

Athletics Mastery with Max and Kit

Learning objective: To analyse the mechanics of athletic performance, including speed, trajectory, and physical coordination.

Use your knowledge of biomechanics and athletic techniques to answer the following questions. Provide justifications for your reasoning where requested.

Max the monkey is practising his sprint starts, focusing on explosive power, while Kit the fox is calculating the optimal angle for a javelin throw to maximise distance.

Word bank: trajectory · acceleration · velocity · momentum · coordination · biomechanics · stamina · stature

1. Max is working on his sprint start. Explain why leaning forward and driving his knees high in the first few strides is more effective than standing upright immediately. (2 marks)

2. Kit discovers that throwing a javelin at a 45-degree angle often results in the greatest distance. What might happen if he released the javelin at a very shallow 10-degree angle? Justify your answer using the concept of trajectory. (3 marks)

3. Compare and contrast the physical requirements of a 100m sprint versus an 800m middle-distance run. Which energy systems are most vital for each? (3 marks)

4. Max wants to improve his long jump distance. If he approaches the take-off board with greater velocity, how does this affect his momentum? Explain the relationship between the two. (2 marks)

5. In a relay race, why is the 'changeover' zone crucial for maintaining the team's overall velocity, rather than just the speed of the individual runners? (2 marks)

Draw: Draw a diagram of a runner in a 'crouch start' position, using arrows to label the direction of force (thrust) and the direction of movement.



Extension challenge: Design a training programme for a heptathlete. Explain why a variety of athletic disciplines (throwing, jumping, and sprinting) creates a more well-rounded athlete than specialising in only one event.