

Generating movement in the body · supported focus

Supported focus · HL

Supported scope

- Supported HL focus. First assessment 2026; current SL/HL brief acquired. Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

Sport Biomech · 1.1

Reasoning

Landing with bent knees increases the time over which momentum changes. The movement can reduce average impact force for the same momentum change. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

Sport Biomech · 2.1

Reasoning

Joint movement results from muscle forces acting through lever systems. The centre of mass and base of support affect stability. Impulse connects force-time evidence to momentum change. impulse: Force integrated over time, equal to momentum change; base of support: The area supporting a body.

Sport Biomech · 3.1

Reasoning

A biomechanical analysis must define the segment, direction and phase of movement. Net force and a single muscle force are not interchangeable. A longer lever arm can change torque without changing applied force. Use teacher-approved video of a safe movement with consent. Calibrate distance and time, identify frames consistently, and avoid making medical claims from a two-dimensional recording. Camera perspective can bias apparent joint angles.

Sport Biomech · 4.1

Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: momentum changes by 150 kg metres per second. Average force magnitude = momentum change/stopping time. For 0.30 s, force = $150/0.30 = 500$ N. For 0.60 s, force = $150/0.60 = 250$ N. This idealized average excludes the detail of a changing force curve.

Sport Biomech · 4.2

Reasoning

Momentum change is 120 kg metres per second over 0.40 s. Find average force magnitude. Use the same sequence: known quantities → model → relation → substitution → unit and interpretation.

Sport Biomech · 5.1

Reasoning

The largest force is not the same as average force. A school movement study should not deliberately create high-impact landings to test a prediction. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Sport Biomech · 5.2

Reasoning

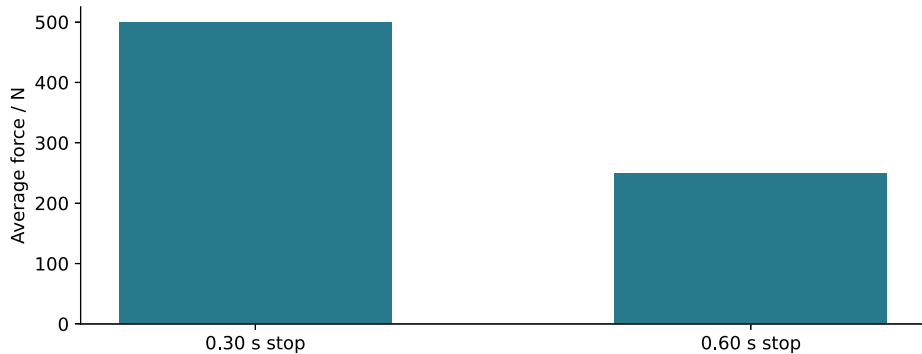
A video from one angle proves the cause of a sports injury. This claim is false: The largest force is not the same as average force. A school movement study should not deliberately create high-impact landings to test a prediction.

Sport Biomech · 5.3

Reasoning

Biomechanics: movement and impulse: A biomechanical analysis must define the segment, direction and phase of movement. Net force and a single muscle force are not interchangeable. A longer lever arm can change torque without changing applied force.

Sport Biomech · diagram



- Original teaching diagram: Biomechanics: movement and impulse
- Use the labels and the stated model together.

Sport Biomech · original transfer

Your turn

Fictional force curves deliver 120 N s impulse over 0.20 and 0.40 s. Compare average forces. Can peaks or injury risk be inferred?

Sport Biomech · transfer reasoning

Method and interpretation

Averages are 600 and 300 N. Impulse specifies area, not force-curve shape or peak. Injury risk requires suitable evidence beyond this mechanical example; no individual recommendation follows.

Check yourself

- Explain base of support using the stated model.
- Explain impulse using the stated model.
- Change one value in the original transfer; explain which assumption still matters.