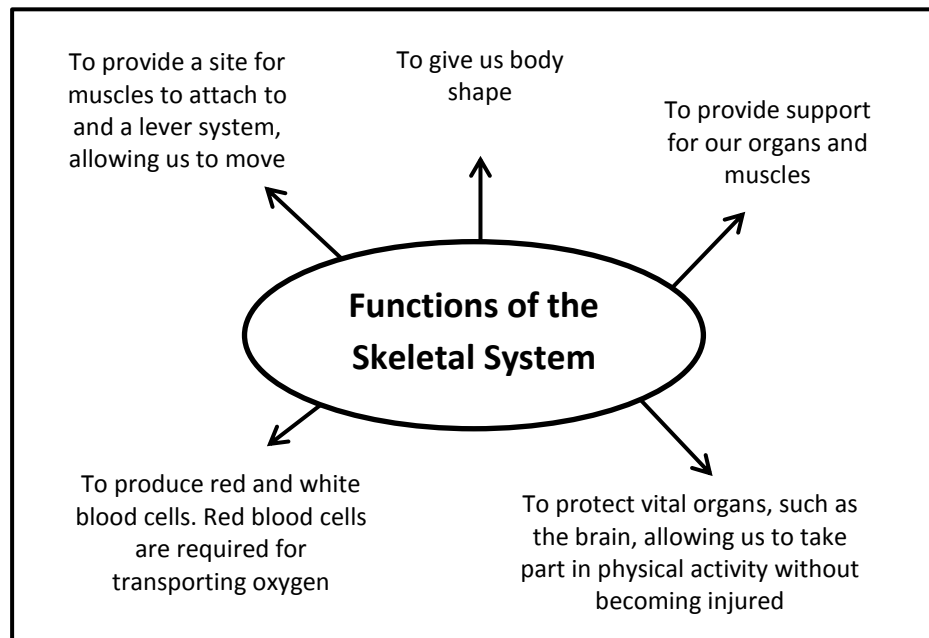




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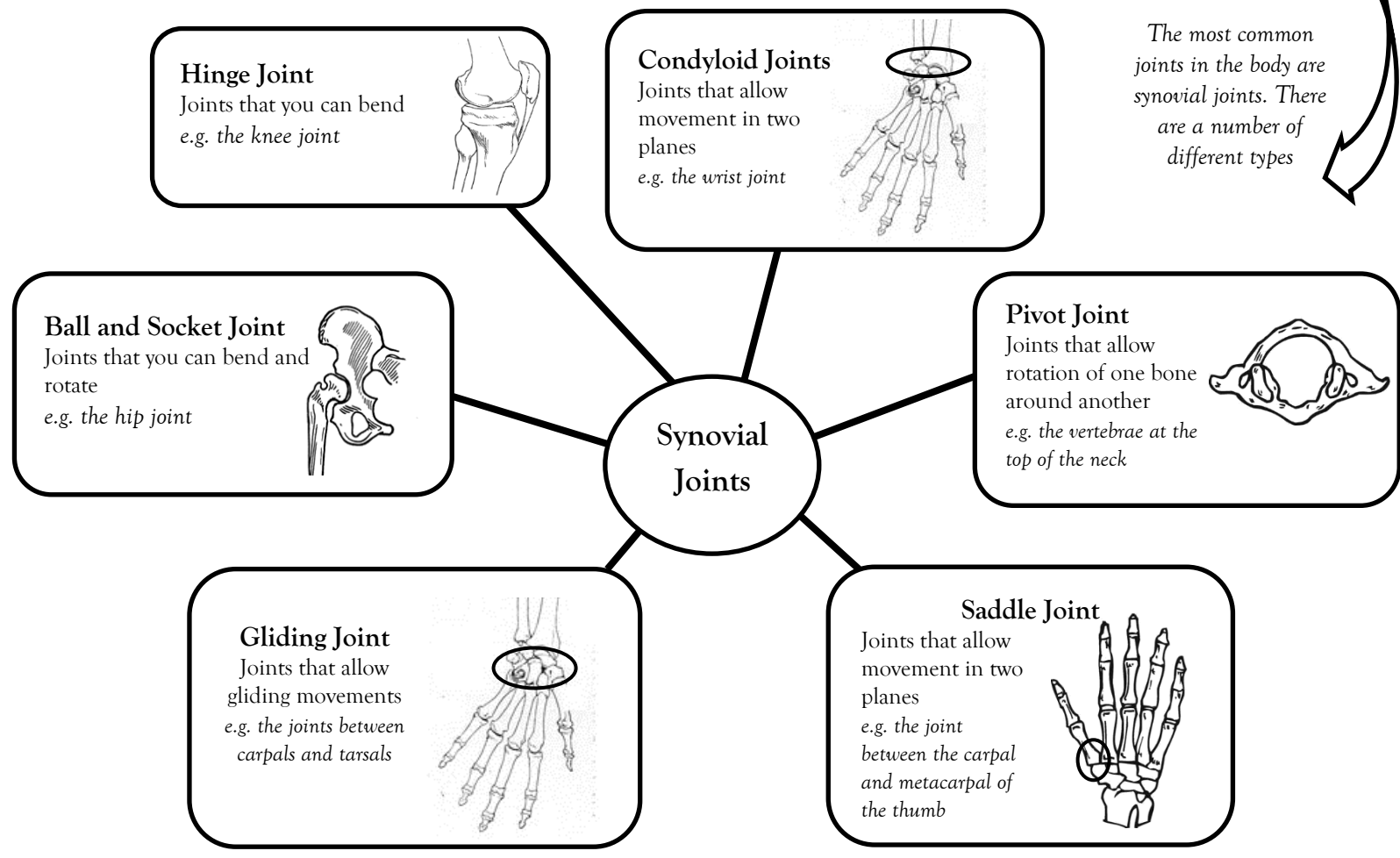
**Bones**  
The skeletal system is made up of different types of bones:

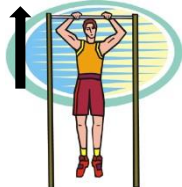

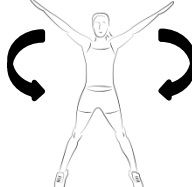

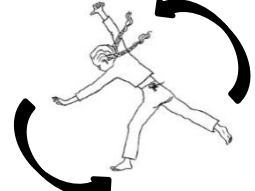
- **Long bones:** bones that are primarily involved in movement e.g. the femur and humerus
- **Short bones:** The bones that are primarily involved in shock absorption e.g. the phalanges
- **Flat (or plate) bones:** The bones that are primarily required for the protection of vital organs, and which also provide a site for muscle attachment e.g. the skull and ribs
- **Irregular bones:** The bones that are primarily involved in providing protection and shape e.g. the vertebrae

**Joints**

Joints are where two or more bones are connected, and where movement occurs. There are different types:

Immovable Joints	Cartilaginous Joints	Synovial Joints
Fixed	Slightly Moveable	Freely moveable
E.g. in the skull and pelvis	E.g. the joints between vertebrae	E.g. the knee and shoulder joints



Movements				
Flexion	Extension	Adduction	Abduction	Rotation
The angle of the joint decreases in size	The angle of the joint increases in size	Movement of a limb towards the body	Movement of a limb away from the body	A circular motion about an axis
E.g. flexion at the elbow joint during the upwards phase of a pull-up	E.g. extension at the knee when kicking a football	E.g. adduction of the arms during the downwards phase of a star jump	E.g. abduction of the arms during the outwards phase of a star jump	E.g. rotation of the whole body during a cartwheel
				

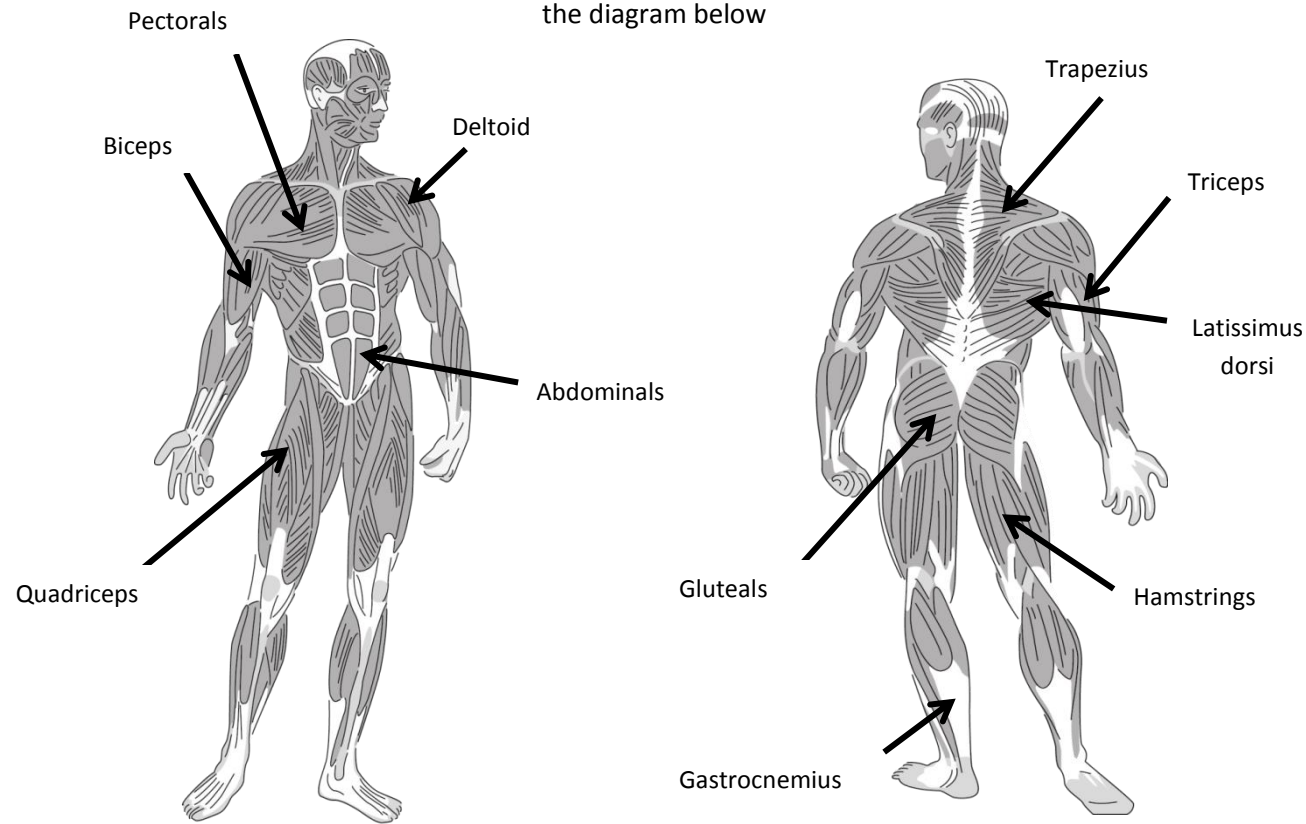
**Connective tissue**  
Connective tissue provides support and connects different parts of the body. There are three different types:

- **Tendons:** Strong, non-elastic tissue that joins muscle to bone
- **Cartilage:** Tough, flexible tissue that acts as a shock absorber between bones
- **Ligaments:** Connective tissue that attaches bone to bone, and helps to keep joints stable

# THE MUSCULAR SYSTEM

## Muscles

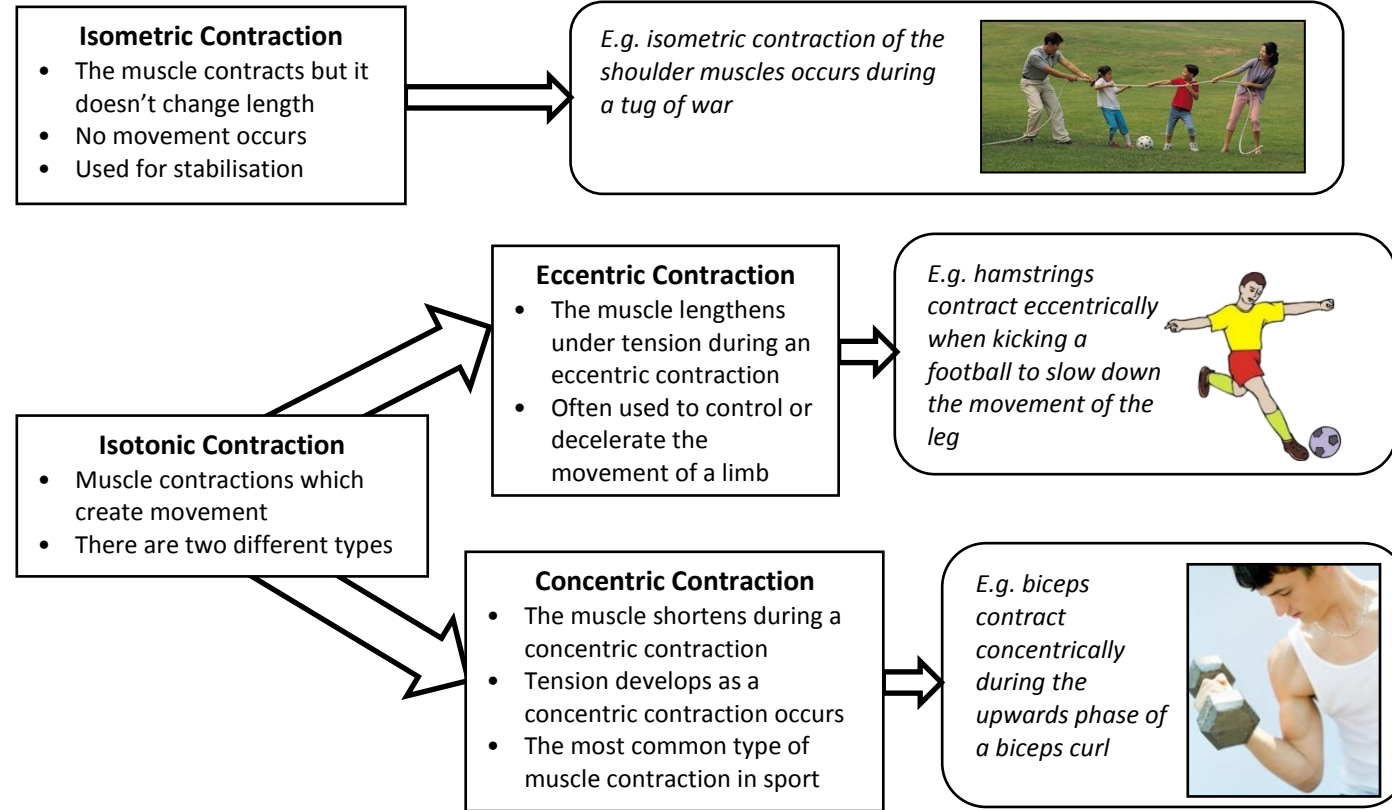
We have over 600 muscles in our body! Some of the major muscle groups that you need to know are labelled on the diagram below



## Types of Muscle

Skeletal Muscle (also called voluntary muscle)	Involuntary Muscle	Cardiac muscle
<ul style="list-style-type: none"> <li>The majority of muscles are voluntary muscles</li> <li>They are attached to bones</li> <li>They are under conscious control (controlled by the nervous system)</li> <li>They allow movement</li> </ul>	<ul style="list-style-type: none"> <li>Located in the digestive and circulatory systems</li> <li>Not under conscious control</li> <li>Contract and relax automatically</li> <li>Contract slowly and rhythmically</li> </ul>	<ul style="list-style-type: none"> <li>Located only in the heart</li> <li>Involuntary muscle, as they contract and relax constantly without conscious control</li> <li>Fairly rapid contraction</li> </ul>

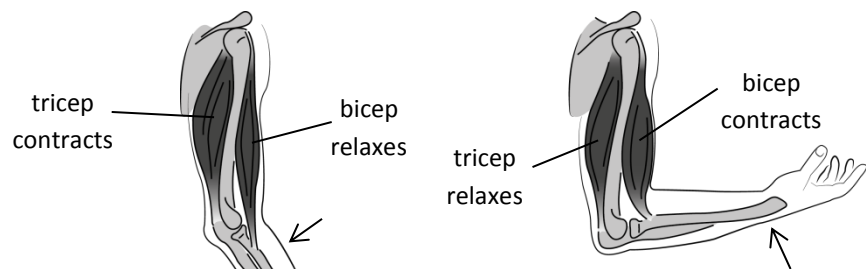
## Types of Muscular Contraction



## Muscles and Movement

Muscles cannot push, they can only pull. For this reason, muscles work in pairs, called antagonistic pairs. In these pairs, the agonist (or prime mover) contracts and shortens while the antagonist relaxes and lengthens to create movement in one direction. These muscles then switch roles to allow movement to occur in the opposite direction.

In this diagram, the tricep is the agonist (prime mover) which contracts and shortens. The bicep is the antagonist which relaxes and lengthens. This creates extension at the elbow, causing the lower arm to move downwards.



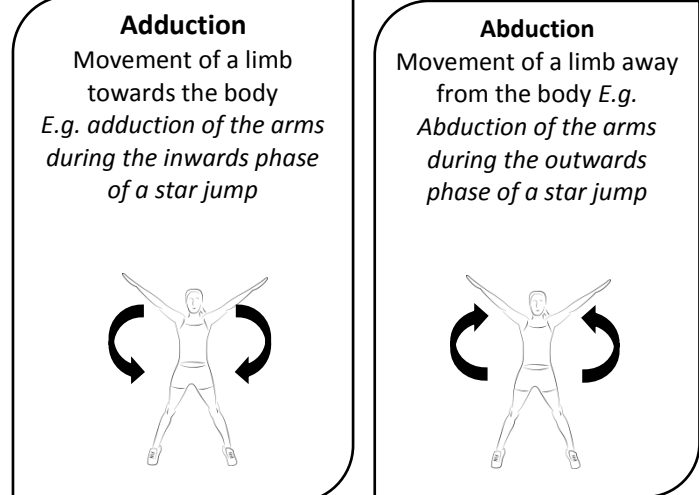
In this diagram, the bicep is the agonist (prime mover) which contracts and shortens. The tricep is the antagonist which relaxes and lengthens. This creates flexion at the elbow, causing the lower arm to move upwards.

The antagonist muscle opposes the pull of the agonist muscle!

### Additional Key Words

- Synergists:** other muscles that are involved in the movement (also called 'helper' muscles)
- Origin:** the end of the muscle that is attached to the bone that moves the least
- Insertion:** the end of the muscle that is attached to the bone that moves the most (opposite end to the origin)

## Types of Movement



### Flexion

Bending a limb so that the angle between the two bones decreases  
E.g. the biceps and triceps work together to flex the elbow during a bicep curl



### Extension

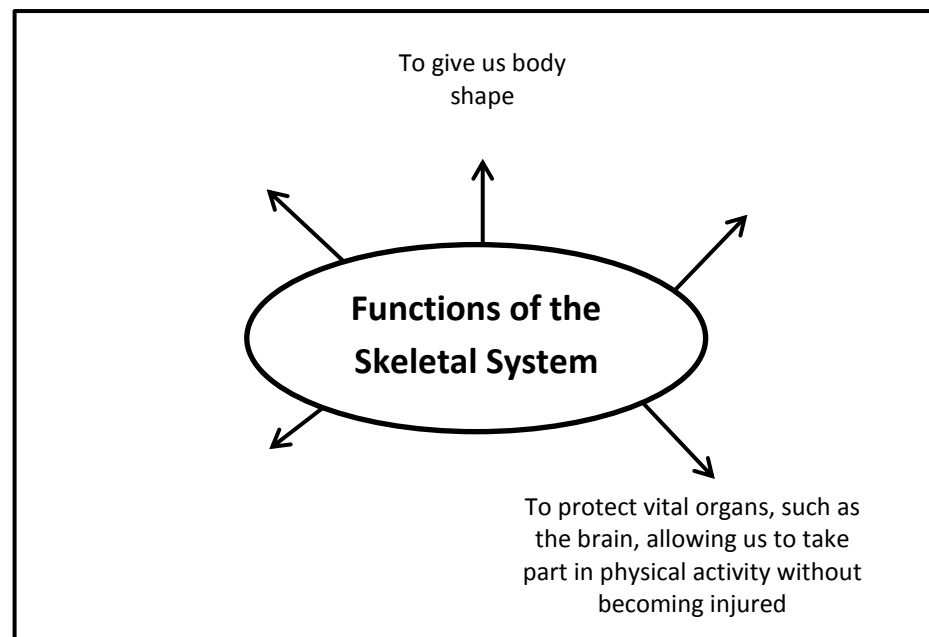
Straightening out a limb so that the angle between the two bones increases  
E.g. the hamstrings and quadriceps work together to extend the knee joint when kicking a rugby ball





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Complete the spider diagram by adding three more functions




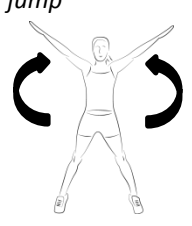
Fill in the missing definitions and examples

**Bones**

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- **Irregular bones:**

Complete the table by filling in the missing examples

Movements				
Flexion	Extension	Adduction	Abduction	Rotation
The angle of the joint decreases in size	The angle of the joint increases in size	Movement of a limb towards the body	Movement of a limb away from the body	A circular motion about an axis
	E.g. extension at the knee when kicking a football 		E.g. abduction of the arms during the outwards phase of a star jump 	

**Connective tissue**

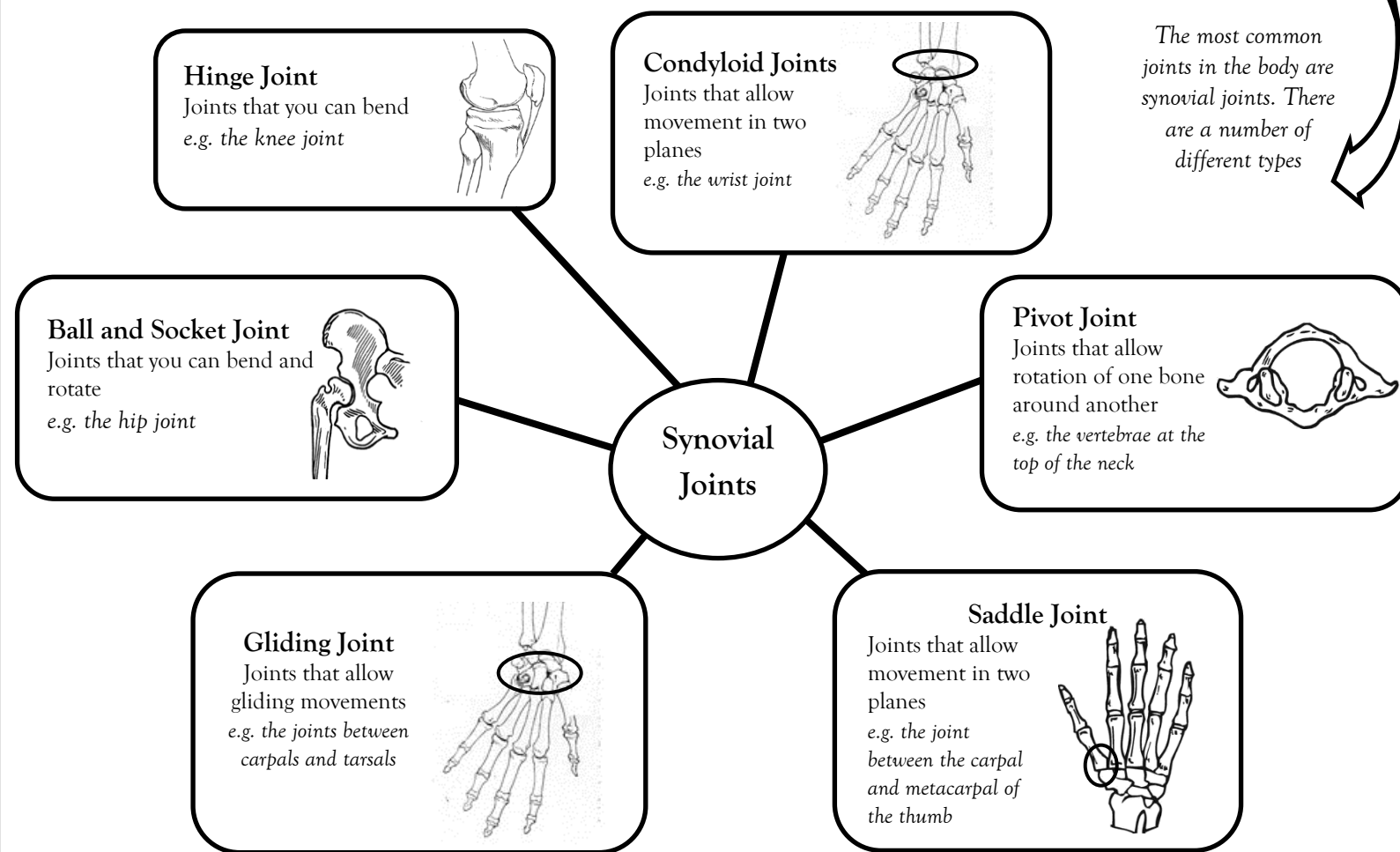
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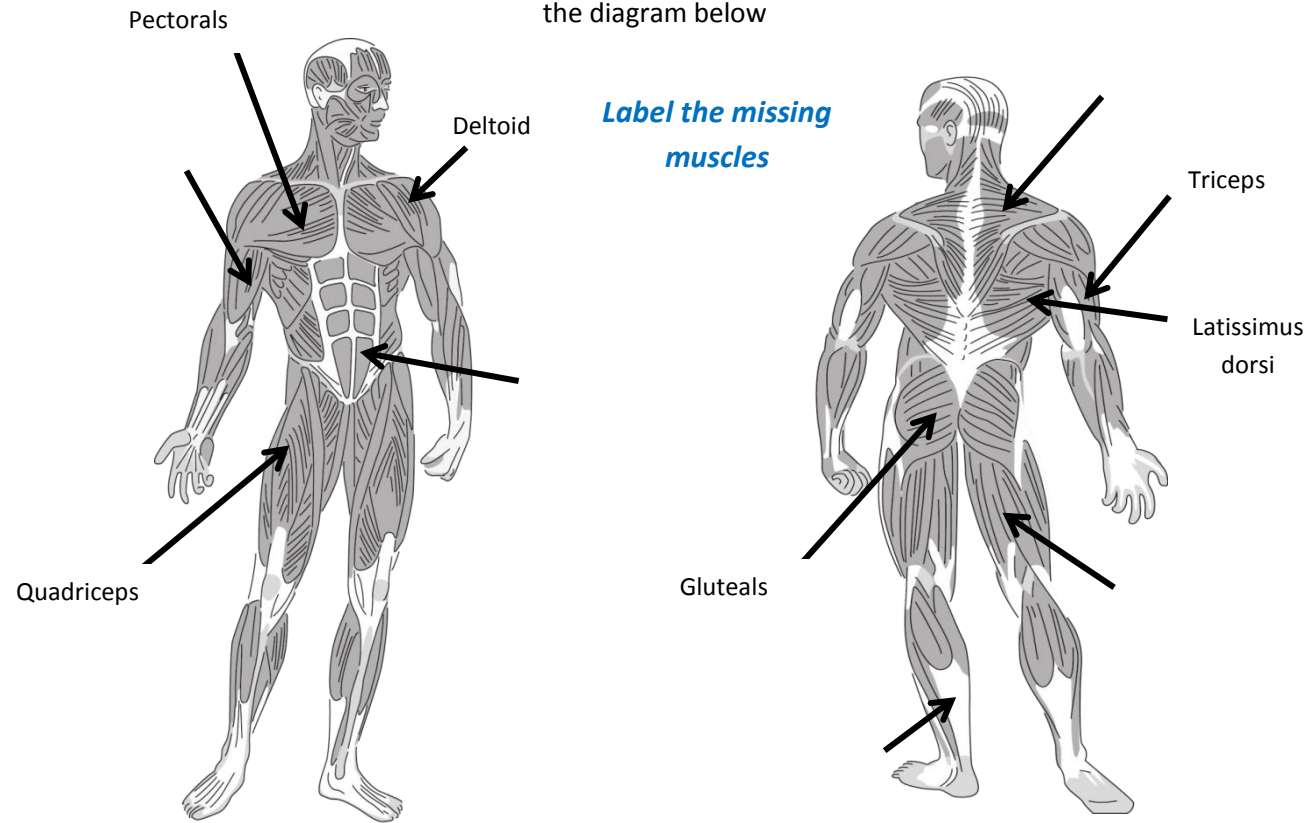
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# THE MUSCULAR SYSTEM

## Muscles

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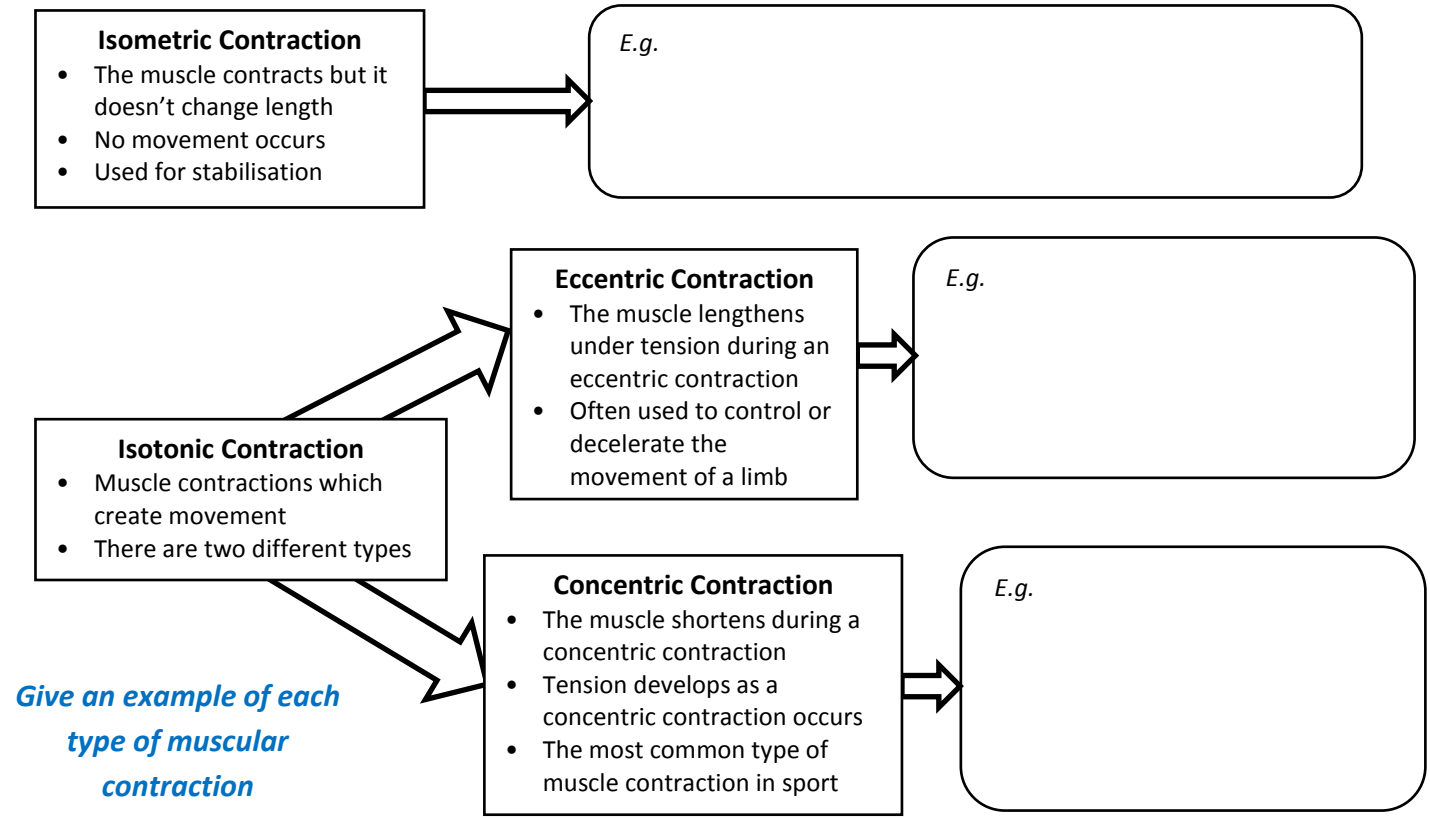


Label the missing muscles

## Types of Muscle

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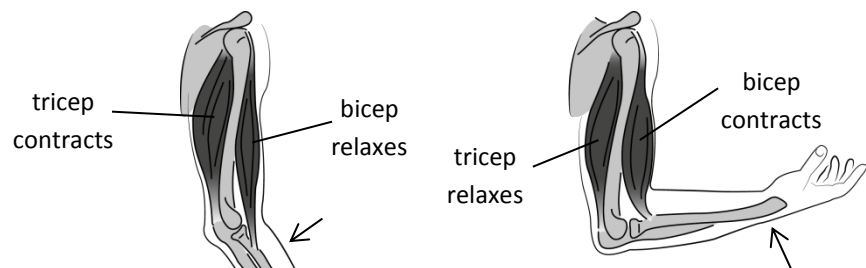
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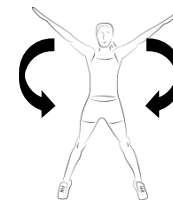
### Define the key words

- Synergists:
- Origin:
- Insertion:

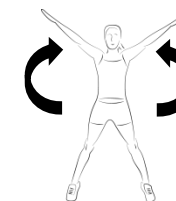
## Types of Movement

Name the types of movement that are being described

Movement of a limb towards the body  
E.g. adduction of the arms during the inwards phase of a star jump



Movement of a limb away from the body E.g. Abduction of the arms during the outwards phase of a star jump



Bending a limb so that the angle between the two bones decreases  
E.g. the biceps and triceps work together to flex the elbow during a bicep curl



Straightening out a limb so that the angle between the two bones increases  
E.g. the hamstrings and quadriceps work together to extend the knee joint when kicking a rugby ball

