

# THE SKELETAL SYSTEM

The skeleton is the body's bony framework which consists of **206** bones. The bones are made up of **water**(45%), **calcium and phosphorous**(35%) and other **organic materials**(20%). The calcium and phosphorous are **minerals** which give the bones their hardness. The organic materials consists mainly of a substance called **collagen**, which allows the bones to be squashed and twisted a little without breaking (although they will break if squashed and twisted too much).

Bones of the human skeleton are alive. Every bone in the human body has tiny blood vessels called capillaries. These help to keep our bones healthy, especially as we grow in size during our teenage years.

## FUNCTIONS OF THE SKELETAL SYSTEM

### Our skeletal system:

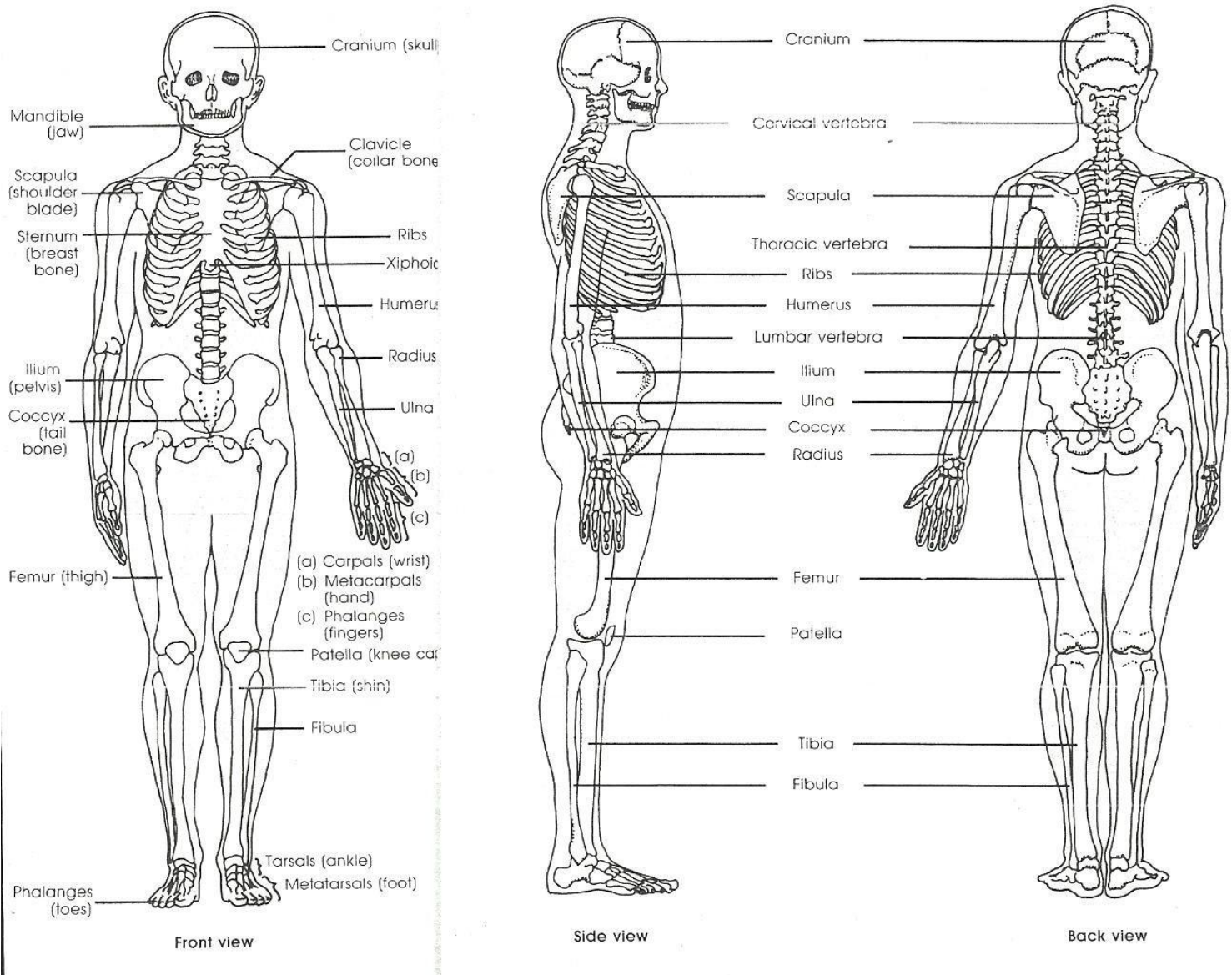
- **Protects** the delicate vital organs of the body.
  - The skull protects the brain
  - The vertebral column protects the spinal cord
  - The rib cage protects the heart and lungs
- Provides **shape** and **support**.
  - gives the body shape
  - supports (holds) internal organs in place
  - supports the body in the correct position or posture
  - provides attachment for muscles
- Allows **movement**
  - works as a lever system
  - allows us to make a fine and large movements
  - allows various types of movements
- **Produces blood**
  - Produces red and white blood cells in the marrow cavity and spongy bone
- **Stores calcium** and other minerals in the bones

## PARTS OF THE SKELETON

The human skeleton is divided into two parts called the **axial** skeleton and the **appendicular** skeleton.

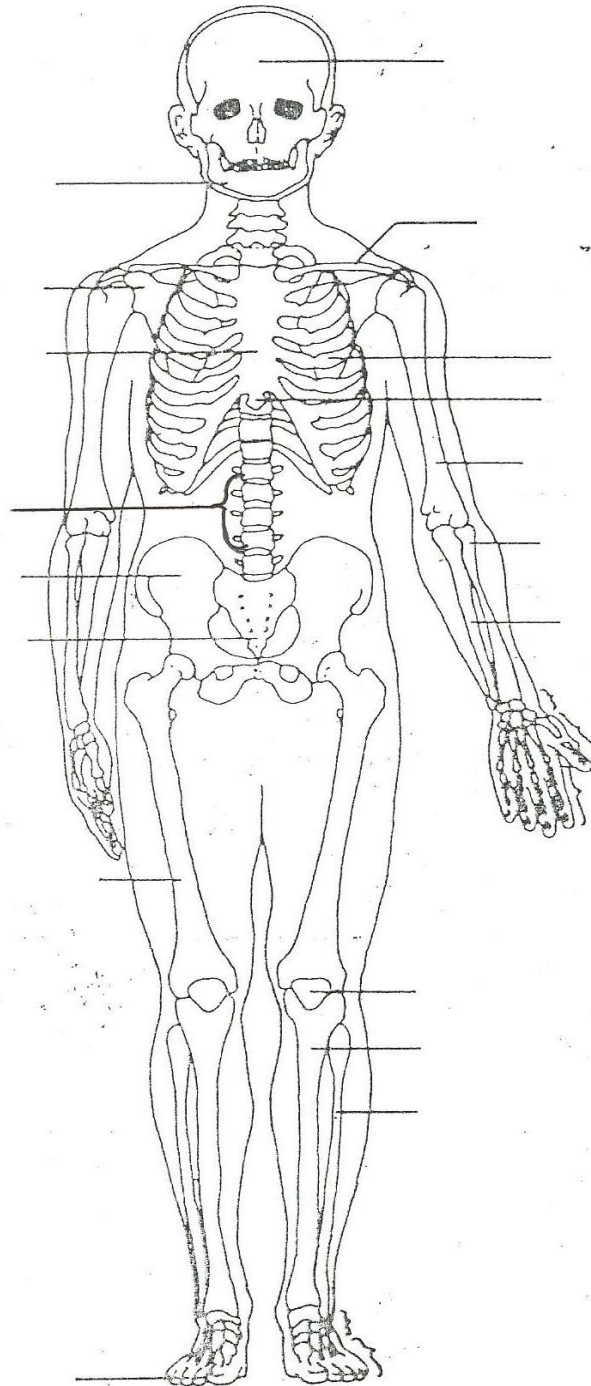
- The **Axial Skeleton** is the central part of the skeleton, and is made up of the skull (or cranium), the spine (or vertebrae), the twelve pairs of ribs and the breast bone (or sternum).
- The **Appendicular Skeleton** consists of the shoulder girdle, arm and hand bones, hip girdle and leg and foot bones.

## NAMES OF THE BONES OF THE SKELETON



**Task 1:**

- a) Label the bones of the skeleton
- b) Colour the bones of the axial skeleton **red** and the bones of the appendicular skeleton **blue**. (use coloured pencils only)



**Task 2:**

Look at the diagram of the Skeleton on page 23 of your text and complete the table below by writing in the scientific names of the bones in the correct spaces.

**BONES OF THE AXIAL SKELETON**

<b>Body Part</b>	<b>Common Name</b>	<b>Scientific Name</b>
Head	Skull	
Back (centre)	Spine	
Chest (centre)	Breast Bone	
Chest & Back	Ribs	

**BONES OF THE APPENDICULAR SKELETON**

<b>Shoulder Girdle and Arms</b>		
<b>Body Part</b>	<b>Common Name</b>	<b>Scientific Name</b>
Shoulder	Collar bone	
	Shoulder Blade	
Upper Arm	-	
Forearm	-	
	-	
Wrist	-	
Hand (palms)	-	
Fingers	-	

<b>Hip Girdle and Legs</b>		
<b>Body Part</b>	<b>Common Name</b>	<b>Scientific Name</b>
Hips	Pelvis	
Thigh	-	
Knee	Knee cap	
Leg	Shin	
	-	
Ankle	-	
Foot	-	
Toes	-	

## TYPES OF BONE

The bones of the skeleton consist of compact bone and spongy bone are of different shapes and sizes. The size and shape of the bones is related to the job it has to do.

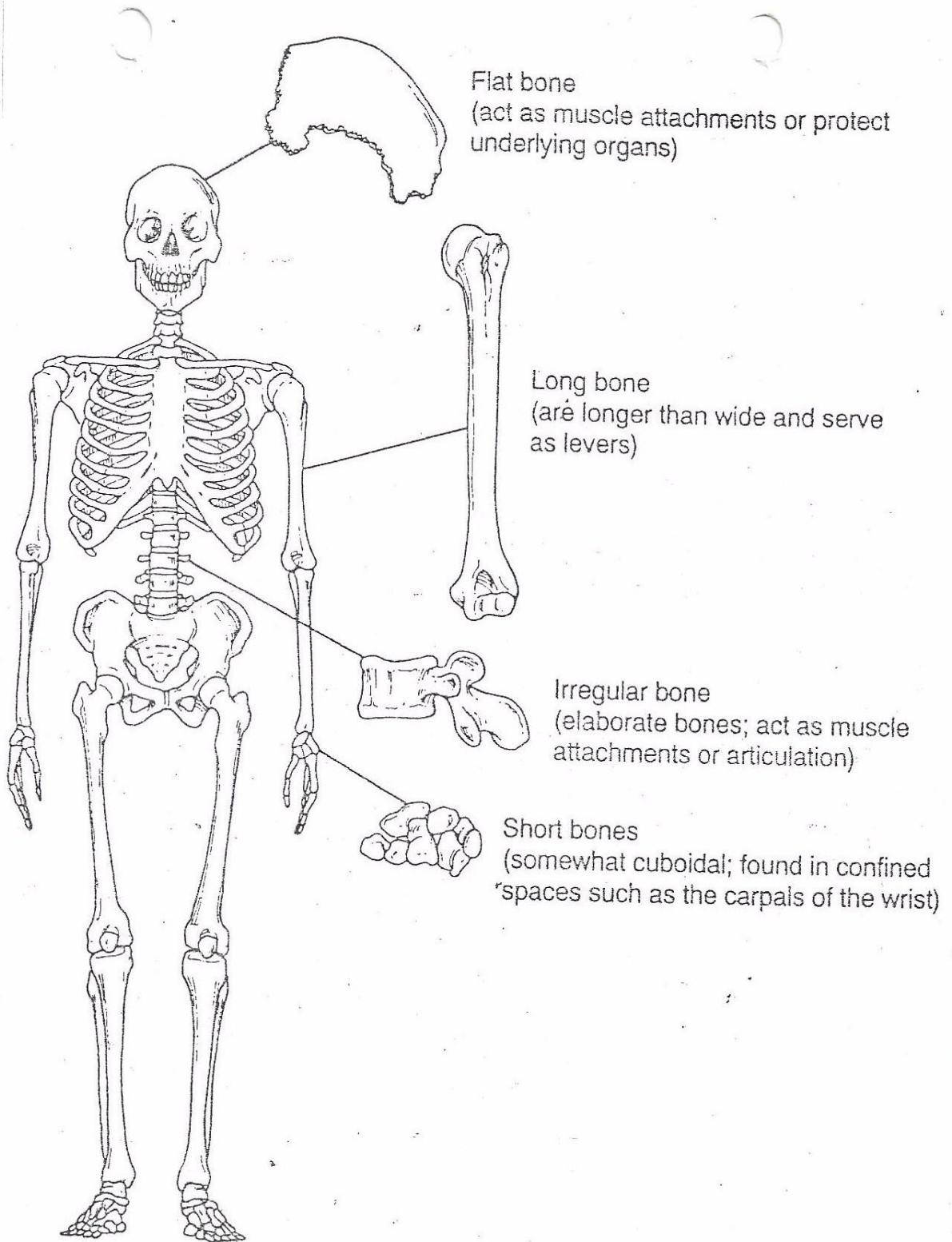
There are four main types of bone in our body:

- **Long bones** are longer than they are wide and have a long thin section called the shaft and two ends (heads) which are usually enlarged. They are used as levers for large movements such as pushing, pulling and throwing. The bones of the limbs (except the patella and the bones of the wrist and ankle) and the clavicle are long bones.
- **Short bones** are smaller and cubed shaped. They are spongy bone covered with compact bone. These bones allow small movements in different directions. The bones of the wrist and ankle are short bones.  
A **sesamoid bone** is a special type of short bone embedded within a tendon. The knee cap or patella is a special type of short bone.
- **Flat bones** consist of spongy bone between two layers of flat bone. They are broad, thin, flattened, usually a bit curved. They serve as shields to protect delicate organs and give a big surface area for muscle attachment. The cranium, sternum (breastbone), ribs, scapula and pelvis are flat bones.
- **Irregular bones** have spongy bone inside and compact bone outside. They are complex in form and can take a variety of different shapes. These normally have bits that stick out, known as projections. Irregular bones serve as shields and help support the body's weight. The bones of the face and vertebrae are irregular bones.

**Task 3:**

Colour the different types of bones of the skeleton as follows:

**Long bones- red; short bones-blue; flat bones- yellow and irregular bones- green**



**Task 4:**

Write the type of bone next to the scientific names of the bones below.

<b>Name of bone</b>	<b>Type of Bone</b>
Cranium	
Ribs	
Sternum	
Vertebrae	
Clavicle	
Scapula	
Humerus	
Radius	
Ulna	
Carpals	
Metacarpals	
Phalanges	
Ilium	
Femur	
Patella	
Tibia	
Fibula	
Tarsals	
Metatarsals	

## STRUCTURE OF THE LONG BONE

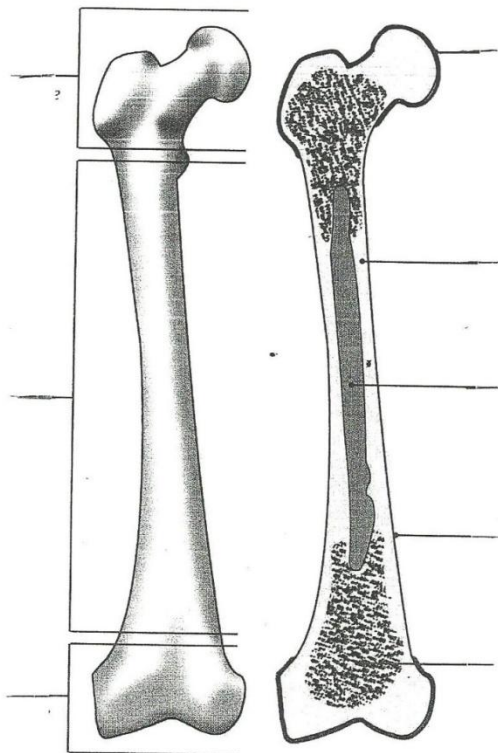
Long bones are made up of two types of tissue:

- **Compact bone** is an extremely tough material that forms the outside layer of a bone and is the tissue we find in the shaft of a long bone.
- **Spongy bone** is located inside the heads of long bones. It resembles the honeycombed criss-crossed pattern like scaffolding, giving the bone strength without a large amount of weight.

Long bones are very strong but they are not very heavy. This is because they have a hollow in the middle of the shaft, known as the **marrow cavity**. This is where white blood cells are produced. The holes of some spongy bone are filled with red marrow which makes red blood cells.

### Task 5:

Look at the diagram of the long bone on page 22 of your text and label the diagram of the long bone below.





## DEVELOPMENT OF THE SKELETON

The skeleton is formed during the first three months of foetal existence and is made up of cartilage. When a child is born, the entire skeleton is made up of cartilage. As we grow older the cartilage hardens gradually to form bone. This process is known as **ossification**.

In long bones, the cartilage in the shaft is the first area to be converted into bone, followed by the cartilage in the heads of the bone. To harden into mature strong bones, the skeleton needs calcium.

The skeleton continues to grow in length until about the age of 13-15 in girls and 16-18 in boys.

### Task 6:

Complete the following sentences with the correct word or phrase.

1. At birth the entire skeleton of a baby is made up of \_\_\_\_\_ .
2. The substance needed to make strong healthy bones is \_\_\_\_\_.
3. Between the ages of \_\_\_\_\_ to \_\_\_\_\_ years the skeleton stops growing in girls.
4. In boys the skeleton stops growing between the ages of \_\_\_\_\_ to \_\_\_\_\_ years.
5. The four types of bones are \_\_\_\_\_ bones, \_\_\_\_\_ bones, \_\_\_\_\_ bones and \_\_\_\_\_ bones.
6. White blood cells are manufactured in the \_\_\_\_\_ of \_\_\_\_\_.
7. The type of bone found in the shaft of a long bone is \_\_\_\_\_ bone.
8. The ends of long bones are called \_\_\_\_\_.
9. Spongy bone is found in the \_\_\_\_\_ of long bones.
10. \_\_\_\_\_ blood cells are manufactured in the heads of long bones.