Draw a Running Stick Figure: Joint Angles and Four-Frame Stride

Original tasks 1, 2 / complete keys

Task 1

In a four-frame strip, Frame 2 has a front hip angle of 120 degrees and a back hip angle of 150 degrees. Frame 3 has a front hip angle of 90 degrees and a back hip angle of 170 degrees. State whether the hip angles change in a plausible direction from Frame 2 to Frame 3 and give one reason.

Answer: Yes, the change is plausible: the front hip angle decreases from 120 to 90 degrees as the knee lifts higher, and the back hip angle increases from 150 to 170 degrees as the trailing leg extends.

Reason: A smaller hip angle means the thigh is closer to the torso, which matches a higher knee lift. A larger hip angle means the thigh is farther from the torso, which matches a trailing leg.

Check: Measure both hip angles from the torso line in each frame and confirm the numbers match the drawn segments.

Task 2

A learner labels a knee angle as 10 degrees in Frame 3. Explain why this is likely a mistake in a running stick figure and suggest a corrected label range.

Answer: A 10-degree knee angle means the shank folds almost completely back onto the thigh, which is not a running pose. A corrected label is likely between 60 and 120 degrees for a lifted knee, depending on the drawing.

Reason: Running poses keep some space between thigh and shank; near-zero knee angles look like a folded leg and are hard to read.

Check: Place the protractor at the knee, align zero with the thigh, and read the angle to the shank; compare with the drawn shape.

Draw a Running Stick Figure: Joint Angles and Four-Frame Stride

Original tasks 3, 4 / complete keys

Task 3

Frame 1 has shoulder angles of 30 degrees forward and 40 degrees back. Frame 4 has shoulder angles of 40 degrees forward and 30 degrees back. Explain what this change shows about the arms and state one check.

Answer: The arms have swapped positions: the arm that was forward is now back, and the arm that was back is now forward. This matches a stride where arms alternate opposite the legs.

Reason: Shoulder angles measured from the torso line show arm position; swapping the values shows the arms exchanged forward and back roles.

Check: Compare the leader lines and angle numbers in Frame 1 and Frame 4 to confirm the swap is drawn, not just written.

Task 4

You draw a four-frame sequence but Frame 3 has both feet on the ground and Frame 4 has both feet off the ground. State whether this matches the contact-drive-flight-recovery order and give one correction.

Answer: No. In the order contact, drive, flight, recovery, flight is the phase with both feet off the ground, so Frame 3 should be flight and Frame 4 should be recovery. Correction: relabel the frames so the off-ground frame is Frame 3 (flight) and the on-ground frame is Frame 4 (recovery), or redraw the feet to match the labels. State explicitly whether your recovery frame shows the swinging foot just above or just touching the ground, and apply that choice consistently.

Reason: The sequence order is contact, drive, flight, recovery; flight is the only phase with both feet off the ground.

Check: Check the ground line in each frame: count how many feet touch it and compare with the phase label.

Draw a Running Stick Figure: Joint Angles and Four-Frame Stride

Source rubric / reflection

- [ ] Four frames are present and labeled Frame 1 to Frame 4.
- [ ] The stick-figure convention is stated and used consistently in all frames.
- [ ] Hip, knee, and shoulder angles are labeled at each joint with leader lines.
- [ ] Angle values are measured or marked as estimates, with units in degrees.
- [ ] The stride sequence shows clear changes between contact, drive, flight, and recovery.
- [ ] Valid alternative conventions are accepted if stated and applied consistently.

Reflection: What did you check, what did you change, and what will you try next?