Draw a Side Plank Hip Dip Figure: Pose, Motion, and Alignment

Original tasks 1, 2 / complete keys

Task 1

On a 16 cm by 10 cm plate with a 1.5 cm margin, use coordinates local to the inside box and floor line y=0. Place shoulder (5,4), elbow (5,1), wrist (8,0), top hip (9,3), bottom hip (9,2.5), bottom ankle (12,0), top ankle (12,1), and top hand (5,7). State the usable box size and check alignment and margins.

Answer: The usable box is 13 cm by 7 cm. All points fit within $0 \le x \le 13$ and $0 \le y \le 7$. Shoulder and elbow share x=5; the hip pair shares x=9; the ankle pair shares x=12. Wrist and bottom ankle are on y=0; top hand is at the inner top boundary y=7.

Reason: Subtract the two 1.5 cm margins from each plate dimension to get the inside box. Local coordinates can then be checked against its width and height without switching origins.

Check: Calculate $16-3=13$ and $10-3=7$. Check every point against x=0..13 and y=0..7. Confirm the three vertical pairs share x and the two ground contacts use y=0.

Task 2

A student draws the elbow 2 cm behind the shoulder and the top ankle 2 cm in front of the bottom ankle. Add a top and bottom hip marker at the same x coordinate. Describe three fixes that restore all three alignment checks without changing the overall pose.

Answer: Move the elbow horizontally until it is directly under the shoulder, move the top ankle horizontally until it is directly above the bottom ankle, and place the top and bottom hip markers at the same x coordinate. Keep their vertical separations and the rest of the pose unchanged.

Reason: Each check is a vertical-stacking relationship in the drawing. Correcting only the horizontal positions restores alignment without changing the pose's overall size.

Check: Drop a vertical guide from the shoulder and confirm it passes through the elbow; repeat from the top hip and top ankle to their paired lower markers.

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Original tasks 3, 4 / complete keys

Task 3

A 20 cm by 14 cm plate has a 2 cm margin. The figure occupies 12 cm of the 16 cm usable width. Design a checklist box that fits in the remaining space with at least 0.5 cm clearance. List four checks.

Answer: The usable width is 16 cm; after the 12 cm figure area, 4 cm remains. A 3.5 cm-wide, 5 cm-tall checklist fits with 0.5 cm horizontal clearance. Its four lines can be shoulder over elbow, top hip over bottom hip, top ankle over bottom ankle, and dip arrow points down.

Reason: The two 2 cm margins leave $20-4=16$ cm. Subtract the figure's 12 cm to get 4 cm; a 3.5 cm box leaves 0.5 cm.

Check: Verify $20-4-12=4$ cm and $4-3.5=0.5$ cm. Confirm all four checklist lines have a tick box.

Task 4

On a 20 cm by 14 cm plate with a 2 cm margin, use local coordinates from the inside box and floor $y=0$. Mirror the pose leftward: shoulder (10,6), elbow 3 cm below it, wrist 4 cm left of the elbow on the floor, top hip 6 cm left and 1 cm below the shoulder, bottom hip 0.5 cm below the top hip at the same x, bottom ankle 6 cm left of the top hip on the floor, top ankle 1 cm above it, and top hand 4 cm above the shoulder. Shift the whole pose only as much as needed to fit the inside box, then report all coordinates.

Answer: The usable box is 16 cm by 10 cm. Before shifting, the bottom ankle is at $x=-2$, so shift every point right by 2 cm. Final coordinates are shoulder (12,6), elbow (12,3), wrist (8,0), top hip (6,5), bottom hip (6,4.5), bottom ankle (0,0), top ankle (0,1), and top hand (12,10). Every point lies within $0\le x\le 16$ and $0\le y\le 10$. The dip arrow still points down from the top hip.

Reason: The unshifted bottom ankle is 2 cm left of the inside box. A 2 cm right shift moves it to $x=0$ and moves every other point by the same amount without changing alignment. The top hand reaches $y=10$, exactly the inside top boundary; floor contacts remain $y=0$.

Check: Calculate the usable box as $20-4=16$ cm wide and $14-4=10$ cm tall. Confirm all x values are 0..16 and y values 0..10. Check shoulder/elbow $x=12$, hip-pair $x=6$, ankle-pair $x=0$, and the floor contacts at $y=0$.

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Source rubric / reflection

- [ ] The plate size, margin, local origin, and floor line y=0 are stated and used consistently.
- [ ] The elbow is directly under the shoulder within about 0.5 cm on the plate.
- [ ] The top hip is directly over the bottom hip within about 0.5 cm.
- [ ] The top ankle is directly over the bottom ankle within about 0.5 cm.
- [ ] A solid downward arrow shows the hip dip, and a dashed upward arrow shows the return.
- [ ] A joint-alignment check box lists at least three checks with tick boxes.
- [ ] Labels are readable and do not cross joint circles.
- [ ] The drawing stays inside the margin and uses consistent line weights.

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