Job No: 07   **Duration:** 16H

Job Title: AEC Design Elements

Objective:

Use 3ds Max features to create elements such as Door, Window and Stair, exploring three-dimensional design ideas much easier.

Students should be able to create and manipulate the following elements:
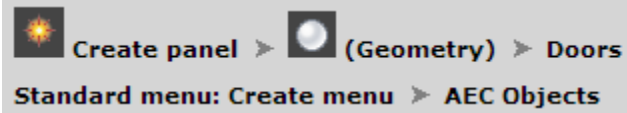
- Door
- Window
- Stair

Introduction:

3ds Max supplies a number of parametric window, door and stair objects that you can place into wall openings to add realism to an architectural model. These objects let you control details like trim and panel fill in your model.

Tip:

While creating an object (between clicks), you can navigate the viewport interactively as follows:

- To pan the viewport, drag with the mouse wheel or middle mouse button held down.

- To orbit the viewport, press and hold Alt while dragging with the mouse wheel or middle mouse button held down.

- To zoom the viewport, roll the mouse wheel or hold down Alt and Ctrl and drag forward and back with the middle mouse button held down.

Doors:

The door models provided let you control details of a door's appearance. You can also set the door to be open, partially open, or closed, and you can animate the opening.


Different door types in a model of a house

The Doors category includes three types:

- The Pivot door is the familiar door that is hinged on one side only.

- The Bifold door is hinged in the middle as well as the side, like many closet doors. You can also make this type of door a set of double doors.

- The Sliding door has a fixed half and a sliding half.

By default, 3ds Max assigns five different material IDs to doors.

The *aectemplates.mat* material library includes *Door-Template*, a [Multi/Sub-Object material](#) designed to be used with doors. Each component of the door/material is listed below along with its corresponding Material ID.
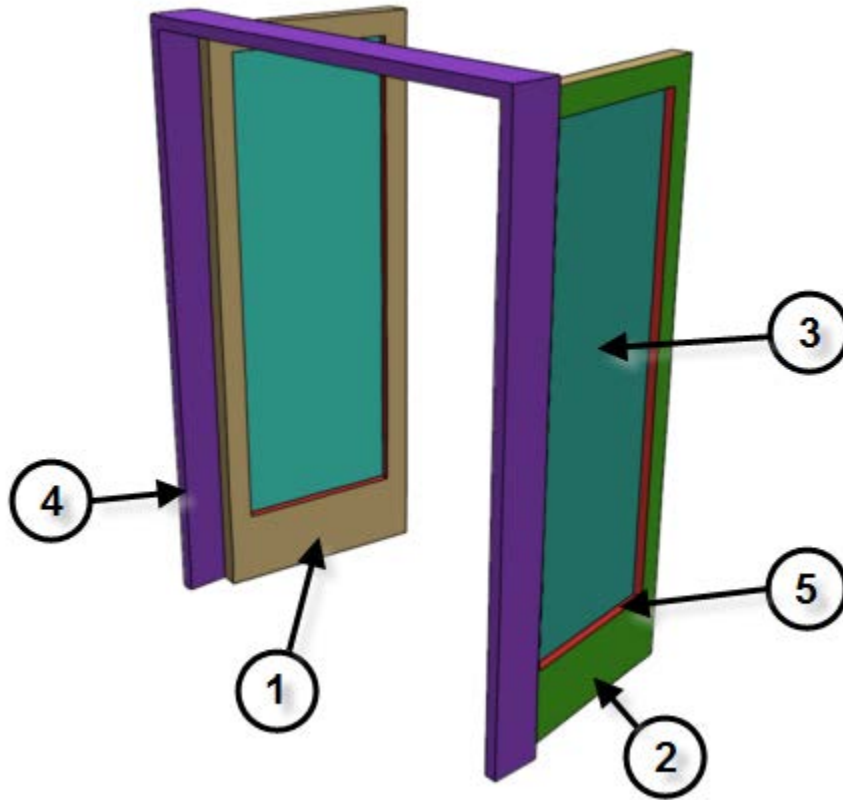
Material IDs for a door or window

Material ID	Door/Material Component
1	Front
2	Back
3	Inner Bevel (used for glazing when Panels set to Glass or Beveled).
4	Frame
5	Inner Door

To create a door:

1. On the Object Type rollout, click the button for the type of door you want to create.

2. Choose options as needed, such as changing the default creation method. Turn off Create Frame to eliminate the door frame. Turn on Allow Non-vertical Jambs if you want an inclined door.

3. Drag the mouse in the viewport to create the first two points, defining the width and angle of the base of the door.

4. Release the mouse and move to adjust the depth of the door (default creation method), and then click to set.

    By default, the depth is perpendicular to the line between the first two points and parallel to the active grid.

5. Move the mouse to adjust the height, and then click to finish.

    The height is perpendicular to the plane defined by the first three points and perpendicular to the active grid.

    You can adjust the Height, Width, and Depth values on the Parameters rollout.

On the Creation Method rollout, you can change the creation order to width-height-depth instead of width-depth-height.

|		
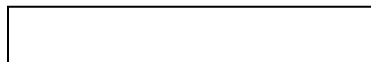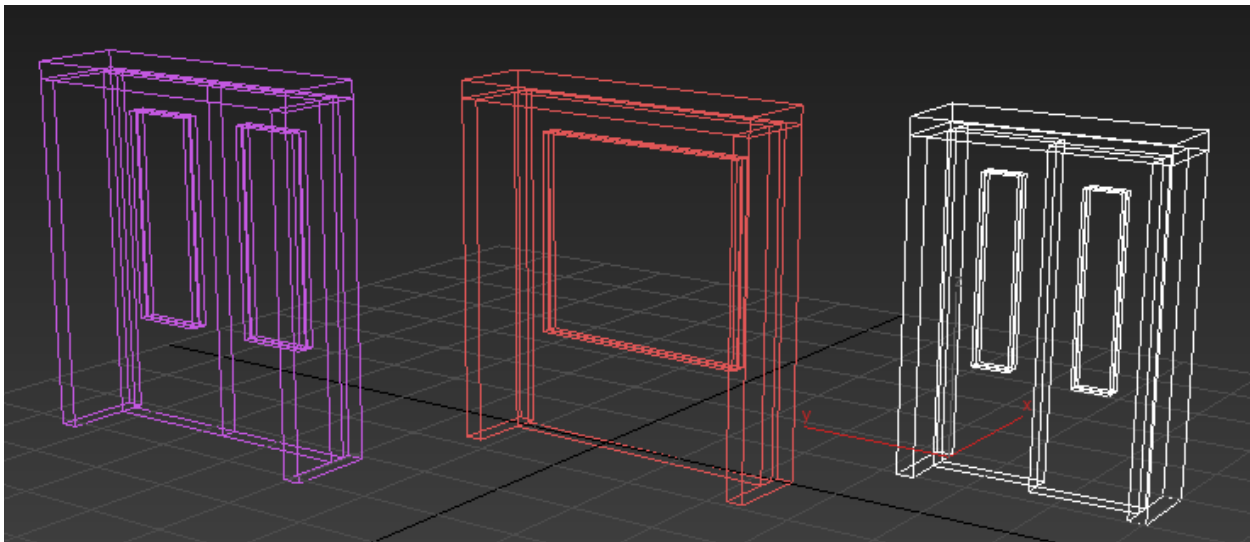
Door Interface Setting:

Creation Method rollout:
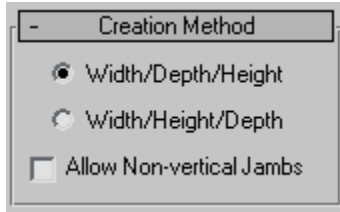
You define each type of door with four points: Drag the first two, followed by two move-click sequences. The Creation Method setting determines the order in which these actions define the door's dimensions.

- **Width/Depth/Height** (The default.) The first two points define the width and angle of the base of the door. You set these points by dragging in a viewport, as the first step in creating a door. The first point, where you click and hold before dragging, defines a point on the jamb at the hinge for single-pivot and bifold doors (both jambs have hinges on double doors, and sliding doors have no hinge). The second point, where you release the button after dragging, specifies the width of the door, as well as the direction from one jamb to the other. This lets you align the door with a wall or opening when you place it. The third point, where you click after moving the mouse, specifies the depth of the door, and the fourth click, where you click after moving the mouse again, specifies the height.

- **Width/Height/Depth** Works like the Width/Depth/Height option, except that the last two points create first the height and then the depth.

Allow Non-vertical Jambs:

- Lets you create tilted doors. Set snaps to define points off the construction plane. Default=off.

Parameters rollout:
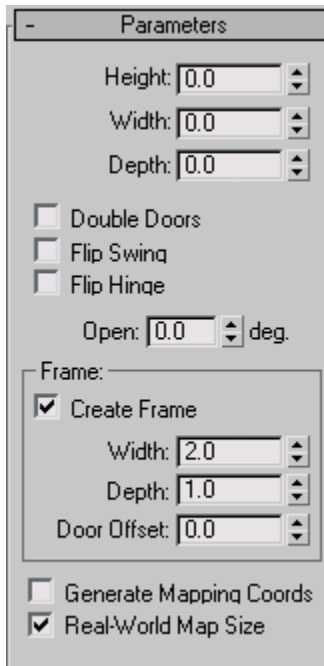
Height

Sets the overall height of the door unit.

Width

Sets the overall width of the door unit.

Depth

Sets the depth of the door unit.

Open

With Pivot doors, specifies in degrees the extent to which the door is open. With Sliding and BiFold doors, Open specifies the percent that the door is open.

Frame group:

This group has controls for the door-jamb frame. Though part of the door object, the frame behaves as if it were part of the wall. It doesn't move when you open or close the door.

Create Frame

> This is turned on as a default to display the frame. Turn this off to disable display of the frame.

Width

> Sets the width of the frame parallel to the wall. Available only when Create Frame is on.

Depth

> Sets the depth of the frame as it projects from the wall. Available only when Create Frame is on.

Door Offset

> Sets the location of the door relative to the frame. At 0.0, the door is flush with one edge of the trim. Note that this can be a positive or negative value. Available only when Create Frame is on.

Generate Mapping Coords

> Assigns mapping coordinates to the door.

Real-World Map Size

> Controls the scaling method used for texture mapped materials that are applied to the object. The scaling values are controlled by the Use Real-World Scale settings found in the applied material's Coordinates rollout. Default=off.

Leaf Parameters rollout:

Provides controls that affect the door itself (as opposed to the door unit, which includes the frame). You can adjust the dimensions of the door, add panels, and adjust the dimensions and placement of those panels. The total number of panels for each door element is the number of horizontal divisions times the number of vertical divisions. Pivot doors have a single door element unless they are double doors. BiFold doors have two door elements, or four if they are double doors. Sliding doors have two door elements.

Thickness

> Sets the thickness of the door.

Stiles/Top Rail

> Sets the width of the panel framing on the top and sides. This setting is apparent only if the door is paneled.

Bottom Rail

> Sets the width of the panel framing at the base of the door. This setting is apparent only if the door is paneled.

 # Panels Horiz.

> Sets the number of panel divisions along the horizontal axis.

Panels Vert.

Sets the number of panel divisions along the vertical axis.

Muntin

Sets the width of the separations between the panels.

Panels group:

Determines how panels are created in the door.

None

The door has no paneling.

Glass

Creates glass panels with no beveling.

Thickness

Sets the thickness of the glass panels.

Beveled

Choose this to have beveled panels.

The remaining spinners affect the beveling of the panels.

Bevel Angle

Specifies the angle of the bevel between the outer surface of the door and the surface of the panel.

Thickness 1

Sets the outer thickness of the panel.

Thickness 2

Sets the thickness where the bevel begins.

Middle Thick.
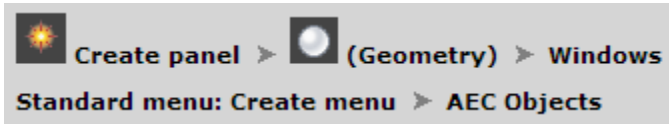
Sets the thickness of the inner part of the panel.

Width 1

Sets the width where the bevel begins.

Width 2

Sets the width of the inner part of the panel.

Window:

The window object lets you control details of a window's appearance. You can also set the window to be open, partially open, or closed, and you can animate the opening over time.


Different types of windows in a model of a house

3ds Max offers six kinds of windows:

- The Casement window has one or two door-like sashes that swing inward or outward.

- The Pivoted window pivots at the center of its sash, either vertically or horizontally.

- The Projected window has three sashes, two of which open like awnings in opposite directions.

- The Sliding window has two sashes, one of which slides either vertically or horizontally.

- The Fixed window doesn't open.

- The Awning window has a sash that is hinged at the top.

By default, 3ds Max assigns five different material IDs to windows.
The *aectemplates.mat* material library includes *Window-Template*, a Multi/Sub-Object material designed to be used with windows. Each component of the window/material is listed below along with its corresponding Material ID.
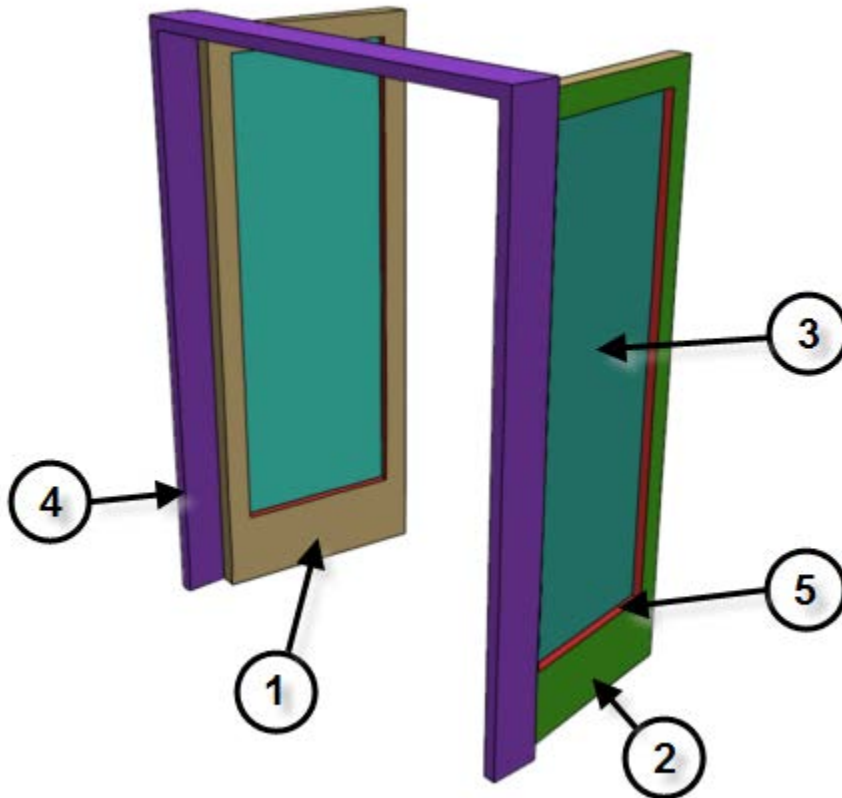
Material IDs for a door or window

Material ID	Window/Material Component
1	Front Rails
2	Back Rails
3	Panels (glazing), with 50% opacity
4	Front Frame
5	Back Frame

To create a window:

1. On the Object Type rollout, click the button for the type of window you want to create.

2. Choose options as needed, such as changing the default creation method. Turn on Allow Non-vertical Jambs if you want an inclined window.

3. Drag the mouse in the viewport to create the first two points, defining the width and angle of the base of the window.

4. Release the mouse and move to adjust the depth of the window (default creation method), and then click to set.

    By default, the depth is perpendicular to the line between the first two points and parallel to the active grid.

5. Move the mouse to adjust the height, and then click to finish.

    The height is perpendicular to the plane defined by the first three points and perpendicular to the active grid.

    You can adjust the height, width, and depth values on the Parameters rollout.

In the Creation Method rollout, you can change the creation order to width-height-depth instead of width-depth-height.

Window Interface Setting:

Creation Method rollout:
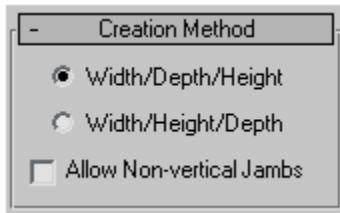
You define each type of window with four points: Drag the first two, followed by two move-click sequences. The Creation Method setting determines the order in which these actions define the window's dimensions.

- **Width/Depth/Height** (The default.) The first two points define the width and angle of the base of the window. You set these points by dragging in a viewport, as the first step in creating a window. This lets you align the window with a wall or opening when you place it. The third point, where you click after moving the mouse, specifies the depth of the window, and the fourth click, where you click after moving the mouse again, specifies the height.

- **Width/Height/Depth** Works like the Width/Depth/Height option, except that the last two points create first the height and then the depth.

Allow Non-vertical Jambs:
- Select to create tilted windows. Set snaps to define points off the construction plane. Default=off.

Parameters rollout:

Height/Width/Depth

Specifies the overall dimensions of the window

Frame group:

Horiz. Width

> Sets the width of the horizontal part of the window frame (at the top and bottom). This setting also affects the glazed portion of the window's width.

Vert. Width

> Sets the width of the vertical part of the window frame (at the sides). This setting also affects the glazed portion of the window's height.

Thickness

> Sets the thickness of the frame. This also controls the thickness of casements or railings on the window's sashes.

**Glazing group:**

Thickness

> Specifies the thickness of the glass.

Generate Mapping Coordinates

> Creates the object with the appropriate mapping coordinates already applied.

Real-World Map Size

> Controls the scaling method used for texture mapped materials that are applied to the object. The scaling values are controlled by the Use Real-World Scale settings found in the applied material's Coordinates rollout. Default=off.

Stair:
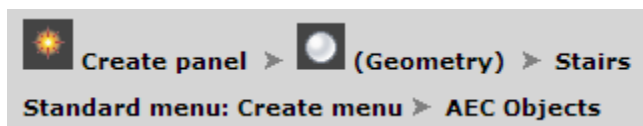
You can create four different types of stairs in 3ds Max:

- L-Type Stair

  The L-Type Stair object lets you create a staircase with two flights at right angles to each other.

- Spiral Stair

  The Spiral Stair object lets you specify the radius and number of revolutions, add stringers and a center pole, and more.

- Straight Stair

  The Straight Stair object lets you create a simple staircase, with optional stringers, carriage, and handrail.

- U-Type Stair

  The U-Type Stair object lets you create a two-flight staircase, with the two flights parallel to each other and a landing between them.

Tip:

While creating a multi-step object (between clicks), you can navigate the viewport interactively as follows:

- To pan the viewport, drag with the mouse wheel or middle mouse button held down.

- To orbit the viewport, press and hold Alt while dragging with the mouse wheel or middle mouse button held down.

- To zoom the viewport, roll the mouse wheel or hold down Alt and Ctrl and drag forward and back with the middle mouse button held down.

By default, 3ds Max assigns seven different material IDs to stairs. The *aectemplates.mat* material library includes *Stair-Template*, a Multi/Sub-Object material designed to be used with stairs. Each component of the stair/material is listed below along with its corresponding Material ID.

Material ID	Railing/Material Component
1	Treads of the stairs
2	Front riser of the stairs
3	Bottom, back, and sides of the risers of the stairs
4	Center pole of the stairs
5	Handrails of the stairs
6	Carriage of the stairs
7	Stringers of the stairs

To create railings on stairs:

1. Create the stairs. See individual stair-type topics for more information.

2. In the Generate Geometry group, turn on Rail Path ➤ Left and Right.

    3ds Max places left and right rail paths above the stairs.

3. In the Railings rollout, set Height to **0.0**.

4. Click ![icon] Create panel ➤ AEC Extended ➤ Railing to create the first railing.

5. Click Railing rollout ➤ Pick Railing Path and select one of the rail paths on the stairs.

6. Adjust the railing parameters.

    3ds Max remembers the parameters you set. When you create the next railing, it will have the same parameters as you set for the first railing.

7. Right-click to end the creation of the first railing.

8. Click Railing again to create the second railing.

9. Click Pick Railing Path and select the other rail path on the stairs.

Stair Interface Setting:

Type group:
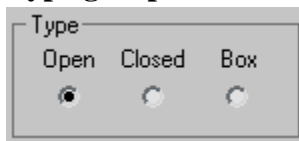
- **Open** Creates an open riser stair.

- **Closed** Creates a closed riser stair.

- **Box** Creates a stair with closed risers and closed stringers on both sides.

Rise group:
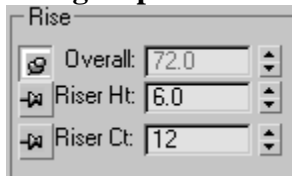
3ds Max keeps one Rise option locked while you adjust the other two. To lock an option, you click a push pin. To unlock an option you click a raised push pin. 3ds Max locks the spinner value of the parameter with the depressed push pin and allows the spinner values of the parameter with the raised push pins to change.

Overall

Controls the height of the flight of stairs.

Riser Ht

Controls the height of the risers.

Riser Ct

Controls the number of risers. There will always be one more riser than steps. This *implied* riser is between the top step of the stair and the upper floor.
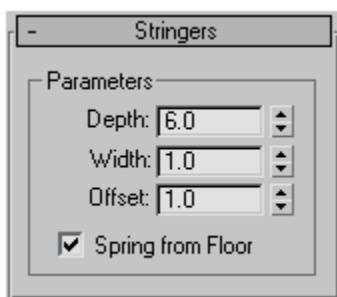
Linear stair with five risers

1 through 4. Risers

5. The implied riser

6. The upper floor you snap to

7. The lower floor you snap to

8. The steps

Stringers Rollout:

These controls are available only when you turn on Stringers on the Parameters rollout ➤ Generate Geometry group.

Depth

Controls how far down the stringers reach toward the floor.

Width

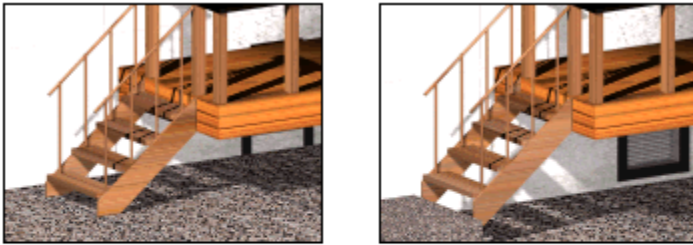Controls the width of the stringers.

Offset

Controls the vertical distance of the stringers from the floor.

Spring from Floor

Controls whether the stringer starts at the floor, flush with the start of the first riser, or if the stringer extends below the floor. You control the amount the stringer extends below the floor with the Offset option.
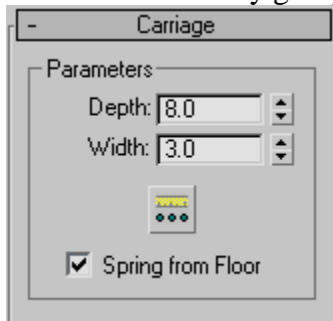

Left: The stringer extending below the floor. (Spring From Floor off.)

Right: The stringer springing from the floor. (Spring From Floor on.)

Carriage Rollout:

These controls are available only when you turn on Carriage on the Parameters rollout ➤ Generate Geometry group.

Depth

Controls how far down the carriage reaches toward the floor.

Width

Controls the width of the carriage.

Carriage Spacing

Sets the spacing of the carriage. When you click this button, the Carriage Spacing dialog displays. Specify the number of carriages you want using the Count option. For more information on spacing options in this dialog, see Spacing Tool.

Spring from Floor

Controls whether the carriage starts at the floor, flush with the start of the first riser, or if the carriage extends below the floor. You control the amount the carriage extends below the floor with the Offset option.
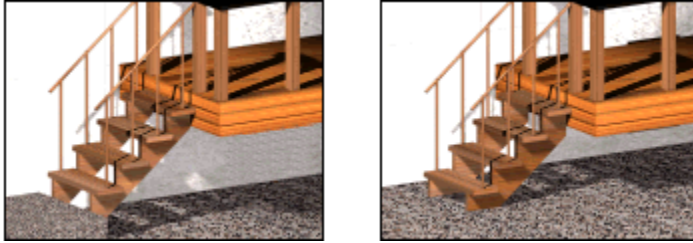

Left: The carriage springing from the floor. (Spring From Floor on.)

Right: The carriage extending below the floor. (Spring from Floor off.)

Railings Rollout:

These controls are available only when you turn on one or more of the Handrail or Rail Path options on the Parameters rollout ➤ Generate Geometry group. Also, Segments and Radius aren't available if neither of the Handrail options is on.
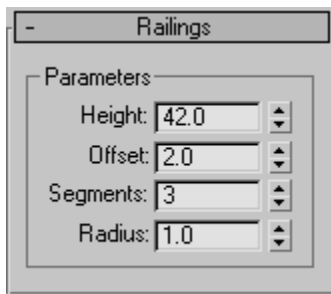
Height

Controls the height of the railings from the steps.

Offset

Controls the offset of the railings from the ends of the steps.

Segments

Controls the number of segments in the railings. Higher values display smoother railings.

Radius

Controls the thickness of the railings.

Job No: 08   **Duration:** 16H

Job Title: AEC Design Elements

Objective:

Use 3ds Max features under AEC extended object to create elements such as Railing, Wall and Foliage, exploring three-dimensional design ideas much easier.

Students should be able to create and manipulate the following elements:

- Foliage
- Railing
- Wall

Introduction:

AEC Extended objects are designed for use in the architectural, engineering, and construction fields. Use Foliage to create plants, Railing to create railings and fences, and Wall to create walls.

Foliage:

Foliage produces various types of plant objects such as tree species. 3ds Max generates mesh representations to create fast, efficient, and good-looking plants.


You control height, density, pruning, seed, canopy display, and level of detail. The seed option controls creation of different representations of the same species. You can create millions of variations of the same species, so each object can be unique. With the viewport canopy mode option, you can control the amount of plant detail, reducing the number of vertices and faces 3ds Max uses to display the plant.

To add plants to a scene:

1. Click the Favorite Plants rollout ➤ Plant Library button to display the Configure Palette dialog.

2. Double-click the row for each plant you want to add or remove from the Palette and click OK.

3. On the Favorite Plants rollout, select a plant and drag it to a location in a viewport. Alternatively, select a plant in the rollout and then click in the viewport to place the plant.

4. On the Parameters rollout, click the New button to display different seed variations of the plant.

5. Adjust the remaining parameters to show elements of the plants, such as leaves, fruit, branches, and if you want, to view the plant in canopy mode.

Parameters Rollout:
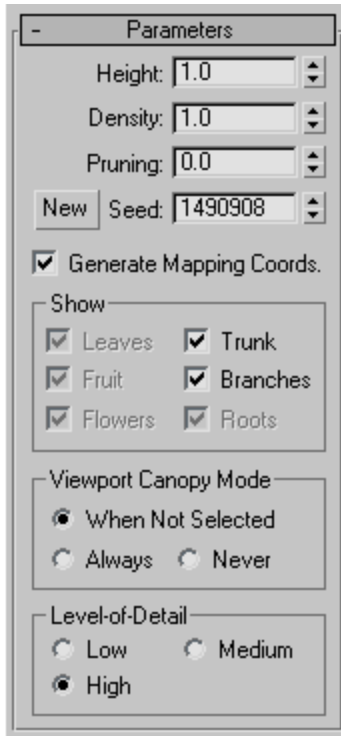
Height

Controls the approximate height of the plant. 3ds Max applies a random noise factor to the height of all of the plants. Therefore, the actual height of a plant, as measured in the viewports, won't necessarily match the setting given in the Height parameter.

Density

Controls the amount of leaves and flowers on the plant. A value of 1 displays a plant with all its leaves and flowers, .5 displays a plant with half its leaves and flowers, and 0 displays a plant with no leaves or flowers.
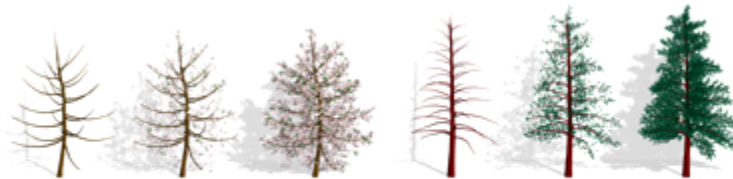
Two trees with varying foliage densities

Pruning

Applies only to plants with branches. Removes branches that lie below an invisible plane parallel to the construction plane. A value of 0 prunes nothing, a value of 0.5 prunes the plant at a plane halfway up its height from the construction plane, and a value of 1 prunes everything possible from the plant. What 3ds Max prunes from the plant depends on the type of plant. The trunk is never pruned.
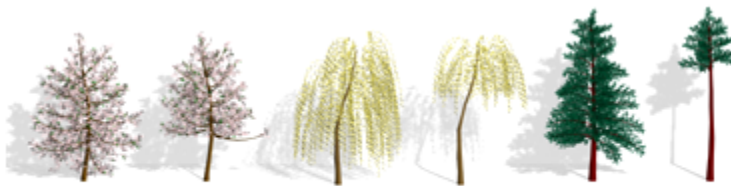

Three pairs of trees, showing different values of pruning

Seed

A value between 0 and 16,777,215 representing the possible variations of branch and leaf placement and shape and angle of the trunk of the current plant.

Show group:
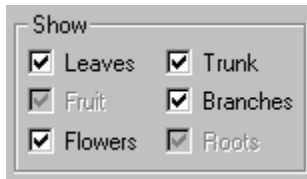
Controls the display of leaves, fruit, flowers, trunk, branches, and roots of plants. Available options depend on the type of plant you select. For example, if a plant doesn't have fruit, 3ds Max disables that option. Turning off options reduces the number of vertices and faces displayed.
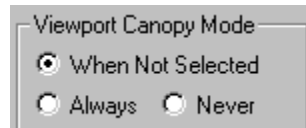
Viewport Canopy Mode group:

In 3ds Max, the canopy of a plant is a shell covering the outermost parts of the plant, such as the leaves or the tips of the branches and trunk. The term derives from "forest canopy." Use reasonable parameters when you create many plants and want to optimize display performance.

Because this setting applies only to the plant's representation in the viewports, it has no effect on how 3ds Max renders the plant. For information on how 3ds Max renders the plant, see Level-of-Detail.

- **When Not Selected** Displays the plant in canopy mode when it's not selected.

- **Always** Always displays the plant in canopy mode.

- **Never** Never displays the plant in canopy mode. 3ds Max displays all the features of the plant.
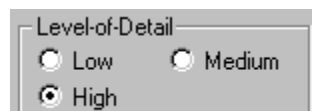
Level-of-detail group:

Controls how 3ds Max renders the plant. For information on how 3ds Max displays the plant in the viewports, see Viewport Canopy Mode.

- **Low** Renders the plant canopy, providing the lowest level of detail.

- **Medium** Renders a reduced-face-count version of the plant. How 3ds Max reduces the face count varies from plant to plant, but it usually involves removing smaller elements of the plant or reducing the number of faces in the branches and trunk.

- **High** Renders all the faces of the plant, providing the highest level of detail.

Railing:
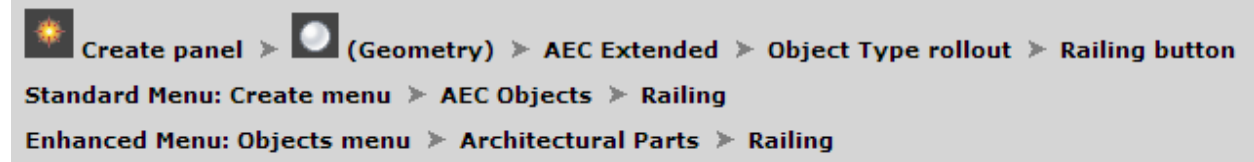
Components of the Railing object include rails, posts, and fencing. Fencing includes either pickets (balusters) or solid-filled material, such as glass or wood strip.
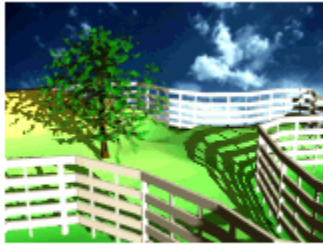
Railings used to create fences in a field.

You can create a railing object either by specifying the orientation and height of the railing, or by picking a spline path and applying the railing to that path. When 3ds Max applies railing to a spline path, the latter is called a *rail path*. Later, if you edit the rail path, the railing object automatically updates to follow the changes you made. You can use three-dimensional splines as rail paths.

When you create the lower rails, posts, and fencing components of a railing, you use the Spacing tool to specify the spacing of those components. 3ds Max names the Spacing tool dialog for each railing component: Lower Rail Spacing, Post Spacing, or Picket Spacing.

By default, 3ds Max assigns five different material IDs to railings.
The *aectemplates.mat* material library includes *Rail-Template*, a Multi/Sub-Object material designed to be used with railings. Each component of the railing/material is listed below along with its corresponding Material ID.

The following procedures describe how to create railings combining each of the components: upper rail, lower rails, posts, picket fencing, and solid filled fencing.

Material ID	Railing/Material Component
1	Lower rails
2	Posts of the railing
3	Solid fill of the railing
4	Top of the railing
5	Pickets of the railing

You can create a railing object in any viewport, but for best results, use a Perspective, Camera, or Top viewport.

To create a railing:

1. Click and drag the railing to the desired length.

2. Release the mouse button, and then move the mouse vertically to set the height. Click to finish.

   By default, 3ds Max creates the top rail along with two posts, a lower rail at half the railing height, and two evenly spaced pickets.

3. If you need to, change any of the parameters to adjust the segments, length, profile, depth, width, and height of the rail.

To adjust lower rails:

1. To modify the lower rail, or add more, choose an option from the Lower Rail(s) group ➤ Profile list.

2. Specify the depth and width for the lower rails and then click Lower Rail(s) ➤ ▦ (Spacing).

3. Specify the number of lower rails you want using the Count option. Click Close to apply your changes. For more information on spacing options in this dialog, see Spacing Tool.

To create posts:

1. If you want to modify the posts, or add more, choose an option from the Profile list under the Posts rollout.

2. Specify the depth and width of the posts and how much they should extend above the top rail. Then click Posts rollout ➤ ▦ (Spacing).

3. Specify the number of posts you want using the Count option. Click Close to apply your changes. For more information on spacing options in this dialog, see Spacing Tool.

To create picket fencing:

1. Choose Fencing rollout ➤ Type list ➤ Pickets. The Solid Fill options will be unavailable.

2. Choose an option from the Profile list, specify the depth and width of the pickets, and then click Picket rollout ➤ ▦ (Spacing).

3. Specify the number of pickets you want using the Count option. Click Close to apply your changes. For more information on spacing options in this dialog, Spacing Tool.

To create solid-fill fencing:

1. Choose Fencing rollout ➤ Type list ➤ Solid Fill. (The options under Picket are unavailable).

2. Under Solid Fill, adjust the options for Thickness and offsets.

To create railings along a spline path:

Before you can create railings along a spline path, you need to create a spline, or use an existing spline from your scene.

1. Click ![icon] Create panel ➤ ![icon] (Geometry) ➤ AEC Extended ➤ Railing.

2. Click Pick Railing Path, then select a spline in your scene.

    Since the number of segments is 1 by default, the upper rail extends for one segment between the start and end of the spline.

3. Change the amount of segments using the Modify panel ➤ Segment setting.

   The higher the segment value, the more closely the railing approximates the spline shape.

4. If you want the railing to contain corners where the spline does, turn on Respect Corners.

5. Complete the remainder of the railing options as described in the preceding procedures.

    Thereafter, the spline is associated with the railing; any changes you make to the spline shape are reflected in the railing.

Railing Interface Setting:

Railing Rollout:

Pick Railing Path

> Click this, and then click a spline in the viewport to use as the railing path. 3ds Max uses the spline as the path along which to apply the railing object.

> If you edit the spline you've used as a railing path, the railing adjusts to the changes you make. 3ds Max doesn't immediately recognize 2D Shapes from a linked AutoCAD drawing. To recognize Shapes from a linked AutoCAD drawing, edit the Shape withEdit Spline in the Modify panel.
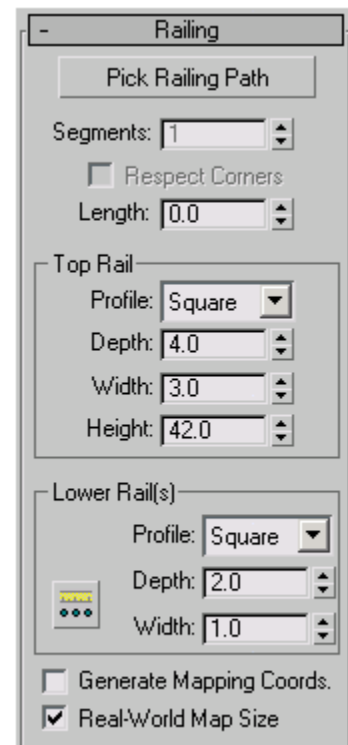
Segments

> Sets the number of segments of the railing object. Available only when you're using a railing path.

> For a close approximation to a railing path, increase the number of segments. Be aware that a high number of segments increases file size and slows down the rendering speed. You might use fewer segments when the spline path has a low curvature (or none) and fewer segments provide an adequate approximation.

Respect Corners

> Puts corners in the railing to match the corners of the railing path.

Length

> Sets the length of the Railing object. When you drag the mouse, the length displays in the edit box.

Top Rail group:

The defaults produce a top rail component, consisting of one segment by the length you specify, a square profile, four units deep, three units wide, and the height you specify.

1. Width

2. Depth

3. Height

4. Profile for the square top rail

5. Profile for the round top rail
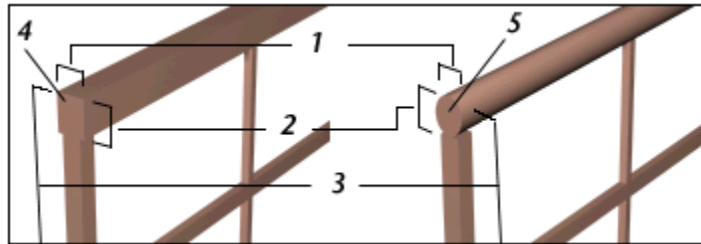
Profile

> Sets the cross-section shape of the top rail.

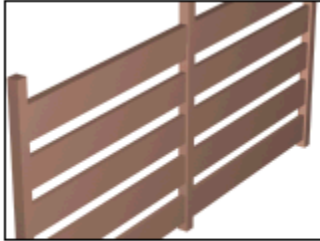**Depth**

> Sets the depth of the top rail.

Width

> Sets the width of the top rail.

Height

> Sets the height of the top rail. During creation, you can drag the top rail to the height you want using the mouse in the viewport. Or you can enter the height amount from the keyboard or use the spinners.

Lower Rail group:

Controls the profile, depth, width, and spacing between the lower rails. You specify how many lower rails you want using the Lower Rail Spacing button.

A railing with the rails defined by their profile, depth, and width as planks.

Profile

Sets the cross-section shape of the lower rails.

Depth

Sets the depth of the lower rails.

Width

Sets the width of the lower rails.

Lower Rail Spacing

Sets the spacing of the lower rails. When you click this button, the Lower Rail Spacing dialog displays. Specify the number of lower rails you want using the Count option. For more information on spacing options in this dialog, see Spacing Tool.

Generate Mapping Coords

Assigns mapping coordinates to the railing object.
NoteIf a visible viewport is set to a non-wireframe or non-bounding-box display, Generate Mapping Coordinates is on for all primitives to which you apply a material containing a map with Show Map In Viewport on. If all viewports are set to wireframe or bounding box, 3ds Max turns on Generate Mapping Coordinates for primitives containing mapped materials at render time.

Real-World Map Size

Controls the scaling method used for texture mapped materials that are applied to the object. The scaling values are controlled by the Use Real-World Scale settings found in the applied material's Coordinates rollout. Default=off.

Posts Rollout:

Controls the profile, depth, width, extension, and spacing between the posts. You specify how many posts you want using the Post Spacing button.

Profile

Sets the cross-section shape of the posts: none, Square, or Round.

Depth

Sets the depth of the posts.

Width

Sets the width of the posts.

Extension

Sets the amount the posts extend above the bottom of the top railing.

Post Spacing

Sets the spacing of the posts. When you click this button, the Post Spacing dialog displays. Specify the number of posts you want using the Count option. For more information on spacing options in this dialog, see Spacing Tool.

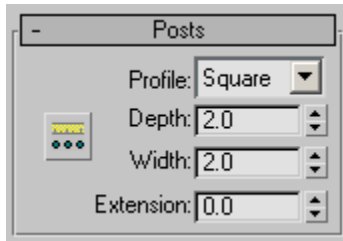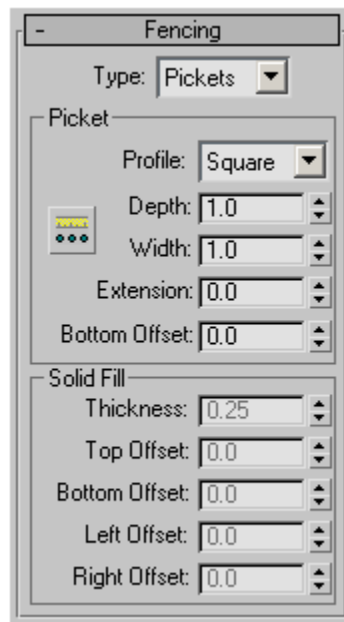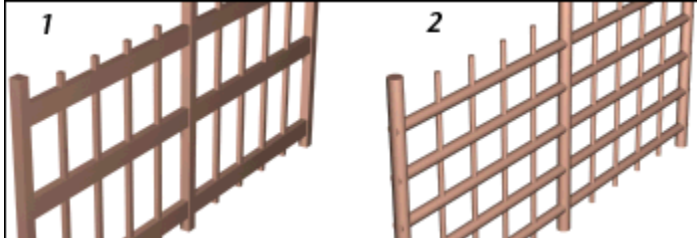**Fencing Rollout:**

Type

Sets the type of fencing between the posts: none, Pickets, or Solid Fill.

Picket group:

Controls the profile, depth, width, and spacing between the pickets. Specify how many pickets you want using the Picket Spacing button. Available only when you set Type to Pickets.

1. A railing with pickets using a square profile

2. A railing with pickets using a round profile

Profile

Sets the cross-section shape of the pickets.

Depth

Sets the depth of the pickets.

Width

Sets the width of the pickets.

Extension

Sets the amount the pickets extend above the bottom of the top railing.

Bottom Offset

Sets the amount the pickets are offset from the bottom of the railing object.

Picket Spacing

Sets the spacing of the pickets. When you click this button, the Picket Spacing dialog displays. Specify the number of pickets you want using the Count option. For more information on spacing options in this dialog, see Spacing Tool.

Solid Fill group:

Controls the thickness and offsets of the solid fill between the posts. Available only when you set Type to Solid.

Thickness

Sets the thickness of the solid fill.

Top Offset

Sets the offset of the solid fill from the bottom of the top rail.
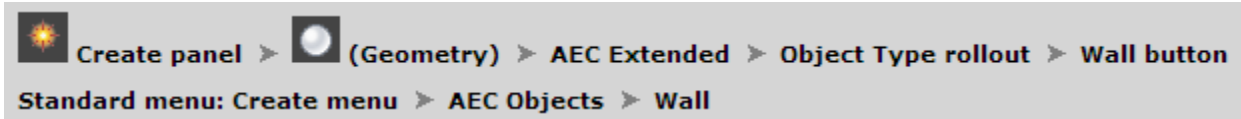
Bottom Offset

Sets the offset of the solid fill from the bottom of the railing object.

Left Offset

Sets the offset between the solid fill and the adjacent left post.

Right Offset

Sets the offset between the solid fill and the adjacent right post.

Wall:

The Wall object is made up of three sub-object types that you can edit in the Modify panel. Similarly to the way you edit splines, you can edit the wall object, its vertices, its segments, and its profile.

When you create two wall segments that meet at a corner, 3ds Max removes any duplicate geometry. This "cleaning up" of the corners might involve trimming. 3ds Max cleans up only the first two wall segments of a corner, not any other wall segments that might share the corner. 3ds Max does not clean up intersections.

Inserting Doors and Windows in a Wall:
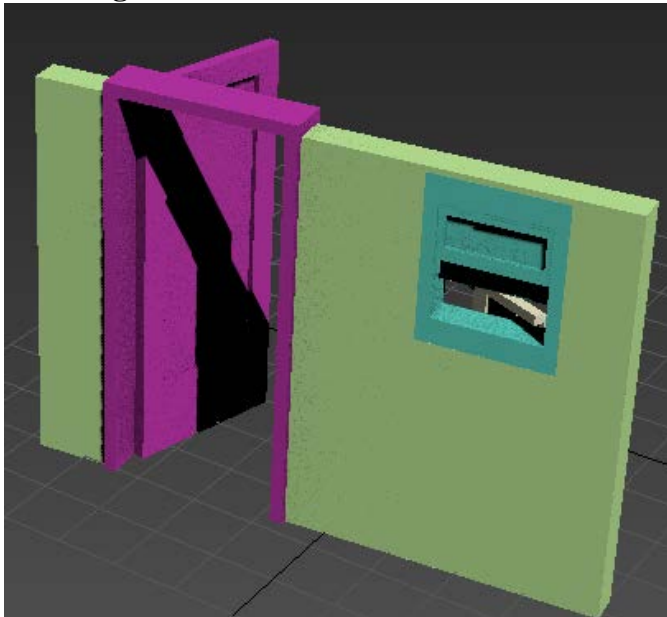
3ds Max can automatically make openings for doors and windows in a wall. At the same time, it links the door or window to the wall as its child. The most effective way of doing both is to create the doors and windows directly on a wall segment by snapping to the faces, vertices, or edges of the wall object.

If you move, scale, or rotate the wall object, the linked door or window moves, scales, or rotates along with the wall. If you move the linked door or window along the wall, using the door or window's local coordinate system and constraining motion to the XY plane, the opening will follow. Also, if you change a door or window's overall width and height on the Modify panel, the hole will reflect those changes.

By default, 3ds Max assigns five different material IDs to walls. The *aectemplates.mat* material library includes *Wall-Template*, a Multi/Sub-Object material designed to be used with walls. Each component of the wall/material is listed below along with its corresponding Material ID.

Material ID	Wall/Material Component
1	Vertical ends of the wall
2	Outside of the wall
3	Inside of the wall
4	Top of the wall, including any edges cut out of the wall
5	Bottom of the wall

To create a wall:

You can create a wall in any viewport, but for vertical walls, use a Perspective, Camera, or Top viewport.

1. Set parameters for the Width, Height, and Justification of the wall.

2. In a viewport, click and release, move the mouse to set the desired length for the wall segment, and click again.

   This creates a wall segment. You can end the wall by right-clicking or you can continue to create another wall segment.

3. To add another wall segment, move the mouse to set the length of the next wall segment and click again.

   If you create a room by ending a segment at the end of another segment of the same wall object, 3ds Max displays the Weld Point dialog. This dialog lets you convert the two end vertices into a single vertex, or to keep the two end vertices distinct.

4. If you want the wall segments to be welded at that corner so that when you move one wall, the other wall stays correct at the corner, click Yes. Otherwise, click No.

5. Right-click to end the wall, or continue to add other wall segments.

To attach separate walls:

1. Select a wall object.

2. On the Modify panel, click Attach, and then pick another wall object.

   The two wall objects become part of the same wall object, but are not physically connected.

Attach stays active, and you can continue clicking wall segments to attach. To stop attaching, click the Attach button or right-click in the active viewport.

To attach multiple wall objects simultaneously to the selected wall object, click Attach Multiple on the Modify panel to open the Attach Multiple dialog. This works the same as the Select From Scene dialog, except that it shows only wall objects; choose multiple walls to attach, and then click the Attach button.

To connect vertices in a wall:

This method lets you connect two separate wall sections with a new segment.
Tip: It is easier to work with wall vertices in wireframe view mode.

1. Select a wall object that has more than one section. Typically you would use Attach to create such an object.

2. In the modifier stack, go to the Vertex sub-object level.

3. Click Connect and point the mouse over an end vertex until the cursor changes to a cross.

4. Click once over the end vertex.

5. Move the cursor to another end vertex, and then click to connect the two segments.

To insert a vertex in a wall:

It is easier to work with wall vertices in wireframe view mode.

1. Select a wall segment.

2. In the modifier stack, go to the Vertex sub-object level.

3. Click Insert.

    A highlighted line appears along the bottom of the wall, showing where you can insert vertices.

4. Click anywhere on the highlighted line to insert a vertex.

    The new vertex is attached to the mouse cursor.

5. Move the mouse to position the vertex, and then click to place it.

    Now the mouse is attached to one of the new segments.

6. Move the mouse along the segment and click to add vertices.

7. Right-click to finish working on this segment. You can now insert vertices in other segments, or right-click again to exit Insert mode.

To detach and reorient a copy of a wall segment:
Tip: It is easier to work with wall vertices in wireframe view mode.

1. Select a wall.

2. In the modifier stack, go to the Segment sub-object level.

3. Select a wall segment.

4. Turn on both Reorient and Copy, and then click Detach.

5. Enter a name for the new wall object in the Detach dialog or click OK to accept the default name.

    3ds Max copies the original wall's Local coordinate system when it makes the copy of the detached segment. It places the new object so that its Local coordinate system is coincident with the World space origin.

To add a gable point to a wall profile or adjust for uneven terrain:
TipIt is easier to work with wall vertices in wireframe view mode.

1.   Select a wall.

2. In the modifier stack, go to the Profile sub-object level.

3. Select a wall profile by clicking a wall segment.

    A grid appears.

4. To add a gable point procedurally, set the height and click Create Gable.

    If you prefer to add the profile point manually, click Insert, click a point on the highlighted top profile, drag the new point into place and then release where you want to place the new gable point. You can move profile points you create with Insert only within the plane of the wall segment, and you cannot move them below the original top edge.

    If you want to adjust the profile for uneven terrain below a wall, click Insert, pick the highlighted bottom profile and add points as necessary.

    If you want to extend multiple segments uniformly downward below floor level, do the following: At the Segment sub-object level, select the segments and, on the Edit Segment rollout, enter a negative Bottom Offset value to move the segments downward. Add the absolute value of the Bottom Offset setting back to the Height value to bring the top of the wall height back up and make it flush with the other wall segments.

To apply a texture to a wall:

Walls are created with five different material IDs for their various parts.

The *aectemplates.mat* material library includes *Wall-Template*, a Multi/Sub-Object material designed for use with walls. You can copy or copy and modify this template, or create your own material as follows:

1. Create a Multi/Sub-Object material using five textures for the following Material IDs:

   - Slot #1 is the material for the vertical ends on the wall

   - Slot #2 is the material for the outside of the wall

   - Slot #3 is the material for the inside of the wall

   - Slot #4 is the material for the top of the wall, as well as any inside edges cut out of the wall

   - Slot #5 is the material for the bottom of the wall

     NoteThe definitions of slots 2 and 3 are interchangeable; inside and outside simply depend on your point of view, and how you created the wall.

2. If the top and bottom surfaces of the wall aren't visible in the rendered scene, you can use a three-sided material instead. The inside and outside of the wall are relative to the direction in which the wall was created. To swap a texture between slots in the Material Editor, drag one of the textures over the other slot in the Basic Parameters rollout of the Multi/Sub-Object material, and then choose Swap.

3. For greater control in tiling across the wall surface, apply a Map Scaler world-space modifier to the wall. Then adjust the scale of the map in the Map Scaler's Parameters rollout.

To create and place a window or door in a wall:

For best results, perform this procedure in a wireframe viewport.

1. Create a window or door (hereafter referred to as "window" for brevity) directly on an existing wall. You can define the window's exact dimensions after insertion. Use edge snap for the first snaps to place and align the window on the wall and to establish its exact depth. Snap to and then click the near top edge of the wall to start creation. Drag to another edge snap point on the near top edge of the wall and release to align the window with the wall segment and to set its width. Snap to the rear top edge of the wall to set the proper depth and click. Move the cursor downward and click to define the window height. This final click doesn't require a snap, as it simply defines a rough height.

2. The window should now be cut out of the wall. On the Modify panel for windows or doors, set the correct width and height. Change the depth if it's different from the snap depth you set above.

3. Use vertex snap to move the window or door from a reference point to a known point on the wall segment. Then

Next, use relative offset values from this new position to accurately locate the window or door. As an example, following the next two steps, you could move a window from its top left corner to the top left corner of the wall segment so that you can then move it 3 feet to the right and 2 feet down.

4. With the window or door selected, set the coordinate system to Local.

5. On the Coordinate Display, activate Offset mode and then enter the offset distances on the X axis for horizontal and the Y axis for vertical.

Note: For best results, do not position an inserted window or door at the bottom of a wall.

Wall Interface Setting:

Keyboard Entry rollout:
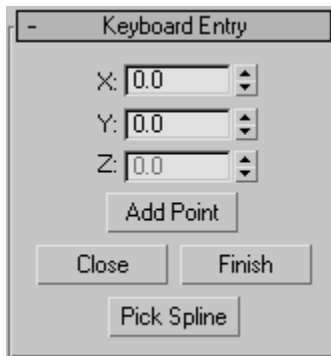
X

> Sets the coordinate position along the X axis for the start point of a wall segment in the active construction plane.

Y

> Sets the coordinate position along the Y axis for the start point of a wall segment in the active construction plane.

Z

> Sets the coordinate position along the Z axis for the start point of a wall segment in the active construction plane.

Add Point

> Adds the point from the X, Y, and Z coordinate values you enter.

Close

> Ends creation of the wall object and creates a segment between the end point of the last segment and the start point of the first segment, to make a closed wall.

Finish

> Ends creation of the wall object, leaving it open ended.

Pick Spline

> Lets you use a spline as the wall path. Click this, and then click a spline in the viewport to use as the wall path. 3ds Max uses the spline as the path along which to apply the wall object. 3ds Max doesn't immediately recognize 2D Shapes from a linked AutoCAD drawing. To recognize Shapes from a linked AutoCAD drawing, edit the Shape with <u>Edit Spline</u> from the Modify panel.
> **Note**If you designate a curved spline as the path, 3ds Max creates straight wall segments that approximate the spline as closely as possible, with one wall segment per spline segment.

Parameters rollout:
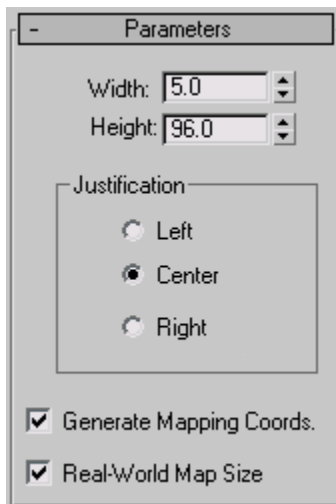
The defaults produce a wall object 5 units wide, 96 units high, and justified at the center of the wall.

Width

> Sets the thickness of the wall. Range=0.01 unit to 100,000 units. Default=5.

Height

> Sets the height of the wall. Range=0.01 unit to 100,000 units. Default=96.

Justification group:

- **Left** Justifies the wall at the left edge of its baseline (the line between the wall's front and back sides, which is equal to the wall thickness). If you turn Grid Snap on, the left edge of the wall's baseline snaps to the grid line.

- **Center** (The default) Justifies the wall at the center of its baseline. If you turn Grid Snap on, the center of the wall's baseline snaps to the grid line.

- **Right** Justifies the wall at the right edge of its baseline. If you turn Grid Snap on, the right edge of the wall's baseline snaps to the grid line.

Generate Mapping Coords

Assigns mapping coordinates to the wall. Default=on.

Real-World Map Size

Controls the scaling method used for texture mapped materials that are applied to the object. The scaling values are controlled by the Use Real-World Scale settings found in the applied material's Coordinates rollout. Default=off.