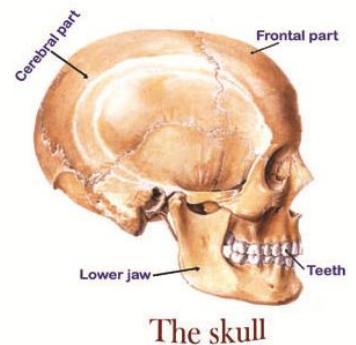


The  
Pioneer  
Series in

# Biology

General Secondary  
Certificate

Support and movement



By  
Dr/ Taha Hassan

Tel.: 01000667832



# support and movement

## Write the scientific term for each of the following:

1. A vertical bony axis, its upper part is attached with the skull and at the thoracic region is attached with the thoracic cage.
2. A part of the skeletal system consists of vertebral column, skull and thoracic cage.
3. 7 articulating vertebrae of moderate size attached to the skull.
4. The largest vertebrae present the abdominal region.
5. 5 broad, flat and fused vertebrae.
6. 4 small fused vertebrae at the end of vertebral column.
7. An anterior thick part in the vertebrae attached laterally with 2 articulating processes.
8. Bony process attached posteriorly directed, downwards in the vertebra.
9. A canal inside it extends in the spinal cord to protect it.
10. The anterior part of the skull which includes the face bones, two jaws and positions of sense organs.
11. A case which is slightly conical in shape, connected posteriorly to the thoracic vertebrae and anteriorly to the sternum.
12. A curved bone attached posteriorly to the centrum of the vertebra and its transverse process.
13. Bones attached posteriorly with the thoracic vertebrae and anteriorly with the sternum.
14. A flat bone pointed at its lower part that is cartilaginous.
15. The two short pairs of ribs that don't reach the sternum.
16. A thin bone attached with the outer end of scapula.
17. A triangular bone, its inner end is broad and its outer end is pointed and has a process attached with the clavicle.
18. A cavity through which the articulation with forelimbs take place, forming the shoulder joint.
19. A structure consists of two rows of 8 bones and their upper part is attached to the lower part of the radius.
20. A bone can rotate around the fixed ulna.
21. A dorsal bone attached anteriorly and ventrally to the pubis and attached posteriorly and ventrally to the ischium.
22. A bone that represents the beginning of lower limb, at its lower end there are two processes, that articulate with the shank at the knee joint.
23. A small rounded bone in front of the knee joint.
24. A type of connective tissue that doesn't contain blood vessels.
25. Joints that don't allow movement to the bones attached with.
26. Joints allow a very limited movement to the bones attached with.

27. Flexible joints which bear shocks.
28. Bundles that link the bones with each other at the joints.
29. Displacement of living organisms responding to the external stimuli.
30. A part of the plant, if it doesn't meet a support during its movement, it wilts and dies.
31. A group of muscles by which the body can move.
32. Strong connective tissues link the muscles with bones.
33. A tendon that connects the gastrocnemius muscle with the heel bone.
34. A type of muscle that has no light or dark regions.
35. A muscle structure surrounded by a sarcolemma and multinucleated.
36. A muscle consists of unstraited fibres and is not under the will of man.
37. A muscle consists of striated fibres and is not under the will of man.
38. A group of bones which protect the brain.
39. A group of bones which protect the heart and lungs.
40. A group of bones which protect the spinal cord.
41. Regions formed of actin and myosin together.
42. The distance between two successive Z-lines in the muscle fiber.
43. Enzyme that destroys acetylcholine into choline and acetate.
44. Hooks that are formed by the help of calcium ions and pull the actin filaments toward each other.
45. Protein filaments in myofibril from which extend the transverse links.
46. A place where the terminal branches attach to one muscle fibre.
47. The functional unit of the skeletal muscle.
48. The accumulation of lactic acid as a result of repeated rapid contraction without enough supply of oxygen.
49. Thick protein filaments share in the structure of muscle fibres.
50. It is a curved bone, attached at back with the centrum of the vertebra and its transverse processes.

### What happens in each of the following:

1. **Soaking some dried fruits in water.**  
➡ The water passes into its vacuole causing an increase in the vacuole size. So, the fruit will attain a physiological support.
2. **The absence of glenoid cavity from the pectoral girdle.**  
➡ The humerus will not attach to the scapula, and therefore the shoulder joint will not be formed, which leads to non-movement of the upper limb.
3. **The absence of cartilages from the tips of bones at joints.**  
➡ The corrosion of bones happens, due to the continuous friction between them.
4. **Twisting of knee joint.**  
➡ This may lead to the ligament's tearing.
5. **The absence of synovial fluid from the knee joint.**  
➡ Friction occurs between the cartilages that cover the bones which in turn affects the joint movement.



**6. The absence of tendons in the human body.**

➡ The muscle will not attach with the bones, which make the movement difficult during the muscles contraction and relaxation.

**7. The tendrils lose their ability to stick with the support during its twinning movement.**

➡ The climbing plant can't grow vertically, then the tendril wilts and dies.

**8. The absence of pulling roots from the corms and bulbs.**

➡ Corms and bulbs will not reach its suitable level in the soil, causing the aerial parts to be affected by wind and this may lead to extract the plant from the soil.

**9. Increasing the permeability of the muscle cell membrane to the sodium ions.**

➡ The sodium ions pass through the membrane causing depolarization (+ve inside and -ve outside), which leads to the muscle contraction.

**10. The absence of cholinesterase enzyme from the neuromuscular junction.**

➡ The muscle remains under the acetylcholine effect, and so that it remains contracted and will not respond to any new stimulus, because the cholinesterase enzyme is responsible for the decomposition of acetylcholine.

**11. The absence of calcium ions from the muscle fibers.**

➡ The nerve impulse will not be transmitted, the neurochemical transmitters will not release from the synaptic vesicles and the transverse links are not formed. Accordingly, the muscle doesn't contract.

**12. The absence of transverse links which is extended from the myosin filaments of the muscle fiber.**

➡ The muscle contraction process will stop, because the transverse links act as hooks that pull the actin filaments from both sides toward each other by using the energy stored in ATP, leading to the muscle contraction.

**13. Stimulus vanishing from the contracted muscle.**

- ➡ ✓ The transverse links move away from the actin filaments by consuming a part of the energy stored in ATP. So, the muscle relaxes.
- ✓ The Z-lines move away from each other and the sarcomeres return to their fundamental length.

**14. The shortage of ATP in the contracted muscle.**

➡ This prevents the separation of the transverse links from the actin filaments, and so the muscle remains in the case of contraction and can't relax which causes a painful muscle spasm.

**15. The excessive spasm in a person.**

➡ This may lead to tear the muscle that causes bleeding.

**16. Repeated rapid contraction of a muscle.**

➡ This leads to muscle fatigue. So, the person can't move until the blood supplies the muscle with oxygen needed for respiration and energy production, which leads to the separation of transverse links from the actin filaments, and so the muscle relaxes.



**Give reasons/ write the scientific explanation for:**

- 1) **The physiological support is a temporary support, while the structural support is permanent support.**

➡ Because, the physiological support depends on the cell filling with water, but the structural support depends on the deposition of substances, such as lignin, suberin and cutin in the plant cell wall.

- 2) **The plant tends to deposit some substances in its cell walls.**

➡ To increase the strength and hardness of this cells (the deposition of cellulose and lignin) and to prevent the loss of water (cutin and suberin).

- 3) **The vertebrae are different from each other in the shape.**

➡ To fit their sites where they exist in the body.

- 4) **The cerebral part of the skull forms only one part, although it consists of 8 bones.**

➡ Because, these 8 serrated bones are attached firmly to each other within the fibrous joints.

- 5) **The ribs move anteriorly and laterally during the respiration.**

➡ To increase the volume of thoracic cavity during the inspiration.

- 6) **The cartilages get food and oxygen from the bone cells by diffusion.**

➡ Because, they do not contain any blood vessels.

- 7) **The synovial joints contain a synovial fluid.**

➡ To facilitate the sliding of cartilages that covering the tips of bones.

- 8) **The synovial joints allow the movement of bones easily with less friction.**

➡ Because, at the synovial joints, the bones are smooth and their tips are covered with a delicate layer of transparent cartilaginous substance, which allow the movement of bones easily with less friction.

- 9) **Shoulder joints is a wide movement joint, while the elbow is a limited movement joint.**

➡ Because, the shoulder joint allows the movement of bones in many directions, while the elbow joint allows the movement of bones in one direction only.

- 10) **The ligament fibers are characterized by the presence of a degree of elasticity.**

➡ Due to the twisting of some joints, as in the case of cruciate ligament in the knee joint.

- 11) **Although the stem of pea plant is weak, it grows vertically.**

➡ Because, the pea's tendril raises itself into the air to make contact with a solid object. Once touching the object, it immediately twines closely around the object for a few turns in a spiral form, leading to the decrease in the tendril length, and so the plant stem approaches the support and grows vertically.

- 12) **The twinning of tendril around the support.**

➡ Due to slow growth on the side which in contact with the support and accelerated growth on the side of tendril away from the support. This leads to elongation of the far side, and so the tendril twines around the support.

13) **Subterranean storing stem always remain at a suitable distance from the soil surface.**

- ➡ Due to the presence of pulling roots which contract, then the plant is pulled downwards to a suitable level in the soil, which support their aerial parts against the wind effect.

14) **The continuous movement of blood inside the blood vessels.**

- ➡ Due to the contraction of smooth muscles in the walls of blood vessels.

15) **The nervous system plays an important role in the muscular contraction.**

- ➡ Because, the nervous system gives the orders for muscles to contract and relax.

16) **The skeletal muscles and cardiac muscles are known as striated muscles.**

- ➡ As they contain dark and light bands.

17) **The potential difference on the muscle fiber membrane is vanished at the arrival of nerve impulses.**

- ➡ Due to the increase permeability of the muscle fiber membrane to sodium ions, which pass quickly through the membrane causing depolarization. This leads to the contraction of muscle and the potential difference disappears.

18) **The presence of cholinesterase enzyme in the muscular junction.**

- ➡ Because, the cholinesterase enzyme converts acetylcholine into choline and acetate that returns the membrane to its resting state.

19) **The theory of sliding filaments is the most acceptable theory for muscle contraction.**

- ➡ Because, it depends on the microscopic structure of muscle fibers, since Huxely compared a muscle fiber in a contraction state with the muscle in a relaxation state using the electron microscope.

20) **The occurrence of muscle fatigue.**

- ➡ Due to the repeated contraction of muscle, leads to the shortage of oxygen needed for respiration and energy production. Hence, the muscle respire anaerobically to produce energy rapidly forming lactic acid which causes muscle fatigue.

21) **The occurrence of changes on each of the light band and myosin filaments during the muscle contraction.**

- ➡ Because, during the muscle contraction:
- The length of light band decreases as the actin filaments are pulled toward each other.
  - The transverse links are formed from the myosin filaments which act as hooks pull the actin filaments from both sides toward each other by using the stored energy in ATP.

## 22) The occurrence of muscle spasm.

→ Because, muscle spasm may occur due to:

- ✓ The shortage of ATP in the muscle which leads to preventing the separation of transverse links from the actin filaments.
- ✓ The troubles that resulted from the arrival of incorrect nerve impulses from the brain to muscle during its normal performance.

**"The motor unit is the functional unit of skeletal muscle." Discuss with reference to its components.**

.....

.....

**The movement is a result of coordination of the skeletal, the muscular and the nervous system in man. Explain.**

.....

.....

.....

.....

### Compare between each of the following:

#### 1. Physiological support and Structural support:

P.O.C	Physiological support	Structural support
<b>Definition</b>	Temporary support depends on the cell turgidity due to the absorption of water by osmosis. So, the cell swells.	Permanent support depends on the deposition of substances, such as cellulose, lignin, suberin and cutin on or in the cell walls.
<b>The effect</b>	It affects the cell as a whole.	It affects the cell wall or some parts of it.
<b>Examples</b>	1) Soaking dried seeds in water. 2) Leaving fresh water in the sun for few days.	1) Collenchyma cells. 2) Sclerenchyma cells.

#### 2. The pectoral girdle and The pelvic girdle:

P.O.C	The pectoral girdle	The pelvic girdle
<b>Location</b>	It is connected to the upper limbs of the appendicular skeleton.	It is connected to the lower limbs to the appendicular skeleton.
<b>Structure</b>	Scapula. Clavicle. Glenoid cavity.	Dorsal ilium bone. Acetabulum.



## 3. Fibrous joints and Cartilaginous joints:

P.O.C	Fibrous joints	Cartilaginous joints
<b>Function</b>	They connect the bones of skull together through its serrated tips.	They connect between the ends of some adjacent bones.
<b>Movement</b>	They don't allow movement.	They allow a very limited movement.
<b>Examples</b>	Fibrous joints which exist between the bones of the skull.	Cartilaginous joints which exist between the vertebrae of vertebral column.

## 4. Limited movement synovial joints and Wide movement synovial joints

P.O.C	Limited movement synovial joints	Wide movement synovial joints
<b>Definition</b>	They are joints which allow the movement of one bone in one direction only.	They are joints which allow the movement of bones in many directions.
<b>Examples</b>	Elbow joints and knee joints.	Shoulder joints and hip joints.

## 5. ligaments and Tendons:

P.O.C	ligaments	Tendons
<b>Description</b>	They are separated bundles of fibrous connective tissue.	They are connective tissues.
<b>Function</b>	They link the bones with each other at the joints. They determine the movement of joints in different directions.	They link the muscles with the bones at joint which allow the movement of muscles during their contraction and relaxation.
<b>Example</b>	Ligaments in the knee joint which are: The cruciate ligament which is divided into anterior and posterior cruciate ligaments. Medial collateral ligament. Lateral collateral ligament.	Achilles tendon.

## 6. Light bands of the sarcomere and Dark bands of the sarcomere:

Light bands of the sarcomere	Dark bands of the sarcomere
<ul style="list-style-type: none"> <li>They are formed of thin protein filaments called actin.</li> <li>They are bisected by a dark lines called Z-lines.</li> <li>They are called I-bands.</li> </ul>	<ul style="list-style-type: none"> <li>They are formed of thin protein filaments called actin and another thick protein filaments called myosin.</li> <li>They are bisected by a semi-light area called H-zone that, is formed of thick myosin filaments.</li> <li>They are called A-bands.</li> </ul>

**Choose the correct answer:**

1. From the structure support in plant ..... (parenchyma cells / phloem tissues / collenchyma cells / a and c are correct)
2. The plant cell swells, when water enters the cell under the effect of .... (absorption / root pressure / osmosis / repletion pressure)
3. The physiological support is represented by .....
  - a) Thickening of the cell wall to prevent the loss of water.
  - b) Swelling of the plant cells, because of absorbing water.
  - c) Repletion of phloem with the food substances.
  - d) Deposition of cellulose on the plant cell wall.
4. ....deposits on the epidermis of the plant cell wall, to prevent the loss of water. (cutin / lignin / cellulose / all the previous)
5. From the structural support in plants, there are .... (phloem tissue / parenchyma cells / collenchyma cells / pericycle)
6. The skeletal system consists of ....bones. (620 / 206 / 602 / 220)
7. Total number of cervical vertebrae, thoracic vertebrae and lumbar vertebrae in man is.....(7 vertebrae - 12 vertebrae - 28 vertebrae - 24 vertebrae)
8. The vertebra number 18 is from the ... vertebrae. (lumbar / coccygeal / sacral / thoracic)
9. The vertebra number 23 in the vertebral column is characterized by its ... (moderate size / large size / broad and flat / small size)
10. The size of vertebra number 20 according to the size of vertebra number 19 of the vertebral column is .... (smaller / equal / slightly larger / most larger)
11. The number of cervical vertebrae is .... (5 vertebrae – 6 vertebrae – 7 vertebrae – 8 vertebrae)
12. Number of bones in the cerebral part of the skull is .... (5 bones – 6 bones – 7 bones – 8 bones)
13. The posterior part of the skull has .... (neural spine / foramen magnum / face bones / transverse process)
14. The transverse process is found in the .... (skull / pelvic girdle / vertebra / pectoral girdle)
15. The neural spine is found in the .... (the skull / pelvic girdle / vertebra / pectoral girdle)
16. The total number of bones of the skull in man are ...bones. (5 / 6 / 7 / 8)
17. The number of ribs in man are ....pairs. (12 / 16 / 20 / 24)
18. The two floating ribs in the thoracic cage are number ..... (8,9 – 9,10 – 10,11 – 11,12)
19. At the upper part of ulna, there is a cavity in which ....bone is attached. (Wrist / humerus / ulna / tibia)
20. The acetabulum cavity is found in ..... (thoracic girdle – pelvic girdle – femur – humerus)
21. Carpels consist of ... (8 bones – 9 bones – 10 bones – 11 bones)
22. The total number of vertebrae in the vertebral column is ..... (23 vertebra – 30 vertebra – 33 vertebra – 40 vertebra)

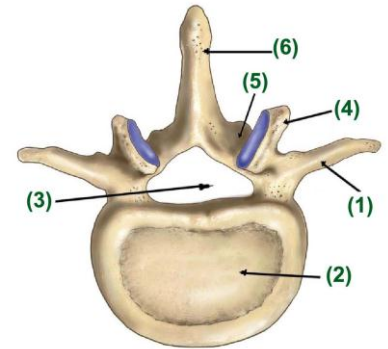
23. The neural canal is found in ... (the skull – the vertebra – the pelvic – the shoulder)
24. The total number of vertebrae in the vertebral column except coccyx is .... (23 vertebra – 30 vertebra – 33 vertebra – 29 vertebra)
25. The number of sacral vertebra is .... (5 vertebrae – 4 vertebrae – 7 vertebrae – 12 vertebrae)
26. Number of bones in the wrist of the upper limb is ..... (5 bones – 6 bones – 7 bones - 8 bones)
27. The lower part of wrist is attached to ....  
a) The upper part of the radius.  
b) The upper part of the ulna.  
c) The lower part of the ulna.  
d) The palm.
28. The number of ribs in the thoracic cage is .... (10 pairs – 11 pairs – 12 pairs – 13 pairs)
29. The glenoid cavity is found in the .... (humerus – fibula – shoulder – pelvic)
30. The wrist in man consists of ...bones. (4 / 6 / 8 / 10)
31. Ankle region of lower limb consists of .... (8 bones – 7 bones – 10 bones – 11 bones)
32. The ankle in man consists of ....bones. (3 / 5 / 6 / 9)
33. The total number of bones of ankle and foot in man are ...in one side. (12 / 17 / 26 / 27)
34. The cartilages represent some body parts as .... (ears / nose / bronchioles of lungs / all the previous)
35. The skeletal system of man, there are ....types of joints. (3 / 4 / 5 / 6)
36. By growing older, the fibrous tissue in the fibrous joints change into ....tissue. (synovial / cartilaginous / bony / neutral)
37. Achilles tendon connects the gastrocnemius muscle with the ....bone. (tibia / heel / fibula / ankle)
38. When the nerve fibre enters the muscle, it supplies a group of muscle fibres form about ..... (5 to 100 – 50 to 100 – 5 to 10 – 500 to 1000)
39. Sarcomere is the distance between each successive two .... (H lines – A lines – Z lines – I lines)
40. The skeletal system includes other structures different than bones such as ..... (cartilages – joints – ligaments – all the above)
41. .... allow the movement of muscles during their contraction and relaxation. (cartilages – joints – ligaments – tendons)
42. .... joints allow a very limited movement to bones. (fibrous – cartilaginous – synovial - all the above)
43. .... form some parts of the body as ..... (ears – nose – bronchioles of the lung – all the above)
44. Cartilages get food and oxygen from the bone cells by .... (diffusion – active transport – selective permeability – all the above)



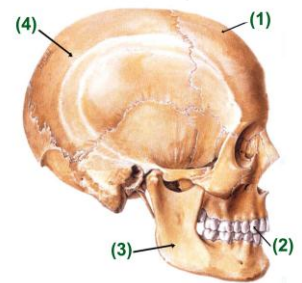
45. ... joint is considered an example of wide movement joints.  
(elbow – knee – shoulder – ankle)
46. .... consists of separated bundles of fibrous connective tissue.  
(cartilages – joints – ligaments – tendons)
47. Shoulder joint is considered an example of ..... joints.  
(cartilaginous – fibrous – synovial – all the above).
48. .... joints do not allow movement of bones that forming these joints.  
(cartilaginous – fibrous – synovial – all the above)
49. Joints found between the vertebra of the vertebral column ....  
a) Do not allow movement of bones.  
b) Allow a very limited movement.  
c) Allow a limited movement.  
d) Allow a wide movement.
50. .... joint is considered an example of a limited movement joints.  
(elbow – hip – shoulder – ankle)
51. .... Joints connect the bones of skull together through its serrated tips.  
(cartilaginous – fibrous – synovial – bony)
52. .... Is a one of structures belongs to the skeletal system and consists of strong connective tissue. (cartilages – joints – ligaments – tendons)
53. By growing older, fibrous tissue of the fibrous joints change into .... Tissue.  
(bony – connective – epithelial – cartilages)
54. .... joints allow the movement of bones easily and with less friction.  
(cartilaginous – fibrous – synovial – bony)
55. The human skeletal system consists of .... Bones. (602 – 620 – 206 -260)
56. .... Of the human skeletal system is the main support of the body.  
(skull – vertebral column – thoracic cage – shoulder girdle)
57. Transverse links of the myosin filaments pull the actin filaments from both sides by helping of energy storing in ... molecules.  
(ATP – sugar – starch – glycogen)
58. .... Of vertebrae helps for protection spinal cord.  
(bony ring – neural canal – neural spine - centrum)
59. .... Of the human skeletal system protect the heart and the lungs.  
(skull – vertebral column – thoracic cage – shoulder girdle)

**In the opposite figure:**

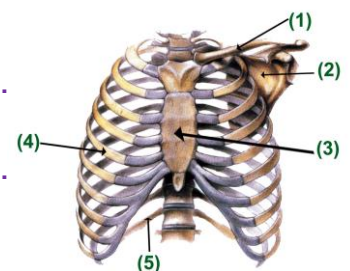
1. What does the opposite structure represent?  
.....
2. Write the labels from no. (1) : (6).  
.....  
.....
3. Complete: this structure is considered from the ..... system.
4. What is the importance of the structure no. (3)?  
.....  
.....

**In the opposite figure:**

1. Write the labels from no. (1) : (4).  
.....  
.....
2. What are the components of structure no. (4).  
.....
3. What is the name of the cavity found in posterior part of the skull? What is its function?  
.....  
.....
4. What is the type of joints link between the bones of the structure?  
.....  
.....

**In the opposite figure:**

1. What does the opposite figure represent?  
.....
2. Write the labels from no. (1) : (5).  
.....  
.....
3. What is the type of vertebrae attached with the structure no. (4)?  
.....  
.....
4. Why does the structure no. (4) move anteriorly and laterally?  
.....  
.....



**In the opposite figure:**

1) Write the labels from no. (1) : (8).

.....

2) What is the role of structure n. (8)?

.....

3) What is the type of movement of the structure no. (6)?

.....

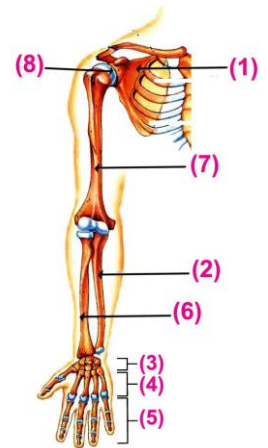
4) Which bone no. (1) or no. (7) articulate with the glenoid cavity?

.....

5) What is the name and type of joints found between each of the following bone?

a) Scapula and humerus.....

b) Humerus, radius and ulna.....

**In the opposite figure:**

1. What does the opposite figure represent?

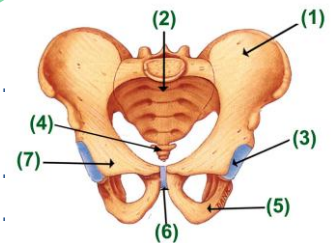
.....

2. Write the labels from no. (1) : (7).

.....

3. Which bone does settle in the structure no. (3)?

.....

**In the opposite figure:**

1. Write the labels from no. (1) : (12).

.....

2. What is the name of the joint at the structure no. (3) and what is its type?

.....

3. What is the largest bone in the structure no. (6)?

.....

4. What is the number of bones of the structure no. (6) and number (8)?

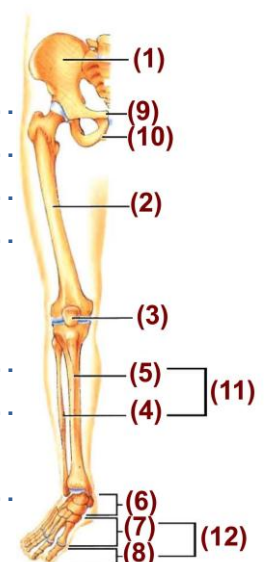
.....

5. What is the name of ligaments present below the structure no. (3)?

.....

6. What is the name of tendons present at the structure no. (6)?

.....





**In the opposite figure:**

a) What does the opposite figure represent?

.....

b) Write the labels from no. (1) to no. (4).

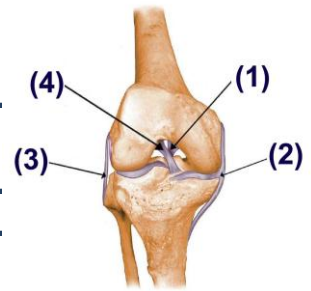
.....

c) What is the function of this structure?

.....

d) When this structure will be ruptured?

.....

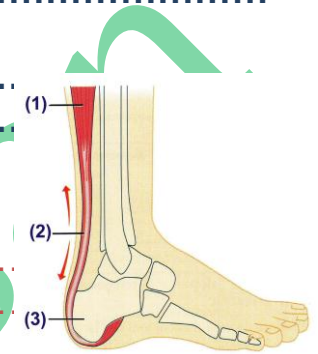
**In the opposite figure:**

A. Write the labels from no. (1) : (3).

.....

B. What is the importance of the structure no. (2).

.....

**In the opposite figure:**

1. What is the name of this movement?

.....

2. What is the importance of the plant?

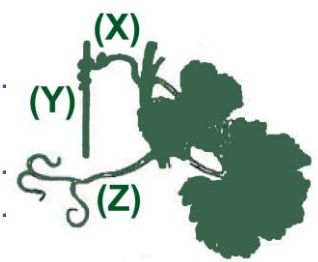
.....

3. How does the part (X) twice around the part (Y)?

.....

4. What happens to the part (Z) if it doesn't twice around a support?

.....

**In the opposite figure:**

1) What is the name of this movement?

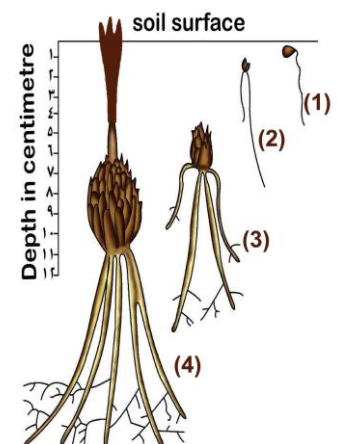
.....

2) What is its importance for the plant?

.....

3) How does this movement happen?

.....



**In the opposite figure:**

1) Write the labels from no. (1) : (5).

.....

.....

2) What is the number and name of the region that contains:

- a) Actin filaments.....
- b) Myosin filaments.....
- c) Actin and myosin filaments together.....

3) What is the name of the region found between the two Z-lines.

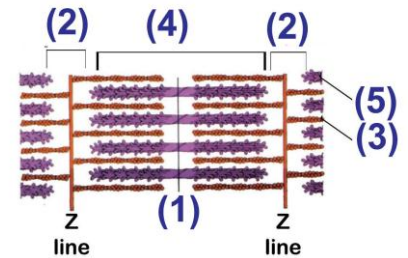
.....

4) Which muscles don't contain these regions?

.....

5) When do the Z-lines move away from each other? And when do they become closed?

.....

**In the opposite figure:**

1. Write the labels from no. (1) : (4).

.....

2. What does this figure represent?

.....

3. What is the position at which the connection between the structure no. (1) and muscle fiber will happen?

.....

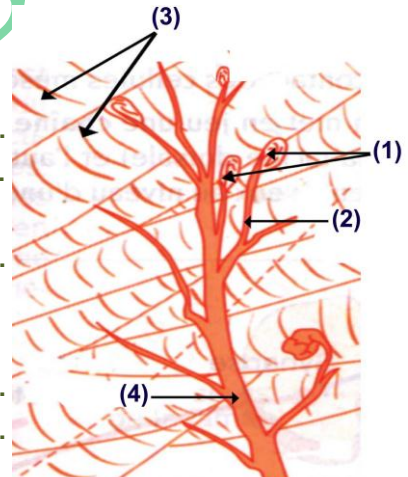
.....

4. What is the relation between the structure no. (1) and muscle fiber?

.....

.....

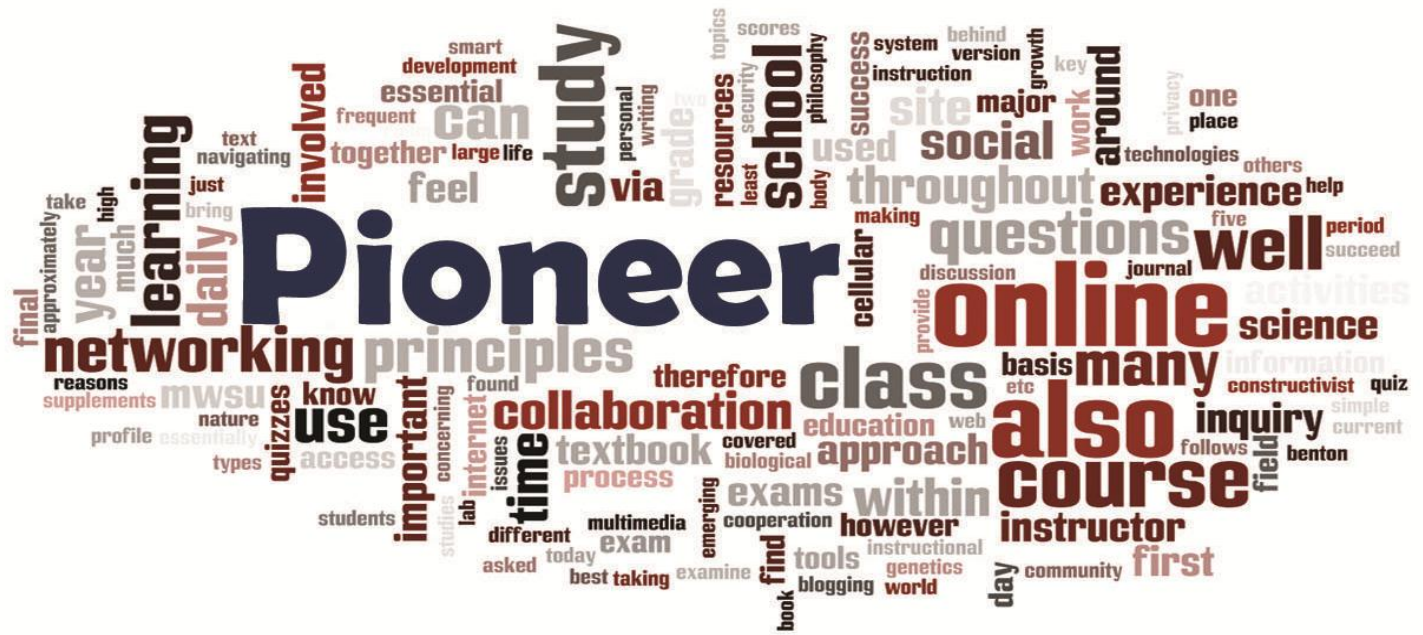
.....

**Rewrite the following statements after correcting what is underlined:**

- 1) Fibers and stone cells are examples for the physiological support.
- 2) The vertebral column is attached with the lower limbs by shoulder bone.
- 3) The vertebral column is attached with the thoracic cage and upper limbs by the pelvic girdle.

- 4) The bony process attached laterally with centrum of vertebra is called the neural spine.
- 5) The hip joint articulates with the pubic symphysis.
- 6) The pelvic girdle consists of 2 identical halves fused at the ventral side at a region called the humerus.
- 7) The leg consists of 2 bones, the inner and the outer bones are radius and ulna respectively.
- 8) The palm and foot, each of them consists of 6 long thick bones.
- 9) The fingers of foot and hand consists of 3 phalanges, except the index finger consists of 2 phalanges only.
- 10) The total bones of foot and ankle is one side are 12 bones.
- 11) The cartilages get food and oxygen from the blood by diffusion.
- 12) The bones form some body parts as ears.
- 13) Cartilaginous joints are flexible to bear shocks.
- 14) Cartilaginous joints don't allow the movement of bones attached with.
- 15) Synovial joints allow limited of bones attached with.
- 16) The cartilages between the vertebral column are examples for the fibrous joints.
- 17) The synovial joints are covered with a delicate layer of transparent fibrous substance.
- 18) Elbow joint is an example for the cartilaginous joint.
- 19) Knee joint is considered as a wide movement joint.
- 20) The cruciate ligaments is found in the elbow joint.
- 21) The corms and bulbs wilt and die during their twinning movement if they don't meet a support.
- 22) The number of muscles in man is about 340 muscles.
- 23) The muscles of abdomen and upper limbs maintain the body posture either in standing and sitting positions.
- 24) Myofibrils are composed of thick actin filaments, thin myosin filaments and transverse links.
- 25) In the skeletal muscles, the dark band has (1) symbol.
- 26) The light band in each muscles fiber is formed of thin protein filaments called lysine.
- 27) In the skeletal muscles, the distance between two successive Z-lines is called sarcolemma.
- 28) When the sodium ions enter the membrane of the muscle fiber, this state is called polarization.
- 29) Potassium ions form the transverse links.
- 30) Malpighi has proposed the theory of sliding filaments.
- 31) The sarcomeres return to its fundamental length when the myosin filaments move away from each other.
- 32) The fundamental unit of the skeletal muscle is called axis.





Biology  
is Life

