

Max's Athletics Challenge: The Science of Movement

Learning objective: To understand the biomechanics of athletic events and apply mathematical reasoning to measure and improve physical performance.

Max the monkey has been analysing the movements of his friends at the sports field. Use your knowledge of athletics to complete the following tasks. For the 'Justify' questions, explain the biomechanics—how the body moves—to demonstrate a greater depth of understanding. Use the word bank to help you express your ideas clearly.

Word bank: Acceleration · Momentum · Trajectory · Velocity · Biomechanics · Extension · Aerodynamic · Force

1. Max is observing Leo the lion preparing for a long jump. Justify why Leo needs to increase his velocity before he reaches the take-off board to achieve a greater distance. (2 marks)

2. When Zara the zebra throws a javelin, she must consider the angle of release. Explain why a 45-degree angle is often considered the optimal trajectory for the longest distance. (2 marks)

3. Compare and contrast the body position needed for a 100-metre sprint start versus the body position required for a long-distance cross-country run. (2 marks)

4. If Bea the bee is timing her flight, and she travels 50 metres in 10 seconds, calculate her average velocity. If she earns £0.50 for every metre she flies, how much money does she earn in total? (2 marks)

5. What might happen to an athlete's performance if they do not follow through with their arm extension during a shot put throw? Explain the effect on the force applied to the object. (2 marks)

6. Design a new athletic event that requires both speed and balance. Describe how you would measure success in this event using standard units of measurement. (2 marks)

Draw: Draw a diagram of an athlete in motion (like a runner or a jumper) and label three key points where force or acceleration is being applied to their body to help them move faster or further.



Extension challenge: Research the history of the modern Olympic Games. Create a presentation explaining how the equipment for one specific athletic event (such as the discus or pole vault) has changed over the last 100 years to allow for better results.