

Long Jump

The Body in Motion



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Q1. CONTRIBUTIONS MADE BY THE MUSCULAR AND SKELETAL SYSTEMS IN PERFORMING MAIN MOVEMENTS

Long jump is athletics' track and field event in involving a combination of speed, strength, and agility in an effort by the athlete to jump the furthest distance possible. These movements are caused by different extensions and contractions in the body especially involving joints. The five major areas of long jump are: approach run up, take off, flight through the air and landing.

During the process of sprinting the major bones work together as joints which facilitate the movement of the body. The ankle along with the tibia and heel bones are a hinge joint. A ball and socket joint is formed from the hip, femur and pelvic bones. Long jump also involves movement in the knee joints with the femur and tibia acting as a hinge joint. Quadriceps muscles are used with extensions of the joint, and gastrocnemius muscles between the knee and ankle are used in plantar flexion.



In the run up approach process, the biceps and abdominal muscles support the body. Movement in the knees, ankles and hip also take place. Joint movements such as hyperextension involving the gluteal muscles help the hip move. Extensions in the quadriceps aid the role of the knee in running and the ankle is moved by plantar flexion involving the gastrocnemius muscles.



The jumping motion requires both the biceps and deltoids as the ball and socket joint. The extension of both arms and legs occur when the athlete is in the flight phase. During the projectile motion of the body, the legs adduct and with the feet are parallel and next to each other.

Q2. THE RELATIONSHIP BETWEEN PHYSICAL FITNESS AND MOVEMENT

The video shows the athlete using several skill and health related components as part of his long jump routine. The main components required for good performance are: speed, technique and strength. When participating in long jump, the athlete uses three skill related components are: power, speed and coordination. Health related components used in long jump are: muscular power, body composition and flexibility.

Muscular power is an important part in the jumping and running movements in long jump. In the video we can see that the athlete needs generate enough muscular power to jump and temporarily oppose gravity which is trying to keep him down on the track. We can also observe that muscular power was also used in the landing as his arms swing back producing slightly more momentum for the athlete to land further.

Speed is a crucial element especially in building up momentum during long jump. The athlete requires speed in the starting phrase of the long jump. Research has shown that many sprinters are also good at long jump. The run up for each person is different in length but is usually around 15 to 25 steps. The more speed an athlete can produce, the more force is able to project the body when it comes to the jump.

Coordination is another area where the athlete needs skill in. The sprint start to long jump involves a coordinated action and response between not only the legs but also the lower and upper body including the arms. Good coordination is necessary as the arms and legs work together in an efficient and aerodynamic manner to reduce air resistance and to aid in the motions in the running, jumping, projectile and landing stages in long jump.

Flexibility allows the athlete more control over their movement of their joints in their body and to prevent injury on jumping and landing. The ability of flexibility can help athletes avoid rolling their ankles on the jump and when landing into the pit. Flexibility can help the athlete when in mid-flight to be able to hold them closer together to reduce surface area and contact with wind resistances.



Jumping

Speed (Running)

Flexibility: Bunching Together

Q3. THE ROLE OF BIOMECHANICS IN INFLUENCING MOVEMENT

For the athlete to further improve his performance in long jump, he would have needed to be familiar with biomechanical principles such as motion, force, momentum along with balance and stability.

Motion is essential in long jump as a correct application will affect the total jump distance. The bodily motion rhythms in the run up affect the style in which the jump is undertaken. Angular momentum is enacted by the athlete as arms and legs move in opposite directions and vice versa. The swinging of the arms forward as the individuals' heels touch the ground builds momentum so that athlete does not fall backwards.

Another important aspect in long jump is the correct application of force which allows the athlete to enhance their performance. Force is most active when the athlete jumps in the take off stage in long jump in an attempt to jump as far as possible. Force is absorbed by the body through the ankles and knees when the athlete lands.

In order to perform a good jump the athlete should try to aim for a lower position during the jump in order to allow their centre of gravity to be near the front of their feet. Stepping slightly in front of their centre of gravity as they run will keep the athlete more stable and less likely to fall over. Balance is also needed to make sure that the centre of gravity is in the correct position in the take off and towards the landing. When the athlete flight stage, the athlete should lean slightly back but slant forward when they land to gain momentum.

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