

# Moving Muscles and Bones

## Teacher's Guide



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# National Standards Correlations

## Benchmarks for Science Literacy

(Project 2061 – AAAS)      Grades 3–5

### The Human Organism – Basic Functions (6C)

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

- Organs and organ systems are composed of cells and help to provide all cells with basic needs.
- To burn food for the release of energy stored in it, oxygen must be supplied to cells, and carbon dioxide removed. Lungs take in oxygen for the combustion of food and they eliminate the carbon dioxide produced. The urinary system disposes of dissolved waste molecules, the intestinal tract removes solid wastes, and the skin and lungs rid the body of heat energy. The circulatory system moves all these substances to or from cells where they are needed or produced, responding to changing demands.

### The Human Organism – Physical Health (6E)

By the end of fifth grade, students should know that:

- Eating a variety of healthful foods and getting enough exercise and rest help people to stay healthy.

## National Science Education Standards

(Content Standards: K–4, National Academy of Sciences)

### Science in Personal and Social Perspectives – Content Standard F

As a result of their activities in grades K-4, all students should develop an understanding of:

#### Personal Health

- Individuals have some responsibility for their own health. Students should engage in personal care--dental hygiene, cleanliness, and exercise--that will maintain and improve health. Understandings include how communicable diseases, such as colds, are transmitted and some of the body's defense mechanisms that prevent or overcome illness.
- Different substances can damage the body and how it functions. Such substances include tobacco, alcohol, over-the-counter medicines, and illicit drugs. Students should understand that some substances, such as prescription drugs, can be beneficial, but that any substance can be harmful if used inappropriately.
- Regular exercise is important to the maintenance and improvement of health. The benefits of physical fitness include maintaining healthy weight, having energy and strength for routine activities, good muscle tone, bone strength, strong heart/lung systems, and improved mental health. Personal exercise, especially developing cardiovascular endurance, is the foundation of physical fitness.
- The potential for accidents and the existence of hazards imposes the need for injury prevention. Safe living involves the development and use of safety precautions and the recognition of risk in personal decisions. Injury prevention has personal and social dimensions.

# Student Learning Objectives

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

- Differentiate between cells, tissues, organs, and organ systems.
- Provide examples of organs and organ systems in the body.
- Understand that the skeleton is the body's framework. The skeletal system consists of bones and materials that connect them.
- Identify important jobs of the skeletal system:
  - protects organs inside the body
  - provides a point of attachment for muscles and other tissues
  - produces red blood cells
  - stores certain materials
- Understand that bones consist of hard, living tissues and there are many bones that make up the skeletal system.
- Explain the role of cartilage. Provide examples of where cartilage is located in the body.
- Cite examples of joints in the body and explain their purpose.
- Compare and contrast the functions of ligaments and tendons.
- Differentiate between the three main types of muscle tissue: skeletal muscle, cardiac muscle, and smooth muscle.
- Provide examples of where the different types of muscle tissues are located in the body.
- Describe examples of measures that should be taken to take care of muscles and bones, including: avoiding injuries; wearing protective equipment, such as a helmet, when engaging in certain sports; eating a healthy, well-balance diet; and exercising vigorously at least five times per week.

# Assessment

## **Preliminary Test (p. 14–15):**

The Preliminary Test is an assessment tool designed to gain an understanding of students' 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.

## **Post-Test (p. 16–17):**

The Post-Test can be utilized as an assessment tool following student completion of the program and student activities. The results of the Post-Test can be compared against the results of the Preliminary Test to assess student progress.

## **Video Review (p. 18):**

The Video Review can be used as an assessment tool or as a student activity. There are two sections. The first part contains questions displayed during the program. The second part consists of a five-question video quiz to be answered at the end of the video.

# Introducing the Program

Before showing the video to students, introduce the term “skeletal system.” Ask students what holds up the school or their home. What is located underneath the roof and walls? The framing, or framework, is located under the roof and in the walls of many types of buildings. The role of the framing is to hold up the building and provide a framework to which other components of the building are attached. Ask students to identify the framework of the human body. Write the term “skeletal system” on the board and then discuss some of its jobs.

Next, ask two volunteers to come forward. Have one volunteer lift a heavy object. Have the other volunteer stand motionless. Ask the class which person is using muscles. Most of the students will say the person who lifted the heavy object used muscles, whereas the motionless person did not. Explain to the class that both students were using muscles, even though one was motionless. Tell students there are many muscles in the body they are using at this very moment, even though they aren't thinking about controlling them. For example, the heart is a muscle that is continually beating. Tell students to pay close attention to the video to learn about the skeletal and muscle systems and the three different types of muscle tissue.

## Program Viewing Suggestions

The student master “Video Review” (p.18) is provided for distribution to students. You may choose to have your students complete this master while viewing the program or do so upon its conclusion.

The program is approximately 14 minutes in length and includes a five-question video quiz. Answers are not provided to the Video Quiz in the video, but are included in this guide on page 12. 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.

# Video Script

1. You have probably felt your legs burn after running,...
2. ...felt sore after exercising,...
3. ...banged your head against something,...
4. ...or received a bruise.
5. If you have had any of these experiences, you are well aware of your muscles and bones.
6. What exactly are bones and muscles?
7. What are some of the different types of bones and muscles in your body?
8. Why are they important and what functions do they serve in the body?
9. During the next few minutes, we are going to try to answer these questions and others,...
10. ...as we investigate moving muscles and bones.
- 11. Graphic Transition – Body Organization**
12. If you were to take a close-up look at your body with a microscope, you would see it is made up of millions and millions of cells.
13. Cells are the basic building blocks of the human body.
14. A group of similar cells that works together forms tissue.
15. There are several different types of tissues in the body, such as nerve tissue and muscle tissue, to name just a couple.
16. Tissues working together to perform a job form an organ.
- 17. You Decide!** What is this organ?
18. This organ is the stomach. The stomach is made up of muscle tissue and other types of tissue.
19. Its job is to help digest food.
20. You are probably familiar with other important organs, such as the heart, lungs, liver, and kidneys.
21. Organs carry out many vital, complex jobs in the body.
22. An organ system is made up of two or more organs which work together to perform a major function.
23. For example, the brain, nerve cord, and nerves located throughout the body make up the nervous system.
24. The nervous system receives information and then reacts to it. The nervous system also controls all the major functions in the body.
- 25. Graphic Transition – Your Skeletal System**
26. Beneath the walls of this building...
27. ...is a frame that supports it.
28. Just as a building has many pieces that make up the framework, the body has a framework made up of many pieces called bones.
29. In fact, your body has over 200 bones.
30. The body's framework is called a skeleton. The skeletal system consists of bones and the materials that connect them.

# Video Script

31. The skeletal system performs many important jobs in addition to providing a supporting frame.
32. For example, muscles and other tissues are attached to the skeleton, enabling us to move.
33. The skeletal system also protects organs inside the body.
- 34. You Observe!** Lightly tap your head. How does it feel?
35. It feels hard. Underneath your hair and scalp is the skull, which is made of bone.
36. The skull protects the brain – a very important organ.
37. The skeletal system also produces red blood cells...
38. ...and stores certain materials the body needs.
- 39. Graphic Transition – Bones and Joints**
40. You usually think of bones as being dry, brittle, and dead.
41. But bones are actually made up of living tissues that grow and heal themselves when injured.
42. There are many different types of bones in your body.
43. Take a look at your hand. It alone has 27 bones in it!
44. Bones are hard substances made of minerals and other materials.
45. The ends of many bones are covered with a soft, flexible tissue called cartilage.
- 46. You Compare!** How does your ear feel, compared to your forearm?
47. Your ear is soft and flexible, but your forearm feels rigid. Why?
48. Your forearm contains hard bone, but your ear is made up of cartilage – a much more flexible material.
49. Your nose is also made of cartilage.
50. Bend your knee. Your knee joint is the place where two long bones in the leg meet. A joint is the place where any two bones come together.
51. A number of different kinds of joints enable our bodies to move in a wide variety of ways.
52. Some joints, such as those in the skull, do not move.
53. Joints are kept together by tough elastic tissues called ligaments.
54. If a ligament is stretched too far, it becomes strained and requires time to heal.
- 55. Graphic Transition – The Muscular System**
56. You are probably well aware of the muscles in your arms and legs.
57. But did you know there are over 640 muscles in your body?!
58. The muscular system generally refers to muscles that are attached to bones and enable us to move.
59. But, there are other types of muscles in the body as well. Did you know that muscles play a role in helping us breathe, digest food, and pump blood throughout the body?
60. There are three main types of muscle tissue: skeletal muscle, cardiac muscle, and smooth muscle.
61. Skeletal muscle, what you usually think of as muscle, is attached to bones.

# Video Script

62. Every time you ride a bike, snowboard, play a musical instrument, or play a sport, you are using skeletal muscles.
63. Tough band-like tissues called tendons attach muscles to bones.
64. Therefore, when a muscle contracts, the bone also moves because a tendon connects it to the muscle.
65. It is important to note that muscles and bones work together to cause movement.
- 66. You Observe!** Put your hand on the middle of your chest. What do you feel?
67. You feel your heart beating. The heart is made of a different kind of muscle called cardiac muscle.
68. Cardiac muscle is found only in the heart and it works without tiring.
69. The heart amazingly contracts 60 to 100 times per minute for your entire life!
70. The repeated contractions are called heartbeats.
71. The muscular contractions of the heart force blood throughout the body,...
72. ...which you can feel as a pulse on your wrist or on your neck.
73. If you have ever heard your stomach churning, you have experienced the effects of another type of muscle called smooth muscle.
74. Smooth muscle is found on the inside of many organs, including the walls of blood vessels.
75. Smooth muscle works automatically.
76. For example, smooth muscle in the stomach churns and mixes food without you even thinking about it.
- 77. Graphic Transition – Taking Care of Bones and Muscles**
78. If you have ever broken a bone...
79. ...or strained a muscle, you know how painful an injury to the skeletal or muscular system can be.
80. There are several things you should do to maintain these systems.
81. First, try to avoid injuries.
82. For example, wear protective equipment, such as a properly fitting helmet, when engaging in potentially dangerous sports and activities.
83. And, if you do get injured, see a doctor immediately.
84. Eating a well-balanced diet is very important for growing and maintaining healthy bones and muscles.
85. Regular aerobic exercise is also necessary for healthy bones and muscles.
86. It is also critical to provide your body with enough sleep and rest so bones and muscles can properly grow and recover.
87. And, seeing a doctor for a physical examination once a year is vital to ensure your bones and muscles are developing properly.
- 88. Graphic Transition – Summing Up**
89. During the past few minutes, we have explored many of the fascinating features of the skeletal and muscular systems.

# Video Script

90. We began by discussing how the body is organized into cells, tissues, organs, and body systems.
91. Many of the characteristics and functions of the skeletal system were addressed.
92. More specifically, the functions of bones and joints were explored.
93. Next, the main types of muscle tissue and their functions were demonstrated.
94. Last, we briefly discussed some of the things you can do to maintain healthy bones and muscles.
95. So, the next time you move your body...
96. ...or feel your muscles ache,...
97. ...think about some of the things we've just discussed.
98. You just might think about bones and muscles a little differently.

## **99. Graphic Transition – Video Assessment**

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

1. The \_\_\_\_\_ is the framework of the body.
2. Over 200 \_\_\_\_\_ make up the skeletal system.
3. The place where bones come together is called a \_\_\_\_\_.
4. Skeletal \_\_\_\_\_ is attached to bones and enables us to move.
5. \_\_\_\_\_ muscle is found in the heart.

Answers can be found on page 12.



# Answer Key to Student Assessments

## Pre-Test (p. 14–15)

1. d - cells
2. c - organ
3. a - skeleton
4. a - living tissues
5. d - cartilage
6. b - joint
7. c - skeletal muscle
8. a - tendon
9. c - smooth muscle
10. a - cardiac muscle
11. true
12. false
13. true
14. true
15. false
16. Smooth muscle is found on the inside of many organs, including the walls of blood vessels and the stomach.
17. The skeleton is the body's framework, made up of over 200 bones.
18. Important jobs of the skeletal system include protecting organs inside the body, enabling the body to move, providing a supporting framework for the body, producing red blood cells, and storing certain materials the body needs.
19. Skeletal muscle is a type of muscle that is attached to bones with tendons.
20. Possible answers: try to avoid injury; wear protective equipment, such as a helmet, when engaging in potentially dangerous sports or activities; eat a well-balanced diet; exercise regularly; provide your body with enough sleep and rest; and see a doctor for a physical examination once a year.

## Post-Test (p. 16–17)

1. c - smooth muscle
2. c - skeletal muscle
3. d - cartilage
4. a - skeleton
5. d - cells
6. a - cardiac muscle
7. a - tendon
8. b - joint
9. a - living tissues
10. c - organ
11. true
12. false
13. false
14. true
15. true
16. Important jobs of the skeletal system include protecting organs inside the body, enabling the body to move, providing a supporting framework for the body, producing red blood cells, and storing certain materials the body needs.
17. Possible answers: try to avoid injury; wear protective equipment, such as a helmet, when engaging in potentially dangerous sports or activities; eat a well-balanced diet; exercise regularly; provide your body with enough sleep and rest; and see a doctor for a physical examination once a year.
18. The skeleton is the body's framework, made up of over 200 bones.
19. Smooth muscle is found on the inside of many organs, including the walls of blood vessels and the stomach.
20. Skeletal muscle is a type of muscle that is attached to bones with tendons.

## Video Review (p. 18)

1. This organ is the stomach.
2. It feels hard because underneath the hair and scalp is the skull, which is made of bone.
3. The ear is soft and flexible, but the forearm feels rigid.
4. You feel your heart beating when you put your hand on the middle of your chest.
1. The **skeleton** is the framework of the body.
2. Over 200 **bones** make up the skeletal system.
3. The place where bones come together is called a **joint**.
4. Skeletal **muscle** is attached to bones and enables us to move.
5. **Cardiac** muscle is found in the heart.

# Answer Key to Student Activities

## Vocabulary (p. 19)

1. organ
2. organ system
3. skeletal system
4. bones
5. cartilage
6. joint
7. ligaments
8. skeletal muscle
9. tendons
10. cardiac muscle

## Writing Activity (p. 20)

The **skeleton** is considered to be the framework of the body. The **skeletal system** consists of bones and the materials that connect them. Bones are actually **living** tissue. There are over 200 of them in the human body. The ends of many bones are covered with a soft, flexible tissue called **cartilage**. The place where two bones come together is a **joint**. **Ligaments** are tough elastic tissues that help hold bones together where they meet. Muscles in the body are very important. They play an important role in helping us breathe, digest food, and pump blood throughout the body. The three main types of muscle tissue are skeletal muscle, smooth muscle, and **cardiac** muscle. **Skeletal muscle** is attached to bones and enables the body to move. Tough, band-like tissues called **tendons** attach muscles to bones. Cardiac muscle is found in the heart. Organs, including blood vessels and the stomach, contain **smooth muscle**. This type of muscle works involuntarily without us thinking about it.




## In Your Own Words (p. 20)

1. One function of the skeletal system is protecting the organs inside the body. Another function is providing a supporting framework for the body. The skeletal system also enables the body to move.
2. Cardiac muscle is located in the heart. Smooth muscle is found on the inside of many organs, including the walls of blood vessels and the stomach. Skeletal muscles are attached to bone by tendons and enable the body to move. These muscles are found throughout the body.
3. Examples of things that should be done to maintain a healthy skeletal and muscular system: get regular exercise, eat a well-balanced diet, see a doctor once a year for a physical examination, provide the body with enough sleep, wear appropriate protective equipment when engaging in sports and certain activities, and try to avoid injuries.

## Where Bones Meet (p. 21–23)

- A
1. This joint is found in the knee.
  2. The knee joint is a movable joint.
  3. This joint is an example of a hinge joint.
  4. The bones in the knee joint move back and forth in one direction, enabling a person to walk or run. It also helps support the upper body.
- B
1. The skull is found in the head.
  2. The skull is an immovable joint.
  3. N/A
  4. The function of the skull is to protect the brain.
- C
1. This joint is found in the back of the neck.
  2. The joint is an example of a movable joint.
  3. The joint is a pivot joint.
  4. This joint allows a person to move the head in different directions.
- D
1. This joint is found in the elbow.
  2. The elbow joint is a movable joint.
  3. This is an example of a hinge joint.
  4. The elbow joint enables a person to bend the arm.
- E
1. This picture represents joints found in the spine.
  2. These joints are slightly movable joints.
  3. The joints are gliding joints.
  4. These joints enable a person to walk upright.
- F
1. The joint represented in the picture is the shoulder joint.
  2. It is a movable joint.
  3. This joint is a ball-and-socket joint.
  4. This joint allows a person to move the arm in a complete circle.

## Types of Muscles (p. 24)

	Name of Structure	Job	Type of Muscle Tissue	Voluntary or Involuntary
	Heart	Pump blood throughout the body	Cardiac muscle	involuntary
	Bicep and tricep	Move the arm	Skeletal muscle	voluntary
	Stomach	Digests food	Smooth muscle	involuntary

# Pre-Test

Name \_\_\_\_\_

Circle the best answer for each of the following questions.

1. These are the basic building blocks of life:  
a. *vertebrates*      b. *nebulae*      c. *teeth*      d. *cells*
2. What is formed by tissues that work together to perform a job?  
a. *cell*      b. *body system*      c. *organ*      d. *disease*
3. This is referred to as the framework of the body:  
a. *skeleton*      b. *muscle*      c. *digestive system*      d. *circulatory system*
4. Bones in the body are actually:  
a. *living tissues*      b. *dead*      c. *nerve tissue*      d. *muscles*
5. The nose and ears are made of a soft, flexible tissue called:  
a. *cardiac muscle*      b. *organ*      c. *skeletal muscle*      d. *cartilage*
6. The place where two bones come together is called a:  
a. *vertebrae*      b. *joint*      c. *synapse*      d. *intersection*
7. This type of muscle is attached to bones and helps us move:  
a. *cardiac muscle*      b. *smooth muscle*      c. *skeletal muscle*      d. *cartilage*
8. This type of tissue connects muscle to bone:  
a. *tendon*      b. *ligament*      c. *nerve*      d. *cardiac*
9. Some organs, such as the walls of blood vessels and the stomach, contain:  
a. *skeletal muscle*      b. *cardiac muscle*      c. *smooth muscle*      d. *nerve muscle*
10. This type of muscle is found in the heart:  
a. *cardiac muscle*      b. *skeletal muscle*      c. *nerve muscle*      d. *smooth muscle*

# Pre-Test

Name \_\_\_\_\_

**Write true or false next to each statement.**

- 11. \_\_\_\_\_ The skeletal system performs many important functions.
- 12. \_\_\_\_\_ Bones in the body are dry, brittle, and dead.
- 13. \_\_\_\_\_ Joints are held together by tough elastic tissues called ligaments.
- 14. \_\_\_\_\_ Skeletal muscle is attached to bones and helps us move.
- 15. \_\_\_\_\_ Bones are tough and don't ever need to be protected from injury.

**Write a short answer for each of the following.**

16. Where in the body is smooth muscle located?

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17. What is the skeleton?

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18. List two important jobs of the skeletal system.

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19. What is skeletal muscle?

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20. Describe one thing you should do to maintain healthy muscles and bones.

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# Post-Test

Name \_\_\_\_\_

Circle the best answer for each of the following questions.

- Some organs, such as the walls of blood vessels and the stomach, contain:  
a. *skeletal muscle*    b. *cardiac muscle*    c. *smooth muscle*    d. *nerve muscle*
- This type of muscle is attached to bones and helps us move:  
a. *cardiac muscle*    b. *smooth muscle*    c. *skeletal muscle*    d. *cartilage*
- The nose and ears are made of a soft, flexible tissue called:  
a. *cardiac muscle*    b. *organ*    c. *skeletal muscle*    d. *cartilage*
- This is referred to as the framework of the body:  
a. *skeleton*    b. *muscle*    c. *digestive system*    d. *circulatory system*
- These are the basic building blocks of life:  
a. *vertebrates*    b. *nebulae*    c. *teeth*    d. *cells*
- This type of muscle is found in the heart:  
a. *cardiac muscle*    b. *skeletal muscle*    c. *nerve muscle*    d. *smooth muscle*
- This type of tissue connects muscle to bone:  
a. *tendon*    b. *ligament*    c. *nerve*    d. *cardiac*
- The place where two bones come together is called a:  
a. *vertebrae*    b. *joint*    c. *synapse*    d. *intersection*
- Bones in the body are actually:  
a. *living tissues*    b. *dead*    c. *nerve tissue*    d. *muscles*
- What is formed by tissues that work together to perform a job?  
a. *cell*    b. *body system*    c. *organ*    d. *disease*

# Post-Test

Name \_\_\_\_\_

## Write true or false next to each statement.

- 11. \_\_\_\_\_ Joints are held together by tough elastic tissues called ligaments.
- 12. \_\_\_\_\_ Bones are tough and don't ever need to be protected from injury.
- 13. \_\_\_\_\_ Bones in the body are dry, brittle, and dead.
- 14. \_\_\_\_\_ The skeletal system performs many important functions.
- 15. \_\_\_\_\_ Skeletal muscle is attached to bones and helps us move.

## Write a short answer for each of the following.

16. List two important jobs of the skeletal system.

\_\_\_\_\_  
\_\_\_\_\_

17. Describe one thing you should do to maintain healthy muscles and bones.

\_\_\_\_\_  
\_\_\_\_\_

18. What is the skeleton?

\_\_\_\_\_  
\_\_\_\_\_

19. Where in the body is smooth muscle located?

\_\_\_\_\_  
\_\_\_\_\_

20. What is skeletal muscle?

\_\_\_\_\_  
\_\_\_\_\_

# Video Review

Name \_\_\_\_\_

While you watch the video, answer these questions:

### You Decide!

1. What is this organ?

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### You Observe!

2. Lightly tap your head. How does it feel?

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### You Compare!

3. How does your ear feel, compared to your forearm?

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### You Observe!

4. Put your hand on the middle of your chest. What do you feel?

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After you watch the video, test your knowledge with these questions.

1. The \_\_\_\_\_ is the framework of the body.
2. Over 200 \_\_\_\_\_ make up the skeletal system.
3. The place where bones come together is called a \_\_\_\_\_.
4. Skeletal \_\_\_\_\_ is attached to bones and enables us to move.
5. \_\_\_\_\_ muscle is found in the heart.

# Vocabulary

Name \_\_\_\_\_

Use these words to fill in the blanks next to the sentences below.

Words	skeletal system	organ	organ system	joint	cartilage
	tendons	cardiac muscle	ligaments	skeletal muscle	bones

- \_\_\_\_\_ Formed by tissues working together to perform a job.
- \_\_\_\_\_ Two or more organs working together to perform a major function.
- \_\_\_\_\_ Bones and the materials that connect them in the body.
- \_\_\_\_\_ Hard, living tissues within the body that are important components of the skeletal system.
- \_\_\_\_\_ Flexible material found at the ends of many bones and in the ears and nose.
- \_\_\_\_\_ Place where two bones come together.
- \_\_\_\_\_ Tough elastic tissues that hold joints together.
- \_\_\_\_\_ Type of muscles that is connected to bones and carries out movement.
- \_\_\_\_\_ Band-like tissues that connect muscles to bones.
- \_\_\_\_\_ Type of muscle found in the heart.

# Writing Activity

Name \_\_\_\_\_

Words	joint	skeleton	cardiac	skeletal system	ligaments
	smooth muscle	cartilage	tendons	living	skeletal muscle

Use the correct word from above to complete the sentences in the following paragraph.

The \_\_\_\_\_ is considered to be the framework of the body. The \_\_\_\_\_ consists of bones and the materials that connect them. Bones are actually \_\_\_\_\_ tissue. There are over 200 of them in the human body. The ends of many bones are covered with a soft, flexible tissue called \_\_\_\_\_. The place where two bones come together is a \_\_\_\_\_. \_\_\_\_\_ are tough elastic tissues that help hold bones together where they meet. Muscles in the body are very important. They play an important role in helping us breathe, digest food, and pump blood throughout the body. The three main types of muscle tissue are skeletal muscle, smooth muscle, and \_\_\_\_\_ muscle. \_\_\_\_\_ is attached to bones and enables the body to move. Tough, band-like tissues called \_\_\_\_\_ attach muscles to bones. Cardiac muscle is found in the heart. Organs, including blood vessels and the stomach, contain \_\_\_\_\_. This type of muscle works involuntarily without us thinking about it.

## In Your Own Words

1. What are three functions of the skeletal system?

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2. List the three types of muscle tissue and provide examples of where each is found in the body.

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3. Explain at least three things you should do to maintain healthy skeletal and muscular systems.

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# Where Bones Meet

Name \_\_\_\_\_

**Background:** The human body contains 206 bones. That's a lot of bones! These bones come in a wide variety of shapes and sizes. The shape and size of a bone enables it to perform specific functions. For example, the femur in the thigh is the longest bone in the body, enabling the leg to support the upright position of the body. This upright position enables us to walk on two legs.

Generally speaking, bones are separate units that are connected to each other. How they are connected determines the way each part of the body functions. Joints are places in the body where bones come together. Most joints in the body allow for movement, but some do not. One way joints are grouped is based on the amount of movement they permit. Listed below are three different types of joints, based on movement:

- Immovable joints** - joints that do not allow movement, such as the joints between bones of the skull.
- Slightly movable joints** - joints that allow some movement, such as vertebrae in the spine.
- Movable joints** - joints that allow the most movement, such as elbows and knees.

There are many types of movable joints. These various types of joints are designed in ways that enable different types of movement. For example, **gliding joints**, such as those in the wrist, allow side to side movement. **Ball-and-socket joints**, such as those in the shoulder, enable movement in a complete circle. **Pivot joints** allow rotation around an axis. For example, some joints in the neck enable you to move your head up and down. In a **gliding joint**, bones slide past one another. Your neck also contains gliding joints, which enable your head to move from side to side.

## Directions:

There are images of six joints on the following two pages. For each joint, answer the following:

1. Where is the joint found in the body?
2. Is it an immovable, slightly movable, or movable joint?
3. If it is a movable joint, decide whether it is a gliding joint, pivot joint, hinge joint, or ball-and-socket joint.
4. Describe the function of this type of joint in the body.

# Where Bones Meet

Name \_\_\_\_\_

A.



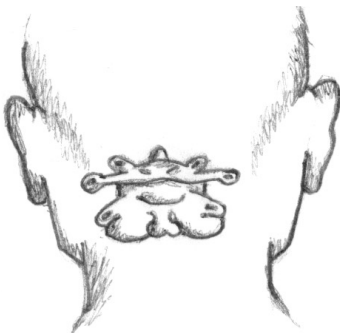
1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_
4. \_\_\_\_\_  
\_\_\_\_\_

B.



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

C.



1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
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# Where Bones Meet

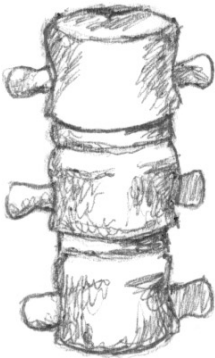
Name \_\_\_\_\_

D.



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



1. \_\_\_\_\_  
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F.



1. \_\_\_\_\_  
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4. \_\_\_\_\_  
\_\_\_\_\_

# Types of Muscles




Name \_\_\_\_\_

**Background:** Every second of every day, muscles are at work in your body. For example, every time you move your arm, you are using muscles. Muscles are very important tissues in the body that perform a wide range of functions. Without muscles, we wouldn't be able to walk, run, or move. The contraction and relaxation of muscle cells produces movement.

Did you know there are over 640 muscles in the body? There are three main kinds of muscles: skeletal muscle, cardiac muscle, and smooth muscle. Skeletal muscle is attached to bones. The contracting and relaxing of skeletal muscles enable us to move. If you want to move your arm or leg, you need to think about it. Skeletal muscles are referred to as voluntary muscles. Another type of muscle, cardiac muscle, is sometimes referred to as heart muscle. Cardiac muscle in the heart continuously pumps blood throughout the body, 60 to 100 times a minute, everyday of our lives. Smooth muscle, the third type of muscle, is found in organs such as the stomach, intestines, and blood vessels. You don't think about controlling these structures in your body. Therefore, cardiac muscle and smooth muscle are generally referred to as involuntary muscle. In this activity you will identify and describe the three different types of muscle tissue in the body.

**Directions:**

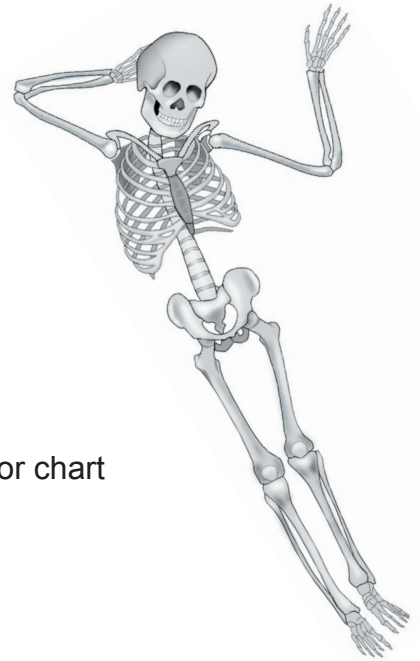
In the table below are images of structures made of three different types of muscle tissue. Next to each image, write the name of the structure and describe its job. Also state the type of muscle tissue of which it is made and if it is a voluntary or involuntary muscle.

	Name of Structure	Job	Type of Muscle Tissue	Voluntary or Involuntary
				
				
				

# Your Skeleton

Name \_\_\_\_\_

**Background:** Underneath your skin is an amazing framework we generally refer to as the skeletal system. It is hard to imagine there are over 200 individual bones in your body, all working together to help you move, play sports, and perform music! The vast number of bones, ranging in size from small to big, are connected to each other by tough stringy tissues called ligaments. Tendons, another type of tissue, attach muscles to bones. At the ends of many bones is a tough, flexible material called cartilage. Together, bones, ligaments, tendons, and cartilage make up the skeletal system. In this activity you will create a life-size diagram of your own skeleton.



**Materials:** large piece of paper (newsprint), colored pencils, book or chart containing a diagram of a skeleton

## Directions:

1. In this activity you will work with a partner.
2. Obtain a large piece of paper that is slightly taller and wider than you. Lay it flat on the floor.
3. Have one person lie carefully on the piece of paper on their back. His/her arms should be positioned near his/her waist, with a slight space between the arms and body. Lay palms flat on the paper.
4. The other person will now carefully use a pencil to trace the outline of the person lying on the paper. Take your time and be neat.
5. Reverse roles and create the outline of the other person.
6. When the body outlines are completed, obtain a book or chart that has a labeled diagram of the skeletal system.
7. Using the chart or book, begin drawing your own skeletal system on your body outline. Remember your skeleton will not go to the edges of your outline because the skeleton is covered with muscles, fat, and skin.
8. Label the following bones on your skeleton: skull, clavicle, breastbone, ribs, vertebra column, humerus, ulna, radius, pelvis, femur, tibia, and fibula.
9. When you have completed drawing your bones on your skeleton, attach it to the classroom wall.