

A. SOFTWARE INTERFACE

Interface Regions & the Object Model

Show the Channel Box and the Outliner, the two interface regions used throughout this presentation.

1. Show the Channel Box, on the right side of the screen.
2. Show the Outliner, also on the right side of the screen.

Workspace Selection

Show the Modeling workspace and how to reset it if the layout changes.

1. Show the Modeling workspace.
2. Show the Workspace menu and the reset option inside it.
3. Open the Workspace menu and find the reset option.

Selection Methods

Show the three ways to select objects, used again in later activities without being re-explained.

1. Show clicking to select one object.
2. Show dragging a marquee box to select several objects at once.
3. Show Shift-clicking to add one more object to a selection already made.
4. Try all three in order: click-select, then marquee-select, then Shift-click to add to the selection.

Navigation — Mouse Look

Show the mouse controls used to move the camera around the scene.

1. Show Tumble, the button combination that rotates the view around its current pivot.
2. Show Track, the button combination that slides the view sideways.
3. Show Dolly, the scroll wheel action that zooms the view in and out.
4. Try tumble, then track, then dolly, on the object you are working on.

Framing & Viewport Recovery

Show how to recover the view any time the object is lost from sight.

1. Move the camera until you lose sight of the object, then press F to recover it.
2. Lose sight again, then press A to recover it.

Undo

Show how undo behaves, so its limits and quirks don't look like errors later.

1. Perform enough actions to go past the undo limit, to show where it runs out.
2. Act on one object, select a different object, then press undo. Show that the first object's action gets undone.

MAYA IN MINUTES

Quick Start Modeling



Icon Menus

Show where the icon menus sit, since this presentation relies on them instead of the hotbox.

1. Show the icon menus, spread across Maya's interface.

Coordinate Axes & View Cube

Show the color-coded axes and the View Cube, both used for navigation throughout.

1. Show the color-coded axes on the object: red X, green Y, blue Z.
2. Show turning the View Cube on and off from the menu.
3. Show clicking a face of the View Cube.
4. Show clicking an edge of the View Cube.
5. Show clicking a corner of the View Cube.
6. Click a face of the View Cube, then check the view is still in perspective mode after the snap.

B. PRIMITIVES AND TRANSFORMATIONS

Primitive Creation (body_geo)

Create the body primitive and rough in the subdivisions the later modeling will need.

1. Create the body primitive. Type exact measurements into the Channel Box, then shape it further using relative scale.
2. Set the subdivision count in the Channel Box, with subdivisions for the window, hood, and trunk locations.

Transformations Overview

Show the three basic tools used to move, rotate, and scale any object.

1. Show the Move tool, shown on the body.
2. Show the Rotate tool, shown on the body.
3. Show the Scale tool, shown on the body.
4. Show double-clicking a transform tool to open its settings window.
5. Double-click a transform tool on the body to open its settings window.

Naming in the Outliner (body_geo)

Name the body object so Maya doesn't auto-number it.

1. In the Outliner, name the body object "body_geo."

Primitive Creation (wheel_geo)

Create the wheel primitive to begin positioning the wheels.

1. Create the wheel primitive, and type exact measurements into the Channel Box.

Positioning

Position a wheel using constrained and free movement, then snap it into its starting place.

1. Show moving a wheel along a single plane, with no rotation.
2. Show moving a wheel constrained to a single direction.
3. Show moving a wheel freely, in any direction.
4. Show the magnet icons on the Status Line.
5. Turn on magnet snapping, then use the magnet icons to place a wheel in its starting position.
6. Turn off the magnet snap toggle once the wheel is placed.

Duplication

Duplicate the wheel into all four positions using Maya's smart duplicate.

1. Duplicate the wheel along the first plane using Shift+drag with X held. Leave the copy where it lands, then move it somewhere visible.
2. Shift-click to select two of the wheels.
3. Duplicate the selected wheels along the second plane using Shift+drag with X held. Leave the copy where it lands, then move it somewhere visible.

Wheel Rotation

Rotate each wheel so it faces the car's direction of travel.

1. Rotate each wheel so its spin axis matches the car's direction of travel.

Freeze Transformations & Delete History

Clear the messy rotation values left by duplication so animation starts from a clean baseline.

1. Apply Freeze Transformations to each wheel after it has been rotated.
2. Delete History on each wheel.

Naming (wheel_geo)

Name the wheel objects to keep the scene organized.

1. In the Outliner, name the wheel objects “wheel_geo.”

Primitive Creation (thin cube)

Create the wiper primitive as a thin cube.

1. Create the thin cube primitive.
2. Set the primitive's scale values, then shape it further using relative scale.

Pivot Point Placement

Move the wiper's pivot so it rotates from the correct end.

1. Show the Move Pivot toggle on the Move tool icon.
2. Turn on Move Pivot mode, then move the pivot to one end of the wiper.
3. Rotate the wiper through an arc.

Naming (wiper_geo)

Name the wiper object to keep the naming pattern consistent.

1. In the Outliner, name the wiper object “wiper_geo.”

C. VERTEX MODELING

Component-Mode Entry

Show how to enter component mode and switch between vertex, edge, and face selection.

1. Show the embedded menu used to enter component mode, and to switch between vertex, edge, and face modes.
2. Switch to component mode using the embedded menu.
3. Show vertex mode on the body.
4. Show edge mode on the body.
5. Show face mode on the body.
6. Show an edge loop selected on the body.
7. Show drag-selecting with backface visibility turned on.
8. Show wireframe view on the body.

Insert Edge Loop

Show how to add a new edge loop to the body.

1. Show the Insert Edge Loop Tool, under Mesh Tools > Insert Edge Loop in the menu.
2. Use the Insert Edge Loop Tool to add an edge loop to the body.

Existing Edge Loop Selection

Show how to select an edge loop that already exists, rather than creating a new one.

1. Double-click an existing edge loop on the body to select it.

Vertex and Edge Transformations

Show vertex and edge transformations by roughing in the body.

1. Select the vertices or edges that shape the hood, then move, rotate, or scale them to rough in the hood.
2. Select the vertices or edges that shape the trunk, then move, rotate, or scale them to rough in the trunk.

Window Creation

Cut a window opening into the body and resolve the topology conflict it creates.

1. Use Insert Edge Loop to mark the window's boundary on the body.
2. Delete the face enclosed by the window boundary.
3. Extrude the opening inward to form the well.
4. Undo the extrusion.
5. Insert an edge loop through the window's top border to fix the conflict.
6. Extrude the window face inward.

Edge Loops and Bevel

Add a bevel near a hard edge so it survives smoothing.

1. Add edge loops and apply bevel near a hard edge on the body.

Center Pivot and Delete History

Close out the body phase by centering its pivot and clearing its history.

1. Apply Center Pivot to the body.
2. Delete History on the body.

Isolation (Isolate Select)

Isolate the wheel so the next phase focuses on it alone.

1. Turn on Isolate Select for the wheel, using the icon in the viewport toolbar.

Face Selection by Deselection

Narrow a broad selection down to just the faces needed next.

1. Select the wheel cylinders.
2. Deselect everything but the top faces.

Accidental Key Presses

Show a few keys that can trigger something unwanted if pressed by accident during this work.

1. Press B to show the Soft Select toggle.
2. Press 4 to show the wireframe toggle.
3. Press 5 to show the shaded view toggle.

Extrude

Shape the wheel rim and hub through a repeated extrude sequence, then fix the double extrusion it creates.

1. Extrude the top faces of the wheel cylinders, offsetting them inward.
2. Press Q.
3. Extrude to inset the newly created faces.
4. Press Q.
5. Extrude to offset the faces inward again.
6. Press Q.
7. Extrude to create the wheel hub.
8. Press Q.
9. Show the double extrusion problem on the wheel hub.
10. Use Vertex Face to find the hidden, overlapping geometry.
11. Use Merge Vertices to fix the double extrusion.
12. Turn off Isolate Select.

Cube Sphere Creation

Create a cube sphere as the starting shape for the headlight.

1. Create a cube primitive.
2. Apply Smooth to the cube, with subdivisions set to 2, to turn it into a cube sphere.

Transformations to Shape and Place

Shape and position the headlight on the car body.

1. Shape and position the cube sphere as a headlight on the car body.

Delete History Reiteration

Clear history on every object now that modeling is finished.

1. Delete History on every object built so far.

Basic Materials

Assign each object a material so it reads clearly once animated.

1. Right-click each object and choose Assign New Material, then pick Lambert.
2. Show the Attribute Editor, which opens after a new material is assigned.
3. Give each object's material its own color, using the color swatch in the Attribute Editor.
4. Show the Transparency slider in the Attribute Editor, left at 0 for these materials.
5. Nudge the Ambient Color on the body's material to show the effect, then bring it back down to a subtle default.

UV Unwrap: Wheel Rim

Unwrap the rim's UVs so a custom texture can be applied to it.

1. Select the rim faces on the wheel: the faces shaped by the offset, inset, and offset sequence in Extrude, not the hub.
2. Apply Planar Mapping to the selected rim faces, from the icon menu.
3. Show the UV Editor, opened to show the projected UV shell.
4. Look at the UV shell in the UV Editor and confirm it does not overlap itself.

Custom Texture: Wheel Rim

Apply a custom texture to the rim using the UVs just set up.

1. With the rim faces still selected, right-click and choose Assign New Material. Pick Lambert to create a second material for those faces only.
2. Show the Attribute Editor for the new rim material.
3. Click the checkered texture icon next to Color in the Attribute Editor, then choose File.
4. Browse to the rim texture image and select it.
5. Show the rim now showing the texture, mapped through the UVs set up in UV Unwrap: Wheel Rim.

D. PARENTING AND ANIMATION

Grouping Objects (car_grp)

Group the finished objects into a single node, ready for animation.

1. In the Outliner, name the headlight object headlight_geo.
2. Apply Freeze Transformations to body_geo, wheel_geo, wiper_geo, and headlight_geo.
3. Run Mesh Cleanup on body_geo, wheel_geo, wiper_geo, and headlight_geo, from the Mesh > Cleanup menu.
4. Show the Group icon in the icon menu.
5. Select body_geo, wheel_geo, wiper_geo, and headlight_geo, then group them using the icon menu.
6. Show the Move Pivot toggle on the Move tool icon.
7. Turn on Move Pivot mode, then move the car_grp pivot to the bottom center of the vehicle.

Switching to the Animation Menu-Set

Switch to the Animation menu-set now that modeling is finished.

1. Switch the menu-set dropdown to Animation.

Lighting and Parenting

Turn the headlight into a real light source and parent it to the car.

1. Create a spot light from Create > Lights > Spot Light, and position it at the headlight.
2. In the Outliner, name the spot light headlight_lt.
3. Select headlight_lt, then Shift-select car_grp, then press P to parent them.
4. Select headlight_lt and press Shift+P to unparent it.
5. Select headlight_lt, then Shift-select car_grp, then press P to parent them again.
6. Create a directional light from Create > Lights > Directional Light.

Timeline

Set the playback range and check the playback speed before animating.

1. Set the playback range to the animation's start and end frames.
2. Show the Playback Speed context menu, opened by right-clicking the timeline.
3. Right-click the timeline and open the Playback Speed context menu.

Keyframes

Show how to set, delete, and automatically record keyframes.

1. Select an object and set a keyframe using Key > Set Key.
2. Click a keyframe in the Time Slider, right-click it, and choose Delete.
3. Turn on Auto Key.

Animate the Drive

Animate the car's drive, which sets the total length of the animation.

1. At the animation's start frame, position car_grp at its starting point and set a keyframe.
2. At the animation's end frame, position car_grp at its ending point, off in the distance, and set a keyframe.

Camera Creation and Dolly Animation

Animate a camera that dollies alongside the car, slightly slower than the car itself.

1. Create a camera from Create > Cameras > Camera.
2. At the animation's start frame, position the camera alongside the car's starting point and set a keyframe.
3. At a later frame, move the camera further along the car's path, keeping it slightly behind, and set a keyframe.
4. At the animation's end frame, set a keyframe on the camera at that same, stopped position.

Aim Constraint (Camera Tracking)

Constrain the camera to keep aiming at the car as it drives away.

1. Select car_grp, then Shift-select the camera, then open the Aim Constraint options from Constrain > Aim.
2. In the Aim Constraint options, set Aim Vector to 0, 0, -1, then apply the constraint.
3. Play back the animation and confirm the camera keeps aiming at car_grp, even after its own movement has stopped.

Animate the Wiper Loop

Animate one wiper cycle, then repeat it to fill the rest of the timeline.

1. At a start frame, set wiper_geo's rotation to its rest position and set a keyframe.
2. At a later frame, set wiper_geo's rotation to the far end of its sweep and set a keyframe.
3. At a further frame, set wiper_geo's rotation back to its rest position and set a keyframe.
4. Select the wiper's keyframe range in the Time Slider and copy it.
5. Paste the copied range across the rest of the timeline, end-to-end with no gap and no overlap, until it reaches the animation's last frame.

Final Render

Render the finished scene once every part of it is complete.

1. Render the current frame using the Render icon on the Status Line, to check framing and lighting.
2. Set the render range to the animation's start and end frames, then start the render using the Render icon.