classmate acts out the situation.

Health Standard Addressed: 3.8.4. Describe situations that may require professional health services.

### Lesson Overview

Content Outline	Methods / Strategy	Estimated Time Needed	Necessary Materials
III. Quiz	Quiz	5 minutes	quiz
IX. Injuries and symptoms a. strains b. sprains c. tears d. soreness e. bruises f. shin splints g. cramp	Lecture / Discussion	15 minutes	none
X. Disease a. Muscular Dystrophy b. Cerebral palsy c. Chronic Tendinitis d. Compartment Syndrome e. Tetanus f. steroids	Lecture/Discussion	15 minutes	none
XI. Role Play injuries		15 minutes	Role Play situations

### Teaching Steps

## Introduction

### *Review of Previous Material*

Yesterday we learned about the skeletal injuries. Many skeletal injuries can also lead to muscular system injuries, as we saw two days ago how the systems are related.

### *Overview & Rationale for Today's Lesson*

Today we will be discussing muscular system injuries. Many people will experience a muscular injury, whether it be as serious as a tear or just a muscle cramp.

## Necessary Teaching Steps

### Strains

AKA: Pulled Muscle

An overstretching of muscles and/or tendons, which may result in the tearing of a muscle or tendon

\*needs medical attention and treatment

To help simplify diagnosis and treatment, doctors often classify muscle strains into three different grades, depending on the severity of muscle fiber damage.

- Grade I Only a few muscle fibers are stretched or torn, so the muscle is mildly tender and painful, but muscle strength is normal.
- Grade II A greater number of muscle fibers are torn, so there is more severe muscle pain and tenderness, together with mild swelling, noticeable loss of strength and sometimes bruising (called ecchymosis).
- Grade III The muscle tears all the way through. Either it rips into two separate pieces or the fleshy part of the muscle breaks away from the tendon. Grade III muscle strains are serious injuries that cause complete loss of muscle function, as well as considerable pain, swelling, tenderness and discoloration. A Grade III strain also causes a break in the normal outline of the muscle, often producing an obvious dent or gap under the skin where the ripped pieces of muscle have come apart.

Symptoms of a strained leg muscle can include:

- Muscle pain and tenderness, especially after an activity that stretches or violently contracts the muscle. Pain usually increases when you move the muscle, but it is relieved by rest.
- Local muscle swelling, black and blue discoloration or both
- Either a decrease in muscle strength or (in a Grade III strain) a complete loss of muscle function
- Difficulty walking
- A pop in the muscle at the time of injury
- A gap, dent or other defect in the normal outline of the muscle (Grade III strain)

To help prevent muscle strains in your legs, you can:

- Warm up before you participate in high-risk sports.
- Follow an exercise program aimed at stretching and strengthening your leg muscles.
- Increase the intensity of your training program gradually. Never push yourself too hard, too soon.

#### Tears

can tear all or part of a muscle and the tendons attached  
tearing of the muscle can also damage small blood vessels, causing local bleeding (bruising) and pain (caused by irritation of the nerve endings in the area)

#### Sprains

A sprain is an injury to the ligaments, tendons and soft tissue around a joint caused by undue stretching

\*most common in the ankle, knee, wrist

Sprains can cause rapid swelling. Generally, the greater the pain and swelling, the more severe the injury.

- Mild. Your ligament stretches excessively or tears slightly. The area is somewhat painful, especially with movement. It's tender. There's not a lot of swelling. You can put weight on the joint.
- Moderate. The fibers in your ligament tear, but they don't rupture completely. The joint is tender, painful and difficult to move. The area is swollen and may be discolored from bleeding in the area. You may feel unsteady when you try to bear weight on your joint.
- Severe. One or more ligaments tear completely. The area is painful. You can't move your joint normally or put weight on it. If the sprain occurs in the ankle or knee, when you try to walk, your leg feels as if it will give way. The joint becomes very swollen and also can be discolored. The injury may be difficult to distinguish from a fracture or dislocation, which requires medical care.

([www.mayoclinic.com](http://www.mayoclinic.com))

Show video of ankle sprain: (<http://www.mayoclinic.com/health/ankle-sprain/MM00717>)

#### Soreness

Muscle soreness is from using a muscle in a different way than you typically use it for.

Ex: you go canoe and paddle for five hours, your arms may be tired and sore because you do not use those same muscles for that long each day

\*muscle soreness is good because you are using muscles actively

\*muscle soreness becomes bad when it persists for multiple days in a row

#### Bruises

A wound in which damage to the soft tissue and blood vessels causes bleeding under the skin; the blood has no place to go so it is trapped under the skin forming a red/purple mark and is tender to the touch

\*also called a contusion or ecchymosis

A bruise will change colors as it heals. The change of color is the body healing, by breaking down the blood and reabsorbing.

Red/purple

Blue/purple/black

Green/yellow

Yellowish brown or light brown

### Shin Splints

Tightening of the calf muscles can pull on the front lower leg causing pain in the shins; many lower leg pains are termed shin splints and the cause of each case is different

### Cramp

The sudden tightening of a muscle.

-May be caused by lack of hydration in a bout of exercise

### Muscular System Diseases

**Muscular Dystrophy**-a genetic disease in which the muscles progressively deteriorate

#### Symptoms

- Muscle weakness
- Apparent lack of coordination
- Progressive crippling, resulting in fixations (contractures) of the muscles around your joints and loss of mobility

#### Causes

Each form of muscular dystrophy is caused by a genetic mutation that's particular to that type of the disease. The most common types of muscular dystrophy appear to be due to a genetic deficiency of the muscle protein dystrophin

**Cerebral palsy**-a disorder of the nervous system that interferes with muscle coordination

**Chronic Tendinitis**-inflammation of a tendon

\*may require surgical repair

-pain, tenderness, swelling

**Compartment Syndrome** ([www.mayoclinic.com](http://www.mayoclinic.com))

Chronic exertional compartment syndrome is an uncommon, exercise-induced neuromuscular condition that causes pain, swelling and sometimes even disability in affected muscles of your legs or arms.

The pain and other symptoms associated with chronic exertional compartment syndrome may be characterized by:

- Aching, burning or cramping pain in the affected limb during exercise
- Tightness in the affected limb
- Numbness or tingling in the affected limb
- Weakness of the affected limb
- Foot drop, in severe cases, if nerves in your legs are affected
- Occasionally, swelling or bulging as a result of a muscle hernia

### Steroids

Many people use steroids to help build muscle. However the consequences related to steroids can be life changing and ending.

- acne
- rashes
- increase risk of heart disease and stroke
- high blood pressure
- reduced sperm count
- roid rage
- shrinking of the testicles

### Role Play

I will tell you the situation, symptom and other information. You will tell me what muscular system injury or disease I am describing. When I am reading the situation students will take turn acting out the situation.

1. You notice an area on your leg it is red/purple mark and is tender to the touch. What do you have?
2. You are playing a sport and all the sudden both your legs have pain shooting through them, what do you have?
3. You are taking a walk and trip over a root. You look down at your ankle and notice that it has swollen and tender to walk on. What do you have?
4. You decide to exercise one day and have no problems. When you wake up in the morning your legs are stiff and it is hard to walk. What do you have?
5. You have been practicing in the months leading up to your basketball season. You notice that your legs have been burning or generally achy while you are practicing. No matter what you do you still seem to have problems. What do you have?

### Summarize and Debrief

Today we learned about muscular injuries and diseases. Many of you have heard about the injuries, but did you know what they were exactly? Now you know what is happening to the body when you see someone with a muscular injury.

Review:

What is a sprain?

A sprain is an injury to the ligaments, tendons and soft tissue around a joint caused by undue stretching

What is a strain?

An overstretching of muscles and/or tendons, which may result in the tearing of a muscle or tendon

What causes muscle cramps/spasms?

-dehydration and tight muscles

Why do bruises change colors?

-the blood is reabsorbing while the body is healing the area

Is muscle soreness good or bad?

-good, unless the pain continues for days

Is muscular dystrophy contagious?

No it is a genetic disease.

Steroids can cause more damage than help one's appearance true or false?

True

Tonight I would like you to read the section over muscular system injuries.

Tomorrow we will be discussing the treatment and rehab of both types of injuries. We will take a quiz over the muscular system injuries and diseases.

### **Assessment Strategy**

Students will complete a short quiz at the beginning of the next class period.

(see attached)

## Lesson 6

Name: Janell Brown

Grade Level: Seventh Grade

Unit / Content Area: Body Systems

Lesson Title: Treatment of Injuries and Disease of the Skeletal and Muscular Systems

### Objectives

Objective 1: Students will be able to work with the rest of the class to work through the decision making process and apply the right type of treatment to injuries of role play.

Health Standard Addressed: 5.8.6 Choose healthy alternatives over unhealthy alternatives when making a decision

Objective 2: Students will be able to explain what each letter in PRICE stands for and what they should do for each step.

Health Standard Addressed: 1.8.6. Explain how appropriate health care can promote personal health.

### Lesson Overview

Content Outline	Methods / Strategy	Estimated Time Needed	Necessary Materials
I.Muscular Injuries/Diseases	Quiz	5 minutes	Quiz Handouts
II.Treatment of skeletal injuries a. Casts, crutches b. Immediate care c. Ligament injuries	Lecture / Discussion	10 minutes	None
III. Treatment of muscular injuries a. PRICE b. Rehabilitation c. Braces d. Prevention	Lecture/Discussion	10 minutes	None
IV. Decision Making Process a. Role Play b. first aid	Discussion/Role Play	20 minutes	Role Play Situations
V. Review	Discussion	5 minutes	None
VI. Quiz	Quiz	5 minutes	Quiz Handouts

### Teaching Steps

#### Introduction

*Review of Previous Material*



In this unit we have learned about the skeletal and muscular system, injuries and diseases, how the systems work together to produce movement.

### *Overview & Rationale for Today's Lesson*

Today we are going to be discussing and practicing the treatment of injuries of both systems. We are going to learn some first aid procedures, as well as rehabilitation for serious injuries and rehabilitation after surgeries for injuries.

### Necessary Teaching Steps

#### Treatment of skeletal Injuries

#### **Fractures**

Tell: Fractures are the most common skeletal injuries. When a bone breaks, we want to make sure there is no bleeding from the bone or break in the skin.

If someone has broken a leg or large bone, we want to make sure not to move the bone.

- moving can cause pain to broken area

- moving can prevent the bone from healing properly

- if you think you may have a fracture do not move, wait for someone to help you, moving can only make it worse

After calling for help and moving someone to take them to the hospital there are some things we must do.

- keep the bone as straight as possible

- wrap the broken area with a splint to keep it straight and not moving

At a hospital

- doctor will take an x-ray after looking at the injury

- if a complete break, doctor may need to reset the bone back into place

- broken area will get a cast to let it heal

  - \*can be worn for a few weeks or month, depending how fast the bone heals

  - \*pain usually lessens when the cast is put on, because the bone is back into place

  - \*two layers to a cast: soft cotton, which rests against the skin and a hard outer layer (plaster or fiberglass) which prevents movement

- if broken into many pieces the doctor may have to do surgery to clean up the broken bones

  - \*may require screws and plates, which will act as a bone

(show pictures of broken bones, casts, splints)

- a splint can also be administered by the doctor

  - \*typically used when the area is swollen

- A sling may be used for arm breaks to help support the arm

  - \*wraps around the neck

  - \*keeps arm comfortable and in place

(kidshealth.org)

#### **Ligament injuries**

Many female athletes have torn their ACL (anterior cruciate ligament). The ACL is the ligament that keeps the knee stable and injury causes severe pain. When they tear this ligament it typically requires surgery to replace the torn ligament. With a tear of this ligament there is limited movement from the knee.

Symptoms of an ACL injury:

- Feeling or hearing a pop in the knee at the time of injury.
- Pain on the outside and back of the knee.
- The knee swelling within the first few hours of the injury. This may be a sign of bleeding inside the knee joint. Swelling that occurs suddenly is usually a sign of a serious knee injury.
- Limited knee movement because of pain or swelling or both.
- The knee feeling unstable, buckling, or giving out.

(<http://www.webmd.com/a-to-z-guides/anterior-cruciate-ligament-acl-injuries-topic-overview>)

### Treatment of Muscular Injuries

#### Sprain

Tell: When you sprain a muscle, by either rolling your ankle, twisting your knee the wrong way, there is a standard immediate treatment you want to take. This is also with any injury in which there is swelling. You want to keep the swelling down. In order to keep the swelling down we use the PRICE procedure. PRICE stands for Pressure, Rest, Ice, Compression, and Elevation

#### **P.R.I.C.E**

- Protect the injured limb from further injury by not using the joint. You can do this using anything from splints to crutches.
- Rest the injured limb. But don't avoid all activity. Even with an ankle sprain, you can usually still exercise other muscles to prevent loss of conditioning or becoming out of shape. For example, you can use an exercise bicycle, working both your arms and the uninjured leg while resting the injured ankle on another part of the bike. That way you still get three-limb exercise to keep up your cardiovascular conditioning.
- Ice the area. Use a cold pack, a slush bath or a compression sleeve filled with cold water to help limit swelling after an injury. Try to apply ice as soon as possible after the injury. If you use ice, be careful not to use it for too long, as this could cause tissue damage.
  - \*use the ice for 20 minutes, then take it off for 20 minutes, repeat this for an hour then take at least an hour off
  - \*only ice the injury for 48 hours after the injury happens
- Compress the area with an elastic wrap or bandage. Compressive wraps or sleeves made from elastic or neoprene are best.
- Elevate the injured limb whenever possible to help prevent or limit swelling. Keep a pillow under the limb when sleeping or when sitting if ankle is swollen.

#### Cramps/Spasms

-Drink plenty of water before, during and after exercise or physical activity

-Massage and stretch the area

#### Bruises

-use ice to reduce swelling and slow the blood flow to the injured area

-you can also elevate the area to keep the blood flowing

Talk to a doctor if:

- A bruise doesn't go away after 2 weeks.

- You bruise often and you haven't been bumping into things.
  - Bruises seem to develop for no known reasons.
  - A bruise is getting more painful.
  - Your bruise is swelling.
  - You can't move a joint.
  - The bruise is near your eye.
- ([http://kidshealth.org/teen/your\\_body/skin\\_stuff/bruises.html](http://kidshealth.org/teen/your_body/skin_stuff/bruises.html))

### Rehabilitation

There are different types of rehabilitation for every injury. However rehabilitation is essential for all injuries. Rehab helps you get back the movement and motion you lost while the injury was healing. Typically people think they only need rehab after surgery, this is not true. If you sprain your ankle, you need to work your way back progressively till you are back to 100% activity.

Rehab may include

- massage
- range of motion exercises
- ice bathes
- progression of stretches
- progression of activity (limited to full)
- progressive increase of duration of activity

### Braces

Many times after a muscular injury athletic trainers, doctors, physical therapist will recommend the use of a brace for the muscle. Many times you will see athletes wearing ankle braces. This is because they probably had an ankle sprain at one time and are protecting the muscle from spraining again.

-Braces prevent the muscles or ligaments from over extending and spraining again.

### Prevention

Playing sports is a lot of fun. Getting hurt is not. Take these five steps to prevent injuries so you can stay in the game:

1. Wear protective gear, such as helmets, protective pads, and other gear.
2. Warm up and cool down.
3. Know the rules of the game.
4. Watch out for others.
5. Don't play when you're injured.

### Decision Making Process

- 1) Describe the situation
- 2) List possible decisions you might make
- 3) Evaluate possible consequences of each decision
- 4) Decide which decision is best
- 5) Act on the decision
- 6) Evaluate decision

### Role Playing

Now we are going to role play some injuries and you are going to have to make decisions about what actions to take, using the decision making process. You are going to tell us what you are doing at each step. We will map the decision process on the board. First you are going to tell us what you would do right away. Tell us all the options. Together as a class we will discuss actions you could take. You will decide what actions you want to take and the class will evaluate the decision concerning each injury.

1. A girl is playing basketball; she steps on the foot of another player and rolls her ankle.
2. A boy is running across a field, when he falls and hits his arm on the ground.
3. During a soccer game a boy is kicked by an opponent while going for the ball.
4. While playing softball Kendra is hit in the shoulder by a pitch.
5. Josh is running across pavement, trips and falls. When he turns over there is blood and a phalange bone is sticking out.
6. Jessica is running around her house playing tag with her siblings, she turns to run away from her brother, as she turns she hears a pop in her knee and instantly has pain.

## Quiz

### Summarize and Debrief

Today we learned the different treatments for skeletal and muscular injuries. Do feel if you are playing with friends at a local park and someone gets hurt you know what to do? Important, if they think they have broken a bone; make sure to keep them not moving and comfortable. When you have to move them keep the bone straight. If they think they have sprained or pulled a muscle, use PRICE. Use the decision making process quickly before acting in an emergency situation with an injury.

Review:

What does PRICE stand for? When do we use it?

-Protection, Rest, Ice, Compression, Elevation

-Use with muscular injuries

When should you use a splint?

-need to move someone but you think they may have a broken bone

What are the steps in the decision making process?

- 1) Describe the situation
- 2) List possible decisions you might make
- 3) Evaluate possible consequences of each decision
- 4) Decide which decision is best
- 5) Act on the decision
- 6) Evaluate decision

How long do you ice an injury?

\*use the ice for 20 minutes, then take it off for 20 minutes, repeat this for an hour then take at least an hour off

\*only ice the injury for 48 hours after the injury happens

Why do we need to rehab an injury?

-get back to full motion

-recondition the body

What can you do to prevent muscle cramps?

-drink plenty of water and stretch

What do you do if a bruise does not go away after two weeks?

-See a doctor

What can you do to prevent injuries?

1. Wear protective gear, such as helmets, protective pads, and other gear.
2. Warm up and cool down.
3. Know the rules of the game.
4. Watch out for others.
5. Don't play when you're injured.

What do braces do?

Braces prevent the muscles or ligaments from over extending and spraining again.

How long do you wear a cast for?

-weeks or months depending on how fast the break heals

What are symptoms of an ACL injury:

- Feeling or hearing a pop in the knee at the time of injury.
- Pain on the outside and back of the knee.
- The knee swelling within the first few hours of the injury. This may be a sign of bleeding inside the knee joint. Swelling that occurs suddenly is usually a sign of a serious knee injury.
- Limited knee movement because of pain or swelling or both.
- The knee feeling unstable, buckling, or giving out.

### **Assessment Strategy**

Teacher will assess role play strategies. Students will take a quiz at the end of class.

## Unit Assessment

Day 1: Worksheet, Quiz

Day 2: Worksheet, Goal Setting, Quiz

Day 3: Web Quest, Quiz

Day 4: Quiz, Posters

Day 5: Quiz, Role Play

Day 6: Quiz, Role Play

Day 7: Unit Exam

Barriers to all assessments would be for limited reading levels. Use of computers would hinder students with the web quest.

The teacher may face barriers with the assessments, if there is a paper shortage or budget to give out quizzes. A solution would be to read the questions out loud or put them on the overhead projector and have students use their own paper.

Students may not be motivated to create posters and participate in class discussions, so the teacher would have to make sure to involve students in discussions and activities, such as the role playing. Teacher could also find things to get their attention more at the beginning of each class, such as a video clip.

A pre-assessment will be used to receive a baseline of student knowledge of the content areas. Lessons and activities for the unit will be modified according to the content knowledge students express in the pre-assessment.

## Pre Assessment

What is the muscular system?

What is the skeletal system?

Name three injuries of the skeletal system.

- 1.
- 2.
- 3.

Name three injuries of the muscular system.

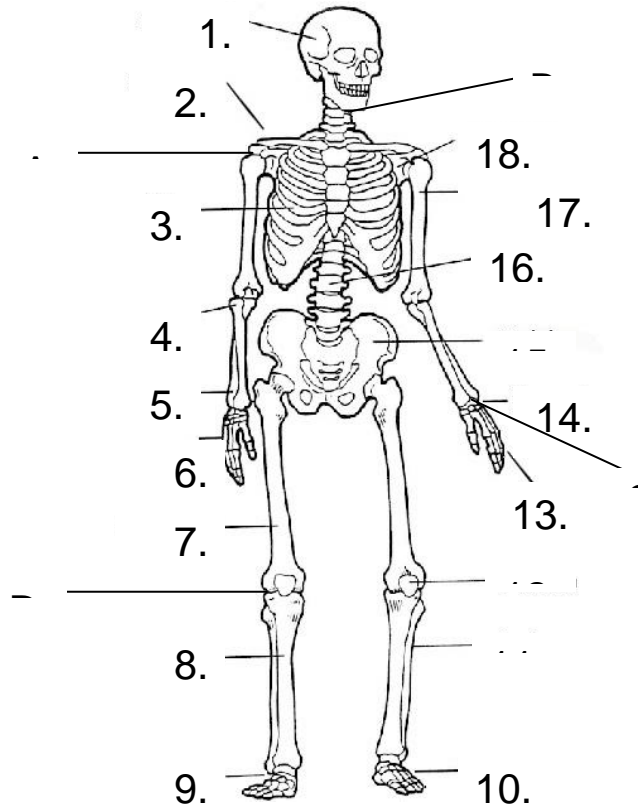
- 1.
- 2.
- 3.

How many bones are in the body?

How many muscles are in the body?

What is a treatment method for a muscular injury?

What is a treatment method for a skeletal injury?



Write the skeletal bone in the blanks below that match the number above on the skeleton.

Write the type of joint that matches the letter above on the skeleton.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_

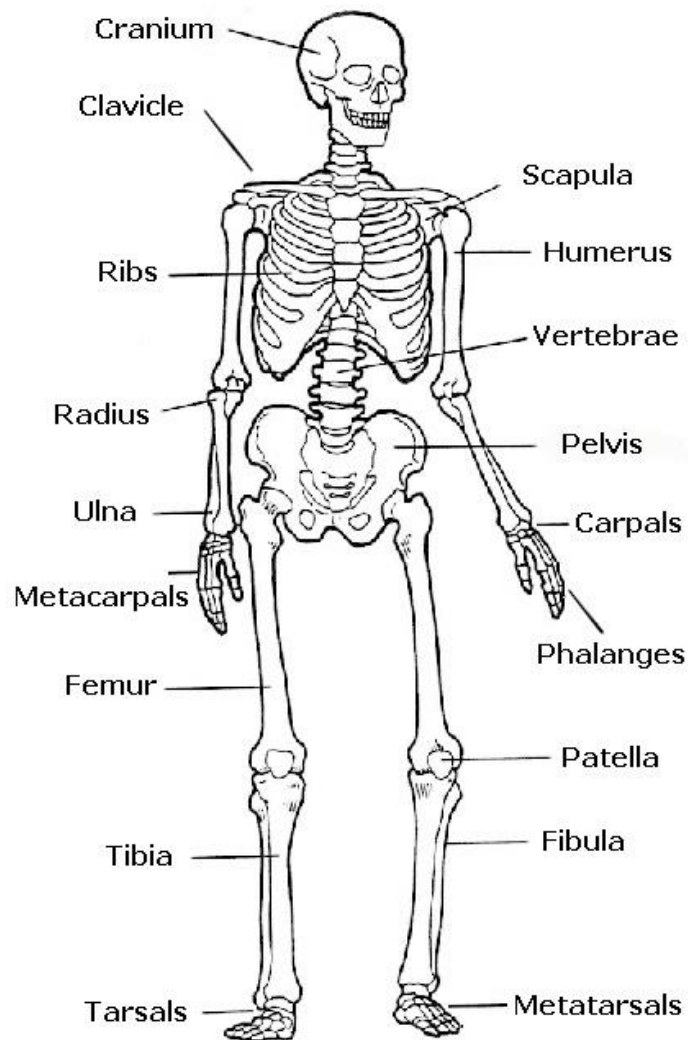
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_

Joints:

- A. \_\_\_\_\_
- B. \_\_\_\_\_
- C. \_\_\_\_\_
- D. \_\_\_\_\_



## Answer Key



1. Cranium
2. clavicle
3. Ribs
4. Radius
5. Ulna
6. metacarpals
7. femur
8. tibia
9. tarsals
10. metatarsals
11. fibula
12. patella

13. phalanges
  14. carpals
  15. pelvis
  16. vertebrae
  17. humerus
  18. scapula
- Joints:
- A. ball and socket
  - B. pivot
  - C. ellipsoidal
  - D. hinge

## Skeletal System Quiz

Circle or fill in the correct answer in the space provided for each question.

1. Which is a type of joint?
  - a. hinge
  - b. long
  - c. irregular
  - d. door
2. Name the four types of bones?
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
  4. \_\_\_\_\_
3. Bone marrow is the soft tissue in the hollow center area of most bones, where red blood cells are produced.  
True    or    False
4. What is the purpose of the skeletal system? (Circle all the apply)
  - a. protection
  - b. movement
  - c. produce blood cells
  - d. flexibility
5. Where do we get the most important nutrient for our bones, calcium from in a diet?
  - a. sweets
  - b. meat
  - c. fruits
  - d. milk
6. At what age is peak bone density?
  - a. 10
  - b. 65
  - c. 40
  - d. 20
7. What happens to the bones of a baby as it grows up?
  - a. disappear
  - b. grow more
  - c. fuse together
  - d. grow smaller
8. A ligament is the point where two bones meet  
True    or    False
9. How many bones are in the body of an adult? \_\_\_\_\_
10. Which type of exercise is best for building strong bones?
  - a. stretching
  - b. weight bearing
  - c. weight lifting
  - d. cardiovascular endurance

### Skeletal System Quiz Answer Key

Circle or fill in the correct answer in the space provided for each question.

1. Which is a type of joint?

- a. **hinge**
- b. long
- c. irregular
- d. door

2. Name the four types of bones?

1. long

2. flat

3. short

4. irregular

3. Bone marrow is the soft tissue in the hollow center area of most bones, where red blood cells are produced.

**True** or **False**

4. What is the purpose of the skeletal system? (Circle all the apply)

- a. **protection**
- b. **movement**
- c. **produce blood cells**
- d. flexibility

5. Where do we get the most important nutrient for our bones, calcium from in a diet?

- a. sweets
- b. meat
- c. fruits
- d. **milk**

6. At what age is peak bone density?

- a. 10
- b. 65
- c. 40
- d. **20**

7. What happens to the bones of a baby as it grows up?

- a. disappear
- b. grow more
- c. **fuse together**
- d. grow smaller

8. A ligament is the point where two bones meet

**True** or **False**

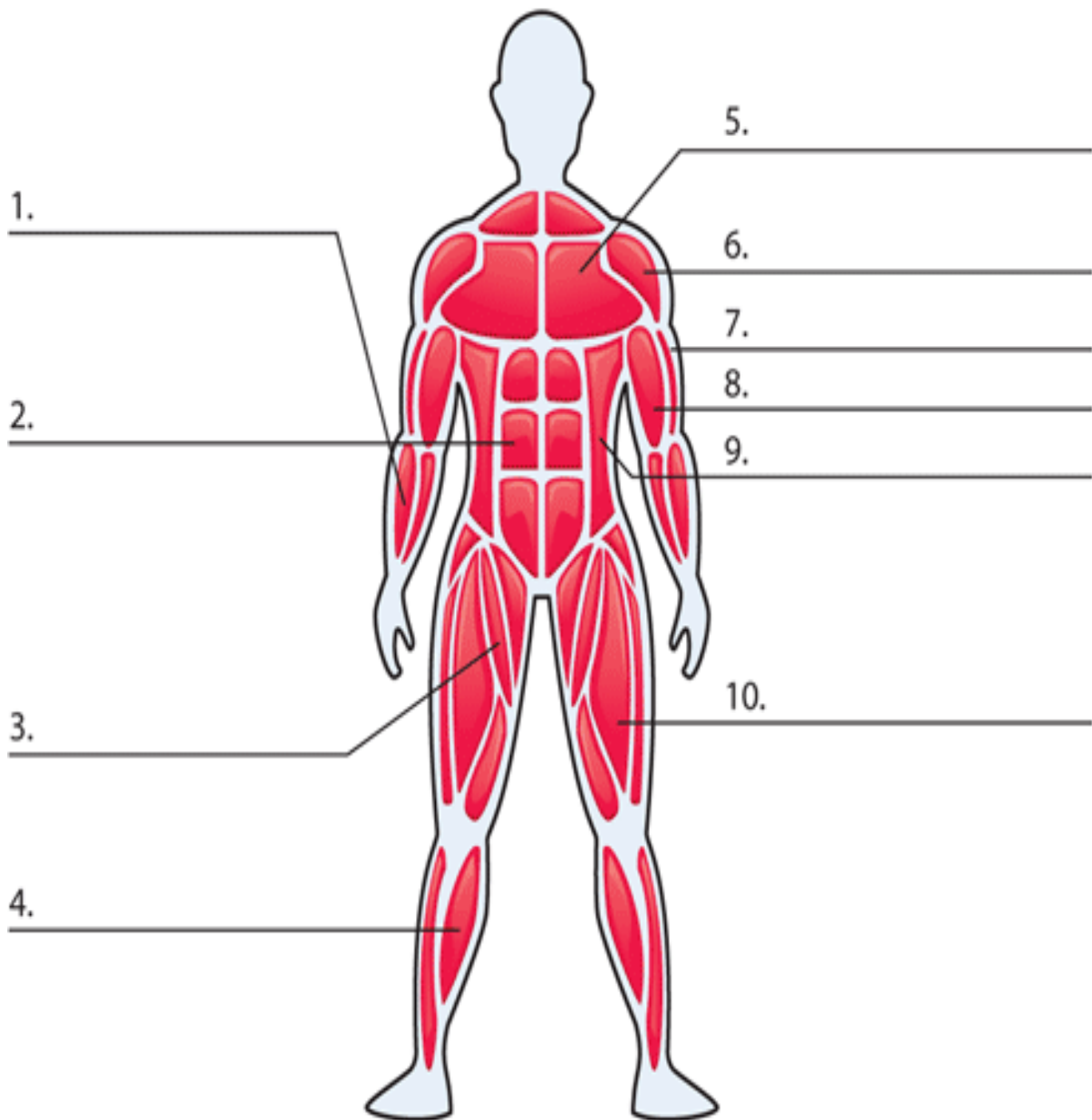
9. How many bones are in the body of an adult? 206

10. Which type of exercise is best for building strong bones?

- a. stretching
- b. **weight bearing**
- c. weight lifting
- d. cardiovascular endurance

### Muscular System Quiz

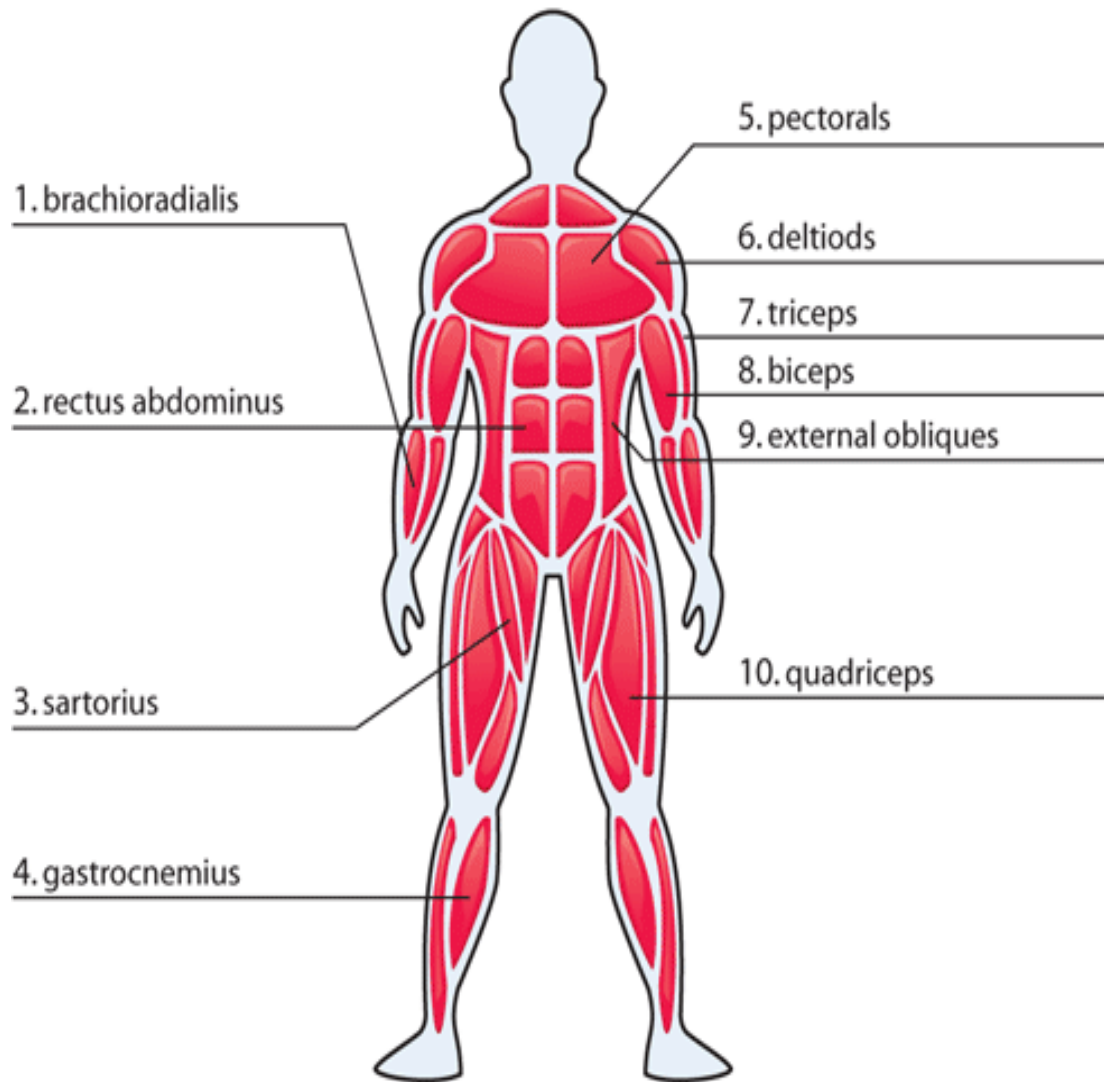
Place the name of the muscle on the blank provided by the number. Use your book to help identify each muscle.



(adopted from kidshealth.org)

# HOW THE BODY WORKS

## The Muscles Solution



### WORD BANK

sartorius	brachioradialis	biceps	quadriceps
rectus abdominus	pectorals	external obliques	gastrocnemius
deltoids	triceps		

(adopted from kidshealth.org)

### **Goal Setting Process for Improving Our Muscular System**

Fill in your response to each step of the goal setting process for improving your personal muscular system. Be descriptive with each step.

<b>Goal Setting Process Steps</b>	
State the goal	
Make an action plan	
Identify your obstacles to your plan	
Set up a time line (when)	
Keep record toward your goal (how)	
Build a support system (who)	
Revise your goal, plan or time line if needed	

## Muscular System Quiz

Please complete the following quiz. Circle the correct answer when multiple answers are presented. Fill in the blank if blanks are provided. Write name on the name line provided above.

1. Lactic acid is good for muscles to store.  
True or False
2. Name two kinds of stretching.  
a. \_\_\_\_\_  
b. \_\_\_\_\_
3. Approximately how many muscles are in the body?  
a. 206  
b. 900  
c. 600  
d. 350
4. Which is not a type of muscle?  
a. smooth  
b. soft  
c. skeletal  
d. cardiac
5. Proteins build \_\_\_\_\_ to repair and build muscles. (fill in the blank)
6. Which is a purpose of the muscular system?  
a. provides motion  
b. helps to maintain posture  
c. pump blood  
d. act as levers to the bones  
e. all of the above
7. An eccentric contraction \_\_\_\_\_ the muscle lengthen. (Fill in the blank)
8. Approximately how much of your body weight is muscles?  
a. 25%  
b. 85%  
c. 15%  
d. 40%
9. Muscular atrophy is the increase of muscle mass.  
True or False
10. What muscle is the most important? \_\_\_\_\_

## Muscular System Quiz

Please complete the following quiz. Circle the correct answer when multiple answers are presented. Fill in the blank if blanks are provided. Write name on the name line provided above.

1. Lactic acid is good for muscles to store.  
True or **False**
2. Name two kinds of stretching.  
a. static  
b. ballistic
3. Approximately how many muscles are in the body?  
a. 206  
b. 900  
c. **600**  
d. 350
4. Which is not a type of muscle?  
a. smooth  
b. **soft**  
c. skeletal  
d. cardiac
5. Proteins build amino acids to repair and build muscles. (fill in the blank)
6. Which is a purpose of the muscular system?  
a. provides motion  
b. helps to maintain posture  
c. pump blood  
d. act as levers to the bones  
e. **all of the above**
7. An eccentric contraction increase the muscle length. (Fill in the blank)
8. Approximately how much of your body weight is muscles?  
a. 25%  
b. 85%  
c. 15%  
d. **40%**
9. Muscular atrophy is the increase of muscle mass.  
True or **False**
10. What muscle is the most important? Heart



## How it works Web Quest

What is the movement? \_\_\_\_\_

Which muscles are involved in the movement? \_\_\_\_\_

Which muscles are contracting, when? \_\_\_\_\_

Which muscles are not contracted when? \_\_\_\_\_

Which bones are involved in the movement? \_\_\_\_\_

Write the steps of action taken to create this movement by the muscular and skeletal systems. Use vocabulary words: name of muscle(s), name of origin bone and/or insertion bone, flexor, extensor, adductor, abductor, contraction, relaxation.

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### Sources

1) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## How it works Web Quest Grading Rubric

### Content

**20 points:** All parts of movement are fully described. All steps to create the movement are described. Use of complete sentences and free of grammar.

**15 points:** Most parts of movement are partially described. Some steps of movement are partially described. Partially complete sentences and some grammatical errors.

**10 points:** A few parts of the movement are listed. A few steps of the movement are listed. No use of complete sentences and contains grammatical errors.

Content Points: \_\_\_\_\_

Content Comments:

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### Sources

**5 points:** Use of at least three credible sources. All sources are credible.

**3 points:** Use of two credible sources. Some sources are credible.

**1 point:** Use of one credible source. Sources are not credible.

Source Points: \_\_\_\_\_

Source Comments:

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### Vocabulary

**10 points:** All vocabulary words are used in the proper context.

**7 points:** Some vocabulary words are used in the proper context

**4 points:** Few (3 or less) vocabulary words are used in the proper context

**1 point:** One or none vocabulary words are used.

Vocabulary Points: \_\_\_\_\_

Vocabulary Comments:

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\_\_\_\_\_ **Points earned**

\_\_\_\_\_ **Total points Possible 35**

**Skeletal/Muscular System 'Teamwork' Quiz**  
**Choose the best answer with a circle. Fill in the blanks to correctly answer the question.**

1. What type of action moves the bone closer to the midline?  
\_\_\_\_\_
2. What type of action moves the bone away from the midline?  
\_\_\_\_\_
3. What types of sources on the internet are **NOT** credible for health information?
  - a. .edu
  - b. .org
  - c. .com
  - d. .gov
4. A flexor opens a joint by the contraction/relaxation of muscles.  
True or False
5. An extensor opens a joint by the contraction/relaxation of muscles  
True or False
6. What attaches bone to muscle?
  - a. ligaments
  - b. tendons
  - c. joints
  - d. muscle fibers
7. Attached end of the muscle to the part of the skeleton that moves is the  
\_\_\_\_\_
8. The origin end of the muscle is attached to a part of the skeleton that moves.  
True or False
9. What attaches bone together? \_\_\_\_\_ lig\_
10. Name the four types of joints.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_

Skeletal/Muscular System 'Teamwork' Quiz

1. What type of action moves the bone closer to the midline?

**Adductor**

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2. What type of action moves the bone away from the midline?

**Abductor**

---

3. What types of sources on the internet are **NOT** credible for health information?

- a. .edu
- b. .org
- c. .com**
- d. .gov

4. A flexor opens a joint by the contraction/relaxation of muscles.

True or **False**

5. An extensor opens a joint by the contraction/relaxation of muscles

**True** or False

6. What attaches bone to muscle?

- a. ligaments
- b. tendons**
- c. joints
- d. muscle fibers

7. Attached end of the muscle to the part of the skeleton that moves is the **insertion**

8. The origin end of the muscle is attached to a part of the skeleton that moves.

True or **False**

9. What attaches bone together? **Ligaments**

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10. Name the four types of joints.

- a. **hinge**
- b. **pivot**
- c. **ball and socket**
- d. **ellipsoidal**

## **Skeletal System Advocacy Poster Rubric**

### **Creativity**

5 points-use pictures, color to get attention, use of new ideas

3 points-some pictures and color, use of ideas from others

1 point-little to no color, does not grab attention

### **Content**

5 points-content is correctly identified and used throughout poster

3 points-content is used sparsely and correct

1 point-content is slightly used on the poster

### **Sources**

5 points-use of three reliable sources for gathering information

3 points-use of one reliable source for gathering information

1 point-sources used are not reliable or valid

### **Appropriate for target audience**

5 points-grabs attention and relates to the target audience

3 points-not directly related to target audience

1 point-not related target audience

### **Promoting**

5 points-use of quick slogan to promote healthy behaviors

3 points-use of slogan or words which do not directly promote healthy behaviors

1 point-does not promote health behaviors

### **25 Total Points Possible**

\_\_\_\_\_ Points Earned

Comments:

### **Skeletal Injuries/Diseases Quiz**

**Choose the best answer with a circle. Fill in the blanks to correctly answer the question.**

1. What makes a fracture a hairline fracture?
  - a. a thin break in the bone
  - b. a break through the skin
  - c. a break along the hairline on your skull
  - d. a break which breaks all the way through a bone
  
2. What makes a fracture complete?  

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3. Which are strategies to prevent the developing of osteoporosis?
  - a. regular physical activity
  - b. calcium rich diet
  - c. vitamin D in the diet
  - d. both a and b
  - e. all of the above
  
4. Name a treatment often used for leukemia patients.  

---
  
5. Which are not symptoms of arthritis.
  - a. Joint swelling, with pain and stiffness.
  - b. Enlarged bones
  - c. Fever and rash.
  - d. Swelling of lymph nodes.
  - e. Eye inflammation.
  
6. Osteoporosis is a deformity of the spine in which the spine shows either a lateral or an S-shaped curvature.  
True or False
  
7. What is an open fracture?
  - a. the bone has a hole in it
  - b. the bone is sticking through the skin
  - c. the bone is only half way broken
  - d. the bones develops a bump
  
8. Advocacy is the promotion of a health behavior, with its benefits or risks to a particular audience.  
True or False

9. Leukemia is best described as
- a. cancer of the blood-forming cells
  - b. painful inflammation of the joints
  - c. a condition in which the bones become thin and brittle
  - d. inflammation of the periosteum of the tibia

10. Describe a bowing fracture

---

### Skeletal Injuries/Diseases Quiz

Choose the best answer with a circle. Fill in the blanks to correctly answer the question.

1. What makes a fracture a hairline fracture?
  - a. **a thin break in the bone**
  - b. a break through the skin
  - c. a break along the hairline on your skull
  - d. a break which breaks all the way through a bone
2. What makes a fracture complete?  
**when the bone has broken into two pieces**
3. Which are strategies to prevent the developing of osteoporosis?
  - a. regular physical activity
  - b. calcium rich diet
  - c. vitamin D in the diet
  - d. both a and b
  - e. **all of the above**
4. Name a treatment often used for leukemia patients.  
**Bone marrow transplant**
5. Which are not symptoms of arthritis.
  - a. Joint swelling, with pain and stiffness.
  - b. **Enlarged bones**
  - c. Fever and rash.
  - d. Swelling of lymph nodes.
  - e. Eye inflammation.
6. Osteoporosis is a deformity of the spine in which the spine shows either a lateral or an S-shaped curvature.  
True or **False**
7. What is an open fracture?
  - a. the bone has a hole in it
  - b. **the bone is sticking through the skin**
  - c. the bone is only half way broken
  - d. the bones develops a bump
8. Advocacy is the promotion of a health behavior, with its benefits or risks to a particular audience.  
**True** or False



9. Leukemia is best described as

- a. **cancer of the blood-forming cells**
- b. painful inflammation of the joints
- c. a condition in which the bones become thin and brittle
- d. inflammation of the periostium of the tibia

10. Describe a bowing fracture.

**when the bone bends but does not break**

## Muscular System Injuries and Diseases Quiz

1. What is a sprain?
  - a. an injury to the muscle when it grows
  - b. an injury to the ligaments, tendons and soft tissue around a joint caused by undue stretching
  - c. an injury to the joint when fluid fills the area
  - d. an injury to muscle from steroids
2. What is a strain? \_\_\_\_\_  
\_\_\_\_\_
3. What causes muscle cramps/spasms?
  - a. Dehydration
  - b. Meat
  - c. Tight muscles
  - d. Both A and C
4. Steroids can cause more damage than help one's appearance.  
True or False
5. Why is muscle soreness good?  
\_\_\_\_\_
6. Is muscular dystrophy contagious?  
No or Yes
7. Cerebral palsy is which of the following.
  - a. a disorder of the muscle in which they are stiff
  - b. a tear to the muscles in the back
  - c. an injury to the muscles from over exercising
  - d. a disorder of the nervous system that interferes with muscle coordination
8. Which of the following are symptoms of compartment syndrome (circle all that apply)
  - a. Aching, burning or cramping pain in the affected limb during exercise
  - b. Tightness in the affected limb
  - c. Numbness or tingling in the affected limb
  - d. Weakness of the affected limb
9. Name three consequences of using steroids?
  - 1.
  - 2.
  - 3.

10. Why do bruises change colors? \_\_\_\_\_

\_\_\_\_\_

## Muscular System Injuries and Diseases Quiz

1. What is a sprain?
  - a. an injury to the muscle when it grows
  - b. an injury to the ligaments, tendons and soft tissue around a joint caused by undue stretching**
  - c. an injury to the joint when fluid fills the area
  - d. an injury to muscle from steroids
2. What is a strain? **An overstretching of muscles and/or tendons, which may result in the tearing of a muscle or tendon**
3. What causes muscle cramps/spasms?
  - a. Dehydration
  - b. Meat
  - c. Tight muscles
  - d. Both A and C**
4. Steroids can cause more damage than help one's appearance.  
**True** or **False**
5. Why is muscle soreness good? **It is good to use different muscles actively.**
6. Is muscular dystrophy contagious?  
**No** or **Yes**
7. Cerebral palsy is which of the following.
  - a. a disorder of the muscle in which they are stiff
  - b. a tear to the muscles in the back
  - c. an injury to the muscles from over exercising
  - d. a disorder of the nervous system that interferes with muscle coordination**
8. Which of the following are symptoms of compartment syndrome (circle all that apply)
  - a. Aching, burning or cramping pain in the affected limb during exercise**
  - b. Tightness in the affected limb**
  - c. Numbness or tingling in the affected limb**
  - d. Weakness of the affected limb**
9. Name three consequences of using steroids?
  1. **acne**
  2. **reduced sperm count**
  3. **high blood pressure**

10. Why do bruises change colors? **The blood is reabsorbing while the body is healing the area**

### Treatment of Injuries Quiz

Choose the best answer with a circle. Fill in the blanks to correctly answer the question.

What does PRICE stand for? When do we use it? \_\_\_\_\_

\_\_\_\_\_

When should you use a splint? \_\_\_\_\_

\_\_\_\_\_

Circle the correct order of steps in the decision making process?

- 1) Describe the situation, List possible decisions you might make, Evaluate possible consequences of each decision, Decide which decision is best, Act on the decision, Evaluate decision
- 2) List possible decisions, Describe the situation, Decide which decision is best, Evaluate possible consequences of each decision, Evaluate decision, Act on the decision
- 3) Evaluate possible consequences of each decision, List possible decisions, Describe the situation, Act on the decision, Evaluate possible consequences of each decision, Evaluate decision

How long do you ice an injury?

- a. 20 minutes
- b. 60 minutes
- c. 120 minutes
- d. 48 minutes

Why do we need to rehab an injury? \_\_\_\_\_

\_\_\_\_\_

What can you do to prevent muscle cramps? (circle all that apply)

- a. drink plenty of water
- b. drink milk
- c. stretch
- d. massage muscles

What do you do if a bruise does not go away after two weeks? \_\_\_\_\_

\_\_\_\_\_

What can you do to prevent injuries?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

What do braces do? \_\_\_\_\_

How long do you wear a cast for? \_\_\_\_\_

Name three symptoms of an ACL injury:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

## Treatment of Injuries Quiz

What does PRICE stand for? When do we use it?

**-Protection, Rest, Ice, Compression, Elevation**

**-Use with muscular injuries**

When should you use a splint?

**need to move someone but you think they may have a broken bone**

Circle the correct order of steps in the decision making process?

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- c. 120 minutes
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Why do we need to rehab an injury?

**get back to full motion**  
**recondition the body**

What can you do to prevent muscle cramps? (circle all that apply)

**-drink plenty of water**

-drink milk

**-stretch**

-massage muscles

What do you do if a bruise does not go away after two weeks?

**See a doctor**

What can you do to prevent injuries?

6. **Wear protective gear, such as helmets, protective pads, and other gear.**
7. **Warm up and cool down.**
8. **Know the rules of the game.**
9. **Watch out for others.**
10. **Don't play when you're injured.**

What do braces do?

**Braces prevent the muscles or ligaments from over extending and spraining again.**

How long do you wear a cast for?

**weeks or months depending on how fast the break heals**

What are symptoms of an ACL injury:

- **Feeling or hearing a pop in the knee at the time of injury.**



- Pain on the outside and back of the knee.
- The knee swelling within the first few hours of the injury. This may be a sign of bleeding inside the knee joint. Swelling that occurs suddenly is usually a sign of a serious knee injury.
- Limited knee movement because of pain or swelling or both.
- The knee feeling unstable, buckling, or giving out.

# Unit Exam

1. Which is a type of joint?
  - a. hinge
  - b. long
  - c. irregular
  - d. door
2. Name the four types of bones?
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
  4. \_\_\_\_\_
3. Bone marrow is the soft tissue in the hollow center area of most bones, where red blood cells are produced.  
True or False
4. What is the purpose of the skeletal system? (Circle all the apply)
  - a. protection
  - b. movement
  - c. produce blood cells
  - d. flexibility
5. Where do we get the most important nutrient for our bones, calcium from in a diet?
  - a. sweets
  - b. meat
  - c. fruits
  - d. milk
6. At what age is peak bone density?
  - a. 10
  - b. 65
  - c. 40
  - d. 20
7. What happens to the bones of a baby as it grows up?
  - a. disappear
  - b. grow more
  - c. fuse together
  - d. grow smaller
8. A ligament is the point where two bones meet  
True or False
9. How many bones are in the body of an adult? \_\_\_\_\_
10. Which type of exercise is best for building strong bones?
  - a. stretching
  - b. weight bearing
  - c. weight lifting
  - d. cardiovascular endurance
11. Lactic acid is good for muscles to store.  
True or False

12. Name two kinds of stretching.
- a. \_\_\_\_\_
  - b. \_\_\_\_\_
13. Approximately how many muscles are in the body?
- a. 206
  - b. 900
  - c. 600
  - d. 350
14. Which is not a type of muscle?
- a. smooth
  - b. soft
  - c. skeletal
  - d. cardiac
15. Proteins build \_\_\_\_\_ to repair and build muscles. (fill in the blank)
16. Which is a purpose of the muscular system?
- a. provides motion
  - b. helps to maintain posture
  - c. pump blood
  - d. act as levers to the bones
  - e. all of the above
17. An eccentric contraction \_\_\_\_\_ the muscle lengthen. (Fill in the blank)
18. Approximately how much of your body weight is muscles?
- a. 25%
  - b. 85%
  - c. 15%
  - d. 40%
19. Muscular atrophy is the increase of muscle mass.  
True or False
20. What muscle is the most important? \_\_\_\_\_
21. What makes a fracture a hairline fracture?
- a. a thin break in the bone
  - b. a break through the skin
  - c. a break along the hairline on your skull
  - d. a break which breaks all the way through a bone

22. What makes a fracture complete?

---

23. Which are strategies to prevent the developing of osteoporosis?

- a. regular physical activity
- b. calcium rich diet
- c. vitamin D in the diet
- d. both a and b
- e. all of the above

24. Name a treatment often used for leukemia patients.

---

25. Which are not symptoms of arthritis.

- a. Joint swelling, with pain and stiffness.
- b. Enlarged bones
- c. Fever and rash.
- d. Swelling of lymph nodes.
- e. Eye inflammation.

26. Osteoporosis is a deformity of the spine in which the spine shows either a lateral or an S-shaped curvature.

True or False

27. What is an open fracture?

- a. the bone has a hole in it
- b. the bone is sticking through the skin
- c. the bone is only half way broken
- d. the bones develops a bump

28. Advocacy is the promotion of a health behavior, with its benefits or risks to a particular audience.

True or False

29. Leukemia is best described as

- a. cancer of the blood-forming cells
- b. painful inflammation of the joints
- c. a condition in which the bones become thin and brittle
- d. inflammation of the periostium of the tibia

30. Describe a bowing fracture

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31. What type of action moves the bone closer to the midline?

---

32. What type of action moves the bone away from the midline?

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33. What types of sources on the internet are **NOT** credible for health information?

- a. .edu
- b. .org
- c. .com
- d. .gov

34. A flexor opens a joint by the contraction/relaxation of muscles.

True or False

35. An extensor opens a joint by the contraction/relaxation of muscles

True or False

36. What attaches bone to muscle?

- a. ligaments
- b. tendons
- c. joints
- d. muscle fibers

37. Attached end of the muscle to the part of the skeleton that moves is the

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38. The origin end of the muscle is attached to a part of the skeleton that moves.

True or False

39. What attaches bone together? \_\_\_\_\_lig\_

40. Name the four types of joints.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

41. What is a sprain?

- a. an injury to the muscle when it grows
- b. an injury to the ligaments, tendons and soft tissue around a joint caused by undue stretching
- c. an injury to the joint when fluid fills the area
- d. an injury to muscle from steroids

42. What is a strain? \_\_\_\_\_

---

43. What causes muscle cramps/spasms?

- a. Dehydration
- b. Meat
- c. Tight muscles
- d. Both A and C

44. Steroids can cause more damage than help one's appearance.

True or False

45. Why is muscle soreness good?

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46. Is muscular dystrophy contagious?

No or Yes

47. Cerebral palsy is which of the following.

- a. a disorder of the muscle in which they are stiff
- b. a tear to the muscles in the back
- c. an injury to the muscles from over exercising
- d. a disorder of the nervous system that interferes with muscle coordination

48. Which of the following are symptoms of compartment syndrome (circle all that apply)

- a. Aching, burning or cramping pain in the affected limb during exercise
- b. Tightness in the affected limb
- c. Numbness or tingling in the affected limb
- d. Weakness of the affected limb

49. Name three consequences of using steroids?

- 1.
- 2.
- 3.

50. Why do bruises change colors? \_\_\_\_\_

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51. What does PRICE stand for? When do we use it? \_\_\_\_\_

---

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52. When should you use a splint? \_\_\_\_\_

---

53. Circle the correct order of steps in the decision making process?

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54. How long do you ice an injury?

- a. 20 minutes
- b. 60 minutes
- c. 120 minutes
- d. 48 minutes

55. Why do we need to rehab an injury? \_\_\_\_\_  
\_\_\_\_\_

56. What can you do to prevent muscle cramps? (Circle all that apply)

- a. drink plenty of water
- b. drink milk
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57. What do you do if a bruise does not go away after two weeks? \_\_\_\_\_  
\_\_\_\_\_

58. What can you do to prevent injuries?

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59. What do braces do? \_\_\_\_\_

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# Unit Exam Answer Key

1. Which is a type of joint?
  - a. **hinge**
  - b. long
  - c. irregular
  - d. door
2. Name the four types of bones?
  1. **long**
  2. **flat**
  3. **short**
  4. **irregular**
3. Bone marrow is the soft tissue in the hollow center area of most bones, where red blood cells are produced.  
**True** or **False**
4. What is the purpose of the skeletal system? (Circle all the apply)
  - a. **protection**
  - b. **movement**
  - c. **produce blood cells**
  - d. flexibility
5. Where do we get the most important nutrient for our bones, calcium from in a diet?
  - a. sweets
  - b. meat
  - c. fruits
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  - a. 10
  - b. 65
  - c. 40
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**True** or **False**



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- **The knee feeling unstable, buckling, or giving out.**

## Unit Resources

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- 20) 19-11 Increase the increase the proportion of persons aged two years and older who meet dietary recommendations for calcium. Retrieved Nov. 19, 2008 from:  
[http://www.healthypeople.gov/Document/HTML/Volume2/19Nutrition.htm#\\_To\\_c490383124](http://www.healthypeople.gov/Document/HTML/Volume2/19Nutrition.htm#_To_c490383124)