UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

المدرسة الإماراتية

Inspire Science


LESSON 1
Levels of Organization

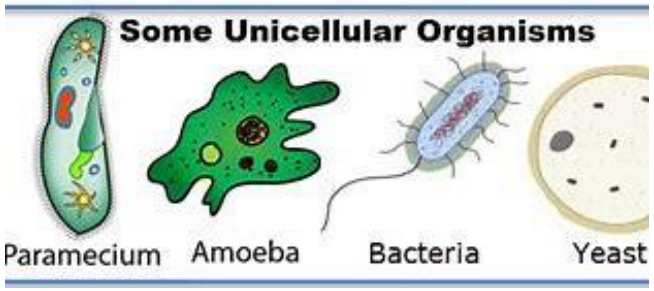
Explain the relationship between structure and function of cell, tissues, organs and organ system

Keywords:

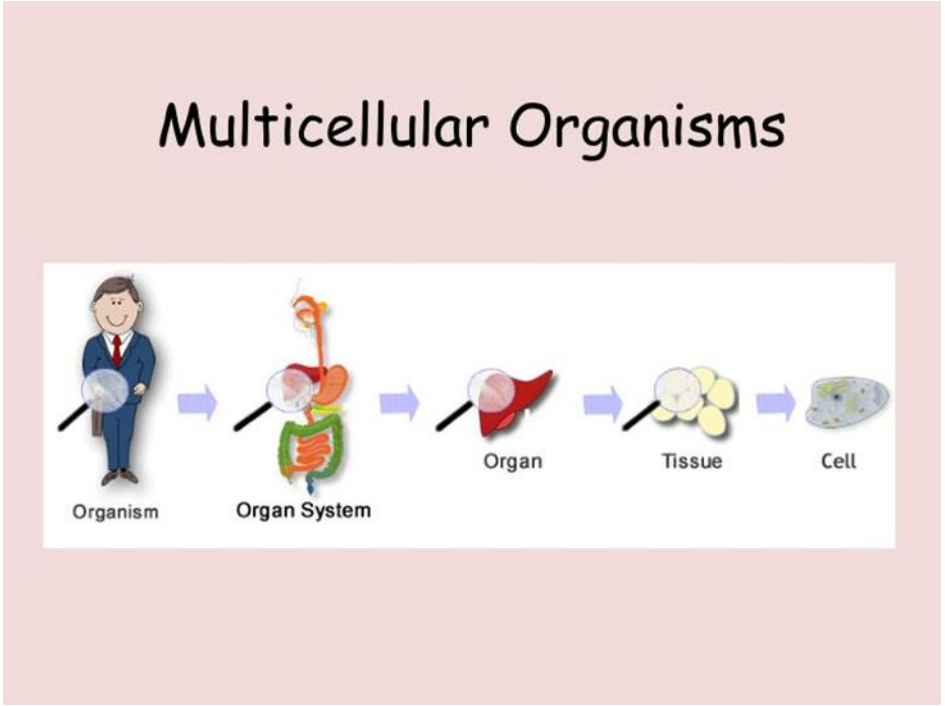
1.Cells

Cells *are smallest unit of living things that carries on the functions of life.*

2.Unicellular Organisms

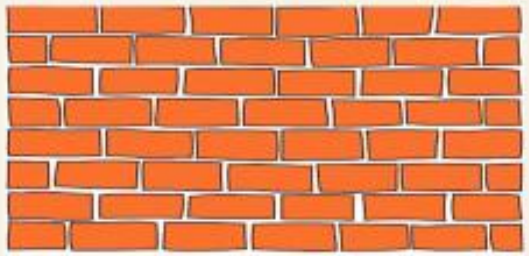


3.Multi-cellular Organisms



Starter

Look at the picture and tell me what do you see in the picture?



What are the building blocks of wall?

- bricks

What are plants and animals made of???

cells

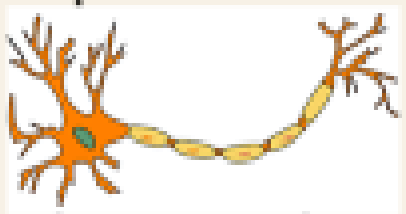
What are cells?

- A cell is the very smallest unit of **living** organism.
- Like brick are the building blocks of houses
- Cells are the building blocks of plants and animals

Why is microscope needed to view most cells?

What are cells?

- Amazingly, the human body has 100 trillion cells!
- Your little toe, it has 2 to 3 thousand million cells! So, cells are very small.
- There are many different kinds of cells, doing many different jobs in a plant or animal.
- Cells come in different sizes and shapes.
- Nerve cells are long and slender.



- Many female reproductive cells are large and round.

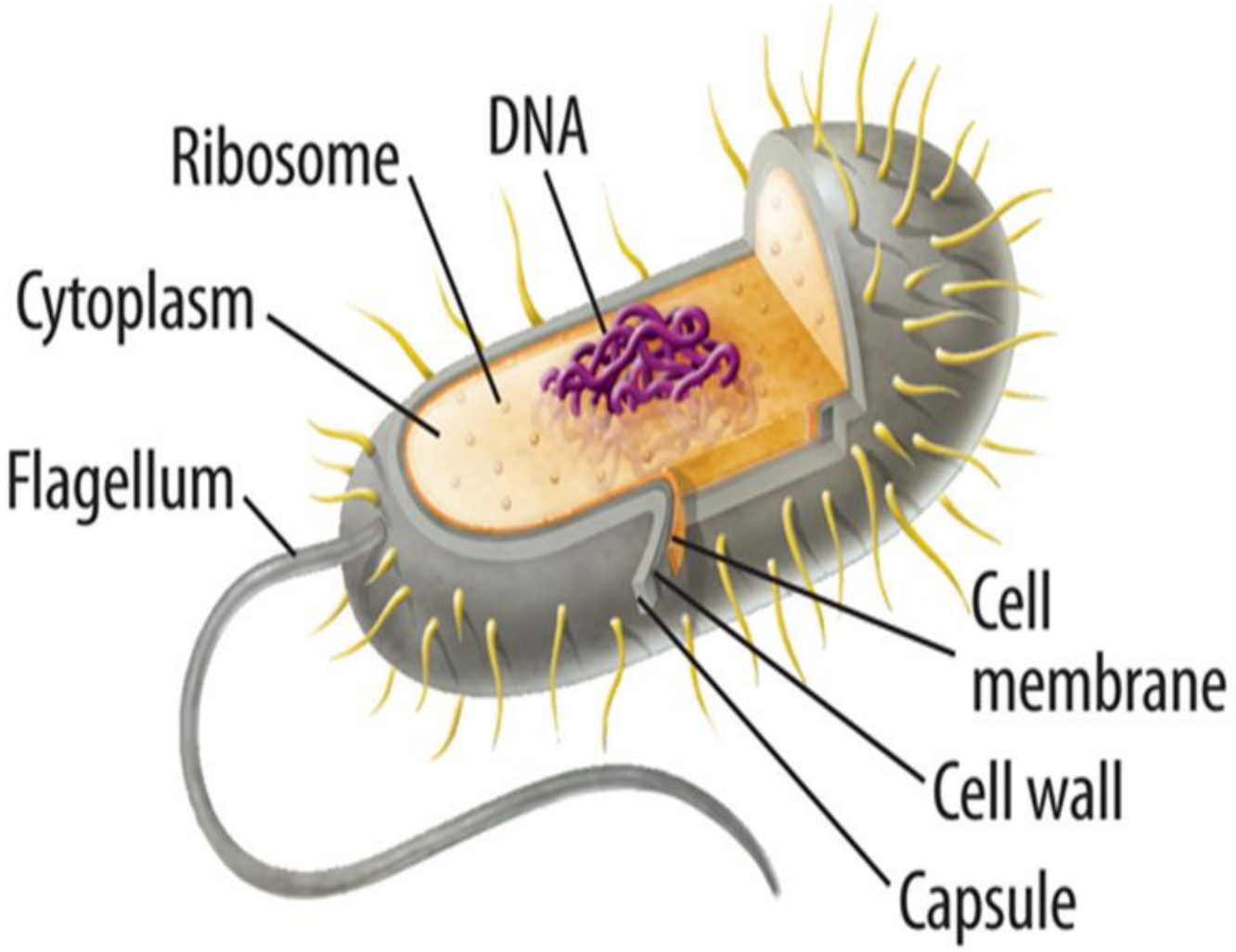
Activity:
Watch edpuzzle video

What is a cell?

https://www.youtube.com/watch?v=M1wdIdCOk-Y

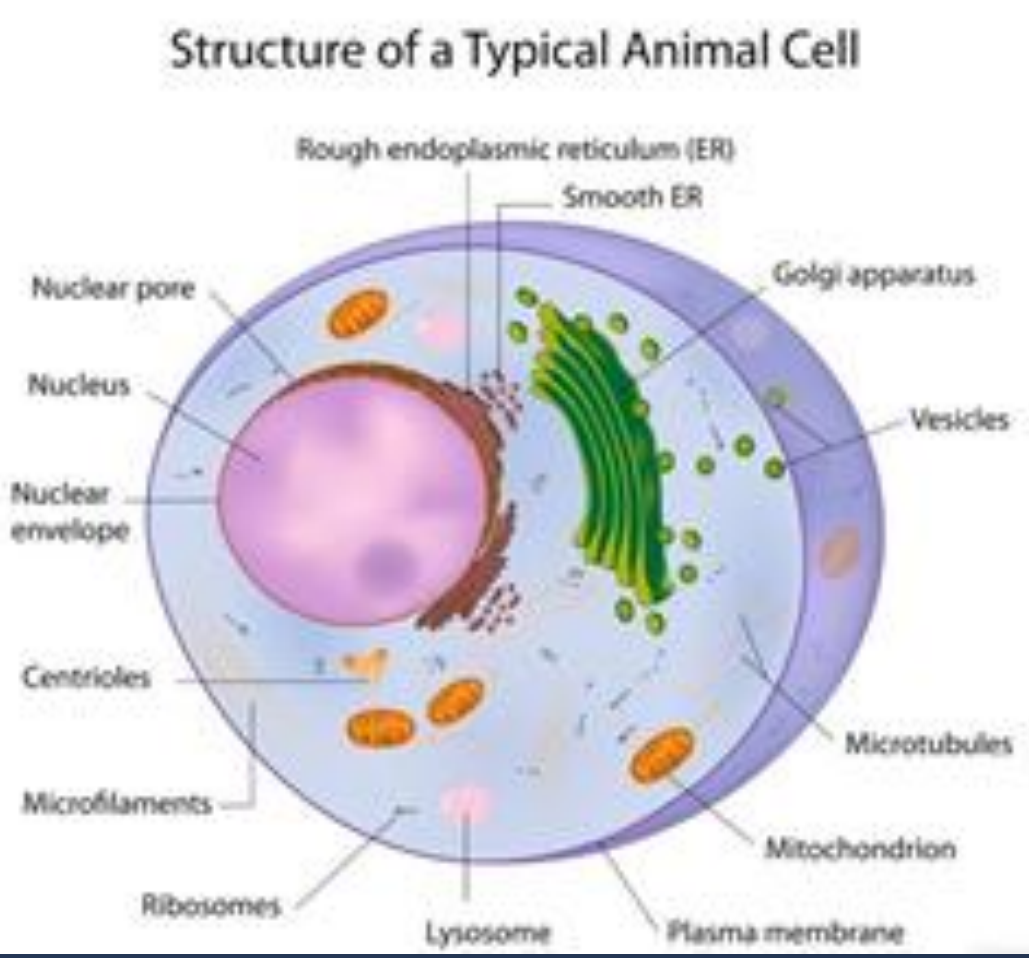
Recap

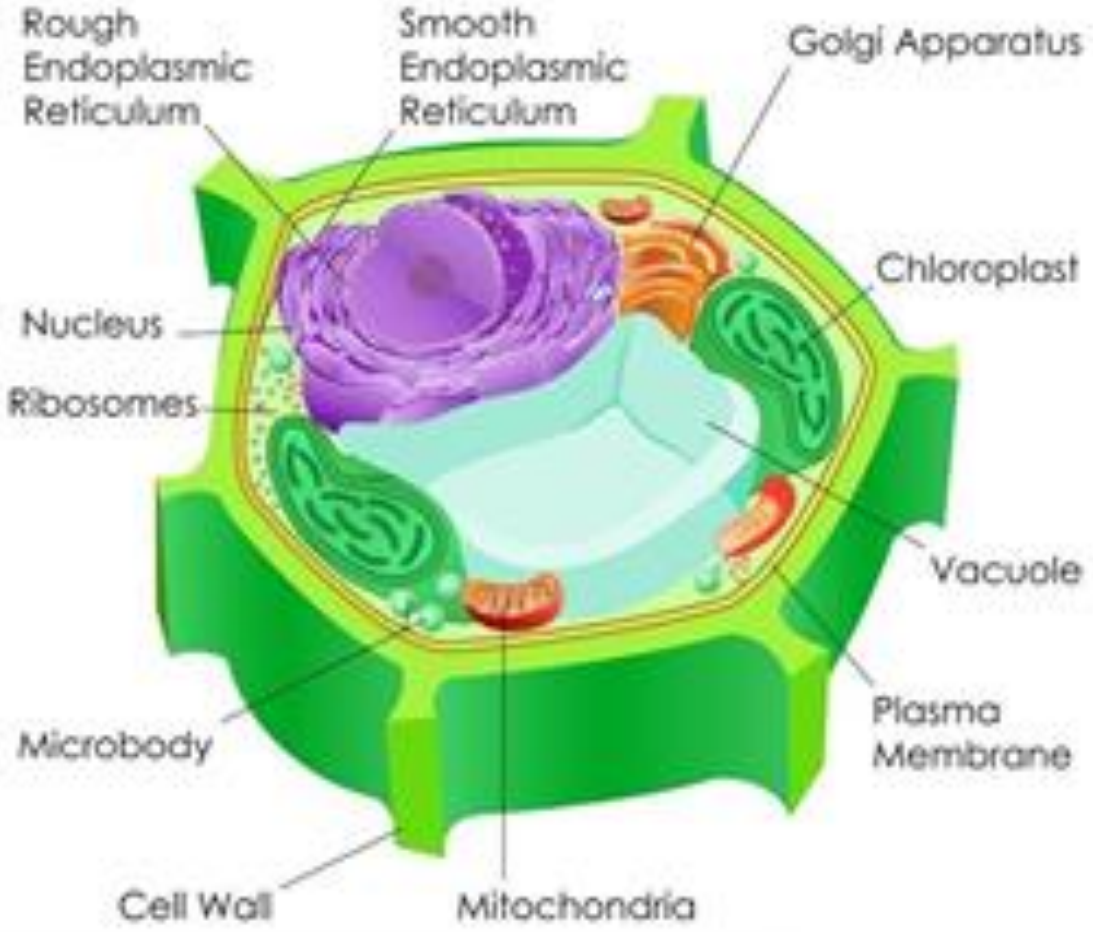
Look at the picture:
Name the type of cell.
What is missing in the cell?



Prokaryotic cell , It doesn’t have Nucleus

The Cell Structure



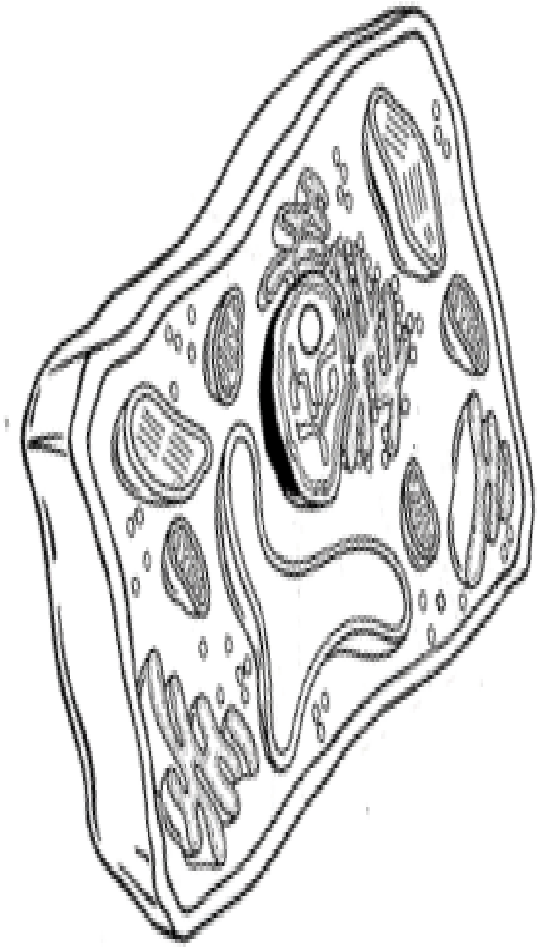


Cell Organelles

Word Search

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

- chloroplast
- cytoplasm
- endoplastic
- golgi
- lysosome
- membrane
- mitochondria
- nucleus
- reticulum
- ribosomes
- rough
- smooth
- vacuole
- wall



1.Recap-Why is cell called as the basic unit of cell

2.Illustrate different levels of organization

3. Explain how cells and tissues are organized in our body

Why are cells called as building blocks of life??

- The cell is our most essential body forming unit. Each organ in our body is made of cells. Cells divide and multiply to form new organs and gametes too.
- The cell is called the structural and functional unit of life as all living organisms are made up of cells.
- Cells are also essential for performing various life processes required for sustaining life.
- Furthermore, cells provide form and structure, process nutrients and convert them into useable energy.
- Multicellular organisms have specialized cells that perform specific functions.

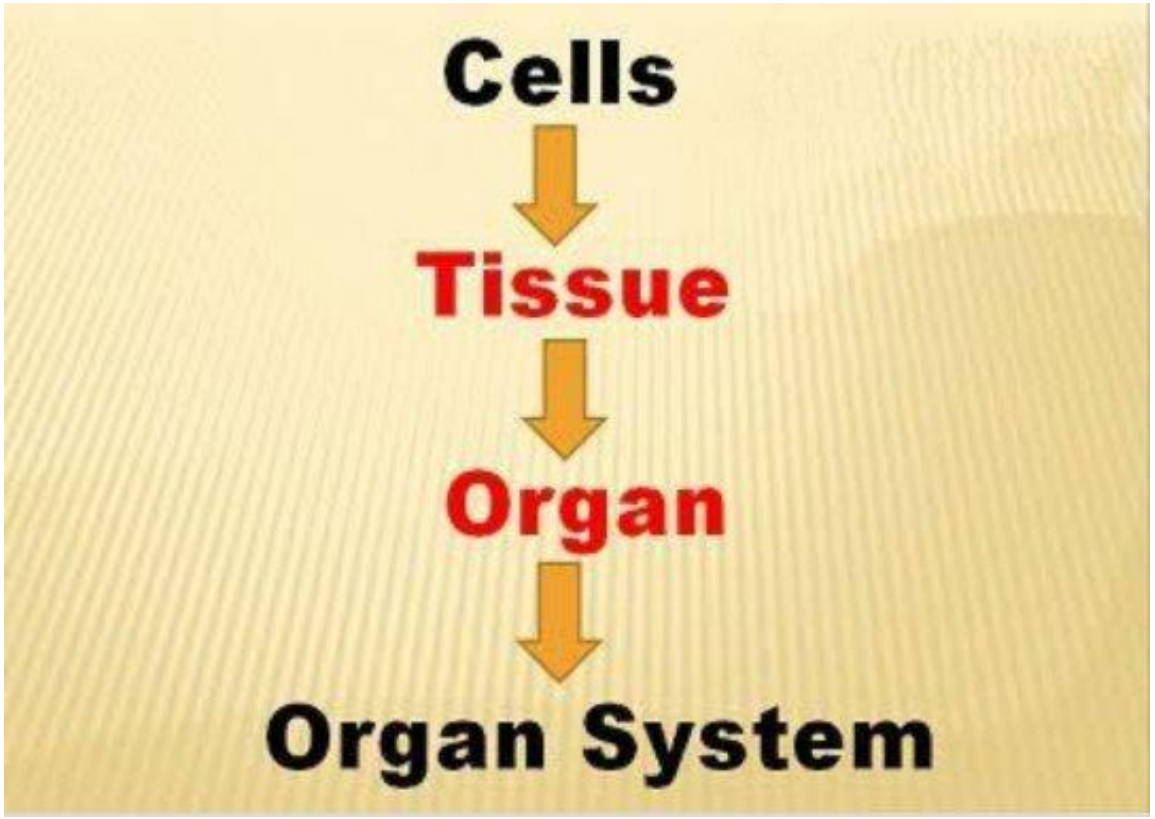
ENCOUNTER
THE PHENOMENON

How are your cells organized to make up your body?

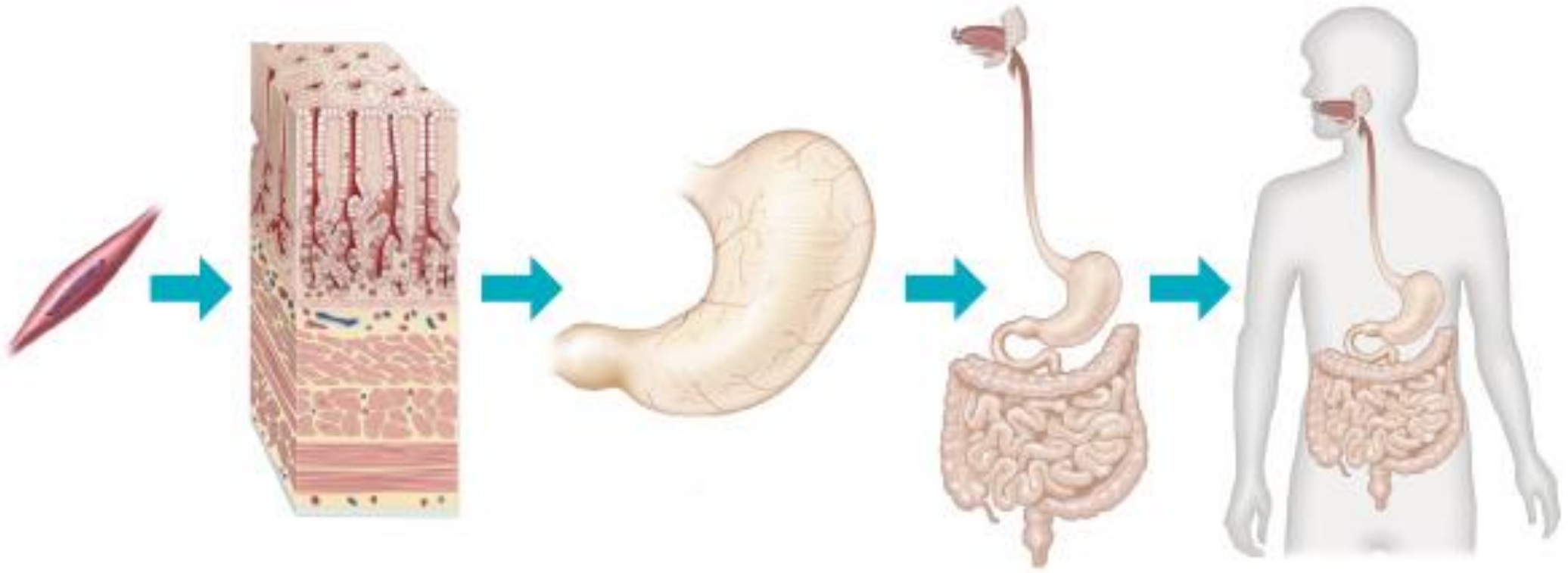
The cells in the photo appear to be grouped together. Pointillism is a style of painting in which many tiny dots are grouped in ways to form an image. How might this be similar to the way your body is organized?

Scientists estimate there are 37.2 trillion cells in your body. All of those cells are organized in a way that enables your body to function. With a partner, use markers or colored pencils to create a basic piece of pointillism art. Then explain how this style of art might be similar to the way the cells in your body are organized.

Cells are the structural and functional units of life



Levels of organization

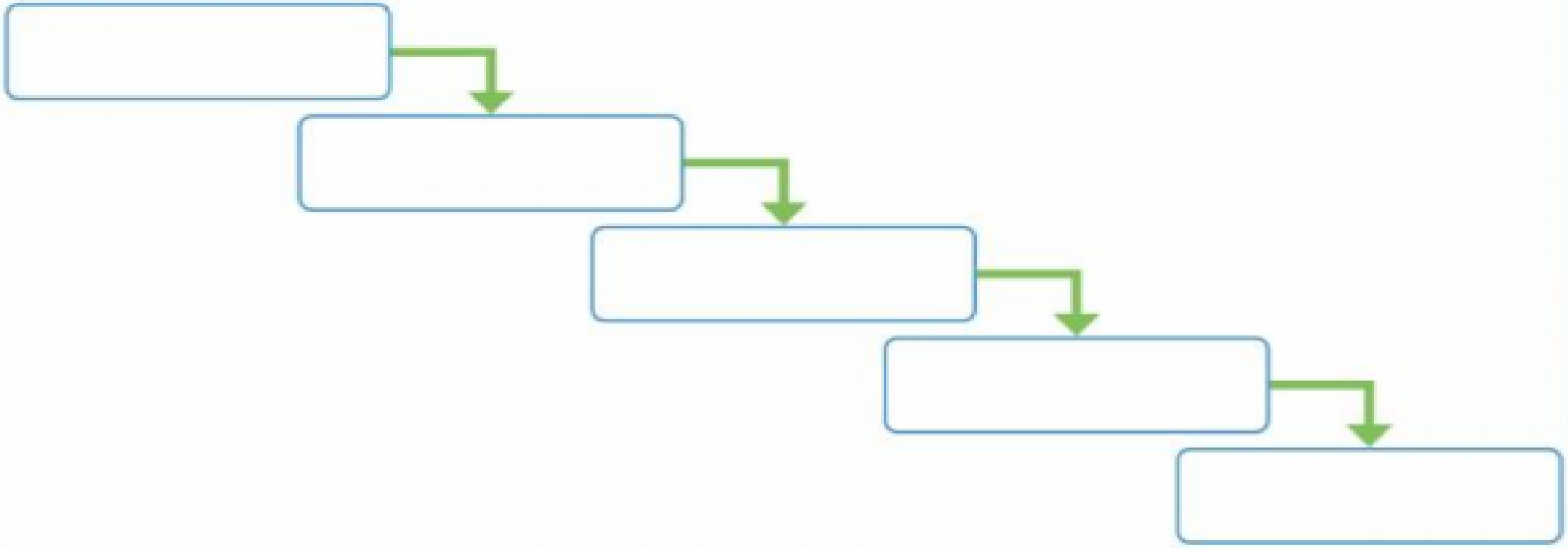


Watch the video assigned in edpuzzle and complete the classkick activity on slide-1

- https://edpuzzle.com/media/6128f2ed9bd2bf415b3e421a

Class kick activity-1

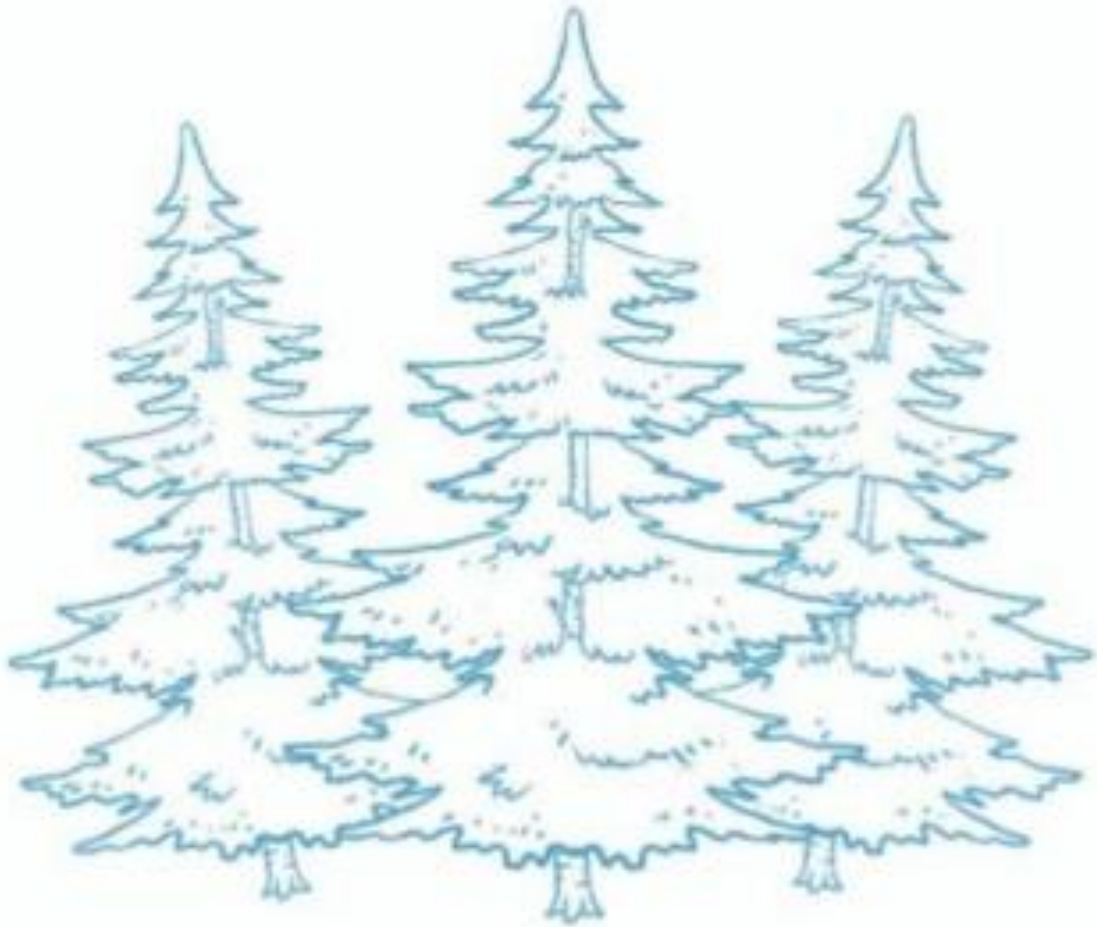
Draw a graphic organizer like the one below in your Science Notebook. Fill in the path of organization from a cell to the organism.



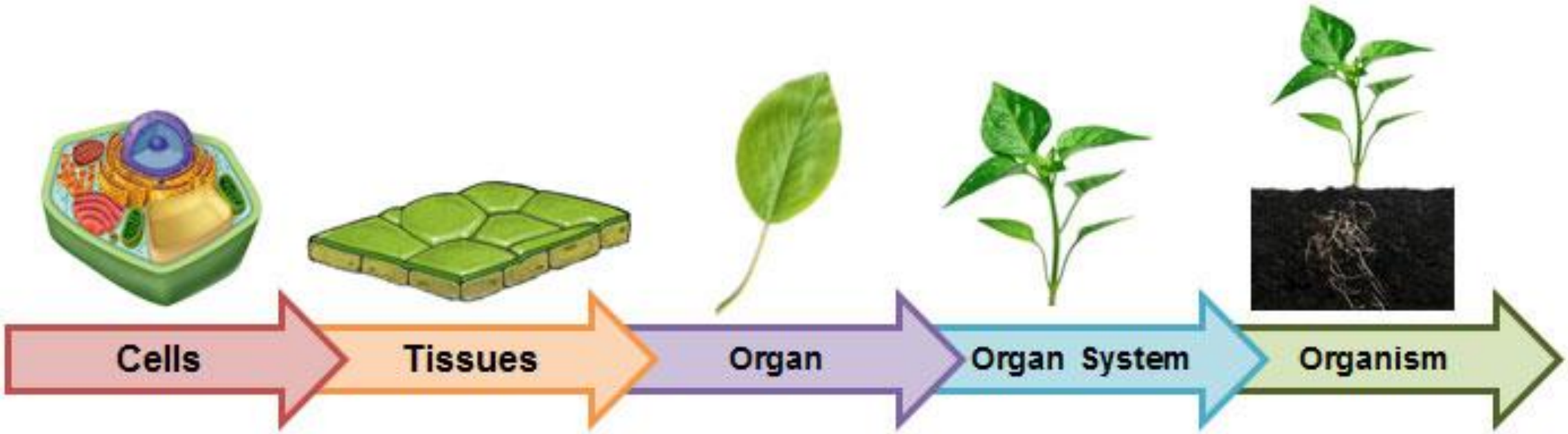
How is this organization similar in plant bodies? How is it different?

Activity:2

Recognize levels of organization in plants. In your Science Notebook, draw and label the levels of organization in a tree.



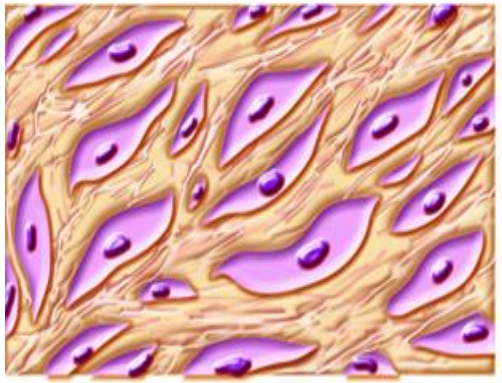
Class kick activity:
Can you write the levels of organization of a tree???



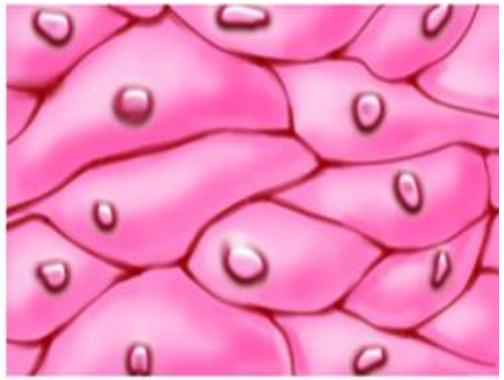
Knowledge check

- Which organ system helps you to move?
- Muscular and skeletal system
- Which organ system helps to provide nutrition to your body?
- Digestive system

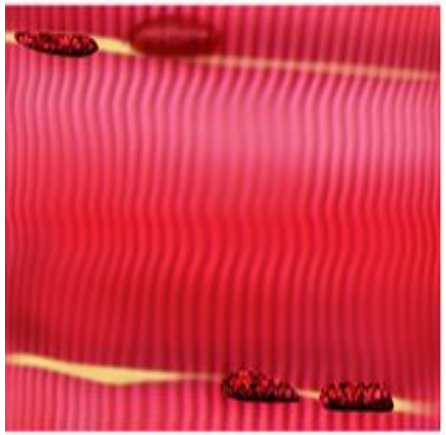
Keywords:



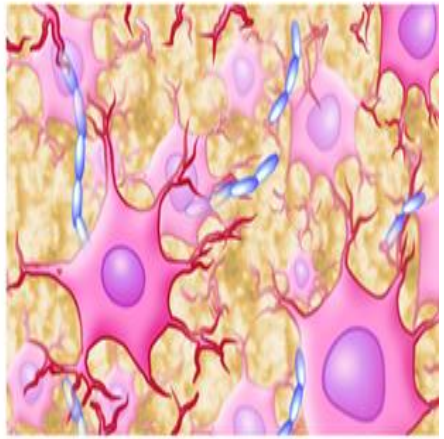
Connective tissue



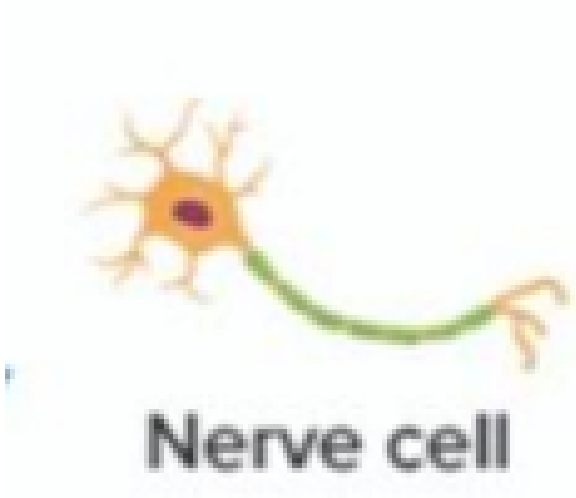
Epithelial tissue



Muscle tissue



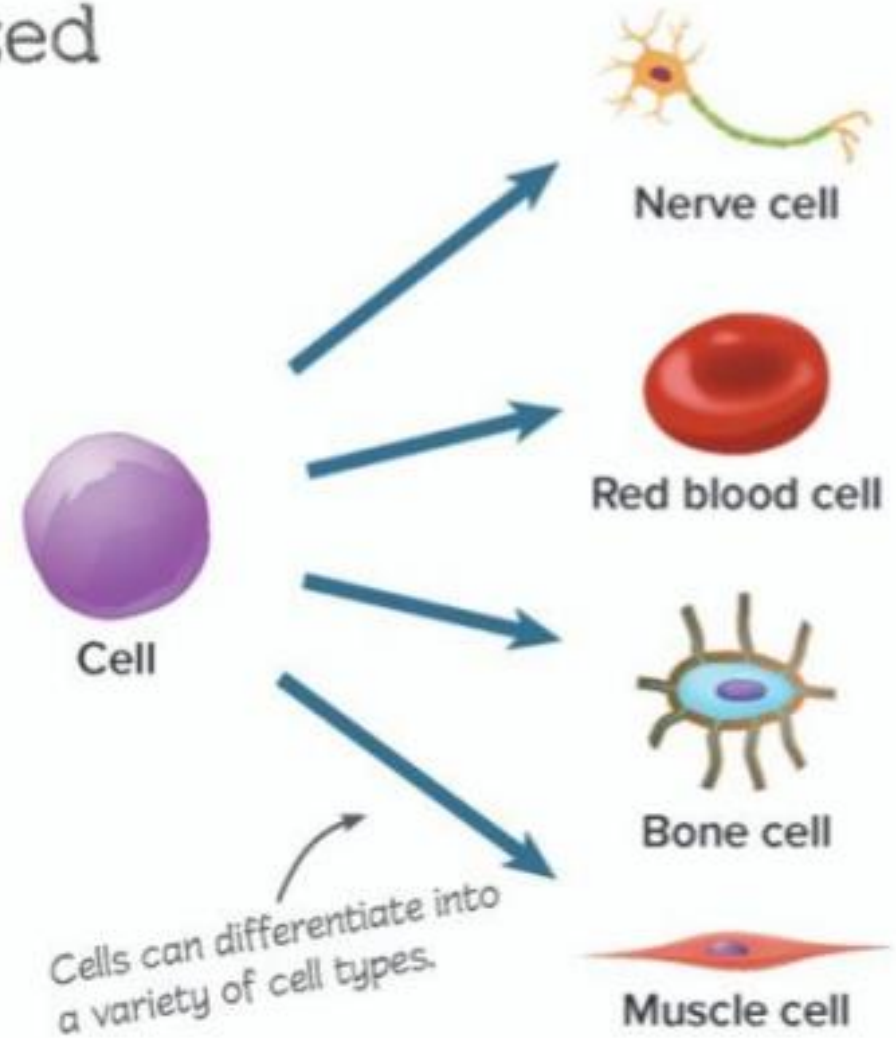
Nervous tissue



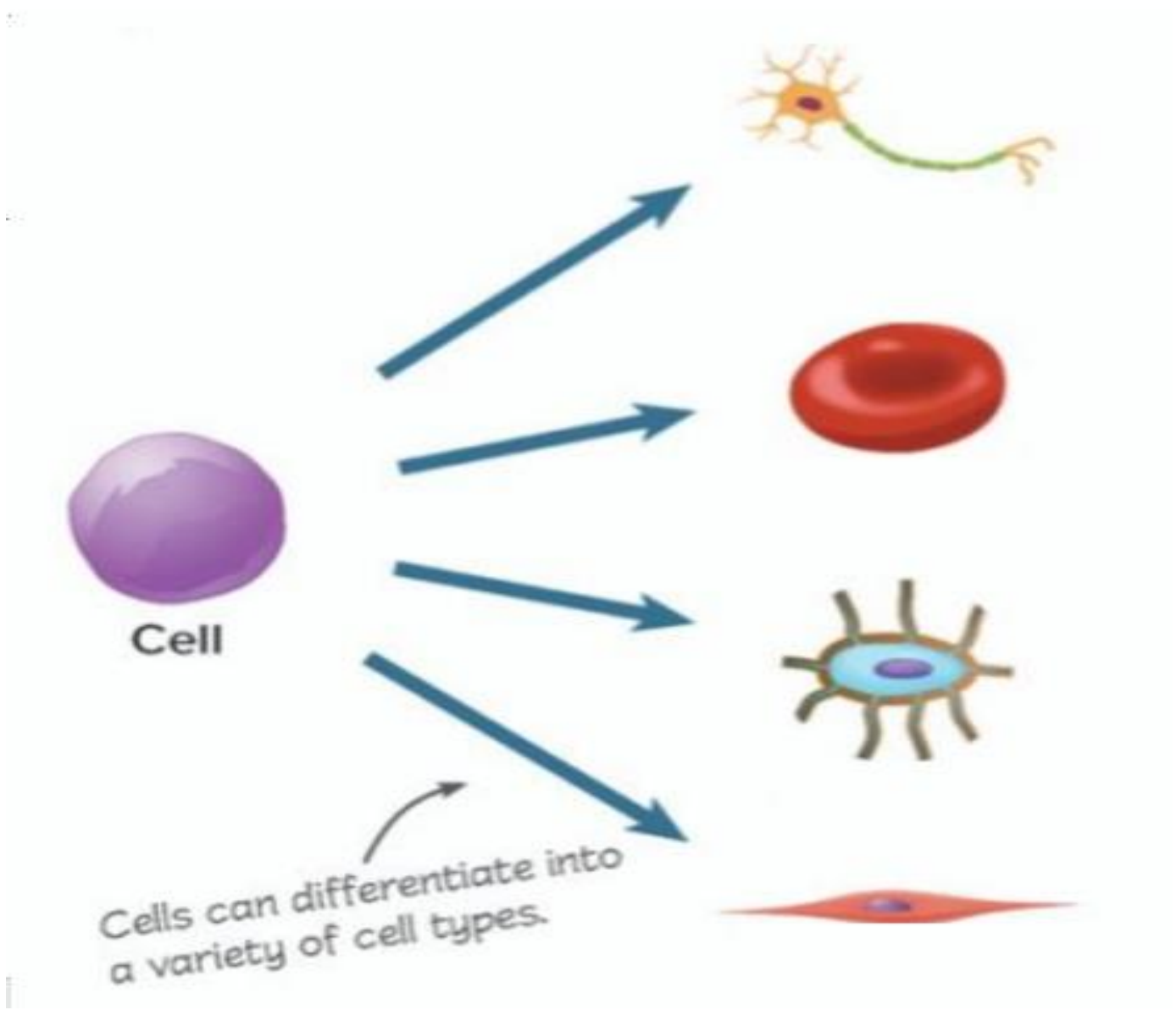
How are cells organized in the body?

Organisms can be unicellular—made of one cell, or multicellular—made of more than one cell. You've learned that your own body has trillions of cells! Multicellular organisms have different types of cells that each perform a specific job.

As multicellular organisms grow, cells divide to produce new cells. The first cells made can become any type of cell, such as a muscle cell, a nerve cell, or a blood cell, through the process of **cell differentiation.** As the number of cells in an organism increases, similar types of cells are organized into groups.



- Activity-classkick



1. Nerve cell

2, Red blood cell

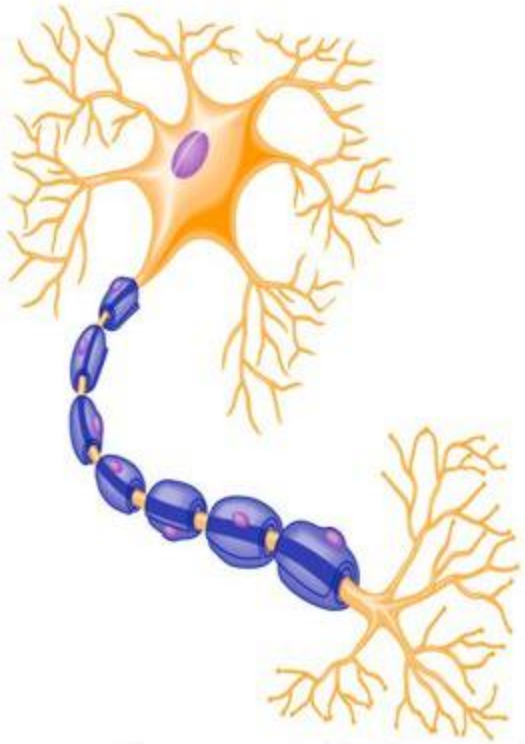
3. Bone cell

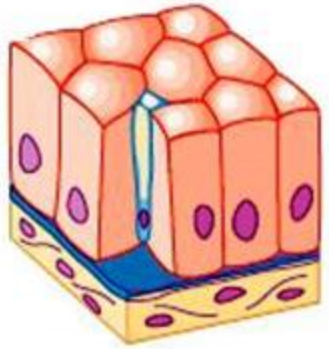
4. Muscle cell

What happens when cells get together?????

- They form a tissue

The Tissue Level of Organization

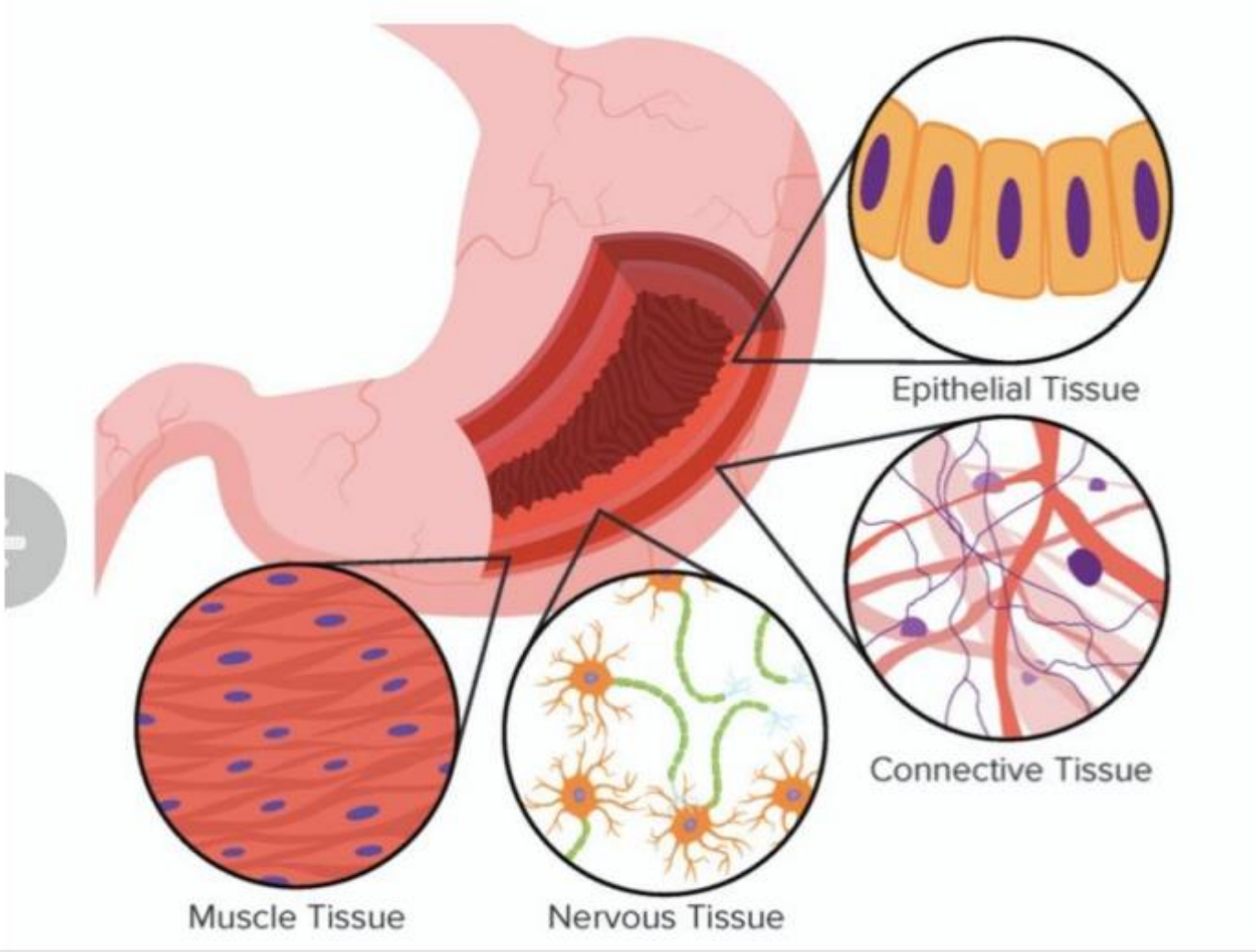




What is a tissue????

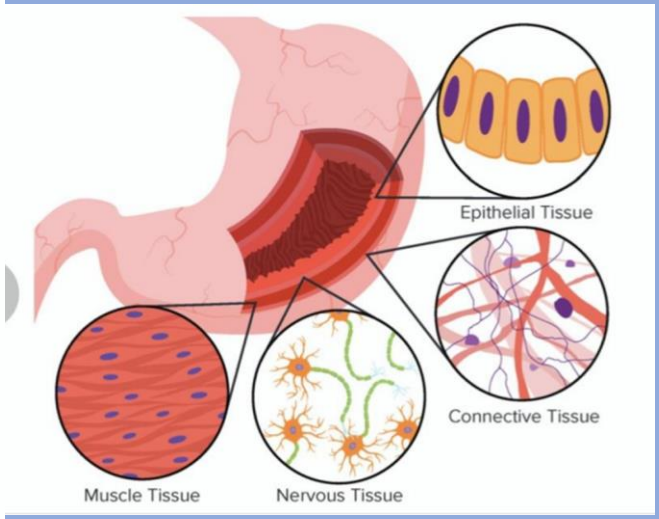
- Tissues are groups of similar types of cells that work together to carry out specific tasks.
- Do you think all organs of the body has same type of tissue????

Different types of tissues make an organ which work together to carry out the same task

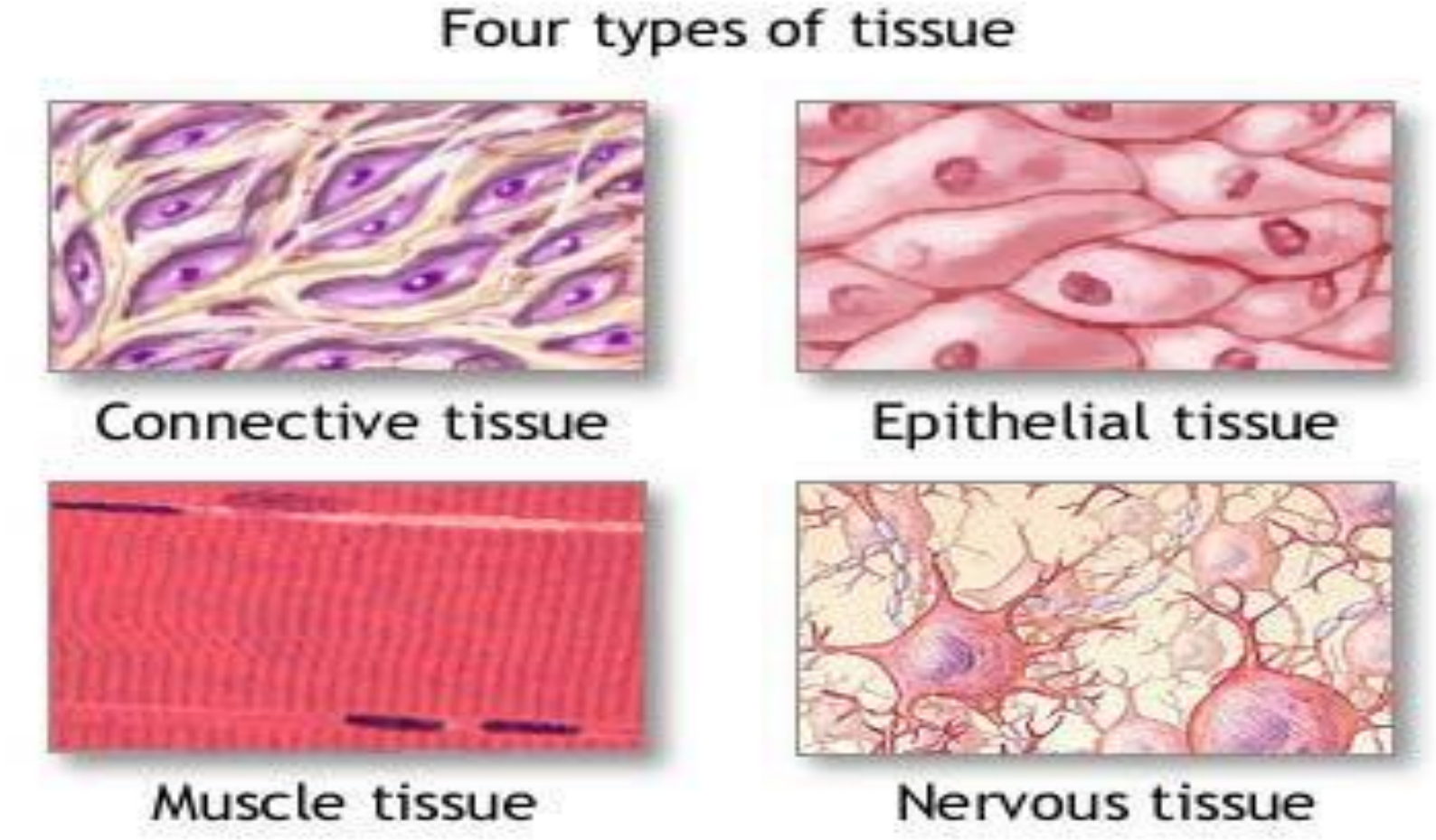


How are tissues organized in the body?

Organs Complex jobs in organisms require more than one type of tissue. **Organs** are groups of different tissues working together to perform a particular job. For example, your stomach, shown in the image below, is an organ specialized for breaking down food. It is made of all four types of tissue: muscle, epithelial, nervous, and connective. Each type of tissue performs a specific function necessary for the stomach to work properly. Layers of muscle tissue contract and break up pieces of food, epithelial tissue lines the stomach, nervous tissue sends signals to indicate the stomach is full, and connective tissue supports the stomach wall.



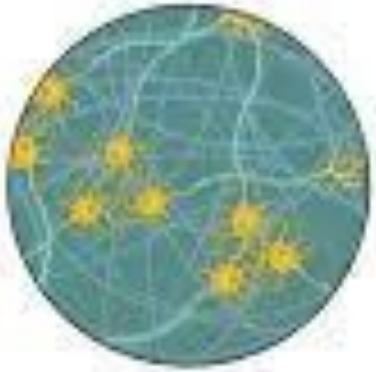
Types of tissue



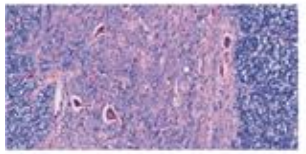
Epithelial tissue covers the body surface and lines body cavities.

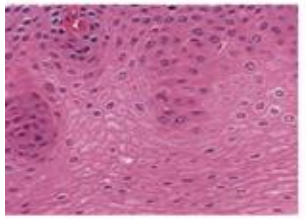
Connective tissue supports and protects organs.

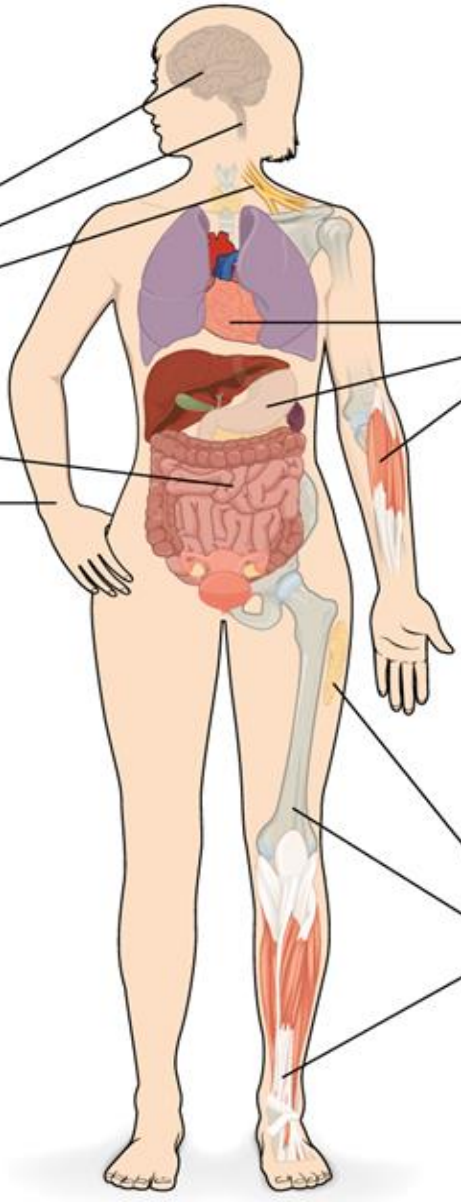
Muscle tissue generates force to allow movement.

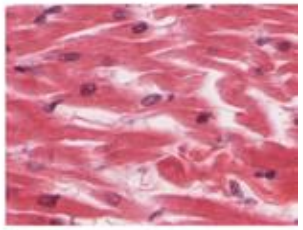


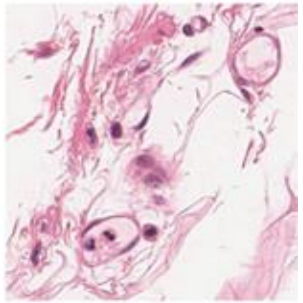
Nervous tissue uses electrical signals for communication.









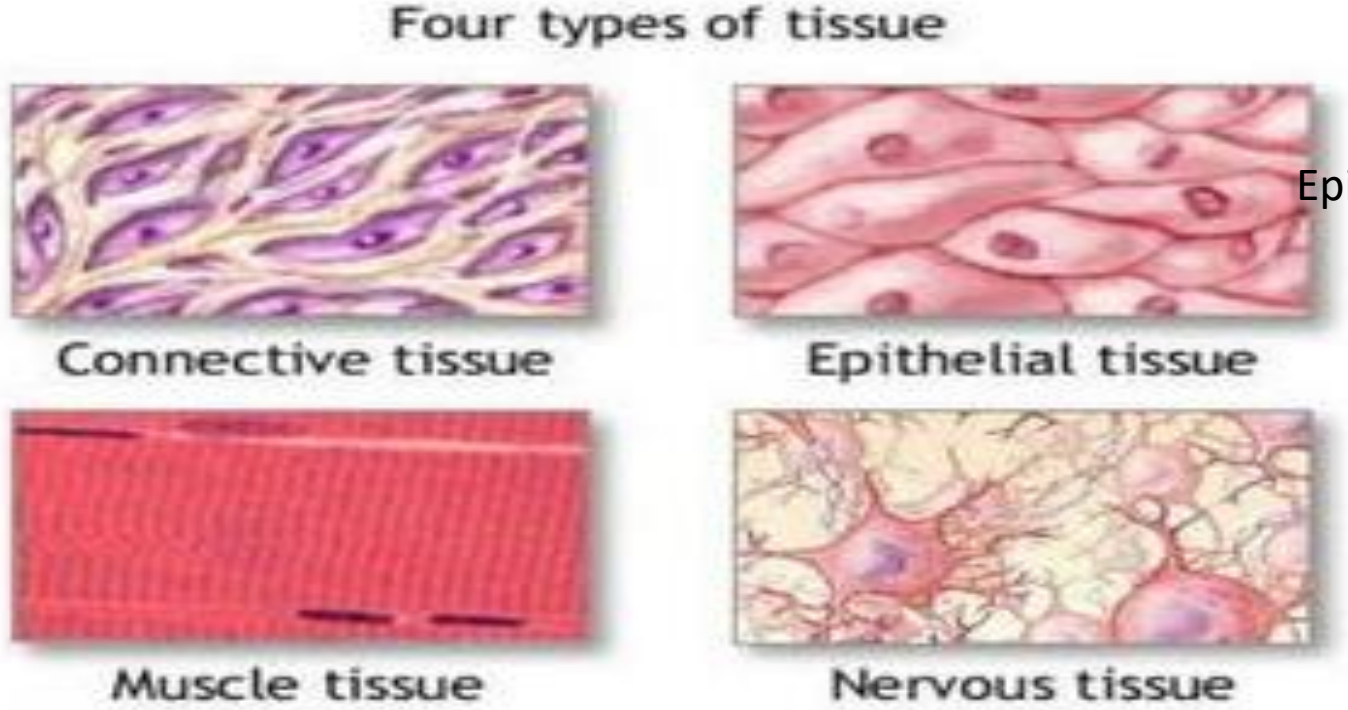


Muscle tissue
Cardiac muscle
Smooth muscle
Skeletal muscle

Connective tissue
Fat and other soft padding tissue
Bone
Tendon

Tissue- & its function


Gen Bio
Youtube Channel
ANIMAL
TISSUES



Epi-the-lial

ADAM.

Epithelial tissue makes up the linings of organs and forms glands

Examples include the surface of the skin, the lining of the mouth, the lining of the stomach, the thyroid gland, the pancreas, etc

Connective tissue is used to connect one thing to another. It is also used to support, cushion, and insulate

Examples include bone, cartilage, tendons, fat, etc.

Nervous tissue makes up the brain and nerves. It allows different parts of the body to communicate.

Muscle tissue is designed for contraction. When a muscle contracts, it causes movement.

Activity time!!!!- 5 mins

- https://quizizz.com/join?gc=36776246

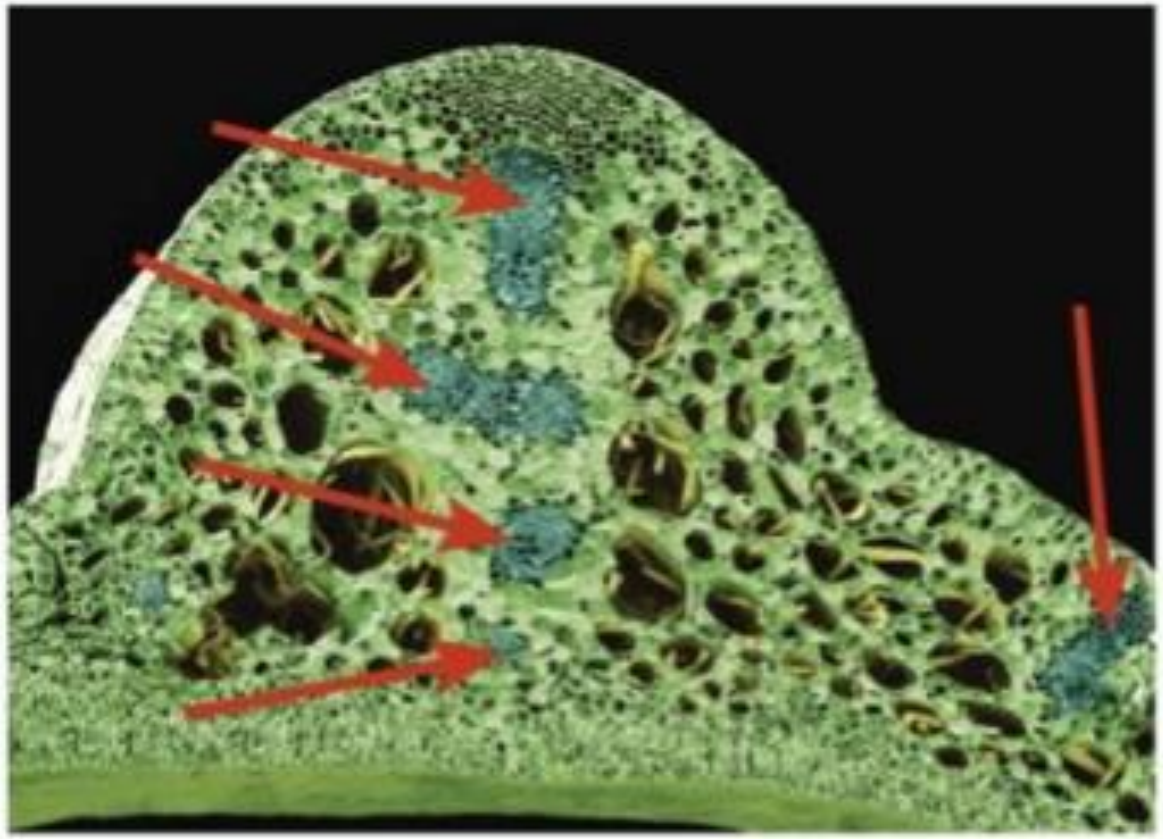
1.Identify plant tissues and state its function

2.List out organ systems

3.Explain how organ systems work together to carry out specific tasks in multicellular organisms

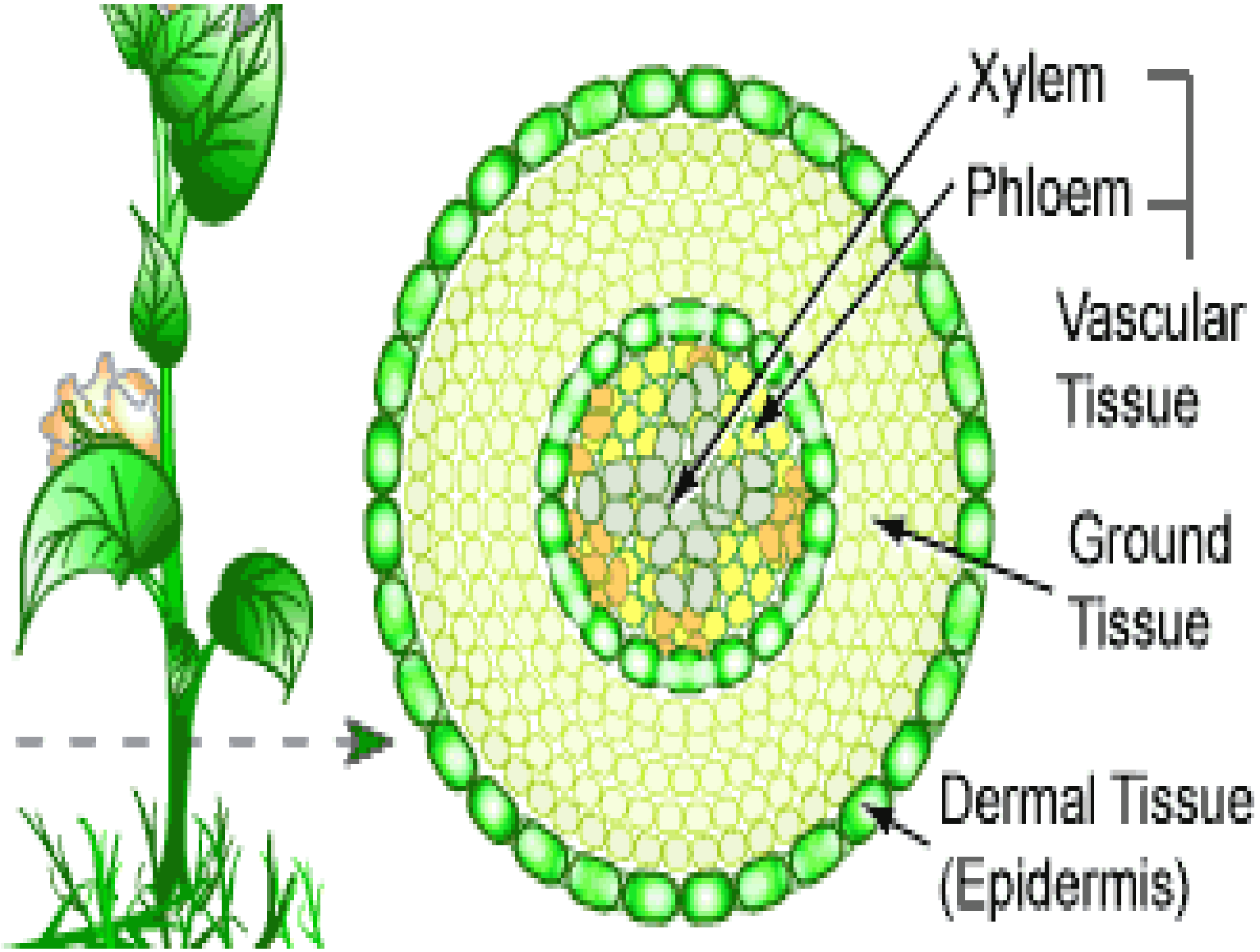
Do plants have tissues???

Plants also have different types of tissues. The three main types of plant tissue are dermal, vascular (VAS kyuh lur), and ground tissue. Dermal tissue provides protection and helps reduce water loss. Vascular tissue, shown in the photo to the right, transports water and nutrients from one part of a plant to another. Ground tissue provides storage and support and is where photosynthesis takes place.



Plant vascular tissue, indicated by arrows, moves water and nutrients throughout a plant.

Plant Tissues



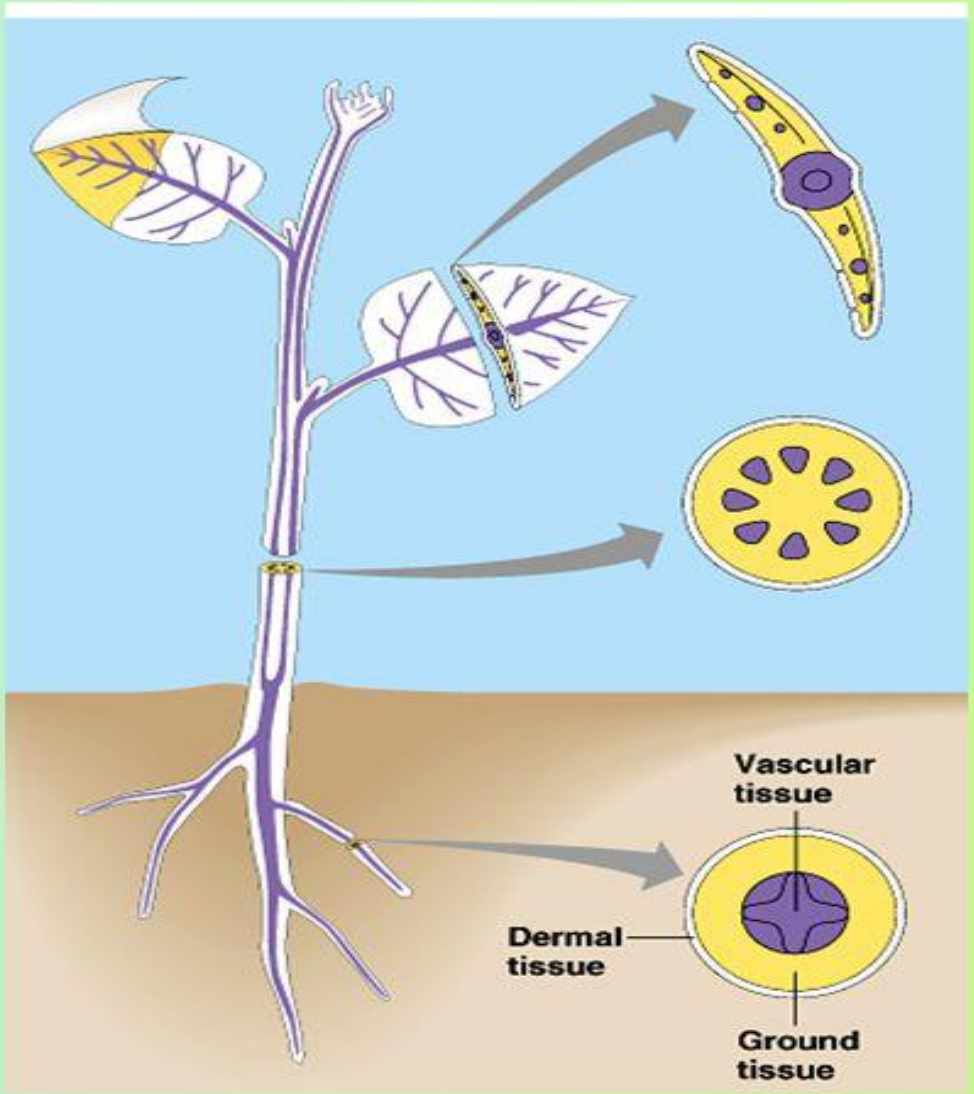
-Vascular tissue transports water and nutrients from part of the plant to another

-Ground tissue provides storage and support to the plant, it is where photosynthesis takes place.

-Dermal tissue – It provides protection and helps reduce water loss

Plant TISSUES

- Dermal
  - epidermis ("skin" of plant)
  - single layer of tightly packed cells that covers & protects plant
- Ground
  - bulk of plant tissue
  - photosynthetic mesophyll, storage
- Vascular
  - transport system in shoots & roots
  - xylem & phloem



Match the plant tissue with its function:

- 1. Dermal — A. Transports water and nutrients from one part to another
- 2. Ground — B. Reduces water loss
- 3. Vascular — C. where photosynthesis takes place

How are organs organized in the body???

1,Which organs work together to make John run??

2,Which level of organization it is??

3.The similar organs which are working together to make him run , form which organ system of the body???

How are organs organized in the body???

1,Which organs work together to make John run??

Muscles, bones, joints

2,Which level of organization it is??

Organ system

3.The similar organs which are working together to make him run , form which organ system of the body???

Muscular system-skeletal system

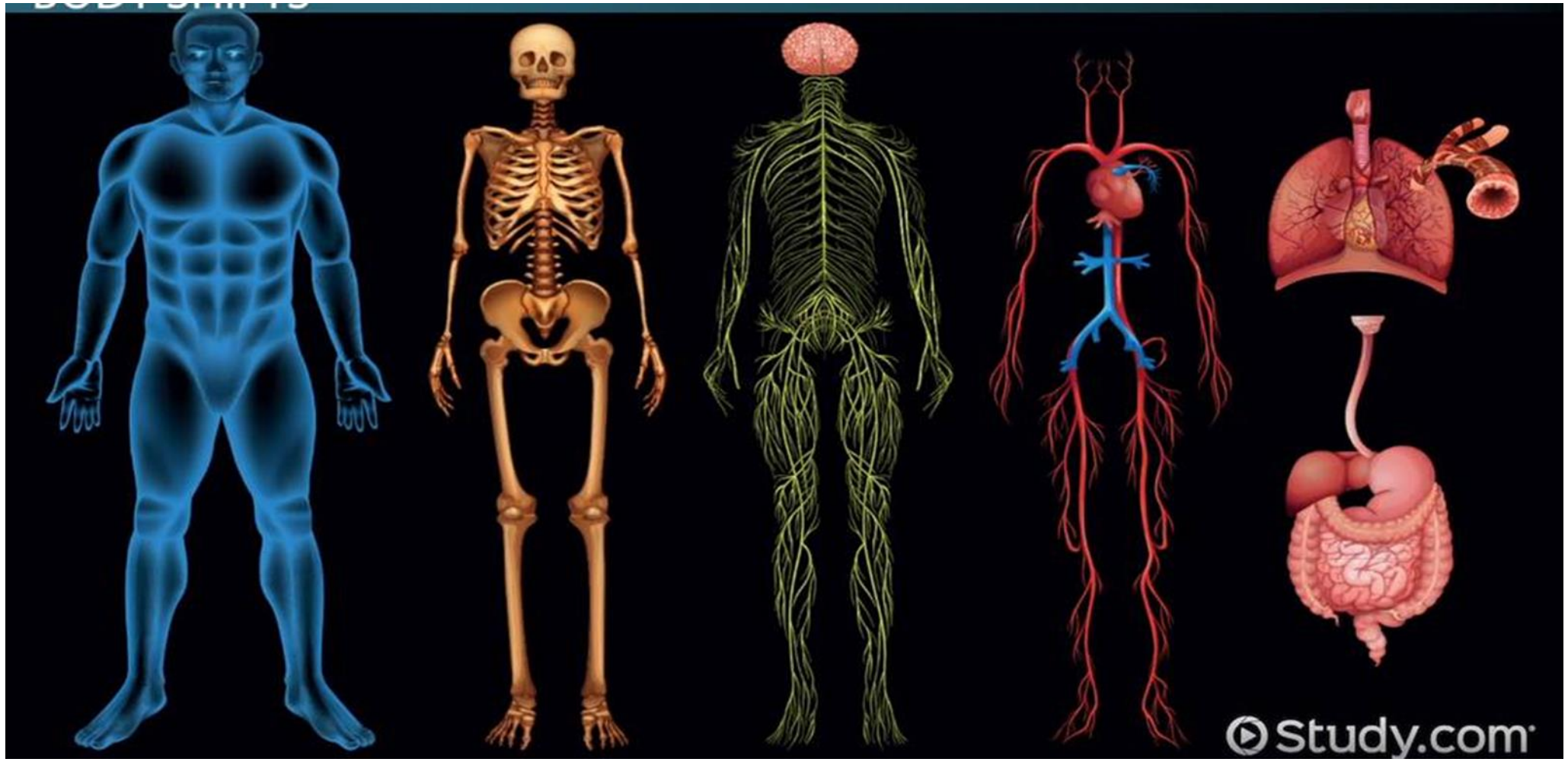
What is an organ system???

Organ Systems Usually organs do not function alone. Instead, **organ systems** are groups of different organs that work together to complete a series of tasks. For example, the human digestive system is made of many organs including the stomach, the small intestine, the liver, and the large intestine. These organs and others all work together to break down food and take it into the body.

DIGESTIVE SYSTEM

For absorption of nutrients, the digestive system includes the oral cavity, esophagus, liver, stomach, small intestine, large intestine, rectum and anus.

Organ systems – Can you identify them???



1.Muscular system

2.Skeletal system

3.Nervous system

4,Circulatory system

5.Respiratory system

6,Digestive system

Activity - Organ systems

- https://www.wordwall.net/play/6675/192/148

Do organ systems work independently, or they depend on each other to carry out their functions????

- They depend on each other to carry out their function
- Can you think of an example????

In the human body, there are many major organ systems. Each organ system depends on the others and cannot work alone. For example, the cells in the muscle tissue of the stomach cannot survive without oxygen. The stomach cannot get oxygen without working together with the respiratory and circulatory systems.

LESSON 2

Structure and Support

- Explore how different systems interact to enable structural and supportive body functions

- Learn how these interacting systems enable movement, and support or refute that the body could not function without the support of the skeletal system

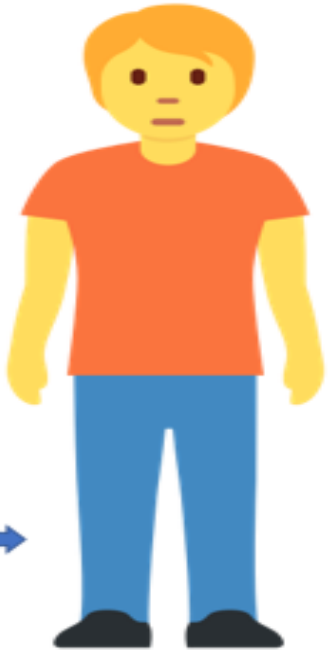
Keywords

1. Muscles
2. Voluntary
3. Involuntary
4. Skeletal muscle
5. Cardiac muscle
6. Smooth muscle

Recognize levels of organization in organ systems

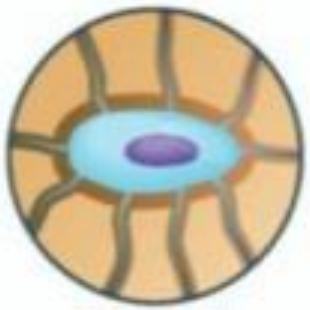
- Classkick activity-Rearrange the given levels of organization and identify the organ system

????

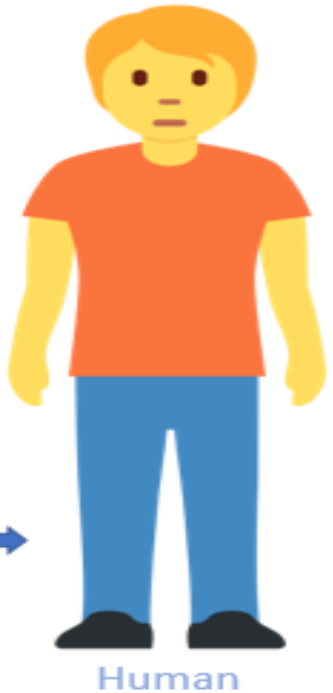


Recognize levels of organization in organ systems

- Rearrange the given levels of organization and identify the organ system



Skeletal system

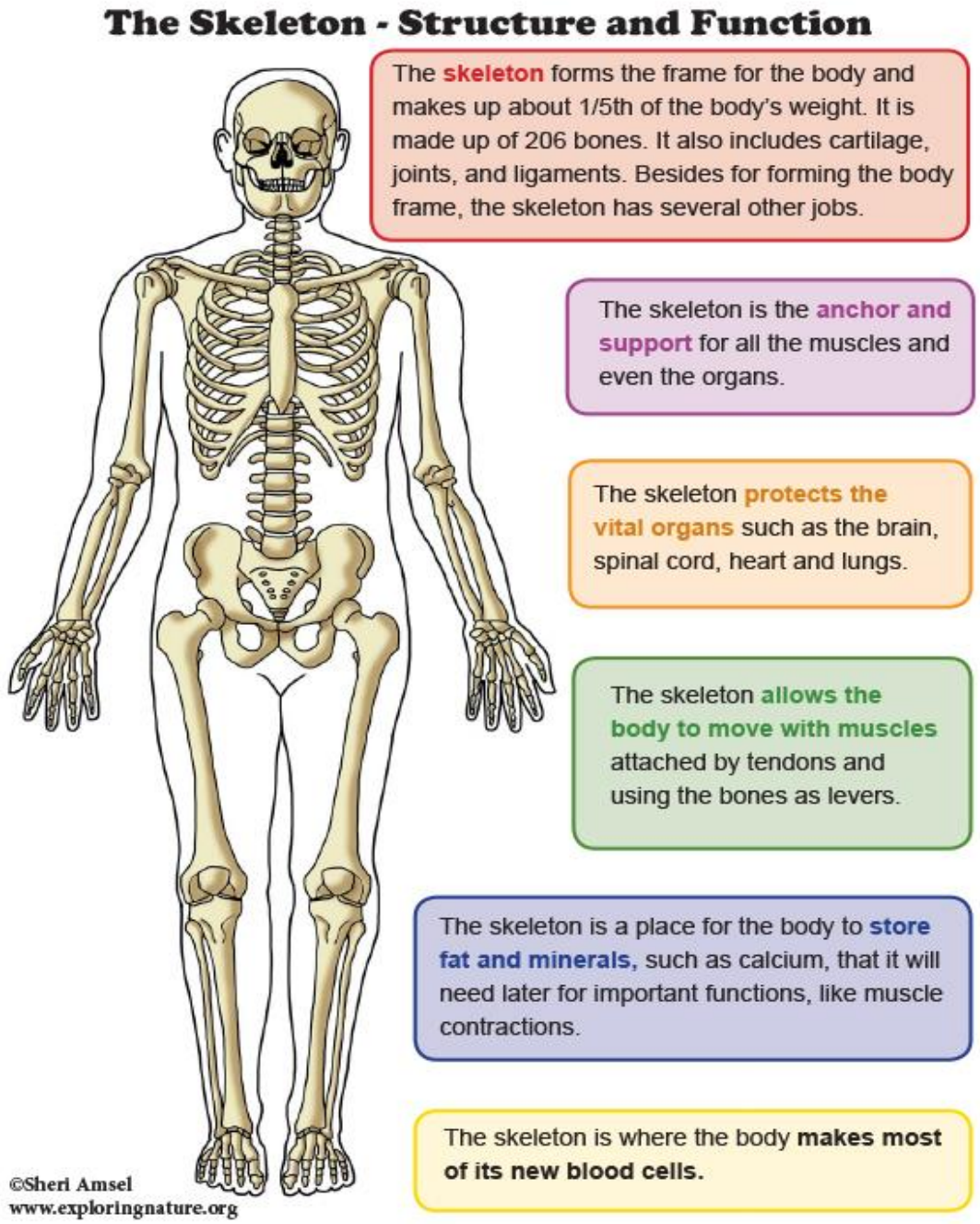


When a person is running do you think only skeletal system and muscular system are interacting with each other to make him run or there are more ogan systems interacting together???

What is the function of skeletal system in the body-

- The skeletal system works as **a support structure for your body**.
- It gives the body its shape, allows movement, makes blood cells, provides protection for organs and stores minerals.
- The skeletal system is also called the musculoskeletal system.

Blood cells are made in **the bone marrow**. The bone marrow is the soft, spongy material in the center of the bones.



How is the girls able to do handstand??

- Which organ systems are involved ?

- What supports a body and enables it to move????

- Muscles and bones
- Muscular system and skeletal system

What is a muscle???

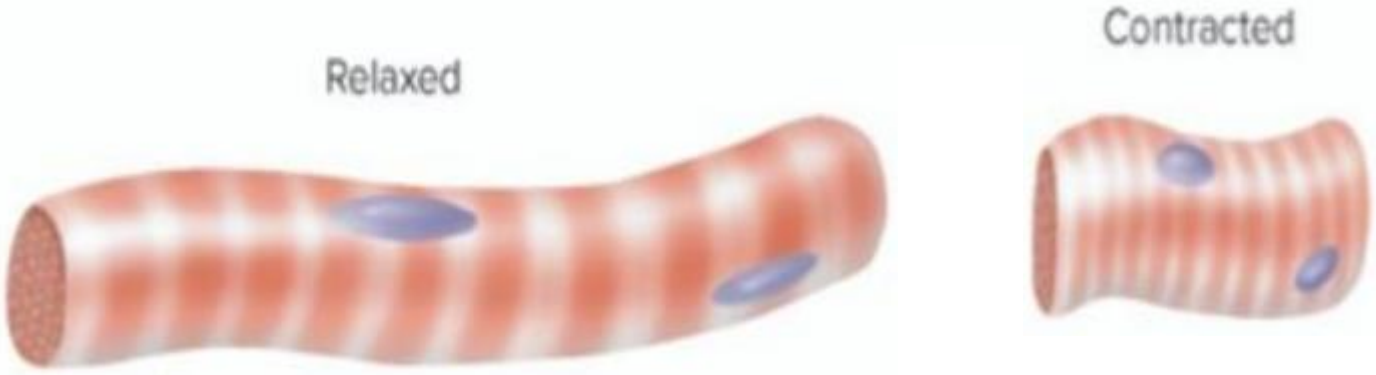
- It is made from a strong muscle tissue
- From where does the muscle get energy to function??
- Muscle cells are packed with mitochondria which generates energy for the muscle to function.

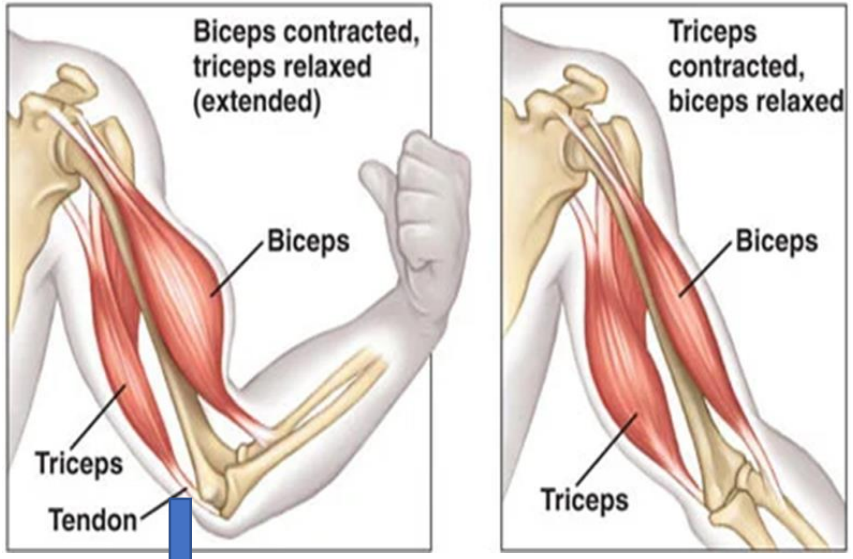
How do Muscles work???

- They contract and relax to enable us to move

Define Muscle

A **muscle** is made of strong tissue that can contract in an orderly way. When a muscle contracts, the cells of the muscle become shorter. When the muscle relaxes, the cells return to their original length.





A tendon is **a fibrous connective tissue which attaches muscle to bone**

Think-Do we have only one kind of muscle in our body?????

Biology Online

Muscles

Voluntary muscles

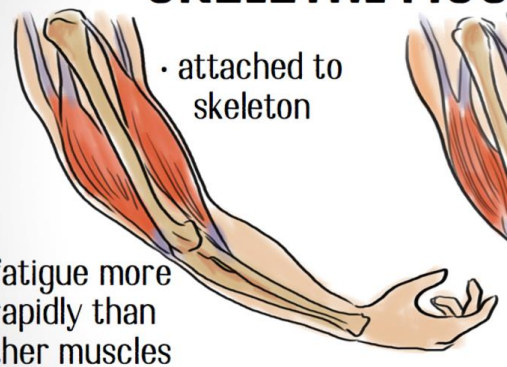
Involuntary muscles

Skeletal muscles

Cardiac muscles

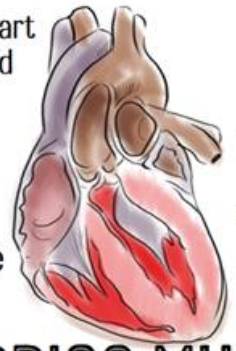
Smooth muscles

SKELETAL MUSCLES



- attached to skeleton
- fatigue more rapidly than other muscles
- aid in voluntary movement

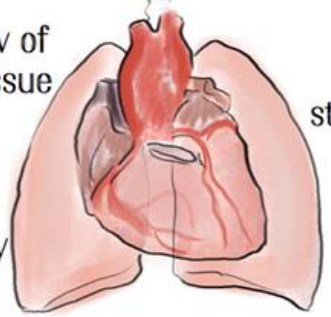
- found only in heart and tips of blood vessels
- do not fatigue
- controlled by central nervous system and "pacemaker" cells



CARDIAC MUSCLES

SMOOTH MUSCLES

- maintain flow of fluids along tissue walls
- fatigue slowly
- found in lungs, stomach, esophagus, and intestines

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Knowledge check

1. Which of these is caused by an involuntary muscle?

- Sticking out your tongue
- Staring at your brother
- Your heart beating
- Wiggling your toes

2. Which of the following uses voluntary muscles?

- Digestion
- Heart beating
- Raising your hand
- Sneezing

3. What are all voluntary muscles attached to?

- Bones
- Each other
- Your heart
- Your legs

Only skeletal muscles are voluntary muscles
True/false

Skeletal Muscle The type of muscle that attaches to bones is skeletal muscle. Skeletal muscles are also called voluntary muscles, which are muscles that you can consciously control. The contractions of skeletal muscles can be quick and powerful, such as when you run fast.

Cardiac Muscle Your heart is made of **cardiac muscles,** which are found only in the heart. A cardiac muscle is a type of involuntary muscle, a muscle you cannot consciously control. When cardiac muscles contract and relax, they pump blood through your heart and through blood vessels throughout your body.

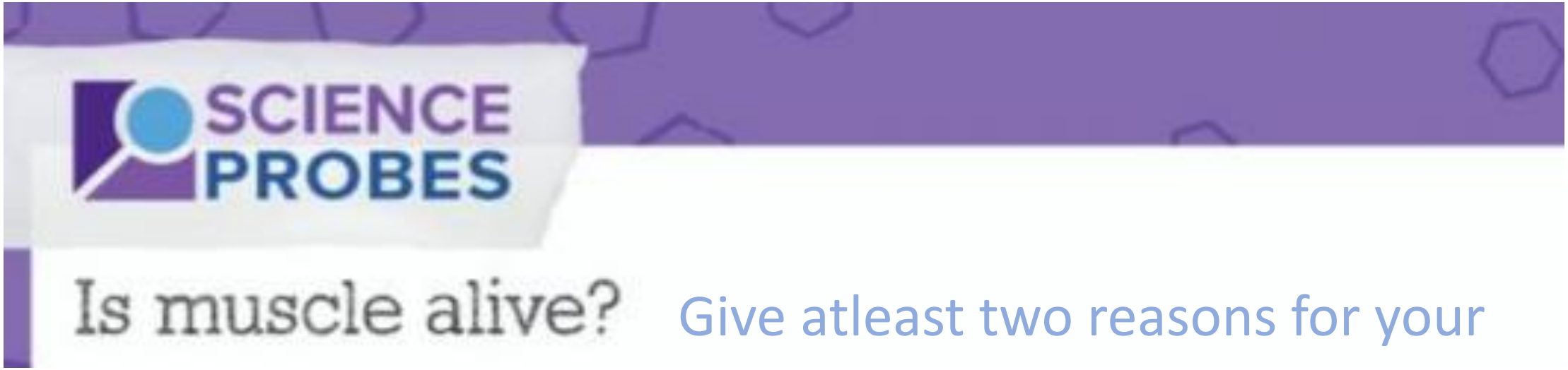
Smooth Muscle Blood vessels and many organs, such as the stomach, are lined with smooth muscles. **Smooth muscles** are involuntary muscles named for their smooth appearance.

Activity:

https://wordwall.net/play/16295/315/436

https://www.liveworksheets.com/ed1850408ys

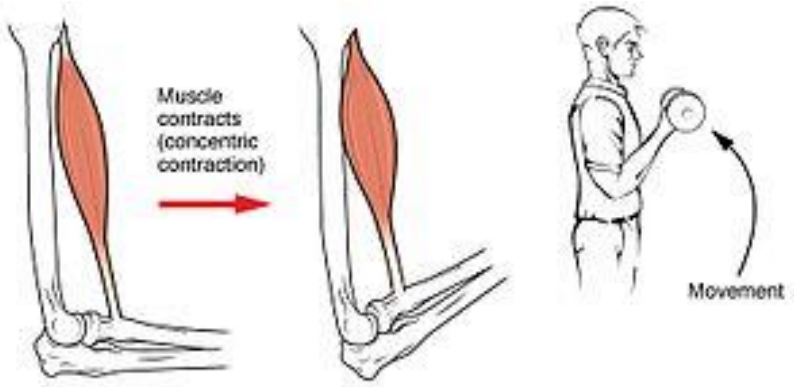
Activity-breakout rooms/general discussion-3mins

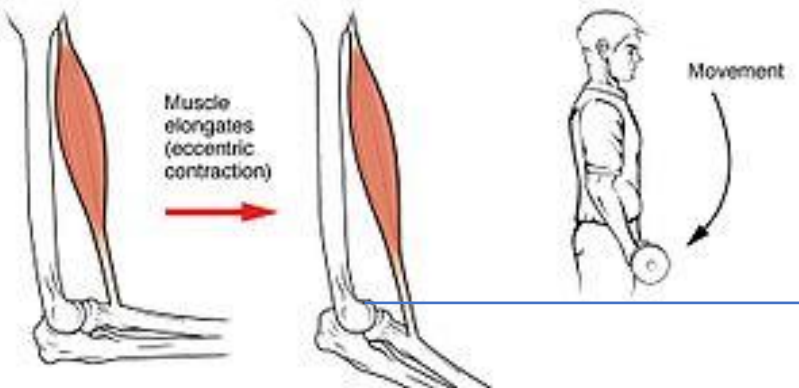


Give atleast two reasons for your answer.

How do muscles work??

Muscles enable the body to move but cannot function without the support of bones. Bones can move because they are attached to muscles. The skeletal system and the muscular system work together and move your body.





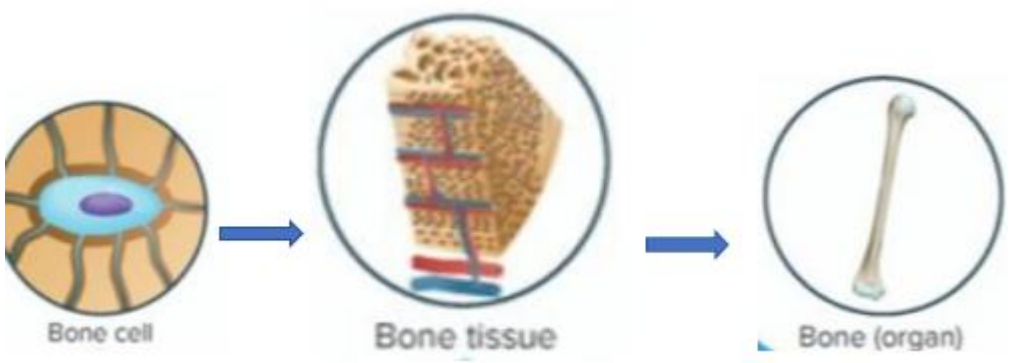
Joints

What are joints??

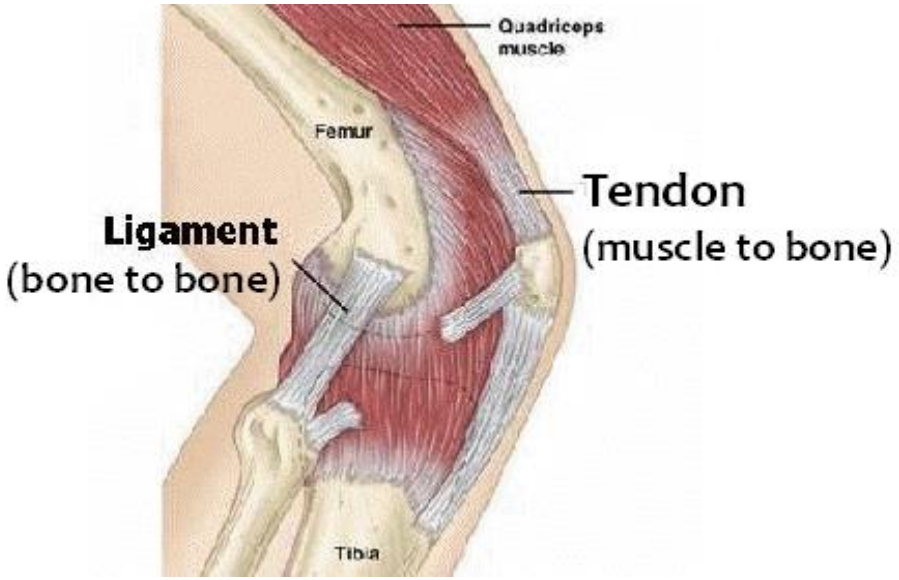
- A joint is where two or more bones meet.
- Joints provide Flexibility and movement

https://www.youtube.com/watch?v=j918PoWWaB0

Bones



- The adult human skeleton is made up of **206 bones**.
- These include the bones of the skull, spine (vertebrae), ribs, arms and legs.
- Bones are made of connective tissue reinforced with calcium and specialized bone cells.



How are bones connected to other bones??

bones connected to other bones by tissues called Ligaments

What is the function of ligaments?

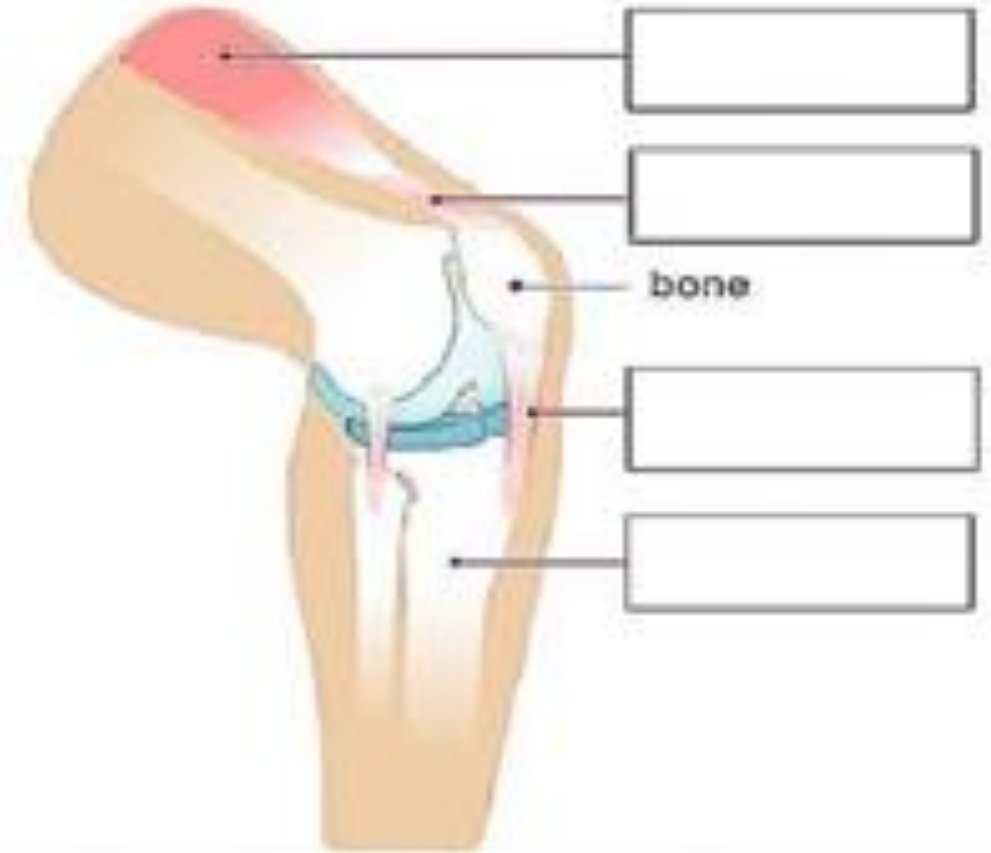
When bones in joints move ,ligaments stretch, and keep the bones from shifting away from each other

How are ligaments different from tendons???

Knowledge check – class kick activity

Label the diagram below by dragging the correct label into place.

bone **ligament** **muscle** **tendon**

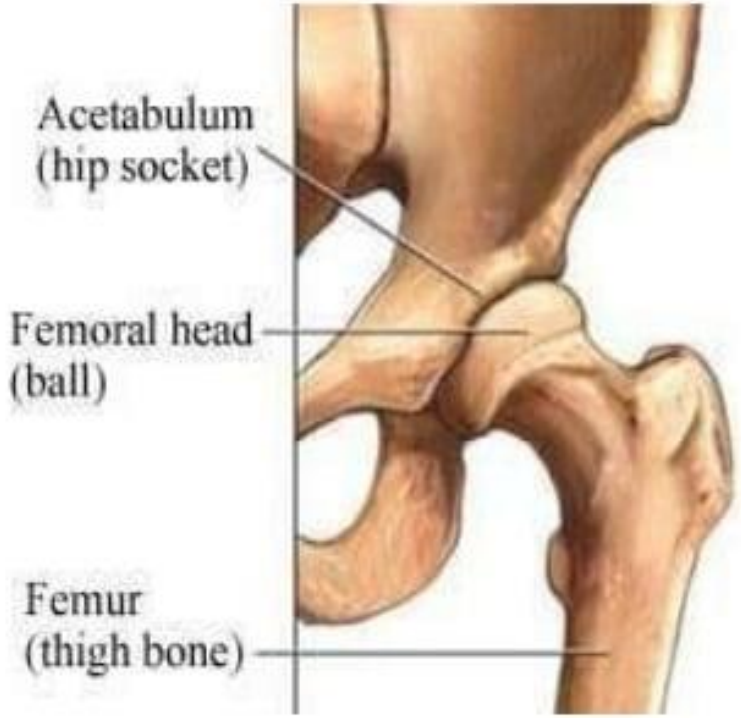


Types of movable joints

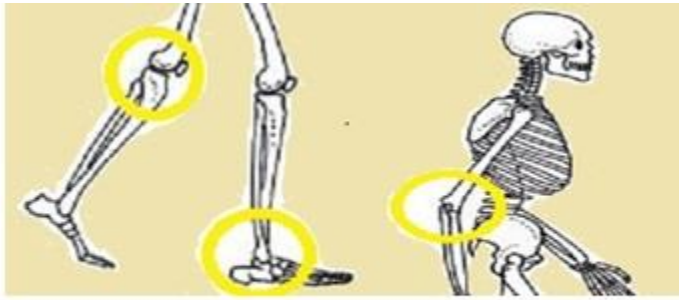
Types of Movable Joints		
Joint	**Description**	**Example**
	allows bones to move and rotate in nearly all directions	hips and shoulder
 	allows bones to move back and forth in a single direction	fingers, elbows, knees
 	allows bones to rotate	neck, lower arm below the elbow

Ball-and-Socket Joint

- Ball-and-Socket Joint: consists of a bone with a ball-shaped head that attaches with the cup-shaped cavity of another bone. This type of joint allows for a wider range of motion than any other kind. It permits movement in all planes, and a rotational movement around a central axis. Two examples of this type of joint would be the hip and shoulder joints.



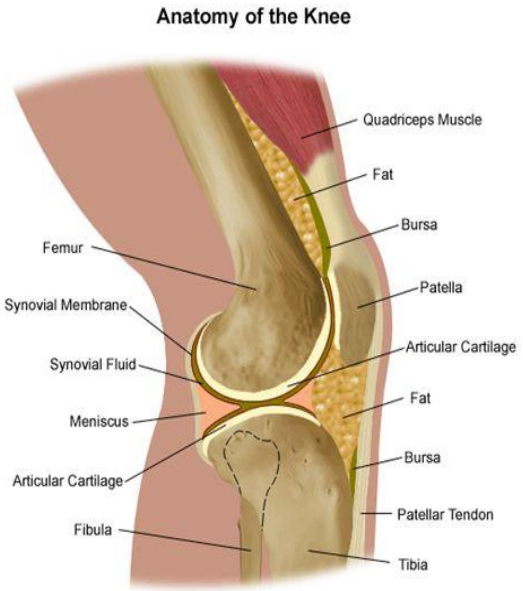
Hinge joint

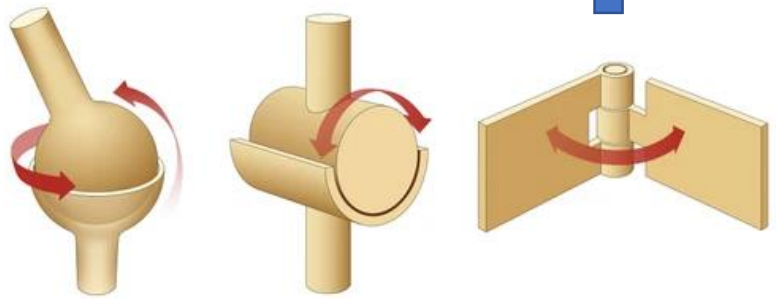


Knee and Ankle joints *Elbow joint*

Hinge Joints

- The elbow and the knee are both hinge joints since they permit an opening/closing type of movement
- Both are also one directional
- Both also are called synovial joints because they have a synovial cavity





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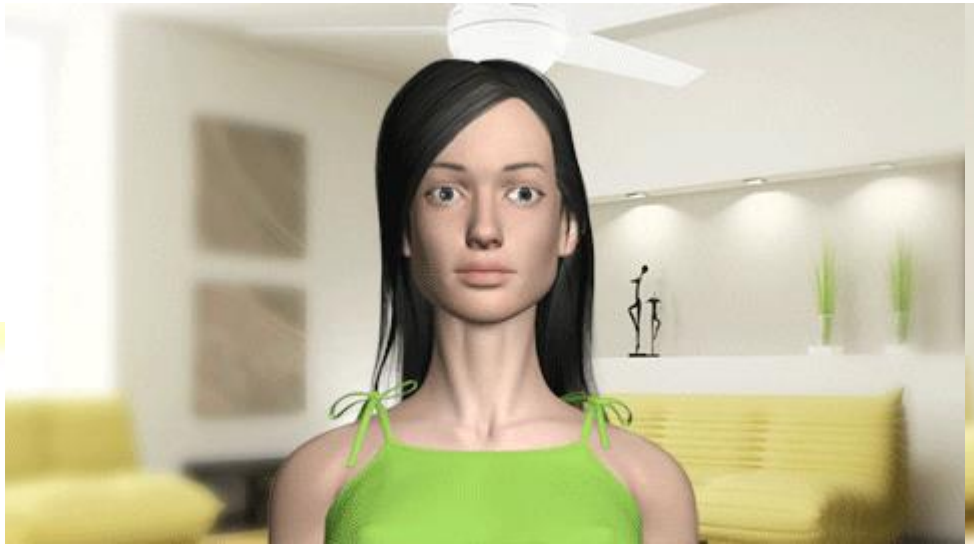
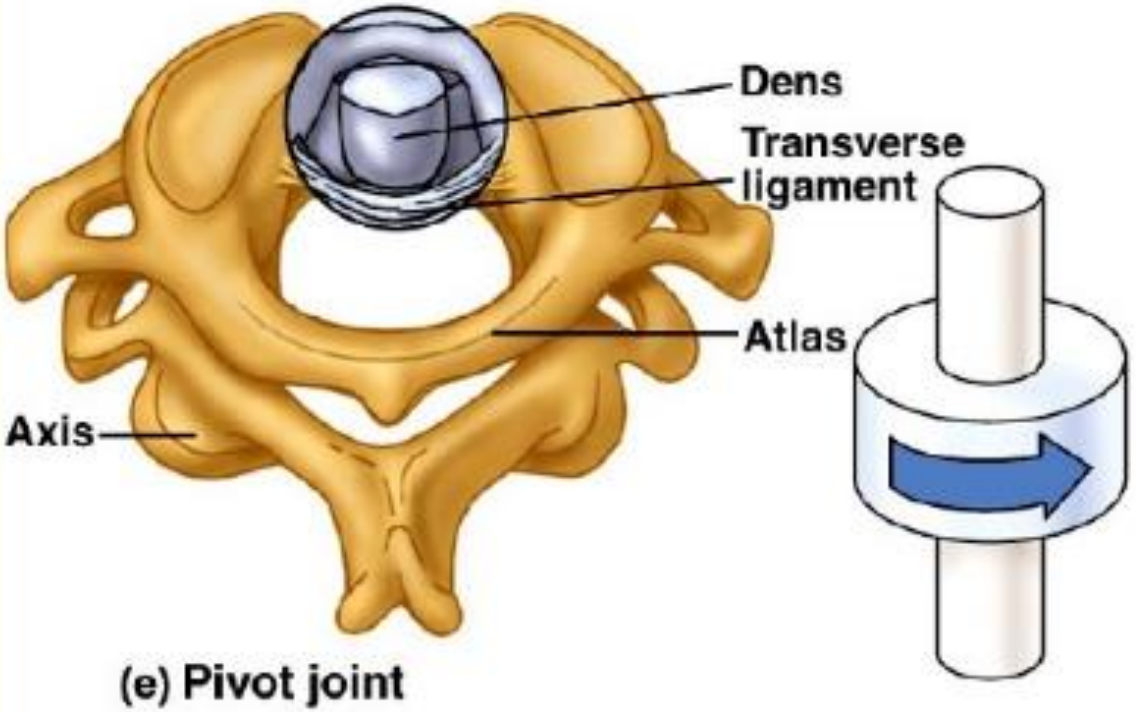
Hinge joint helps in opening and closing the doors, windows in our houses

Can you identify them??

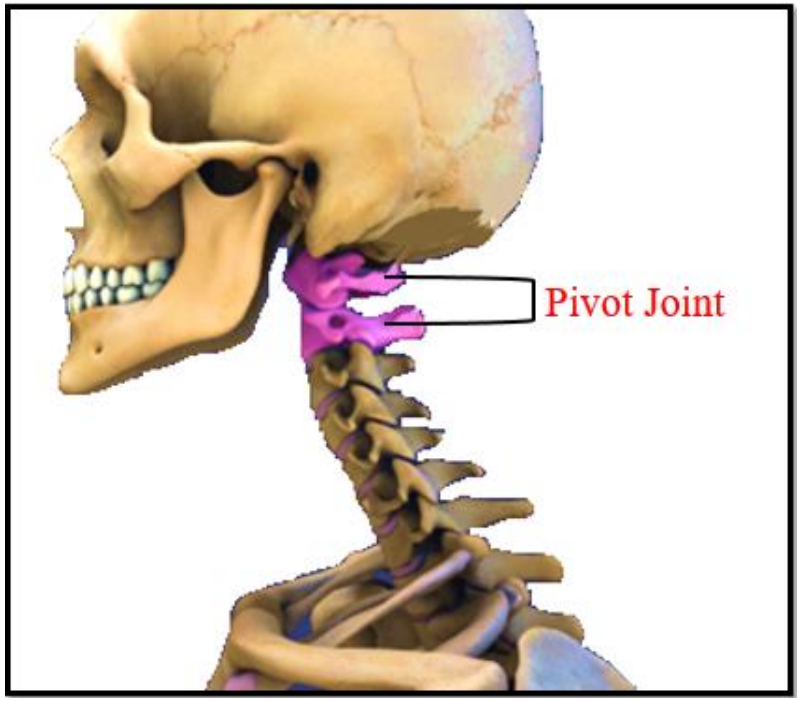
Pivot Joint



- **Pivot joint:** rotation around a central axis
- **Ex:** atlas/ axis joint



(e) Pivot joint



Activity:

https://wordwall.net/play/7761/708/732

Activity-Classkick

Name the joints.

Join the function to the picture

Twist & turn

Move backward & forward

Give all around movement

Knowledge check

https://quizizz.com/admin/quiz/6132856f39f654001e34a627

How are different organisms provided with structure and support ???

- How does an earthworm move???
- Does it have a skeleton like us??

Fluid Support Some animals have a hydrostatic skeleton, which is a fluid-filled internal cavity surrounded by muscle tissue. Muscles help the organisms move by pushing the fluid in different directions. Flatworms (shown below), sea anemones (uh NE muh neez), and earthworms are organisms that have hydrostatic skeletons.

Breakout room activity- 3Mins.

- Discuss with your friends how does a snail,scorpion move????

- Present your claim on a power point slide

In what ways are different animals are supported and provided with structure

External Support Hard outer coverings provide support and protection for many animals. Sometimes called shells, these outer coverings support animals such as crabs, snails, and the scorpion shown to the right. A thick, hard outer covering that protects and supports an animal's body is called an **exoskeleton.**

Knowledge check

- Differentiate between hydrostatic skeleton and exoskeleton