

Digital Tutors- Creating Walk Cycles in Maya

Setting up Scene

Animation preferences.

- Right frame rate.
- Right tangent- Use plateau (keeps tangents flat when needed and smooth when needed).
- Playback speed- 24fps
- Update view- all (this can lag if character is high res).

Casual walk cycle.

- Think about the personality.
- Think about what's noticeable.
- Weight and balance is important to look natural.
- Odd numbers when working on walk cycles to give a mid point.
- Length of cycle is 33. Mid point is 17. Even spacing of 4 frames throughout. 1,5,9,13 etc.
- Turn on character set to key character to 1 and 33. Press S.
- Go to graph editor. Select top character set node. Curves pre infinity cycle, curves post infinity cycle to cycle all keys. Go to view and select infinity to see how the curves blend to get a seamless cycle. We will notice popping in the cycle if not.
- Use fk functionality for the arms as you can get nice arcs quickly.
- Keep in mind rotation order to avoid gimbal lock in the arms. Rotate tool, hold E, left click and select gimbal.
- Go to attributes if you want to change rotation order.
- Display layer-reference layer so we only select controls and not the mesh.

Beginning the Walk Cycle

- Use a diagram to get positions right.
- 4 main positions- contact position, down position (lowest part), passing (body rises), key point (highest point).
- Turn on auto key.
- Center of gravity control to bring character down.
- Place legs and feet then rotate heels.
- Rotate the hips next on y. Rotate to the right as the left leg is forward.
- Tilt the upper body forward slightly.
- Left leg is forward so right arm should be forward- rotate chest left on the y axis. Then bring the right arm down, forward and rotate the elbow.
- Make hand more neutral and rotate arm in x axis inwards so it's not so straight. Rotate out for a more feminine posture.
- Rotate right shoulder forward and upwards.
- Poses are to be refined later on.
- Rotate left shoulder back and down. Rotate arm inwards on z and out on x.
- Bring eyes straight forward.
- Pose the fingers.
- It's important to bring this whole pose into the last keyframe on 33, then render from

- 1-32 so that there is no pause in the loop.
- Go to character set, middle click from frame 1 to 33 and hit S key. First contact position is finished.

Finishing the Contact Positions

- Swap the values of the first contact position into the midpoint contact position, 17.
- Hips- put in the reciprocal values (if it's positive, change it to the negative).
- Arms- When copying and pasting, put in the reciprocal values for the shoulders and arms apart from x (just copy this).
- Work on elbows when it's time to add follow-through.
- Linear movement with the feet as they move back- graph editor with left foot selected. Select z axis. 1-17 where it moves back should be linear. The rest as it moves up should be smooth. Break tangents, select blue to left and select linear, same with 1 to the right. Right foot goes backwards from 17-33.

Adding the Down Position

- These will lie on frames 5 and 21. Turn off character set to clean up the keys.
- Drop left heel on frame 5. 0 the keys out. Then roll the front heel up on the right foot on this frame and 0 hell out. Right foot rolls up as the left foot plants down.
- Frame 5 is lowest part of the walk. Select centre gravity control and lower slightly. Copy this over to frame 21. 0 right toe out on frames 17 and 21. Right foot is planted at 21.
- Left foot at 21 will be the same as right foot on 5.
- 0 toe out on frame 17 for contact pose.
- To show weight- use the speed at which the foot lands. Drag the left heel key 2 frames back from frame 5. Drag the right heel 2 frames back from frame 21.

Completing the Extremes

- Adding in the passing and peak positions.
- Peak, frames 13 and 29- left foot frame 13 bring character up to a nearly locked position. Raise ball of the foot slightly. Have this zeroed out on frame 9.
- Copy ball control of foot to the right foot on frame 29. 0 this out on frame 25.
- Can insert keys into graph editor. Middle mouse button to add.
- Add the same high points on body on frame 9 and 25.
- Still showing signs of popping and foot rolls need smoothed.

Refining Upper Body and Feet

- [Shift, alt right mouse to view it differently in graph editor.](#)
- Smooth curves of translate Y on frame one and 33 to blend into each other better.
- Fix IK locking: Select all contact keys in the same translate y curve, hold shift and drag down.
- Foot roll: Select rotate x on frames 1 and 33 and drag up to make more foot roll. Copy this to frame 17 for left foot. Go to translate z, select bottom keys and drag down to bring leg back slightly and copy to left foot.
- Fix locking: increase ball roll peak positions. Right foot frames 25-33, break tangent between 25 and 33. Delete frame 29. Smooth the curve more. Delete 13 on left leg

and repeat.

Balancing the Character in the Front View

- Upper body: frame 9 move character to the left translate x as right leg is raised. Paste the reciprocal on frame 25. Blend tangents on frames 1 and 33.
- Right foot: Midpoint where foot comes forward, frame 10 sway foot out slightly. Sway in before it plants on frame 17. Take this and paste on frames 1 and 33 so the foot doesn't slant the whole way(move over the line for a catwalk). Paste reciprocals on left foot on frame 26. Use the reciprocal contact position from right foot onto frame 17 for the left foot.

Animating the Subtle Rotations of the Feet

- Angle feet outwards: Frame 21 for right foot, rotate y, shift drag downwards in graph editor. Copy reciprocal to left foot frame 21.
- Subtle rotation of feet: Character just lifts foot up frame 8, rotate z, angle inwards. Rotate outwards frame 13. 0 out on frame 19. Copy reciprocal values to inwards frame 24 and outwards frame 29 for left foot. 0 out contact frame 3. Adjust start and end tangents in graph editor.
- Refine: Frame 5 zero out rotate z on right foot to hold the inward movement. Apply to frame 21 on left foot. 0 out frame 17 also where the foot plants and delete excess keys.

Animating a Toe Flap for Fluidity

- Toe z control: Right toe control z should still be 0 at frame 5. Frame 8, bring the toe down. Bring up at frame 19 before it plants. 0 out at frame 21.
- Frame 8 should be the same on left foot for frame 24. 0 out on frame 21. Toe is up on frame 3. 0 out on frame 5. Add weight to frame 5.
- Drag 1 and 33 frames upwards and blend into the rest.
- Needs more weight: break tangent at 21 and move the in tangent upward.

Adding Weight to the Hips

- Frame 5, select hips and rotate z towards the lifted leg. Rotate more if female. Put in the reciprocal on frame 21.
- Hips need to hold in down position until contact position then shift. Go to graph editor. Set key on frame 17, shift and drag up until it's just under the pose in frame 5. Paste this key on 17 and put in reciprocal to frames 1 and 33. Flatten 1 and 33, select in tangents and blend.
- Select frame on 21, break tangent and select in tangent and move upwards to create more weight. Do the same to the key on frame 1.
- Check legs for locking up.
- Left foot, frame 13, rotate x and stop it from locking.
- Same for right foot frame 29.

Animating the Rotations of the Upper Body

- Back moves backwards into the down position and forwards in the contact position.
- Key rotate x (centre gravity) on frame 5. Rotate forward on frame 17 (contact). Copy

frame 5 on frame 21. Copy frame 17 onto frames 1 and 33. If its too much, shift and drag the same points up or down.

- Side to side rotation- body moves away from whichever arm is forward. Tilt to the left on frame 1 and copy the reciprocal on frame 17 (rotate z). Copy frame 1 to frame 33.

Working on the Chest

- Chest follows through with the upper body rotation. Rotate x frame 5 backwards. Rotate forward on frame 17.
- Copy frame 17 to frames 1 and 33. Copy frame 5 to frame 21.
- Select all keys in this curve and drag to the right.
- Motions can be too abrupt so drag all keys upwards and drag the bottom keys closer.
- Adding side to side rotations: Rotate to the right towards arm leaning outwards in rotate z on frame 1. Copy the reciprocal on frame 17.

Animating the Head

- Rotate y frames 1, 17, 33. Chin leans towards the lifted arm.
- Rotation x follows through what's happening with the chest. Rotate head back slightly on frame 4. Bring head forward on frame 9. Copy frame 9 to frame 27. Copy frame 4 to frame 20. Drag 1 and 33 down and blend into the tangents.
- Delay these keys for follow through and overlapping by dragging all keys to the right by a frame.
- Add weight to this curve: Go to nod keys. Break tangencies on 5 and 21. Select out tangents and bring up.
- Side to side tilting in z axis: frame 5 tilt to characters left, paste reciprocal on frame 21.
- Animating the neck: frame 8 move neck slightly forward on translate z. Apply the same to frame 24. 0 out contact position on frame 17. Frames 1 and 33 should also be zeroed out.
- Side to side shifting in translate x axis: shift to left on frame 5. Paste reciprocal on frame 21.
- Lifting and tilting head back: move rotate x keys down to make head and neck more upright.

Correcting the Motion of the Upper Arm

- Still needs weight from the forearm and wrist. Rotate y on right arm: To swing back faster work with tangency- right click weighted tangency in graph editor. Free tangent weight before editing. Only affect in tangent so break tangents in key 17. Shift and drag backwards.
- Pin curve to view it while having another selected.
- Use animation node to get the length we changed it to: with control selected and key, head to window, rendering editors, hypershade and select input and output node. Head to attributes. Shows a table (intan type- fixed means broken tangent).
- Expand spreadsheet to see the angle of the tangency. Copy intan weight and bring to left arm on key 33 (so key 2 in spreadsheet). Back to graph- weight tangent, free weight tangent and back to hypershade to paste key over. Out tangent will change so fix this.

Wrapping Up the Movement of the Upper Arms

- Add side to side rotation to upper arms to create a nice arc: as right arm swings forward add a midpoint key to where it swings outward, eg frame 21. Add another key midpoint of where the arm comes back in and delete unnecessary keys. Bring start and end keys in between the high and low keys.
- Frame 8 on right arm is equivalent (reciprocal) to frame 24 on left. Frame 24 on right arm is equivalent to around frame 7 on left arm.

Follow Through and Overlapping of the Elbows

- Use rotate y. Raise right elbow as arm rises. Bring down as arm moves back.
- Add drag as arm swings forward (hold position), by using the outtangent and dragging downwards in graph editor.
- Bring over to left arm with reciprocal in appropriate keys.
- Copy frame one from right elbow to frame 17 for left elbow.

Adding Follow Through to the Wrists and Finalising

- Start with y axis: rotate right wrist up as arm pulls back. Rotate back as arm moves forward. Blend curve.
- Secondary Rotation z axis: Rotate outwards slightly as arm starts to pull forward. Rotate outwards before hand rises up. Rotate in at the midpoint. Create a nice wrist flap.
- Add twisting to x axis: As wrist comes forward, rotate inwards. Rotate outwards as wrist swings back. [Don't add reciprocal values for x axis.](#)
- Move arm out if there is intersecting. Remember to change the other arm also.

Refining Shoulder Movement

- Delay all of the keys to make them faster if necessary.
- If you move all curves down or up, add keys to frames 1 and 33, delete one unnecessary, flatten both tangents, curve and delete any that aren't necessary.

Finalising the Walk Cycle

- Study all views to see if anything can be fixed.
- Delay any motions to see what looks right.
- Make sure there is no intersecting through the floor or body parts.

Translating a Walk Cycle Forward

- Use the global control. Key frames 1 and 33.
- Make sure graph is linear and pre and post finity are cyle with offset.
- Adjust end key so you can avoid the character drifting backwards.

Utilising Animation Layers to Add More Life

- Select where you want to change and create an animation layer.
- Head turn: set 0 key within layer. Should be over 8 frames or so.
- Can add objects to selected layers.