

### NEW WORDS

- brittle
- cartilage
- collagen
- contract
- fracture
- frame structure
- joint
- ligament
- mineral salts
- muscle
- tendons

## 2.4 The musculoskeletal system

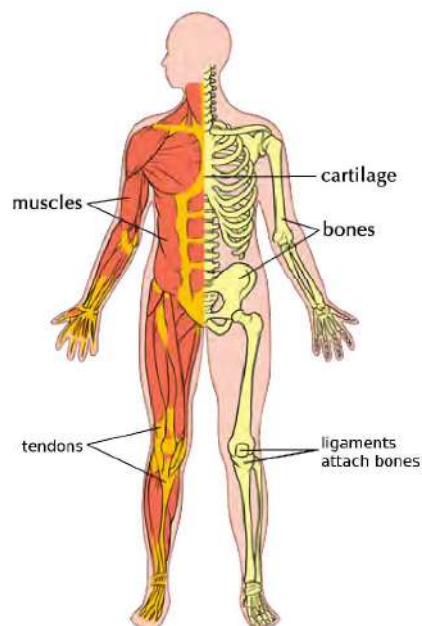
All the movements that your body performs rely on a system of muscles, tendons, ligaments, bones and joints that work together. These are the components of your musculoskeletal system.

### Purpose of the musculoskeletal system

Muscle tissue is responsible for producing movement in the body, however muscles need to be attached to a frame structure to produce movement.

The bones of the skeleton provide a frame for muscles to attach to, so that movement is possible. The skeleton also protects the body, especially the soft, fragile organs like the heart, lungs and brain.

### Components of the musculoskeletal system



*The components of the musculoskeletal system help bring about movement.*

### VISIT

A video on muscle contraction and relaxation in the arm.

[bit.ly/13ZIUd](http://bit.ly/13ZIUd)



### DID YOU KNOW?

You use 200 muscles when taking only one step!



The components of the musculoskeletal system include the following:

#### 1. Muscles

Muscles allow us to move because they are able to contract (become shorter) and relax (become longer).

#### 2. Bones

Bones provide support and help to form the shape of the body. The place where bones meet is called a joint - think of your knee or elbow joint, or your finger and toe joints.

#### 3. Cartilage

Cartilage is stiff yet flexible and is found between bones in joints and between the ribs and breastbone (as indicated in the diagram). It also forms the ears, nose and bronchial tubes, and forms discs between the bones of the spinal column.

#### 4. Tendons

Your muscles attach to the bone with strong cords called tendons. You can feel some of the tendons in your body, for example behind your ankle (called the Achilles tendon).

#### 5. Ligaments

Ligaments occur between bones at joints and hold bones together within the joint. Ligaments are extremely strong.

#### Main processes in the musculoskeletal system

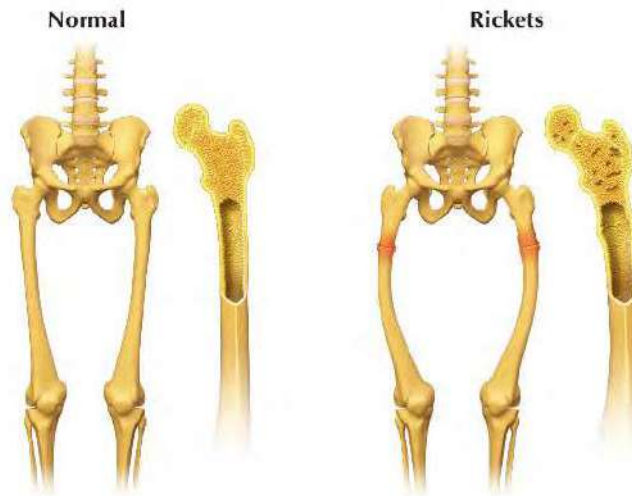
We can move our entire bodies from one place to another through self-propulsion. This is called **locomotion**. Locomotion is different to movement. Movement is the change in shape, direction, position or size of a part of the body. Animals show movement and locomotion. What about plants? Do you think plants show movement and locomotion?

Locomotion and movement are made possible through the contraction and relaxation of muscles. Muscles are stimulated by nerves to contract.

#### Health issues involving the musculoskeletal system

Common disorders of the musculoskeletal system include:

**Rickets:** This disorder is caused by a lack of vitamin D, calcium or phosphate which results in soft, weak bones. A typical symptom in children who have rickets is a bowing (bending outwards) of the bones of the legs.



*Can you see how the shape of the bones changes when a person has rickets?*

**Arthritis:** This is a condition where the joints in the body become inflamed, painful and swollen. The cartilage between the joints breaks down causing the bones to rub against each other which is very painful.

**Osteoporosis:** This occurs when the bone tissue becomes brittle, thin and spongy. These fragile bones can break easily, and they start to crumble and collapse. Although osteoporosis is common in older people (especially older women), teenagers and young adults may also develop it.

#### NEW WORDS

- bowing
- locomotion
- self-propulsion



#### DID YOU KNOW?

The muscle that moves the fastest in your body is the muscle that controls your eyelids! There is a reason why we use the phrase "in the blink of an eye" to mean very fast!



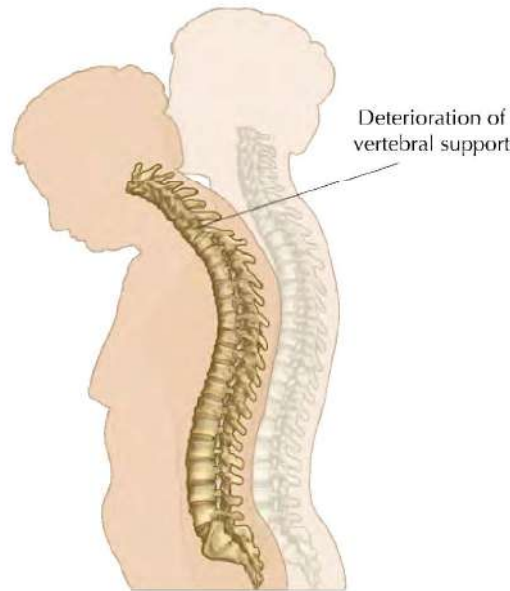
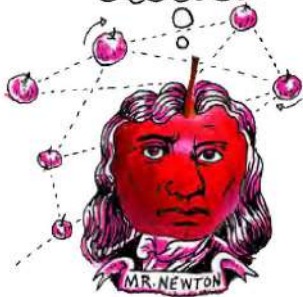
#### VISIT

An innovative use of 3D printers to help repair fractures in bones!  
[bit.ly/13Q6hBw](http://bit.ly/13Q6hBw)



### DID YOU KNOW?

Babies are born with 305 bones while adults only have 206 bones. As babies grow into adults, many smaller bones fuse together to form bigger bones.



*As this woman got older, she developed osteoporosis causing her vertebral column to crumble and collapse and so she now stoops over.*

## 2.5 The excretory system

We will now be looking at the excretory system. This is often confused with egestion, which we previously learned about.



### ACTIVITY: Differentiating between excretion and egestion

Do you remember learning about the difference between excretion and egestion? Explain what you understand the difference between these terms are.

1. Egestion is...

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2. Excretion is ...

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