Movement

What are joints?

Joints occur where two or more bones join together. Most joints are flexible. However, some bones in your skeleton are joined rigidly together and cannot move.

How do joints allow you to move?

Your joints need to be strong enough to hold your bones together but flexible enough to let them move. Different types of joint allow movement in different directions.

Three types of joint are:

- hinge joints – for movement backwards and forwards, for example, the knee and elbow
- ball-and-socket joints – for movement in all directions, for example, the hip and shoulder
- fixed joints – do not allow any movement, for example, the skull.

The ends of bones in a joint are covered with cartilage, a strong, smooth tissue. It is kept slippery by fluid in the joint. This allows the bones to move without rubbing together. The two bones are held together by ligaments.

The strength of a muscle can be measured by how much force it exerts. You can measure the strength of your muscles using a Newton scale. The harder you can push on the scale, the greater the force exerted. Force is measured in newtons (N).

Quick question

State the unit of force.

Muscles in the body

Muscles are found all over your body. They are a type of tissue – lots of muscle cells work together to cause movement.

How do muscles work?

To make you move, muscles work by getting shorter – they contract.

Muscles are attached to bones by tendons. When a muscle contracts, it pulls on a bone. If the bone is part of a joint, the bone will move.

How do pairs of muscles work together?

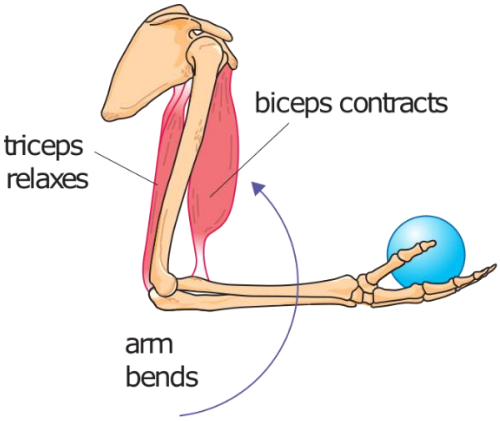
Muscles can only pull. They cannot push. This means that two muscles have to work together at a joint. If you only had one muscle in your arm, you may be able to bend your arm but you would not be able to straighten it again.

At each joint a pair of muscles work together to cause movement. These are known as antagonistic muscles. When one muscle contracts, the other muscle relaxes.

The biceps and triceps are an example of a pair of antagonistic muscles. These are used to bend and straighten the arm at the elbow joint.

To bend the arm:

- the biceps muscle (on the front of the upper arm) contracts
- the triceps muscle (on the back of the upper arm) relaxes.



To straighten the arm:

- the biceps muscle relaxes
- the triceps muscle contracts.