



Lesson Plan: Bones, muscles, and skin

Grade Level: 8

Subject: Life Science

Duration: 45–60 min

NGSS MS-LS1-3: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Learning Objectives

By the end of this lesson, students will be able to:

- **Describe** the levels of organization in the human body, from cells to tissues to organs to organ systems, and name the four types of tissue.
- **Explain** how the structure of a bone — hard compact bone outside, lighter spongy bone



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

it.

- **Marrow:** The soft connective tissue that fills the spaces inside a bone. Red marrow makes blood cells for the body, and yellow marrow stores fat the body can use for energy.
- **Joint:** Any place in the body where two bones come together. Movable joints, such as the hip and knee, let bones move; immovable joints, such as those between the bones of the skull, lock bones in place to protect what is underneath.
- **Ligament:** A band of connective tissue that holds the bones of a movable joint together so they stay lined up when the joint moves.



- **Tendon:** A strong connective tissue at each end of a muscle that fastens that muscle to a bone, so when the muscle shortens it pulls the bone with it.
- **Epidermis:** The thin outer layer of the skin. It has no blood vessels or nerve cells, and its cells mature for about two weeks, die, and are then shed from the surface of the body.
- **Dermis:** The inner layer of the skin, lying just above a layer of fat. It holds the nerves, blood vessels, hair follicles, oil glands, and sweat glands, so it is the layer that senses touch and releases sweat to lower body temperature.

Materials Needed: (all links are included in this PDF)

- Bones, Muscles, and Skin Study Guide, printed one per student (<https://newpathworksheets.com/api/guide/study-guide-science-grade-8-bones-muscles-and-skin-1.pdf>)
- Practice Worksheet 0 — levels of organization, tissue types, homeostasis, stress and



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

group — for tracing the muscle-to-tendon-to-bone connection

- Hand lenses, one per pair, for examining hairs, pores, and surface ridges on a student's own forearm
- Digital surface thermometer for reading skin temperature before and after light activity

Lesson Procedure

Step 1: Introduction (8 minutes)



- Ask students: "When you wave good-bye you decide to move your arm, but you cannot decide how fast your heart beats — what is different about those two movements?"
- Have students press on the back of the hand, the upper arm, and the top of the head to feel hard bone, soft muscle, and the skin covering both, then list what each one is doing for them at that moment.
- State the claim the lesson will build evidence for: bones, muscles, and skin are separate subsystems, each built from groups of cells, and none of them can do its job alone.

Step 2: Direct Instruction (15 minutes)

- Build the sequence cell → tissue → organ → organ system on the board from the Study Guide's opening section, then name the four tissue types and what each does: connective connects and supports, nerve carries information to the brain, muscle contracts to move the body, and epithelial covers every inside and outside surface.

(<https://newpathworksheets.com/api/guide/study-guide-science-grade-8-bones-muscles-and-skin-1.pdf>)



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

can only shorten and pull, never push, so a second muscle must contract to return the first to its original length.

- Complete the Vocabulary matching sheet as a class; it supplies the definitions for joint, adrenaline, acne, cancer, and the axial versus appendicular skeleton.
- (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-bones-muscles-and-skin-1-1.pdf>)

Step 4: Independent Practice (13 minutes)



- Students complete Practice Worksheet 1 on their own: what the skeleton determines about body shape, the mineral that strengthens bone, marrow's job, the cartilage skeleton of a newborn, movable joints, ligaments, osteoporosis, and the three types of muscle tissue. (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-8-bones-muscles-and-skin-1-1.pdf>)
- Students examine their own forearm with a hand lens and sketch what they see — hairs coming out of follicles, pores, and surface ridges — then label which skin layer each structure sits in.
- Students finish Practice Worksheet 2 on tendons, smooth and cardiac muscle, how a muscle pair restores length, sweat glands and follicles, and how many main layers the skin actually has. (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-8-bones-muscles-and-skin-1-2.pdf>)

Step 5: Assessment (12 minutes)

- Give Practice Worksheet 0 as the graded check: order the levels of organization, identify which of four choices is not a tissue, state the job of epithelial tissue, define homeostasis



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

- Have students compare the ball-and-socket joint at the hip with the hinge joint at the knee, using the shape of the bone ends as evidence for why each joint allows a different range of motion.
- Challenge students to argue, in writing, how the bone, muscle, and skin subsystems each contribute when a person sprints on a hot day, naming the tissue type doing the work in each case.

For learners needing support:



- Give students a desk-sized labeled skeleton diagram marking the skull, vertebral column, rib cage, and limb bones so they can point to each bone as it is named instead of recalling it from memory.
- Pre-cut the pictures from the Vocabulary matching sheet and have students match picture to term first, then term to definition, so the reading load is split in two.

Extension Activities

- Soak a clean chicken leg bone in vinegar for three days, then compare how far it bends against an untreated bone, and connect the result to the calcium that gives bone its hardness and to osteoporosis.
- Build a working model of an arm from a cardboard hinge and two rubber bands so the class can see one muscle contract while its partner returns to its original length.
- Read skin temperature at the forehead, forearm, and fingertip before and after five minutes



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

[grade-8-bones-muscles-and-skin-1-1.pdf](#))

- Vocabulary PDF 2 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-bones-muscles-and-skin-1-2.pdf>)
- Vocabulary PDF 3 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-bones-muscles-and-skin-1-3.pdf>)
- Vocabulary PDF 4 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-bones-muscles-and-skin-1-4.pdf>)
- Vocabulary PDF 5 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-bones-muscles-and-skin-1-5.pdf>)



- Vocabulary PDF 6 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-bones-muscles-and-skin-1-6.pdf>)
- Vocabulary PDF 7 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-bones-muscles-and-skin-1-7.pdf>)



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet



BONES, MUSCLES AND SKIN

Human Body Is Organized into Systems

The human body works very smoothly carrying out its daily functions because it is organized. The human body has different levels of organization that consist of **cells** (the smallest), **tissues**, **organs**, and **organ systems** (the largest).

The cell is the basic building block of all living organisms. The adult human body contains trillions of cells. Tissues are the second level of organization.

Four Types of Tissue

Tissues are made of similar cells that serve a specific function. The human body is made up of four different types of tissue. They are



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

Connective tissue: This type of tissue connects the different parts of the body together. Bone is an example of this tissue type. It supports the body and protects the internal structures.

Nerve tissue: This type of tissue brings information from all parts of the body to the brain. The brain then sends a message back out to the body.

Muscle tissue: This type of tissue controls all of the movement of the body. Muscle tissue contracts, stretches, and shortens, which allows the body to move.

Epithelial tissue: This tissue covers all of the surfaces of the body, both inside and outside.

Organs

As we learned in Topic 14, an organ is a group of tissues that come together to perform a specific job that is more complex than each individual tissue's specific job. An organ system is many organs that work together.

What is homeostasis?

The body's tendency to maintain a balance internally is called **homeostasis**. Despite what is happening in the environment outside



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

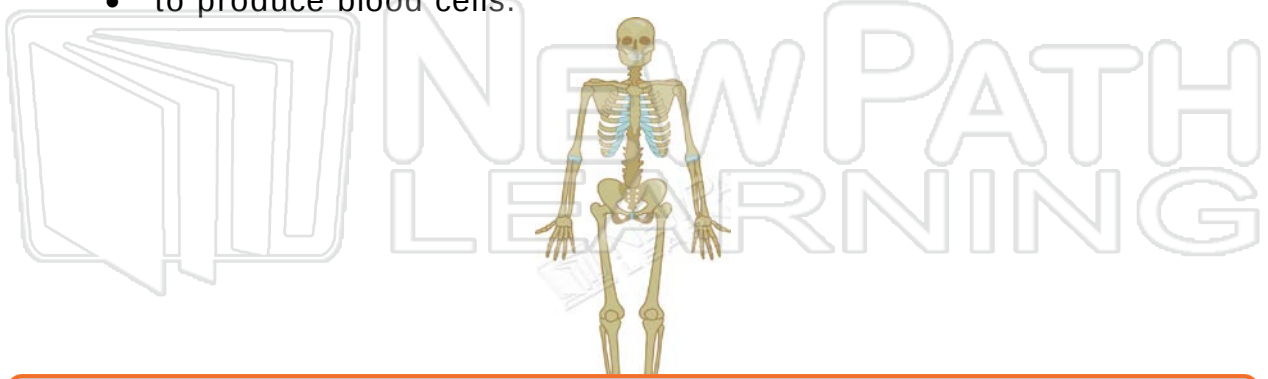
flight" response. The name is given because your body will make the decision to either fight the stressor or take flight or run from the stressor.

Let's review several of your body's organ systems.

The Skeletal System

There are five major functions of the skeletal system:

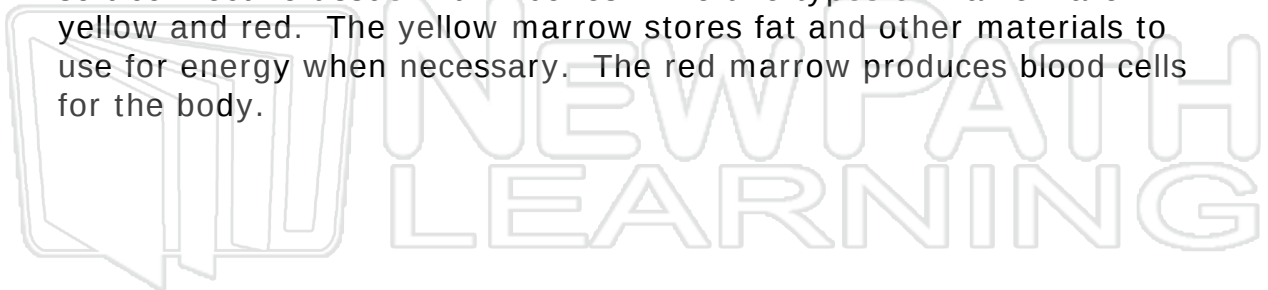
- to enable you to move around your environment,
- to protect internal organs,
- to support and provide shape,
- to store materials, and
- to produce blood cells.

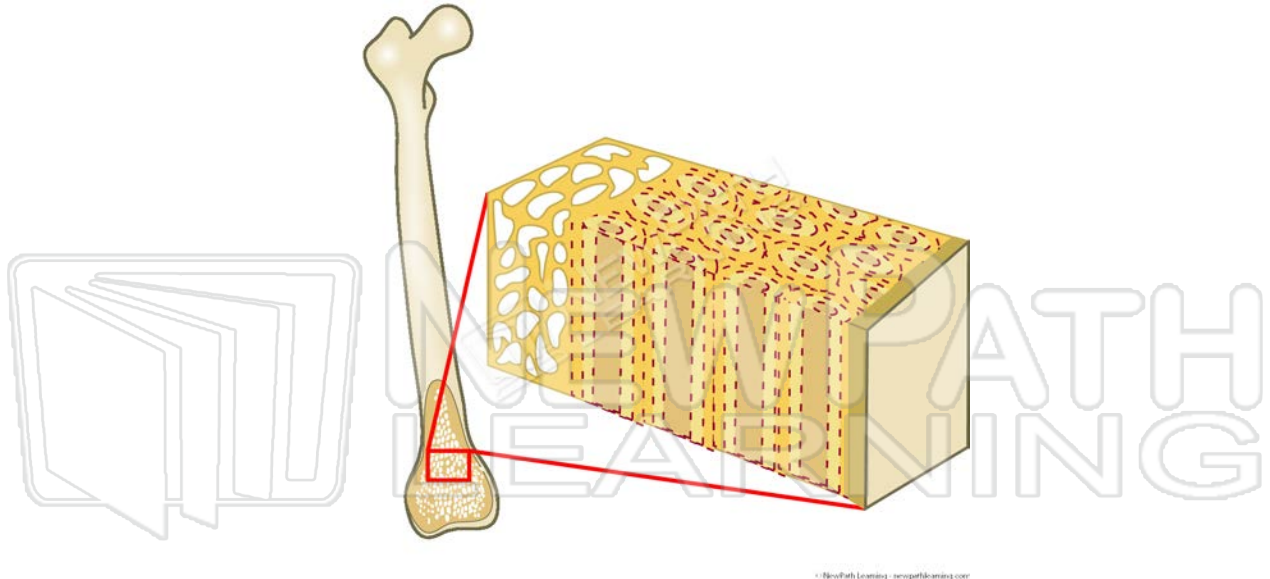


PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

bone. The spongy bone gives the bone its lightness and keeps the bone strong. The spaces within the bone are filled with **marrow**, a soft connective tissue within bones. The two types of marrow are yellow and red. The yellow marrow stores fat and other materials to use for energy when necessary. The red marrow produces blood cells for the body.





PREVIEW

Please [Sign In](#) or [Sign Up](#) to download
the printable version of this worksheet

pivot, and gliding joints. Connective tissues called **ligaments** hold together the bones in movable joints.

Immovable joints

Immovable joints are joints between bones that do not allow movement. Examples of immovable joints are the joints between the bones of the skull, which protect a part of the body that doesn't have movable parts.

Healthy bones

When a person becomes older, s/he begins to lose the minerals that are within the bones, a process known as **osteoporosis**. To keep your bones healthy and prevent osteoporosis, exercise regularly and eat a balanced diet.

The Muscular System

Have you ever waved good-bye to someone? Was the movement hard to control? The movement of waving good-bye is one that we have all completed numerous times. It is an easy movement to complete. Can you control how many times your heart beats per minute? This is an easy movement, but it is one that we cannot control.

Muscles that you are able to control are called **voluntary muscles**. Muscles that you are not able to control are called **involuntary muscles**.



PREVIEW

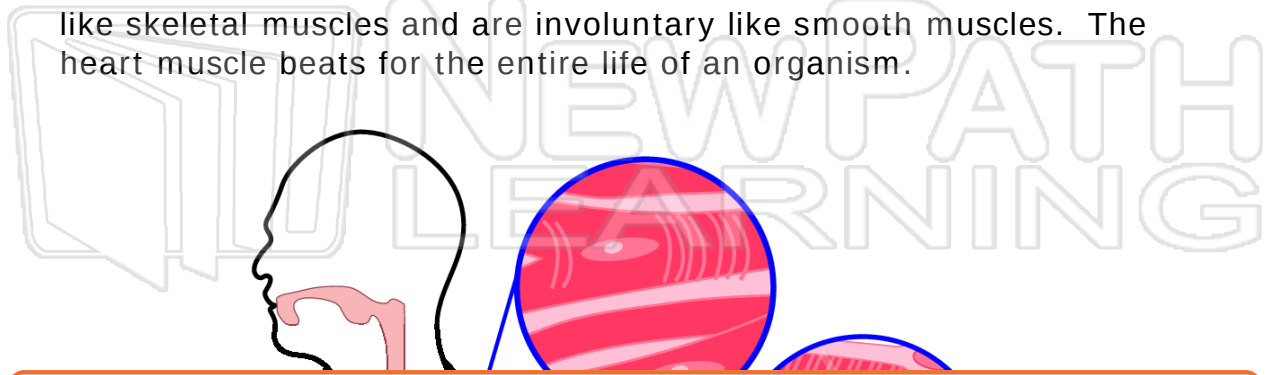
Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet



Skeletal muscles appear to banded, which is another word for striated. Skeletal muscle is sometimes called striated muscle because of the appearance of the cells.

Smooth muscle: These involuntary muscles are on the insides of internal organs. These muscles work automatically to control many functions of the body. Smooth muscles are not striated like skeletal muscles.

Cardiac muscle: This type of muscle has characteristics in common with both skeletal and smooth muscles. Cardiac muscles are striated like skeletal muscles and are involuntary like smooth muscles. The heart muscle beats for the entire life of an organism.



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

A skeletal muscle will contract when it receives information from the brain. Muscles will contract, but they will not extend. This means that for every muscle there is a muscle that does the opposite. Muscles work in pairs so that when one muscle contracts, the other in the pair will go back to its original length.

The Skin

The skin completes many important functions for the body and is the largest organ of the body.

The skin provides these functions to your body:

- covers the body,
- prevents water loss,
- gathers information from the environment,
- eliminates waste,
- protects the body from injury and infection,
- produces vitamin d, and
- regulates the body's temperature.

There are two main layers of the skin. They are the **dermis** and the **epidermis**.



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

- They will remain here for about two weeks until they are shed.



Keeping your skin healthy

The skin is a very important organ, so keeping it as healthy is very important. This can be done by:

- Keeping the skin clean and dry – **acne** is a bacterial infection of the skin that is very difficult to control.
- Wearing protection in the sun – without consistent protection from the sun's rays, it is possible to develop skin cancer. Cancer is a disease that causes cells to divide uncontrollably.
- Drinking plenty of water – replacing the liquid in your body while completing a demanding activity is important for sweating.
- Eating properly – a healthy diet is important for keeping the cells supplied without energy.



PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet



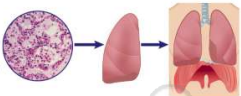


Name _____ Class _____ Date _____

1

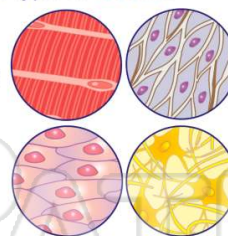
Which levels of the human body is correct from **smallest to largest**?

- A** organ, organ system, tissue, and cell
- B** organ system, organ, tissue, and cell
- C** cell, tissue, organ system, and organ
- D** cell, tissue, organ, and organ system

**2**

Which is **not** a type of **tissue**?

- A** epithelial
- B** connective
- C** epidermis
- D** nerve

**3**

What is the **function** of **epithelial** tissue?

- A** connects different parts of the body together
- B** covers all surfaces of the body
- C** controls the movement of the body
- D** brings information from the body

4

Homeostasis _____

- A** is internal balance
- B** are similar organ systems
- C** is a reaction to stress
- D** are the same alleles

**5**

PREVIEW

7

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

9

What **response** will you have if a growling dog is face to face with you and the dog is about to come after you?

- A** happy
- B** angry
- C** fight-or-flight
- D** fly away

**10**

Which is a major **function** of the **skeletal system**?

- A** store materials
- B** release adrenaline into your bloodstream
- C** allows you to sweat through pores
- D** breaks down food particles



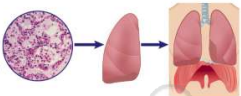


Name _____ Class _____ Date _____

1

Which levels of the human body is correct from **smallest to largest**?

- A organ, organ system, tissue, and cell
- B organ system, organ, tissue, and cell
- C cell, tissue, organ system, and organ
- D cell, tissue, organ, and organ system

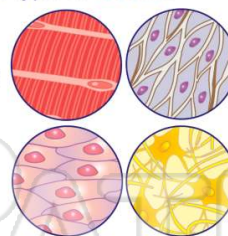


D

2

Which is **not** a type of **tissue**?

- A epithelial
- B connective
- C epidermis
- D nerve



C

3

What is the **function** of **epithelial** tissue?

- A connects different parts of the body together
- B covers all surfaces of the body
- C controls the movement of the body
- D brings information from the body

B

4

Homeostasis _____

- A is internal balance
- B are similar organ systems
- C is a reaction to stress
- D are the same alleles



A

5



D

PREVIEW

7

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

D

9

What **response** will you have if a growling dog is face to face with you and the dog is about to come after you?

- A happy
- B angry
- C fight-or-flight
- D fly away



C

10

Which is a major **function** of the **skeletal system**?

- A store materials
- B release adrenaline into your bloodstream
- C allows you to sweat through pores
- D breaks down food particles



A



Name _____ Class _____ Date _____

1

What does the **skeletal system** determine?

- A the types of bones you have
- B the shape of your body
- C how much you are able to sweat
- D which organs will work properly



2

Which **mineral** helps to strengthen bones?

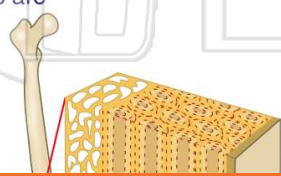
- A chloride
- B oxygen
- C iron
- D calcium



3

All bone cells are **dead cells**.

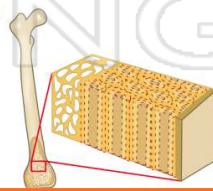
- A true
- B false



4

Which is a **function** of **marrow**?

- A breaks down calcium
- B makes bones flexible



5



PREVIEW

7

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

9

_____ muscles are **muscles** that you have **no control** over.

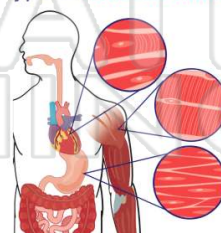
- A Voluntary
- B Immovable
- C Movable
- D Involuntary



10

Which is not a type of **muscle tissue**?

- A skeletal
- B connective
- C cardiac
- D smooth





Name _____ Class _____ Date _____

1

What does the **skeletal system** determine?

- A the types of bones you have
- B the shape of your body
- C how much you are able to sweat
- D which organs will work properly



B

2

Which **mineral** helps to strengthen bones?

- A chloride
- B oxygen
- C iron
- D calcium

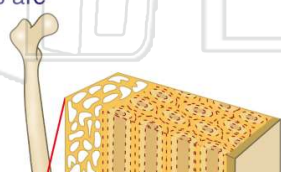


D

3

All bone cells are **dead cells**.

- A true
- B false

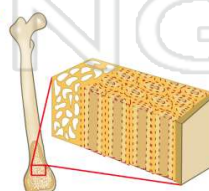


B

4

Which is a **function** of **marrow**?

- A breaks down calcium
- B makes bones flexible



C

5



C

PREVIEW

7

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

A

9

_____ muscles are **muscles** that you have **no control** over.

- A Voluntary
- B Immovable
- C Movable
- D Involuntary

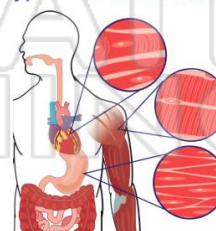


D

10

Which is not a type of **muscle tissue**?

- A skeletal
- B connective
- C cardiac
- D smooth



B

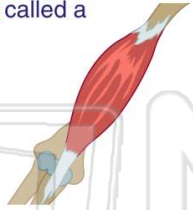


Name _____ Class _____ Date _____

1

At the end of each muscle is a **strong connective tissue** that attaches your muscles to bones called a _____.

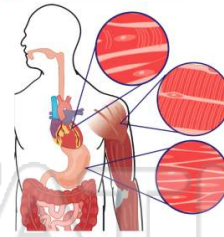
- A tendon
- B ligament
- C epithelial
- D cartilage



2

Smooth muscles are _____.

- A striated
- B voluntary
- C immovable
- D involuntary



3

What **structure** is an example of a **cardiac muscle**?

- A heart
- B brain
- C bicep
- D stomach



4

How do muscles get back to their **original length**?

- A by extending back
- B by another muscle contracting
- C the tendon pulls it back



5



PREVIEW

7

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

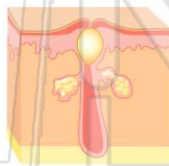
- D cool, warm



9

Acne is _____.

- A a disease of the skin
- B a bacterial infection of the skin
- C when cells divide uncontrollably
- D way of cleaning the skin



10

_____ is when cells **divide uncontrollably**.

- A A bacterial infection
- B Cell disease
- C Cancer
- D Acne



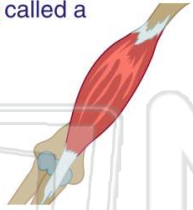


Name _____ Class _____ Date _____

1

At the end of each muscle is a **strong connective tissue** that attaches your muscles to bones called a _____.

- A tendon
- B ligament
- C epithelial
- D cartilage

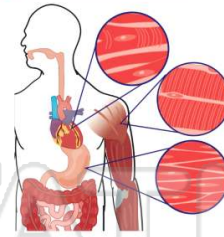


A

2

Smooth muscles are _____.

- A striated
- B voluntary
- C immovable
- D involuntary



D

3

What **structure** is an example of a **cardiac muscle**?

- A heart
- B brain
- C bicep
- D stomach



A

4

How do muscles get back to their **original length**?

- A by extending back
- B by another muscle contracting
- C the tendon pulls it back



B

5



B

PREVIEW

7

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

C

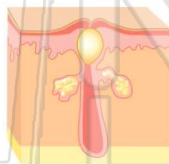
- D cool, warm



9

Acne is _____.

- A a disease of the skin
- B a bacterial infection of the skin
- C when cells divide uncontrollably
- D way of cleaning the skin



B

10

_____ is when cells **divide uncontrollably**.

- A A bacterial infection
- B Cell disease
- C Cancer
- D Acne



C



Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Antigen

Cancer

Axial skeleton

Appendicular skeleton

Antibodies

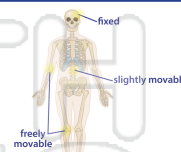
Acne

Adrenaline

Joint

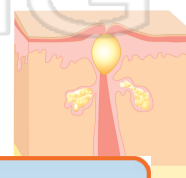
1. bones to bend or move

- a spot between two bones that allows the



2. difficult to control

- a bacterial infection of the skin that is very



3. of ene



4. that at

5. recogni

6. found

PREVIEW

Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet

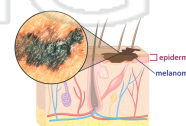
7. skeleton that consists of the skull, backbone (vertebrae) and rib cage

- the central, anchoring part of the bony



8. uncontrollably

- a disease that causes cells to divide





Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Antigen

Cancer

Axial skeleton

Appendicular skeleton

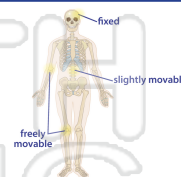
Antibodies

Acne

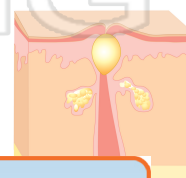
Adrenaline

Joint

1. **joint** - a spot between two bones that allows the bones to bend or move



2. **acne** - a bacterial infection of the skin that is very difficult to control



3. **adrenaline** causes



4. **antibodies** to an antigen

5. **antibodies** body cells

6. **appendicular skeleton** found in the arms and legs

7. **axial skeleton** - the central, anchoring part of the bony skeleton that consists of the skull, backbone (vertebrae) and rib cage



8. **cancer** - a disease that causes cells to divide uncontrollably

