



## Anatomy & Physiology – Joints, muscles & movements

- Learn the following joints, muscles & movements by creating cue cards for each.

### The Shoulder joint

Type of synovial joint	Ball and socket				
Joint movement	Plane of movement	Agonist muscle	Antagonist muscle	Fixator muscle	Sporting example
Flexion	Sagittal	Anterior deltoid	Posterior deltoid	Trapezius	Upward ball toss of tennis serve
Extension	Sagittal	Posterior deltoid	Anterior deltoid	Trapezius	Backstroke start
Abduction	Frontal	Medial deltoid	Latissimus dorsi	Trapezius	Outward arm movement as GK prepares to save pen
Adduction	Frontal	Latissimus dorsi	Medial deltoid	Trapezius	Inward arm movement as footballer sets up wall
Horizontal flexion	Transverse	Pectoralis major	Teres minor	N/A	Execution phase of discus throw
Horizontal extension	Transverse	Teres minor	Pectoralis major	Trapezius	Preparation phase of discus throw
Medial rotation	Transverse	Anterior deltoid	Posterior deltoid	Trapezius	Execution of topspin forehand drive
Lateral rotation	Transverse	Posterior deltoid	Anterior deltoid	Trapezius	Execution of topspin backhand drive

### The Wrist joint

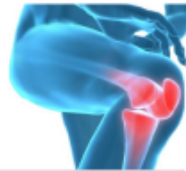
Type of synovial joint	Condylloid	
Joint movement	Flexion	Extension
Plane of movement	Sagittal	Sagittal
Agonist muscle	Wrist flexors	Wrist extensors
Antagonist muscle	Wrist extensors	Wrist flexors
Fixator muscle	N/A	N/A
Sporting example	Recovery phase of a basketball shot	Grip in a javelin throw

# The hip joint



Type of synovial joint	Ball and socket				
Joint movement	Plane of movement	Agonist muscle	Antagonist muscle	Fixator muscle	Sporting example
Flexion	Sagittal	Iliopsoas	Gluteus maximus	Latissimus dorsi	Recovery phase of kicking a ball
Extension	Sagittal	Gluteus maximus	Iliopsoas	Latissimus dorsi	Driving back leg in sprint start
Abduction	Frontal	Gluteus medius & minimus	Adductor longus, brevis & magnus	Latissimus dorsi	Outward leg movement to stop a ball going wide of the body
Adduction	Frontal	Adductor longus, brevis & magnus	Gluteus medius & minimus	Iliopsoas	Inward leg movement when landing from a cartwheel
Medial rotation	Transverse	Gluteus medius & minimus	Gluteus maximus	Latissimus dorsi, iliopsoas	Turning leg inwards to kick ball with outside of foot
Lateral rotation	Transverse	Gluteus maximus	Gluteus medius & minimus	Latissimus dorsi	Turning feet out for breast stroke leg action

# The Knee joint



Type of synovial joint	Hinge	
Joint movement	Flexion	Extension
Plane of movement	Sagittal	Sagittal
Agonist muscle	Biceps femoris	Rectus femoris
Antagonist muscle	Rectus femoris	Biceps femoris
Fixator muscle	Gluteus maximus	Iliopsoas

# The Ankle joint



Type of synovial joint	Hinge	
Joint movement	Dorsi flexion	Plantar flexion
Plane of movement	Sagittal	Sagittal
Agonist muscle	Tibialis anterior	Gastrocnemius and Soleus
Antagonist muscle	Gastrocnemius and Soleus	Tibialis anterior
Fixator muscle	Hamstring group	Quadricep group
Sporting example	Ski jumper holding the position in flight	Gymnast pointing their toes



## Fill in the blanks 1: Skeletal and muscular system

### The Ankle, Knee and Hip

The ankle is a \_\_\_\_\_ joint with three articulating bones: talus, tibia and fibula.

- When a basketballer jumps and leaves the ground the ankle plantar flexes. The agonist for plantar flexion is the \_\_\_\_\_. The \_\_\_\_\_ is the tibialis anterior which \_\_\_\_\_ contracts, lengthening under tension to provide a co-ordinated movement.

The knee is a hinge joint with two articulating bones: \_\_\_\_\_ and tibia.

- When a footballer strikes the ball, in the execution phase of a kick the knee extends. The agonist for extension is the \_\_\_\_\_ which concentrically contracts, \_\_\_\_\_ under tension. The antagonist is the \_\_\_\_\_ which eccentrically contracts to control the movement.

The hip is a \_\_\_\_\_ joint which has a large range of movement. The deep socket of the \_\_\_\_\_ articulates with the head of the humerus.

- When rotating over the high jump bar using the Fosbury Flop technique, the hip joint extends. The agonist for hip extension is the \_\_\_\_\_ concentrically contracting. The antagonist is the iliopsoas eccentrically contracting.
- When performing a star jump, in the outward phase the hip joint abducts. The agonists for hip abduction are the gluteus medius and minimus, which \_\_\_\_\_ contract to create the movement. The antagonist is the adductor \_\_\_\_\_ which eccentrically contracts, \_\_\_\_\_ under tension.

#### Word bank

biceps femoris	ball and socket	antagonist	gluteus maximus	lengthening
hinge	rectus femoris	pelvic girdle	eccentrically	gastrocnemius
longus	concentrically	femur	shortening	



## True or false / Beat the teacher 1: Skeletal and muscular systems

	Statement	T or F
1	The articulating bones in the ankle joint are the tibia, fibia and talus	
2	The wrist is an example of a condyloid joint	
3	The biceps femoris acts as the agonist for flexion of the elbow	
4	The hip joint can perform flexion, extension, circumduction, rotation, abduction, adduction, horizontal flexion and horizontal extension	
5	When performing a squat, on the downward phase the knee joint performs extension	



Any Anatomy & Physiology questions drop Mr Wright or Mr Wales an email:

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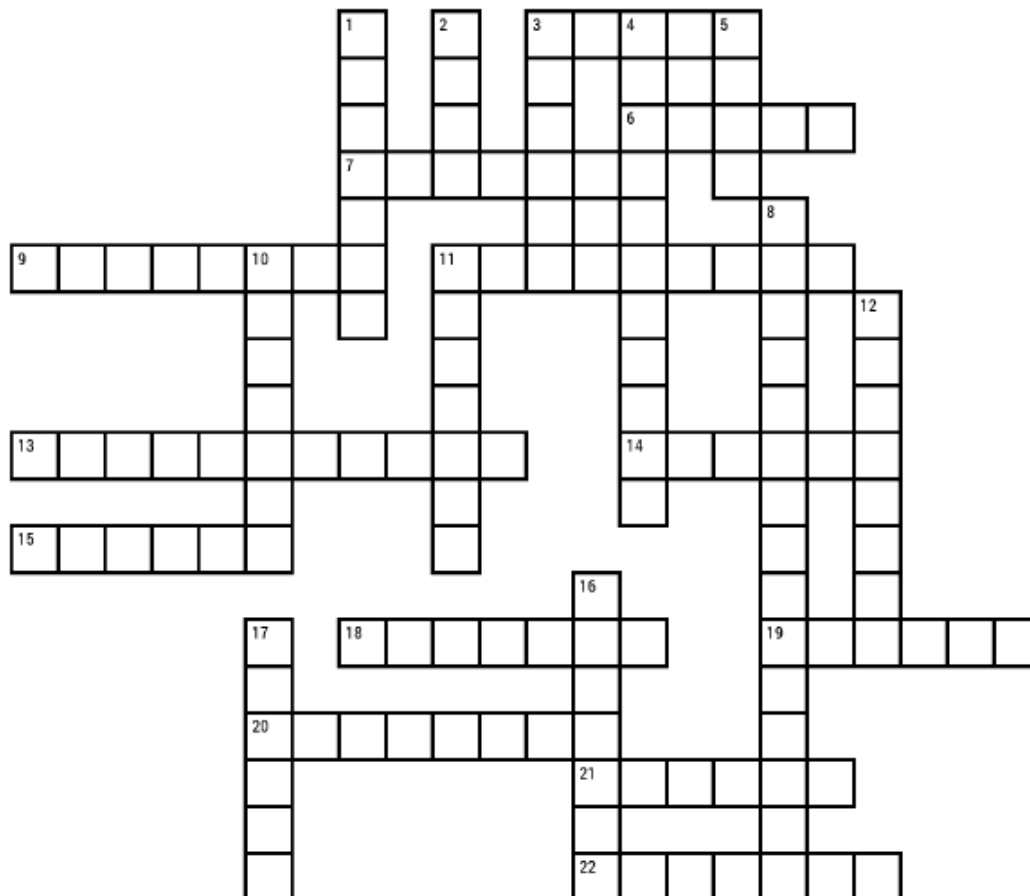
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## Anatomy & Physiology – Skeletal & Muscular System

### ***Skeletal System: Major Bones***



#### **Across**

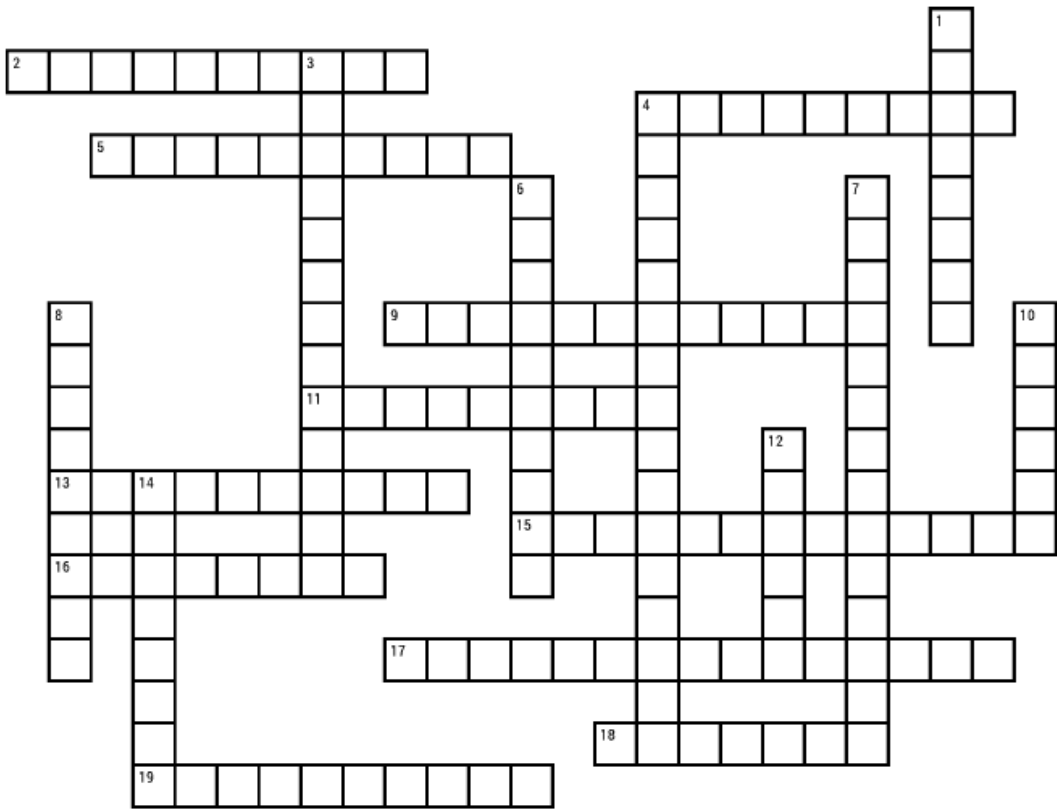
- 3 This bone connects the hip to the knee (5)
- 6 The largest bone located within the lower leg (5)
- 7 Also known as the shoulder blade (7)
- 9 The uppermost portion of the vertebral column (8)
- 11 The bones that form the ends of the fingers and toes (9)
- 13 These bones connect the tarsals to the phalanges in the feet (11)
- 14 This portion of the vertebral column acts to support the weight of the upper body (6)
- 15 Also known as the hip bone (6)
- 18 This bone protects the brain (7)
- 19 The \_\_\_ forms the base of the vertebral column (6)
- 20 The \_\_\_ is also known as the collar bone (8)
- 21 The longest bone located in the lower arm (6)
- 22 The \_\_\_ is attached to the ribs at the front of the chest (7)

#### **Down**

- 1 The bones that form the ankle of the foot (7)
- 2 The shortest bone located in the lower arm (4)
- 3 Along with the tibia this bone connects the knee to the ankle (6)
- 4 Connect the carpals and phalanges (11)
- 5 The bones that protect the internal organs of the chest (4)
- 8 the structure of bones that form the spine (9,6)
- 10 The small bones located in the wrist (7)
- 11 Also known as the kneecap (7)
- 12 This portion of the vertebral column contains twelve unfused bones (8)
- 16 The bone of the upper arm that connects the shoulder to the elbow (7)
- 17 The region of the vertebral column that contains five unfused bones (6)



### Muscular System: Major Skeletal Muscles



**Across**

- 2 The \_\_\_ contract concentrically when kicking a rugby ball (10)
- 4 This muscle's main role is to stabilise the scapula (9)
- 5 Muscles located on the inner side of the pelvis that contract to perform flexion of the hip (3,7)
- 9 These muscles allow wrist flexion (5,7)
- 11 The muscles located in the chest that allow an athlete to perform a bench press exercise (9)
- 13 The muscles used when performing a sit-up (10)
- 15 Also known as the calf muscle (13)
- 16 The muscles located on both sides of the abdominals (8)
- 17 The \_\_\_ muscle covers the mid-section of the back (10,5)
- 18 These muscles of the upper arm are often used when shooting the ball in basketball (7)
- 19 The muscles that allow supination of a limb (10)

**Down**

- 1 The muscles that make up the buttocks (8)
- 3 A group of muscles located on the lower back (7,6)
- 4 Enables dorsiflexion at the ankle (8,8)
- 6 The muscle that an athlete is likely to have injured if they feel a short, sharp pain at the back of the upper leg (10)
- 7 These muscles allow wrist extension (5,9)
- 8 The muscles that allow pronation of a limb (9)
- 10 The \_\_\_ muscle connects the calf to the ankle (6)
- 12 These muscles enable flexion at the elbow (6)
- 14 These muscles allow abduction of the arm (8)





**Skeletal System: Structure** *(Table Complete)*

A growth plate formed of cartilage that covers the ends of long bones	
A structure formed from the vertebral column and the spinal cord that runs down its centre	
A type of postural deviation that is associated with a curvature of the spine that causes the shoulders to become hunched	
A type of postural deviation that is associated with an abnormal twisting of the spine	
Bones that are associated with large body movements	
Bones that have an unusual shape	
Bones whose primary function is to protect internal organs	
Cells associated with bone degradation	
Cells associated with bone production	
Central bones of the skeleton including the cranium and vertebral column that are associated with protection and posture	
Functional or structural problems with the spine that pull it out of line	
More distant from the centre	
short and irregular bones that are held within tendons	
Small bones associated with support and stability	
The correct spine shape that is associated with good posture and a natural spine curvature	
The more distal bones of the skeleton including the bones of the arms and legs which are associated with movement	



**Muscular System: Characteristics, Functions and Movement** *(Table Complete)*

A muscle that works alongside an agonist to assist movement	
A muscle that works alongside an agonist to stabilise movement	
A type of muscle that causes movement by contracting; also known as a prime mover	
The muscle that contracts to assist movement; also known as the agonist	
The type of muscle found in the digestive system which is associated with slow, rhythmic and involuntary contractions	
The type of muscle found in the heart which is associated with fairly rapid involuntary contractions	
The type of muscle that attaches to bones and assists movement	
These types of muscles are not under our conscious control, and, therefore, we can't actively initiate their contraction	
These types of muscles are under our conscious control, and, therefore, we can actively initiate their contraction	
This muscle relaxes to oppose the movement of the agonist muscle	
When a muscle becomes tired from continual contractions	
When a muscle develops tension in order to generate a force	
When a muscle works with another muscle to aid movement	