What are the functions of the skeleton?

Importance in sport (s)

Protects you in conflict sports such as boxing for example the

Every sport as the body wouldn't have its upright position if it

Movement is essential to all sport because it would be impossi-

ble to move without bones. For example it would be impossible

to run if you didn't have muscles pulling your legs. Bones meet

stronger bones which are essential to avoid injury. It also stores

to form joints and then muscles pull to provide force to move

Minerals are important in sport because they help provide

fat which can provide energy during sport

weren't for the skeleton. This upright shape is especially im-

portant in sports like basketball where height helps.

skull protects the brain from impact

bones

Example (s) of bone (s) where

function is located.

All bones of the appendicular and

All bones of the appendicular skele-

ment the movement is provided by

All bones store minerals. These minerals

In the bone marrow of all long bones

and flat bones - produce red blood

erals are calcium, magnesium and

ton help to aid movement as they

contain joints and provide move-

muscles pulling the bones.

cells & white blood cells

Femur, Tibia, Pelvis

axial skeleton provide support.

Cranium

Rib cage

phosphorus

Patella

Unit	1	Learning	Aim	A
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What is the skeleton?

The skeleton is a bony framework of about 206 bones which gives our body shape and protects the body.

What is the axial skeleton?

The axial skeleton consists of all the bones in the skull, ribcage and spine. These bones protect, support or carry other body parts. An example of this is how the skull protects the brain. The axial skeleton is basically the central core of the body.



What is the structure of the bone?

A bone is a rigid non elastic hard substance. It is made up of 65% minerals (with much of it being calcium) and collagen which helps it bend and strengthen bones. If a bone was completely made from minerals it would break easily. A bone consists of two different types of bone. Compact bone and cancellous bone.. Compact bones form the outer surface layer of bones and the whole shaft of long bones. And coat all bones. Compact bones also protect you from external forces and provide you with weight bearing abilities. Cancellous bones lie beneath and inside compact bones. They are also found at the end of long bones and they fill all flat bones. These look like honeycomb and they are constantly reorganised to strengthen the bones during exercise. Many factors contribute to bone density, one of the main factor is exercise. Weight bearing exercises in particular helps to promote stronger bones. A weight bearing exercise is one in which you use your muscles against gravity such as running or dancing. These cause stress on the bones and help increase the production of osteoblasts which help rebuild bones. Impact exercises result in small deformations. In response to this osteoblasts transfer to the surface Articular cartilage of the bone to build stronger bones. Diet is also very important Epiphysis line/ for healthy bones. The main substance you need to make sure epiphyseal plate. you have in your diet is calcium which is essential for bone density. Vitamin D is also important for maintaining epiphysis bone health. There is a process that bones must do in order to grow this process is called ossification. Ossification is the Cancellous/ process by which embryonic cartilage is replaced with bone, spongey bone osteoblasts are the bone-forming cells whereas osteoclasts are cells that remove material to form the central canal in a long Bone marrow bone Ossification is the process of bone formation, in which connective tissues, such as cartilage are turned to Diaphysis Compact bone bone or bone-like tissue. A foetus's skeleton is made (shaft) entirely of cartilage and then as people grow up the periosteum Cartilage turns to bone. There are two main parts of the bone the Epiphysis (the head) and the diaphysis (the shaft) in between these two areas there is an area of cartilage called the epiphyseal plate/ growth plate the cartilage stretches and grows bigger and as epiphysis this happens the cartilage nearest the diaphysis hardens to form bone. Then this process is repeated and the bone gets a little bigger each time.

Metacarnals The five classifications of bone

Type of bone	example	shape	function	Uses in sport	
Long bones	Legs (tibia fibula and femur and arms (radius, ulna and humerus)	Long and thin, they are a lot longer than they are wide. They are cylindrical.	The long bones are used in most movements by provid- ing levers and they help give us our upright position	Very important in all gymnastic events and it would be impossible to run or throw without them	
Short bones	Hands (phalanges, metacarpals and carpals) and feet (tarsals metatarsals and phalanges)	As long as they are wide. They are small and cube shaped.	Used to help you grip items and to enable you to balance. They are designed for strength and weight bearing exercise.	In gymnastics when gripping onto the rings or when doing a balance	
Flat bones	Flat Ribs, pelvis, ster- bones num and skull Flat plates of bone which are slightly curved		They protect important parts of the body. Also the pelvis helps support the weight of the body	In sports like boxing the skull pro- tects the brain against punches	
Irregular bones 14 bones in the face and 33 bones in the spinal col- umn Sizes Sizes		They protect the nervous tissue and provide attach- ment sites for some skeletal muscles. And gives us our upright shape	The spine protects the nervous tissue which is important because if it didn't something as simple as a ball hitting you in the back could seriously harm you.		
Sesamoid bones	Patella	Usually shaped like short or irregular bones usually small.	Increases the mechanical advantage of the tendon. And they ease joint movement and resist friction.	It helps you too run by making you able to move your knee more meaning you can take longer strides	

Ossification

Ossification is the process that bones are formed and grow. Embryos have a cartilage template; they are soft and this process helps them to develop. The process of ossification uses calcium to create the bones as the child matures; a good source of calcium is milk. Osteoblasts are the bone building cells whereas the osteoclasts are breaking down cells and remove the material to form the central canal within a long bone.

Osteoblasts which are a type of bone cell are found in the bone tissue and builds new bones. These osteoblasts enter the cartilage and gradually replace the cartilage with bone (old cells called Osteocyte. This continues until the epiphyseal plate has been replaced with bone. For this to happen blood cells are needed to provide materials like calcium and deposit within the tissue.

Osteoclasts are cells that break down and absorb bone tissue back into the body; these cells must work together with osteoblasts to maintain the skeletal system. Osteoclasts degrade bone surfaces so that osteoblasts can produce new bone.

The spinal column

Function

Shape & support

Leverage/ move-

Storage of miner

Blood cell pro-

Weight bearing

across joints

Reducing friction

duction

ment

als

Protection

The spinal column is made up of a total of 33 irregular shaped bones. Between these bones there is a thin layer of cartilage which protects and stops the bones rubbing together. The spine is split into 5 areas each with a different

Area of spine	Number of bones	Function	
Cervical	7	Enables us to move our head and ro- tate at the neck	
Thoracic	12	Connects the ribs	
Lumbar	5	Allows support for weight bearing, provides most movement	
Sacral	5	Carries weight of the upper body	
coccyx	4	Muscle attachment sites	



Articular cartilage