Bones and Muscles

Teacher's Guide

Middle School

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A Message from our Company ...

Dear Educator:

Thank you for your interest in the educational videos produced by the *Visual Learning Company.* We are a Vermont-based, family owned and operated business specializing in the production of quality educational science videos and materials.

We have a long family tradition of education. Our grandmothers graduated from normal school in the 1920's to become teachers. Brian's mother was an elementary teacher and guidance counselor, and his father was a high school teacher and superintendent. This family tradition inspired Brian to become a science teacher, and to earn a Ph.D. in education, and lead Stephanie to work on science educational programs at NASA.

In developing this video, accompanying teacher's guide, and student activities, our goal is to provide educators with the highest quality materials, thus enabling students to be successful. In this era of more demanding standards and assessment requirements, supplementary materials need to be curricular and standards based - this is what we do!

Our videos and accompanying materials focus on the key concepts and vocabulary required by national and state standards and goals. It is our mission to help students meet these goals and standards, while experiencing the joy and thrill of science.

Sincerely,

Brian and Stephanie Jerome

Standards Correlations

National Science Education Standards

(Content Standards: 5-8, National Academy of Sciences, c. 1996)

Life Science - Content Standard C:

As a result of their activities in grades 5-8, all students should understand that:

- Living systems at all levels of organization demonstrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, organs, tissues, organ systems, whole organisms, and ecosystems.
- All organisms are composed of cells--the fundamental unit of life. Most organisms are single cells; other organisms, including humans, are multicellular.
- The human organism has systems for digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, and for protection from disease. These systems interact with one another.

Benchmarks for Science Literacy

(Project 2061 - AAAS, c. 1993)

The Human Organism - Human Identity (6A), Basic Functions (6C).

By the end of the 8th grade, students should know that:

- Like other animals, human beings have body systems for obtaining and providing energy, defense, reproduction, and the coordination of body functions.
- Organs and organ systems are composed of cells and help to provide all cells with basic needs.

Student Learning Objectives

Upon viewing the video and completing the enclosed student activities, students should be able to do the following:

- Explain a variety of functions performed by the skeletal and muscular systems;
- Differentiate between the different tissue types and list areas of the body where each can be found;
- Describe some of the important functions of bones;
- Provide some examples of different muscles found in the body and describe their function;
- State some of the differences between bone and cartilage;
- Describe the different parts of bone including periosteum, compact bone, spongy bone, and marrow;
- List some of the joints found in the human body;
- Identify and provide examples of the following joints: hinge, ball and socket, gliding, immovable, and pivot; and
- Differentiate between voluntary and involuntary muscle. Provide examples of each.

Assessment

Preliminary Test:

The Preliminary Test, provided in the Student Masters section, is an assessment tool designed to gain an understanding of student preexisting knowledge. It can also be used as a benchmark upon which to assess student progress based on the objectives stated on the previous pages.

Video Review:

The Video Review, provided in the Student Masters section, can be used as an assessment tool or as a student activity. There are two main parts. The first part contains questions titled "You Decide" that can be answered during the video. The second series of ten questions consists of a video quiz to be answered at the conclusion of the video.

Post-Test:

The Post-Test, provided in the Student Masters section, can be utilized as an assessment tool following student completion of the video and student activities. The results of the Post-Test can be compared against the results of the Preliminary Test to assess student progress.

Introducing the Video

Explain to students that all humans have similar body parts that differ in shape and size. Explain to students that the body is comprised of many different systems that work together in making the body perform correctly. Ask students to list some of the different body systems. Write their answers on the blackboard. Next, ask the students which body systems are responsible for body support and movement. Tell students that in the upcoming video they will explore the skeletal and muscular system.

Ask students to name different bones in the body. Write their answers on the board. Do the same with muscles. Tell students to pay close attention to the video to learn more about the structure and function of bones and muscles in the body.

Video Viewing Suggestions

The Student Master "Video Review" is provided for distribution to students. You may choose to have your students complete this Master while viewing the program or to do so upon its conclusion.

The program is approximately 20-minutes in length and includes a ten-question video quiz. Answers are not provided to the Video Quiz on the video, but are included in this teacher's guide. You may choose to grade student quizzes as an assessment tool or to review the answers in class.

The video is content-rich with numerous vocabulary words. For this reason you may want to periodically stop the video to review and discuss new terminology and concepts.

Student Assessments And Activities

Assessment Masters:

- Preliminary Test
- Video Review
- Post-Test

Student Activity Masters:

- Voluntary vs. Involuntary
- Human Reflexes
- Movable Joints
- Vocabulary of *Bones and Muscles*

Video Script: Bones and Muscles

1. The human body is amazing.
2. It's capable of doing a wide array of activities from running . . .
3. . . . to swimming great distances . . .
4. . . to climbing steep, icy cliffs. . .
5. . . . to performing snowboard acrobatics.
6. The human body is also capable of riding a bicycle over great distances, . . .
7. . . . jumping high in the air . . .
8. . . . and guiding race cars around perilous curves.
9. What enables the human body to do all of these fantastic things?
10. The skeletal system and the muscular system play a pivotal role.
11. During the next few minutes we're going to explore some of the fascinating features of the skeletal and muscular systems.
12. **Graphic Transition – Tissue**
13. What do these human beings . . .
14. . . . and these fish have in common? They're all made of cells.
15. As you may know, all living things including plants . .
16. . . . and animals are made of cells.
17. This ameba is a relatively simple organism.
18. But the human body has trillions of cells – with many cells that are very specialized.
19. Groups of similar cells form tissues.
20. Within the human body there are four main types of tissues: muscle tissue, connective tissue, nerve tissue, and epithelial tissue.
21. During the next few minutes we're going to study the skeletal system, which is made up of connective tissue, and we'll examine the muscular system which is made up primarily of muscle tissue.
22. **Graphic Transition – Body systems**
23. Different types of tissue come together to form organs in our bodies.
24. You're probably familiar with the names of various organs such as the heart and lungs.
25. **You Decide!** What is your body's largest organ?
26. Believe it or not, your skin is considered an organ and it's the largest in your body!
27. Groups of organs which work together are called organ systems.
28. For example, the circulatory system is made up of the heart, blood vessels and other structures.

Script (cont.)

29. The muscular system is made up of all the muscles in the body and is responsible for the way we move.
30. The skeletal system is made up of bones and other tissues.
31. It is primarily responsible for supporting and protecting the body.
32. Let's take a more in depth look at the skeletal system.
33. **Graphic Transition – The Skeletal System**
34. Notice how these carpenters are building the frame of this new building.
35. In this case, the framework is made of wood.
36. And in this building the framework is made of steel.
37. **You Decide!** What's the framework of the human body made of?
38. That's right – bones.
39. Underneath our skin and other tissue lie bones.
40. In fact, there are 206 bones in the human body.
41. All these bones working together is referred to as the skeletal system.
42. The skeletal system has many very important functions.
43. As we already stated, the skeletal system serves as the framework for the body.
44. It's what gives the body its shape.
45. Different animals have different skeletal systems which support different forms.
46. The skeletal system also helps the body move.
47. Look down at your fingers. Make a fist.
48. What happened? When the muscles in your fingers contract, it caused your hand bones to form a fist.
49. This happens throughout your body as muscles cause your bones to move.
50. The skeletal system also plays an important role in protecting tissues and organs in the body.
51. Tap your head. Did this hurt your brain? Of course not.
52. This is because the brain is enclosed within the skull.
53. Similarly, our breastbone and ribs protect our heart and other vital organs.
54. And vertebrae in our backbone protect the spinal column.
55. At one time or another you have cut yourself and noticed red blood in the wound.
56. The red blood is the result of red blood cells which play a very important role in carrying oxygen throughout the body.
57. **You decide!** Where are red blood cells produced?
58. Red blood cells are produced in the long bones of the body like in the leg bones.
59. So, our skeletal system is vital for blood cell production!
60. **Graphic Transition - Cartilage**
61. As we already mentioned, the skeletal system is made up of connective tissue.

Script (cont.)

62. But not all connective tissue in the skeletal system is made of bone.
63. Cartilage is a type of connective tissue. It's a tough flexible material.
64. With your hand, move your nose back and forth gently.
65. Notice how flexible it is? This is because it's made of cartilage.
66. Some animals such as sharks possess a skeleton that is made up almost entirely of cartilage.
67. In newborn babies, the skeletal system is also made up mostly of cartilage…
68. …and, over the years, the cartilage transforms into bone.
69. However, in many places in the body the cartilage remains, such as in your outer ears.
70. Cartilage is also found in many places where bones meet other bones such as in your knees and elbows.
71. **Graphic Transition – Bone Structure**
72. This is the skull of a cow. It looks like solid rock, and almost appears as if it were never living.
73. But the bones in your body are all thriving, living things.
74. Bones contain nerves, cells, and blood vessels.
75. What makes bones so hard?
76. Bones are made primarily of mineral compounds. The elements calcium and phosphorous are abundant.
77. Therefore, it's important to get sufficient amounts of calcium and phosphorous in your diet.
78. Milk and cheese are good sources of these elements.
79. In some cases, especially with adult women, it's often recommended that they receive extra calcium to keep their bones strong and healthy.
80. If you look closely at a bone you will notice that it is not smooth but is rough, pitted, and bumpy.
81. Muscles attach to many of these bumps and pits on bones.
82. And in some cases blood vessels and nerves go through holes in the bone.
83. A membrane called the periosteum covers the bone. This plays a role in bone growth and repair.
84. Beneath the periosteum is compact bone, which is hard and strong.
85. Within compact bone are spaces, which contain a soft material.
86. **You Decide!** What is this soft material?
87. It's called marrow.
88. Marrow is abundant in long bones such as in the femur. . .
89. . . . as well as in bones of the skull, ribs, breastbone, and

Script (cont.)

vertebrae.

90. One type of marrow called red marrow is extremely important in producing red blood cells – as many as 2 million per secon.
91. At the end of many bones is a large knob. These knobs are made of a type of bone called spongy bone.
92. Spongy bone is not soft but is hard and contains many spaces.
93. Let's now take a look at the places where bones meet bones.
94. **Graphic Transition – Skeletal Joints**
95. Think of all the different movements you've already made today.
96. You probably bent your arm to take a drink . . .
97. . . . or to brush your teeth.
98. You've probably walked or ran.
99. And more than likely you gripped a pen, or pencil.
100. And you turned your head numerous times.
101. None of these movements would have been possible without skeletal joints.
102. A joint is a place in your body where bone meets bone.
103. Bones are attached to each other by tough bands of tissue called ligaments
104. Bones come together in different ways to form different kinds of joints. Let's take a look at some of the joints in your body.
105. **Graphic Transition – Types of Skeletal Joints**
106. Believe it or not, there are some joints in your body that do not allow bones to move. These are called immovable joints.
107. For example, in your skull there are several different bones that meet to form immovable joints.
108. These joints are formed as a child's skull bones gradually grow and fuse together.
109. When you think of skeletal joints in the body, you often think of joints such as those in your knees or elbows.
110. These are called hinge joints,
111. Because they move in one direction, and not from side to side.
112. These joints move kind of like a hinge on a door.
113. **You Decide!** What type of joint is in your shoulder?
114. This type of joint is a ball and socket.
115. There is also a ball and socket joint in your hip.
116. In this type of joint a bone with a rounded end fits inside a cuplike pocket of another bone.
117. Ball and socket joints, such as in your shoulder allow you to swing your arm in a circle.
118. When you move your wrist from side to side you are utilizing another type of

Script (cont.)

joint called a gliding joint.

119. The small bones in your neck, called vertebrae, also have gliding joints
120. This allows you to turn your head from side to side.
121. A second type of joint found in your neck is called a pivot joint. It allows you to nod your head up and down.
122. Graphic Transition – The Muscular System
123. These oxen are extremely strong animals, having the ability to pull enormous loads.
124. Similarly, these Canada geese are powerful enough to fly for days without rest.
125. And these ski jumpers have the necessary strength to jump 80 meters down the hill.
126. What enables these living things to accomplish such feats? The answer lies in muscles.
127. Muscles are tissues made up of muscle fibers.
128. If you have ever eaten chicken, you may have noticed that you can actually see the muscle fibers running parallel to each other.
129. Each muscle fiber in our body is a single cylinder-shaped cell.
130. There are several different types of muscles, so let's take a look at them.
131. Graphic Transition – Types of Muscles
132. When we think of muscles, we usually think of muscles we consciously move like those in our arms…
133. …and legs. These are called skeletal muscles and they're attached to bones.
134. Tissues called tendons attach the muscles to bones.
135. A close-up of skeletal muscle shows that it is banded or striated.
136. Skeletal muscles are also referred to as voluntary muscles because they move when we want them to.
137. Skeletal muscles tend to work in pairs. When one muscle in the pair contracts, the other muscle relaxes.
138. In this model of the arm, as the forearm is pulled up, the biceps contract, and the triceps relax.
139. Whenever we move, muscles are contracting and relaxing.
140. Smooth muscles are a second type of muscle in the body. They are involuntary muscles, meaning they can contract without us having to think about it.
141. For instance, the bladder and intestines contain smooth muscle.
142. Smooth muscle does not have bands, and looks smooth.
143. Cardiac muscle is a third type of muscle.
144. This type of muscle is found only in the heart and is also involuntary.

Script (cont.)

145. Cardiac muscle is fibrous, and amazingly works during every moment of a person's life.
146. Graphic Transition – Summing Up
147. During the past few minutes we've taken a look at some of the fascinating features of the skeletal and muscular systems.
148. We've explored some of the different functions of the skeletal system including how it supports the body.
149. We looked at the role cartilage plays in the body.
150. And we took a more detailed look at the structures of bones.
151. We explored some of the different types of joints common in the body.
152. Finally we studied some of the different characteristics of muscles, the three different types of muscles, and the role they play in the human body.
153. So the next time you play a sport,
154. . . . write your name . . .
155. . . . or just go for a walk.
156. Think about the bones and muscles in your body that make these activities possible.
157. You just might think about your body a little differently.

Video Quiz

Fill in the correct word to complete the sentence. Good luck and let's get started.

1. Groups of similar cells form _____.
2. The heart and lungs are examples of _____.
3. The framework of the body is made of _____.
4. The skull _____ the brain from injury.
5. The nose is made up of _____.
6. Bones are made up primarily of _____ compounds.
7. A substance called _____ is found inside bones.
8. A _____ is the place where bone meets bone.
9. _____ muscles attach to bones.
10. The heart is an example of an _____ muscle.

Answers to Student Assessments

Preliminary Test

1. connective
2. skin
3. skull
4. bone
5. calcium
6. hinge
7. voluntary
8. smooth
9. cartilage
10. joint
11. true
12. false
13. true
14. false
15. false
16. false
17. true
18. true
19. true
20. true

Video Review

1. Skin is the largest organ in the human body.
2. The human body's frame is made of bone.
3. Red blood cells are produced mainly in the long bones of the body, as well as in bones such as the skull, ribs, breastbone, and vertebrae.
4. A ball and socket joint is found in your shoulder.

Video Quiz:

1. tissue
2. organs
3. bone
4. protects
5. cartilage
6. mineral
7. marrow
8. joint
9. tendons
10. involuntary

Post Test

1. true
2. false
3. true
4. false
5. true
6. false
7. true
8. true
9. false
10. true
11. smooth
12. calcium
13. skin
14. joint
15. skull
16. connective
17. cartilage
18. bone
19. voluntary
20. hinge

Answers to Student Activities

Voluntary vs. Involuntary

1. jaw - voluntary
2. pupil - involuntary
3. heart - involuntary
4. triceps - voluntary
5. finger - voluntary
6. bladder - involuntary
7. biceps - voluntary
8. blood vessel - involuntary
9. intestine - involuntary
10. eyelid - both

Human Reflexes

1. When tapped on the soft tissue below the kneecap, the leg will jerk up as if you are kicking something. This is a reflex action that doctors test in order to make sure that the nervous system is functioning correctly. If no response or a slow response occurs, this is a possible indication of a neurological disorder.
2. The pupil in your eye responds to light and will shrink when it is subjected to light. The pupil contracts and enlarges to regulate the amount of light entering the eye.
3. When sensory nerve endings in the foot are stimulated the toes curl.
4. Answers will vary depending on if the student blinked or not. It is most likely that the student will blink because it is a reflex action the body makes to protect the eyes.
5. Answers will vary but the description should include that reflex actions are automatic responses to stimuli and either protect the body or indicate a problem of the nervous system.

Movable Joints

1. Gliding joint:

2. Pivot joint:

3. Hinge joint:

4. Ball-and-Socket joint:

Vocabulary:

1. i, tissue
2. j, periosteum
3. h, red marrow
4. g, calcium
5. f, spongy bone
6. a, red blood cells
7. b, cartilage
8. c, ligaments
9. d, immovable joints
10. e, vertebrae

Assessment and Student Activity Masters

Name_____

Preliminary Test

Directions: Fill in the blank with the correct word. A list of possible answers is provided at the bottom of the page.

1. The skeletal system is made up of _____ tissue.

2. The _____ is your body's largest organ.

3. Your _____ protects your brain from injury.

4. A newborn baby's skeletal system is made up primarily of cartilage which eventually transforms into _____ over years.

5. _____ is one of the main minerals found in bone.

6. _____ joints are found in your knee and elbow.

7. Skeletal muscles are also referred to as _____ muscles.

8. _____ muscle is a type of involuntary muscle.

9. _____ is a flexible material found in the nose and ears.

10. A _____ is a place where bone meets bone.

skin	skull
hinge	voluntary
smooth	cartilage
calcium	bone
connective	tendons
muscle	joint

Name_____

Preliminary Test

Directions: Decide whether the answer is True (T) or False (F).

11. All living things are made of cells. T F

12. Spongy bone consists of a soft material. T F

13. Ligaments attach bone to bone. T F

14. All systems of the body are part of one big system called the circulatory system. T F

15. The knee is an example of a ball and socket joint. T F

16. There are only a few bones in the human body. T F

17. The skeletal system forms the framework of your body. T F

18. The heart is an example of an involuntary muscle. T F

19. Cartilage is a flexible material found in the nose and ears. T F

20. Tendons are tissues that attach muscles to bone. T F

Name_____

Video Review

Directions: During the course of the program, answer the "You Decide" questions as they are presented in the video. Answer the Video Quiz questions at the end of the video.

You Decide:

1. What is your body's largest organ? Answer _____
2. What's the framework of the human body made of? Answer _____
3. Where are red blood cells produced? Answer _____
4. What type of joint is in your shoulder? Answer _____

Video Quiz:

1. Groups of similar cells form _____.
2. The heart and lungs are examples of _____.
3. The framework of the body is made of _____.
4. The skull _____ the brain.
5. The nose is made up of _____.
6. Bones are made up primarily of _____ compounds.
7. A substance called _____ is found inside bones.
8. A _____ is the place where bone meets bone.
9. _____ attach muscles to bones.
10. The heart is an example of an _____ muscle.

Name_____

Post Test

Directions: Decide whether the answer is True (T) or False (F).

1. Tendons are tissues that attach muscles to bone. T F
2. The knee is an example of a ball and socket joint. T F
3. Ligaments attach bone to bone. T F
4. Spongy bone consists of a soft material. T F
5. All living things are made of cells. T F
6. There are only a few bones in the human body. T F
7. The skeletal system forms the framework of your body. T F
8. The heart is an example of an involuntary muscle. T F
9. All systems of the body are part of one big system called the circulatory system. T F
10. Cartilage is flexible material found in the nose and ears. T F

Name_____

Post Test

Directions: Fill in the blank with the correct word. A list of possible answers is provided at the bottom of the page.

11. _____ muscle is a type of involuntary muscle.

12. _____ is one of the main minerals found in bone.

13. The _____ is your body's largest organ.

14. A _____ is a place where bone meets bone.

15. Your _____ protects your brain from injury.

16. The skeletal system is made up of _____ tissue.

17. _____ is a flexible material found in the nose and in many joints.

18. A newborn baby's skeletal system is made up primarily of cartilage which eventually transforms into _____ over years.

19. Skeletal muscles are also referred to as _____ muscles.

20. _____ joints are found in your knee and elbow.

skin	skull
hinge	voluntary
smooth	cartilage
calcium	bone
connective	tendons
muscle	joint

Name_____

Voluntary vs. Involuntary

Objective: In this activity students will differentiate between voluntary and involuntary muscles of the body.

Background: Muscles perform a variety of tasks that are necessary in the functioning of the human body. In moving your arm or leg, muscles are essential! In order for your heart to continuously pump blood through the body, cardiac muscles have to contract and relax. Needless to say the muscular system is a very important body system.

Your heart beats continuously, and with good reason. If your heart did not beat continuously then your blood flow would cease and you would die. Your heart is in fact a muscle and because it works without your conscious control it is referred as an **involuntary muscle**. Involuntary muscles act without our knowledge and without consciously controlling them.

Hold your arm straight out in front of you and clinch your fist. Now bring your forearm up to touch your upper arm. You have just demonstrated how a **voluntary muscle** works. You have conscious control of voluntary muscles! In order for you to move your arm or walk to the store, you have to make your muscles move.

Directions: Listed in the table below are different parts of the body. Next to each one write if a voluntary muscle or an involuntary muscle controls it.

Body Part	Voluntary vs. Involuntary
1. jaw	
2. pupil	
3. heart	
4. triceps	
5. finger	
6. bladder	
7. biceps	
8. blood vessel	
9. intestine	
10. eyelid	

Name_____

Human Reflexes

Objective: In this activity students will stimulate and experience different muscular reflexes in the body.

Background: The body's largest organ and one of the most important, is the skin. Not only is the skin a covering for your body but it also acts as a shield. The skin holds fluids in while simultaneously keeping disease causing microorganisms out. Millions of tiny nerve endings, invisible to the naked eye, enable your skin to sense heat, cold and pressure. In fact, the nerve endings in your skin can sense if something is too hot even before you realize it. If you have ever touched a hot stove, and retracted your hand quickly, then you have experienced your reflex action at work. A **reflex action** is a fast, automatic response to a stimulus. Your reflexes allow you to remove your hand from the hot stove even before you fully realize that it is hot. By doing so your reflexes prevent your skin from being severely burned.

The **reflex arc**, is the pathway that includes a stimulus and a response. Sensory neurons carry impulses from the skin to the central nervous system, and then to a motor neuron. The motor neuron stimulates the muscle to withdraw. All this happens in a time span of a fraction of a second!

Materials:
Wooden popsicle stick
Clear plastic sheet
paper

Procedure:
1. In this experiment you will work in pairs. Alternate being the subject and the experimenter. Record the answers to the questions as you go along.
2. **Subject**: sit on a chair with your legs crossed. Relax the leg on top so that it can swing freely.
3. **Experimenter**: using the side of your hand gently, but firmly, tap the soft area just below the kneecap. It may take a few tries to tap the correct area. Switch roles and repeat the experiment. Answer question 1.
4. **Subject**: close and cover your eyes for 1 minute. Your partner should keep track of the time. At the end of the minute, your partner should observe your pupil when you open your eyes. Switch roles and repeat. Answer question 2.
5. **Subject**: remove your shoe and sock.

Name_____

Human Reflexes

Procedure (cont.):

6. **Experimenter**: gently drag the wooden popsicle stick along the bottom of the subject's foot moving from toe to heel. Switch roles and repeat. Answer question 3.
7. **Subject**: hold a clear plastic sheet in front of your face.
8. **Experimenter**: gently toss a crumbled piece of paper at the plastic sheet and observe if the subject blinks. Answer the following questions.

Questions:

1. What response did your leg make? Why is it important for your leg to respond in that way?

2. What response did your pupils make when you opened them? Why is it important for your eyes to adjust in such a way?

3. What response did your foot make when you dragged the popsicle stick across the sole?

4. Did you blink when the crumpled piece of paper was tossed at you? If not, how difficult was it to not blink? Why is it important for you to blink when something is tossed at your face?

5. Describe the reason for each of your responses. In your description be sure to include the terms reflexes, and stimulus.

Name_____

Movable Joints

Objective: In this activity students will identify different types of joints in the body, and identify areas of the body in which they are found.

Background: The human body is an amazing structure composed of numerous systems all working together. For instance, the respiratory system is made up of the organs involved in the process of taking in oxygen and carbon dioxide. The digestive system breaks down the food you eat and distributes nutrients throughout your body. All organs in the human body have separate but important jobs they must perform in order for the body to continue working. The structure of the organ helps it perform the function it carries out. There is hardly a better system to demonstrate the importance of structure and function than the skeletal system.

There are 206 bones in the human body. Each bone is a certain size and shape depending on its function. The human skeleton is divided into two categories, the **axial skeleton** and the **appendicular skeleton**. The head, vertebral column, and rib cage make up the axial skeleton, which protects all vital organs including the brain and heart The appendicular skeleton includes the arms, legs, pelvis, and shoulder bones. These bones are essential to movement such as running, and walking. Generally speaking, bones are separate units that are connected to each other. The way in which they are connected determines the way each part of the body functions.

Joints are the places in your body where bone meets bone. Most joints in the body allow for movement while some do not. There are three different types of joints, **immovable**, **slightly movable**, and **freely movable**. Immovable joints are joints found between bones of the skull and do not allow movement. Slightly movable joints can be found between the vertebrae in the spine. These joints allow some movement. Freely movable joints allow the most movement and are the joints that we will study more closely.

Name_____

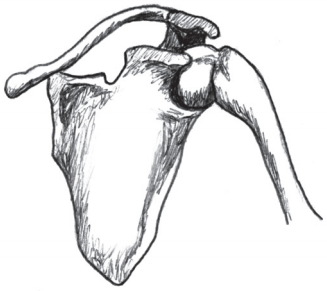
Movable Joints (cont.)

Materials:
Construction paper
Scissors
Glue

Activity
1. Cut out each of the four pictures below.
2. Observe the pictures of four different movable joints in the body.
3. Read the description of the four joints.
4. Identify the drawing of the bone joint in your own body. Move the joint and feel it moving. Describe what you feel, and describe the motion of the joint.
5. Glue the body part to a piece of construction, and then match the correct description to it

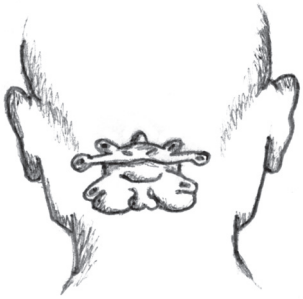
Gliding Joints
A joint in which bones glide over each other.

Pivot Joint
Bones rotate around one another, such as the upper most bones in the spine.



Hinge Joint
A joint in which bones move back and forth in one direction.

Ball-and-socket Joint
A joint in which a ball formed on the end of a bone fits into a cup-shaped bone.



Name_____

Vocabulary of *Bones and Muscles*

___1) iusest_____

___2) mutesiopre_____

___3) wmoarr der_____

___4) mcaulci _____

___5) spgyon oben _____

___6) rde boold clels _____

___7) artilcage _____

___8) amenligst _____

___9) ovmmiable oinjts _____

___10) earbetrev _____

a. blood cells which carry gases throughout the body

b. flexible material commonly found in the ear adn nose

c. tough bands of tissue that attach bone to bone

d. a joint that does not allow bones to move

e. small bones in your neck and spine

f. portion of bone containing many spaces

g. is the dominant nutrient found in bone

h. soft material abundant in long bones that produces red blood cells

i. a group of similar cells

j. covering of the bone