



Primary 7 Integrated Science

Term 1

Theme: Human Body

Topic 1/3 – Muscular – Skeletal System

Learning Outcomes: The learner:

- develops appreciation for the human body as a system of muscles and bones.
- develops knowledge and skills for maintaining the body as a system.

Skeleton

- The skeleton is the **framework of bones inside the body**.
- It gives the body **shape, support, and protection**.

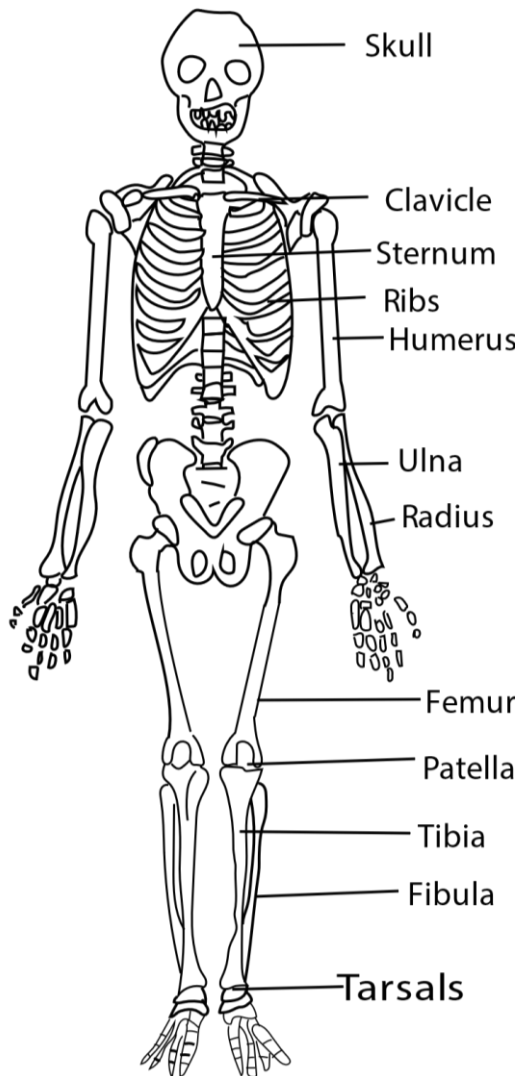
Functions of the Skeleton

- Supports the body** – helps us stand upright.
- Protects organs** – e.g., the skull protects the brain, ribs protect the heart and lungs, vertebral column protects the spinal cord.
- Helps movement** – bones join with muscles to allow walking, running, and other actions.
- Stores minerals** – like calcium, which keeps bones strong.
- Makes blood cells** – inside some bones, blood cells are produced.

Exercise 1

Mention any four functions of human skeleton.

Human skeleton



Parts of human skeleton

Human skeleton is divided into two parts:

The **axial skeleton** forms the central axis of the body and includes the **bones** of the skull, vertebral column, and the thoracic cage

The **appendicular skeleton** is the portion of the skeleton of vertebrates consisting of the bones that support the appendages.

The appendicular skeleton includes the skeletal elements within the limbs, as well as supporting shoulder girdle **pectoral** and **pelvic girdle**.

Joints

A joint is a place where joint meet.

Types of Joints

1. Movable Joints

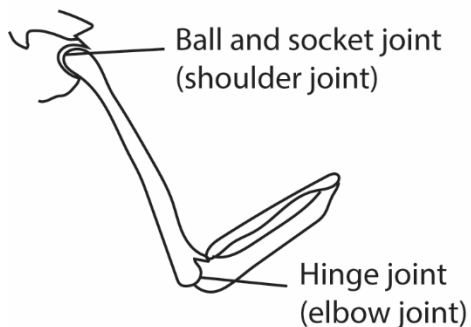
Movable joints are joints in the body that allow bones to move freely. They make it possible for us to walk, run, bend, and perform many activities.

Types of Movable Joints

(i) Hinge Joint

- Moves in one direction like a door.

A drawing of the arm bones to show positions of ball and socket joint and hinge joints



- Example: **elbow, knee, fingers.**
- (ii) **Ball and Socket Joint**
 - Allows movement in many directions.
 - Example: **shoulder, hip.**
- (iii) **Pivot Joint**
 - Allows turning or rotation.
 - Example: **neck (head turning side to side).**
- (iv) **Gliding Joint**
 - Bones slide over each other.
 - Example: **wrist, ankle.**

2. **Immovable Joints** – do not allow movement

- Found in the **skull**, where bones are fixed together to protect the brain.

Importance of Joints

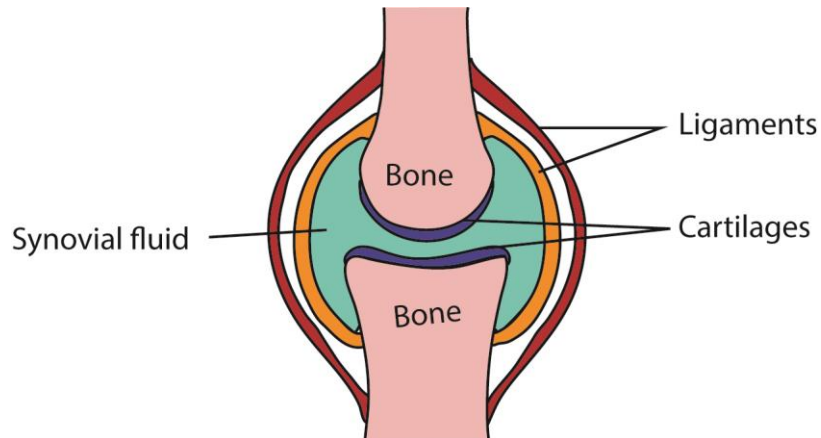
- (i) Help the body **move**.
- (ii) Provide **flexibility**.
- (iii) Allow us to perform daily activities like walking, bending, and turning.

☞ In short: **Movable joints allow different kinds of movement, while immovable joints (like in the skull) protect vital organs without moving.**

Exercise 2

Giving one example each list any four types of joints.

Parts of movable joints



Functions of Parts of a Movable Joint

- (i) **Bones** – provide structure and support; they form the framework of the joint.
- (ii) **Cartilage** – covers the ends of bones to reduce friction and prevent them from wearing out.
- (iii) **Synovial fluid** – acts like oil, lubricating the joint so bones move smoothly.
- (iv) **Ligaments** – strong bands that hold bones together and keep the joint stable.
- (v) **Muscles and tendons** – muscles create movement, and **tendons** attach muscles to bones to pull them during movement.

Exercise 3

State the function of each of the following tissues of a joint.

- (i) Cartilage
- (ii) Synovial fluid
- (iii) Ligament
- (iv) tendon

Muscles in the Human Body

Muscles are soft tissues that help the body move and perform different activities. They work together with bones and joints.

Types of Muscles

1. Voluntary Muscles

These are muscles we **control by choice**.

They help us move parts of the body when we decide to.

Examples: **arm muscles, leg muscles, face muscles**.

Function: allow walking, running, writing, smiling, and other actions.

2. Involuntary Muscles

These are muscles that work **without our control**.

They keep the body alive by performing automatic actions.

Examples: **heart muscles, stomach muscles, intestines**.

Function: pump blood, digest food, and move substances inside the body.

Exercise 4

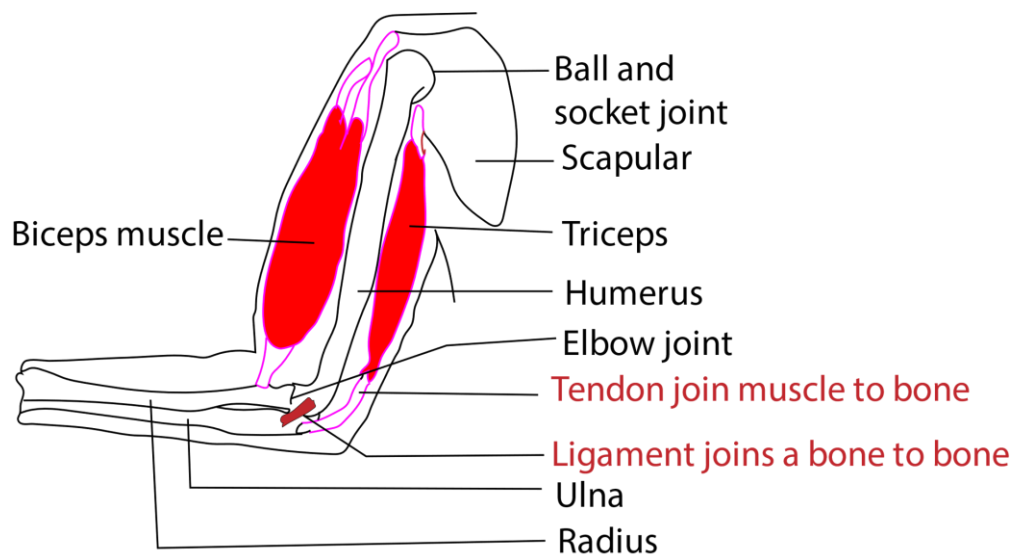
- (a) Distinguish between voluntary and involuntary muscles
- (b) Give one example of each of the following muscles
 - (i) Voluntary muscle
 - (ii) Involuntary muscle

Importance of Muscles

- (i) **Movement** – muscles work with bones and joints to help us walk, run, bend, and lift.
- (ii) **Support** – muscles hold the body upright and maintain posture.
- (iii) **Protection** – muscles cover and protect delicate organs inside the body.
- (iv) **Circulation** – the heart muscle pumps blood throughout the body.
- (v) **Digestion and breathing** – involuntary muscles help in swallowing food, moving it in the stomach, and controlling breathing.
- (vi) **Heat production** – muscles generate heat to keep the body warm.

☞ In short: **Voluntary muscles move when we choose, while involuntary muscles work automatically to keep us alive.**

Skeletal structures of the fore arm



NB

- (i) **Tendons** are tissues that join muscles to bones
- (ii) **Ligaments** are tissues that join bone to bone

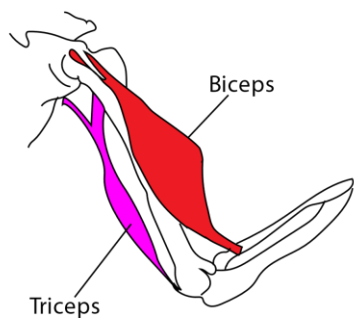
Antagonistic muscles

Antagonistic muscles are **pairs of muscles that work against each other** to bring about movement.

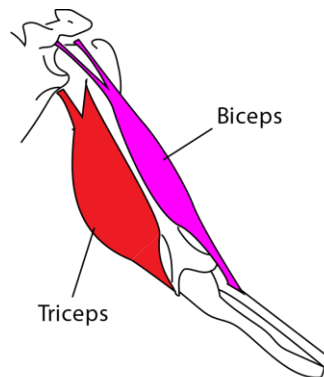
When one muscle contracts (shortens), the other relaxes (lengthens).

Examples

1. Biceps and Triceps (arm muscles)



When the biceps contract it bends and curls the arm



When the triceps contract it straightens the arm

2. Quadriceps and Hamstrings (leg muscles)

- **Quadriceps contract** → leg straightens.
- **Hamstrings contract** → leg bends.

Exercise 5

State what happens to the arm when

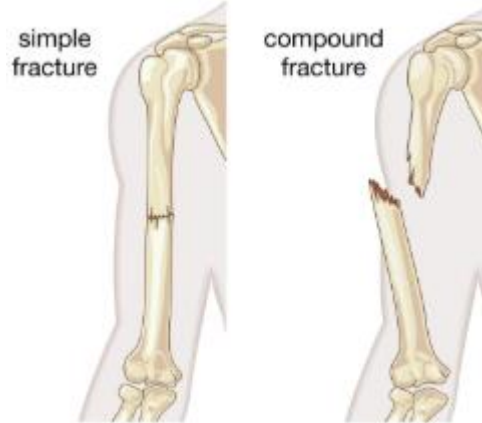
- Biceps muscle contract
- Triceps muscle contract

Diseases and Disorders of Bones, Muscles, and the Skeletal System

1. Diseases and Disorders of Bones



Rickets



Fractures

- (i) **Rickets** – caused by lack of vitamin D; bones become soft and bend.
- (ii) **Fractures** – broken bones due to accidents or falls.
- (iii) **Osteoporosis** – bones become weak and break easily.

2. Diseases and Disorders of Muscles

- (i) **Cramps** – sudden painful tightening of muscles.
- (ii) **Polio** – a disease that weakens muscles and can cause paralysis.
- (iii) **Muscle fatigue** – muscles get tired after too much work.

3. Diseases and Disorders of the Skeletal System

- (i) **Arthritis** – joints become swollen and painful.
- (ii) **Dislocation** – bones move out of their normal position at a joint.
- (iii) **Scoliosis** – abnormal bending of the backbone.

Prevention of Diseases and Disorders

- (i) **Eat a balanced diet** – include foods rich in calcium, vitamin D, and proteins to strengthen bones and muscles.

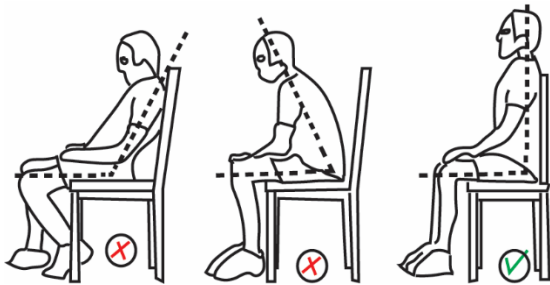
- (ii) **Exercise regularly** – keeps bones strong and muscles active.
- (iii) **Maintain good posture** – prevents backbone problems like scoliosis.
- (iv) **Avoid accidents** – be careful during play, sports, and work to prevent fractures or dislocations.
- (v) **Seek medical care early** – treat injuries and diseases quickly to avoid complications.
- (vi) **Rest properly** – allows muscles and bones to recover after work.

Posture

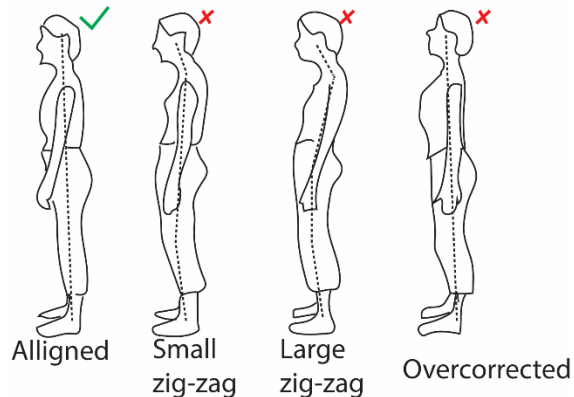
This is the way a person positions one's body while sitting, standing or walking.

Bad postures lead to bent bones which leads to back and chest pain

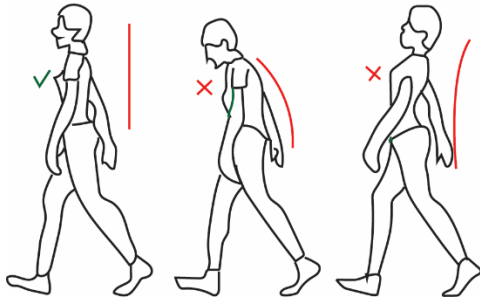
Sitting posture



Standing Postures



Walking Posture



Importance of Correct Posture

- (i) **Prevents backbone problems** – reduces chances of bending or deformities like scoliosis.
- (ii) **Avoids muscle strain** – keeps muscles relaxed and prevents unnecessary pain.
- (iii) **Helps breathing** – standing or sitting upright allows lungs to expand properly.
- (iv) **Improves blood circulation** – good posture helps blood flow easily throughout the body.
- (v) **Supports learning and work** – sitting correctly in class or at work keeps the body comfortable and focused.
- (vi) **Boosts confidence** – upright posture makes a person look smart and healthy.

Good health practices maintain skeletal system

- (i) Feed on a balanced diet
- (ii) Sit, stand and walk with correct posture.
- (iii) Avoid dangerous games like fighting that can cause injury.
- (iv) Regular exercise

Exercise 6

State any **four** good practices that maintain the skeletal system in good order.

Importance of Regular Physical Exercise

1. **Strengthens muscles and bones** – makes them firm and less likely to get weak or break.
2. **Improves flexibility** – keeps joints moving smoothly and prevents stiffness.
3. **Prevents diseases** – reduces chances of disorders like osteoporosis, arthritis, and muscle weakness.
4. **Helps posture** – supports the backbone and prevents bending problems.
5. **Improves blood flow** – supplies muscles and bones with nutrients and oxygen.

Revision Questions

1. Name the disorder in the skeletal system where a bone move from its normal position at the joint

Dislocation

2. (a) Name the two muscles found in the human arm

- (i) Biceps
- (ii) Triceps

- (b) State any one function of muscles in the human body

- (i) **Movement** – muscles work with bones and joints to help us walk, run, bend, and lift.
- (ii) **Support** – muscles hold the body upright and maintain posture.
- (iii) **Protection** – muscles cover and protect delicate organs inside the body.
- (iv) **Circulation** – the heart muscle pumps blood throughout the body.
- (v) **Digestion and breathing** – involuntary muscles help in swallowing food, moving it in the stomach, and controlling breathing.
- (vi) **Heat production** – muscles generate heat to keep the body warm.

- (c) State the importance of maintaining a correct posture

- (i) **Prevents backbone problems** – reduces chances of bending or deformities like scoliosis.
- (ii) **Avoids muscle strain** – keeps muscles relaxed and prevents unnecessary pain.
- (iii) **Helps breathing** – standing or sitting upright allows lungs to expand properly.
- (iv) **Improves blood circulation** – good posture helps blood flow easily throughout the body.
- (v) **Supports learning and work** – sitting correctly in class or at work keeps the body comfortable and focused.
- (vi) **Boosts confidence** – upright posture makes a person look smart and healthy.

3. Name one part of the human body where gliding joint is found?

- (i) **Wrist** – allows the hand to move in different directions.
- (ii) **Ankle** – helps the foot move and adjust while walking.

4. Give any one way in which regular physical exercise help to maintain the muscular-skeletal system healthy.
- (i) **Strengthens muscles and bones** – makes them firm and less likely to get weak or break.
 - (ii) **Improves flexibility** – keeps joints moving smoothly and prevents stiffness.
 - (iii) **Prevents diseases** – reduces chances of disorders like osteoporosis, arthritis, and muscle weakness.
 - (iv) **Improves blood flow** – supplies muscles and bones with nutrients and oxygen.

5. Why are triceps and biceps muscles referred to as voluntary muscles?

Their movements are controlled by choice/at will

6. (a) Apart from the vertebral column, give any two other parts of the human skeleton used for protection

- (i) Chest cavity protects the heart and lungs
- (ii) Skull protects the brain
- (iii) Long bones like femur protect bone marrow.

- (b) Name the part protected by the vertebral column in the body.

Spinal cord

- (c) Give any one health habit that helps to strengthen the human body

Physical exercise

7. The diagram below is of a human skull and a neck vertebra. Use it to answer the questions that follow



- (a) Name the movable joint K

Pivot joint

(b) Which delicate organ is protected by S
Brain

8. Name one sign of compound fracture.

Broken bone pierces the tissues causing bleeding

9. (a) Name any two bones that form the joint at the knee of the human body

(i) **Femur** – the thigh bone, which is the longest bone in the body.

(ii) **Tibia** – the shin bone, found in the lower leg.

(b) What name is given to the joint at the knee?

Hinge joint

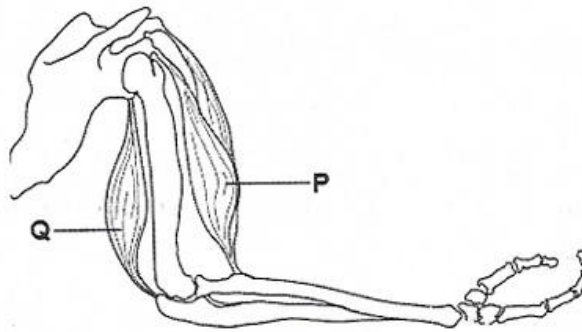
(c) In which one way is friction reduced at a joint?

(i) **Cartilage** – covers the ends of bones, making the surface smooth and preventing bones from rubbing directly against each other.

(ii) **Synovial fluid** – acts like oil, lubricating the joint so movement is smooth.

(iii) **Joint capsule and ligaments** – hold the bones in place, preventing rough contact.

10. The diagram below is of a human arm. Study and use it to answer the questions that follow.



(a) Name muscle P

Biceps muscle

(b) What happens to muscle Q when the arm is raised?

Relaxes

11. What is a compound fracture?

This is an injury where bone(s) break and come out of the flesh.

12. What First Aid should be given to a person with a compound fracture on the arm?

Tie a splint around the broken bone and hold the arm in one position by a sling.



13. (a) Give the difference between hinge joint and Ball and socket joint.

Hinge joint moves only in one plane whereas ball and socket joint moves in all directions.

(b) Give the function of a tendon.

It joins a muscle to a bone

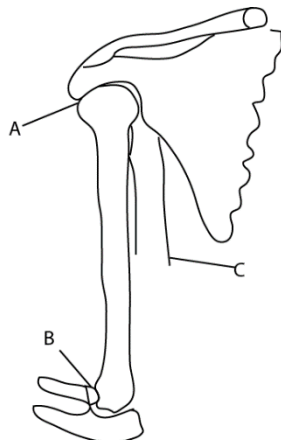
(c) Name a disease connected with the muscle and skeleton system.

Polio

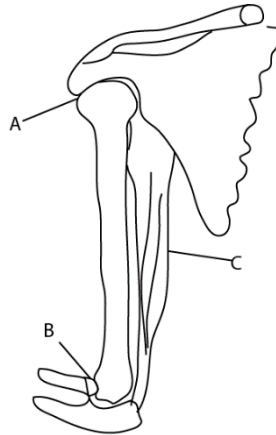
14. What is the difference in the movement between a ball and socket joint and a hinge joint?

Ball and socket joint move in all directions while a hinge joint moves in one plane only.

15. The diagram below is of a part of a human arm, use it to answer the questions which follow



- (a) Name the joint A
Ball and socket joint
- (b) What kind of movement does the joint B allow?
Allows movement in one plane
- (c) Complete the drawing of muscles C to show where its lower end is attached.



- (d) If the arm is in the position shown, name the muscle which must be contracted.

Biceps

16. (a) Mention the structure that joins a bone to a muscle
Tendon
- (b) Give one example of the following types of joints
(i) hinge joint: **knee, elbow**
(ii) ball and socket joint: **hip joint and shoulder joint**
- (c) Name the food substance that help in formation of strong bones.

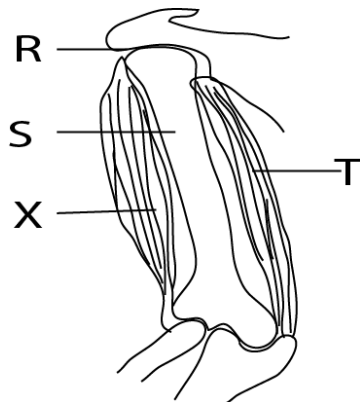
Calcium and phosphorus

17. Give an example of a ball and socket joint in human being.

Shoulder joint

Hip joint

18. The diagram below shows the arm. Study it and answer the questions that follow.



- (a) Name the Joint labelled R: **ball and socket joint**
- (b) Name the bone labelled S: **Humerus**
- (c) What happens to muscles T and X when the fore arm is raised?

T: **(triceps) - relaxes**

X: **(biceps) - contracts**

19. You are running home with your friend after school and one of your friends accidentally falls down and his thigh bone breaks

- (a) What do we call the injury he got?

Fracture

- (b) Give two things you will do to give him First Aid

Applying a splint around the broken bone area

Prevent movements

Stop bleeding

- (c) What would you prepare to enable you carry him properly

Stretcher

20. Which bone in the human skeleton protects the brain?

The skull

21. John fell off a bicycle and broke his thigh bone.

- (a) Name the injury which John got.

A fracture

- (b) State any two ways in which John can be given First Aid.

- (i) **apply a splint at the broken area**

- (ii) **give a pain killer**

- (c) What is the importance of giving first Aid to a person like John?

Reduce pain

Prevent injury from worsening

22. (a) Give any one part the human body where each of the following joint is found

(i) Ball and socket joint: **shoulder and hip**

(ii) Hinge joint: **elbow and knee**

(iii) Gliding joint: **wrist**

(b) Which one of the above joint can make an all –round movement?

Ball and socket joint

23. Give any one function of the human skeleton.

Provide shape of organism

Provide support

Protect delicate organs

Manufacture red blood cells

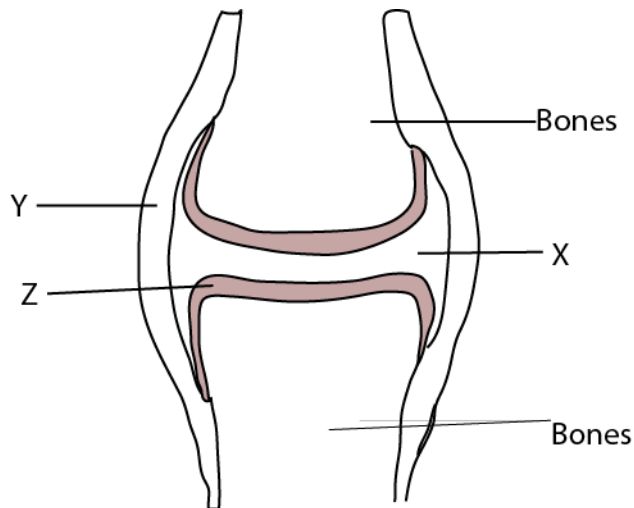
Store minerals like phosphorus and calcium

24. Why is a sling used when giving First Aid to a person with a broken hand?

To minimize movement of the broken hand

25. The diagram below shows a human joint.

Use it to answer the questions that follow.



(a) Name the part marked with letter **Y** and **Z**

(i) **Y** **Ligament**

(ii) **Z** **cartilage**

(b) Give any one function of the fluid found in the place marked with letter **X**

The synovial fluid reduce friction

(c) What type of joint is shown in the diagram above?

Hinge joint

26. Name one structure in a human which connects bone to bone.

Ligament

27. (a) State the function of each of the following structure in the human skeleton.

(i) Ligament: **joins a bone to a bone**

(ii) Tendon: **joins a bone to a muscle**

(b) Give one example of a long bone in a human skeleton.

Femur, Humerus, tibia, fibula, ulna, radius.

(c) Name one disease that affects a human skeleton.

Polio, rickets, osteomyelitis, Yaws, cancer of the bones

28. What kind of accident requires the use of splints in giving First Aid?

Fracture

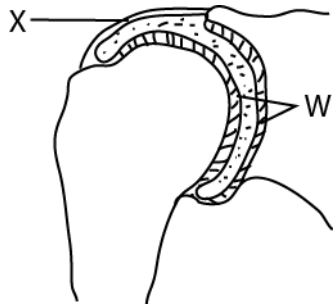
29. The table below shows joints and their position in the human body.

Study and complete it correctly

Joints	Position in the body
Pivot joint	Neck
Ball and socket joint	shoulder
Hinge joint	Knee
Suture joint	Skull

The diagram below shows part of a joint.

Study and use it to answer questions that follow

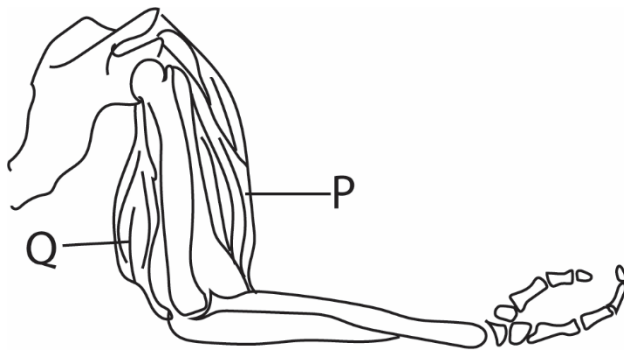


(a) Name the part marked X

Ligament (joins a bone to a bone)

(b) Using letter W, label the part that reduces friction in the joints, apart from the synovial fluid.

30. The diagram below is of a human arm. Study and use it to answer questions that follow



(a) Name muscle P

Biceps

(b) **What** happens to muscle Q when the arm is raised?

Relax

31. (a) Name any two bones that form the joint at the knee of the human body

(i) **Femur**

(ii) **Tibia**

(b) What name is given to the joint at the knee?

Hinge joint

(c) In which one way is friction reduced at the joints

By smooth cartilages

By synovial fluid.

32. State any sign of a compound fracture

Broken bones pierce through the skin

Thank You

Dr. Bbosa Science