Standard Primitives
**Slice On**—Uses the From and To angles to create a partial sphere. The effect is similar to lathing a semicircular shape fewer than 360 degrees.

**Slice From**—Sets the start angle.

**Slice To**—Sets the stop angle.

**Base To Pivot**—Moves a sphere upward along its local Z axis so the pivot point is at its base.

**Generate Mapping Coords**—Generates coordinates for applying mapped materials to the sphere.

*Effect of using Base To Pivot setting*
GeoSphere Primitive

To create a geosphere:
2. In any viewport, drag to set the center and radius of the geosphere.
3. Set parameters such as Geodesic Base Type and Segments.

To create a geo-hemisphere:
1. Create a geosphere.
2. In the Parameters rollout, turn on the Hemisphere check box. The geosphere is converted to a hemisphere.
Creation Method rollout

Edge— Draws a geosphere from edge to edge.
Center— Draws a geosphere from the center out.

Radius— Sets the size of the geosphere.
Segments— Sets the total number of faces in the geosphere.

Geodesic Base Type group

Lets you choose one of three types of regular polyhedrons for the geosphere's basic geometry.

- Tetra—
  Based on a four-sided tetrahedron. The triangular facets can vary in shape and size. The sphere can be divided into four equal segments.

- Octa—
  Based on an eight-sided octahedron. The triangular facets can vary in shape and size. The sphere can be divided into eight equal segments.

- Icosa—
  Based on a 20-sided icosahedron. The facets are all equally sized equilateral triangles.

Smooth— Applies smoothing groups to the surface of the sphere.
Hemisphere— Creates a half-sphere.
Base To Pivot— Sets the pivot point location. When on, the pivot is at the bottom of the sphere.
Generate Mapping Coords— Generates coordinates for applying mapped materials to the
To create a cylinder:
2. In any viewport, drag to define the radius of the base, then release to set the radius.
3. Move up or down to define a height, either positive or negative.
4. Click to set the height and create the cylinder.
Creation Method rollout

Edge— Draws a cylinder from edge to edge.
Center— Draws a cylinder from the center out.

Radius— Sets the radius of the cylinder.
Height— Sets the dimension along the central axis.
Height Segments— Sets the number of divisions along the cylinder's major axis.
Cap Segments— Sets the number of concentric divisions around the center of the cylinder's top and bottom.
Sides— Sets the number of sides around the cylinder.
Smooth— The faces of the cylinder are blended together, creating a smooth appearance in rendered views.
Slice On— Enables the Slice function.
Slice From, Slice To— Sets the number of degrees around the local Z axis from a zero point at the local X axis.
Generate Mapping Coords— Generates coordinates for applying mapped materials to the cylinder.
To create a tube:
2. In any viewport, drag to define the first radius, which can be either the inner or outer radius of the tube. Release to set the first radius.
3. Move to define the second radius, then click to set it.
4. Move up or down to define a height, either positive or negative.
5. Click to set the height and create the tube.
Creation Method rollout

Edge— Draws a tube from edge to edge.
Center— Draws a tube from the center out.

Radius 1, Radius 2—
The larger setting specifies the outside radius of the tube, while the smaller specifies the inside radius.

Height—
Sets the dimension along the central axis.

Height Segments—
Sets the number of divisions along the tube's major axis.

Cap Segments—
Sets the number of concentric divisions around the center of the tube's top and bottom.

Sides—
Sets the number of sides around the tube.

Smooth—
When on, faces of the tube are blended together, creating a smooth appearance in rendered views.

Slice On—
Enables the Slice feature, which removes part of the tube's circumference. When you turn it on, faces of the tube are blended together, creating a smooth appearance in rendered views.

Slice From, Slice To—
Sets the number of degrees around the local Z axis from a zero point at the local X axis.

Generate Mapping Coords—
Generates coordinates for applying mapped materials to the tube.
**Torus Primitive**

**حلقة (الدولاب)**

Create panel > Geometry button > Standard Primitives > Object Type rollout > Torus button
Create menu > Standard Primitives > Torus

Examples of tori

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**To create a torus:**
1. From the Create menu, choose Standard Primitives > Torus.
2. In any viewport, drag to define a torus.
3. As you drag, a torus emerges with its center at the pivot point.
4. Release to set the radius of the torus ring.
5. Move to define the radius of the cross-sectional circle, then click to create the torus.
**Creation Method rollout**

**Edge**— Draws a torus from edge to edge.

**Center**— Draws a torus from the center out.

**Radius 1**— Sets the distance from the center of the torus to the center of the cross-sectional circle.

**Radius 2**— Sets the radius of the cross-sectional circle.

**Rotation**— Sets the degree of rotation.

**Twist**— Sets the degree of twist.

**Segments**— Sets the number of radial divisions around the torus.

**Sides**— Sets the number of sides on the cross-sectional circle of the torus.
Smooth group

- All— Produces complete smoothing on all surfaces of the torus.
- Sides— Smooths the edges between adjacent segments, producing smooth bands running around the torus.
- None— Turns off smoothing entirely, producing prism-like facets on the torus.
- Segments— Smooths each segment individually, producing ring-like segments along the torus.

Slice On— Creates a portion of a sliced torus rather than the entire 360 degrees.
Slice From— When Slice On is on, specifies the angle where the torus slice begins.
Slice To— When Slice On is on, specifies the angle where the torus slice ends.
Generate Mapping Coords— Generates coordinates for applying mapped materials to the torus.
Standard primitives

-- Geometric primitives are familiar as objects in the real world such as beach balls, pipes, boxes, doughnuts, and ice cream cones.

-- In 3ds max, you can model many such objects using a single primitive.

-- You can also combine primitives into more complex objects, and further refine them with modifiers.
The Pyramid primitive has a square or rectangular base and triangular sides.

To create a Pyramid:
2. Choose a creation method, either Base/Apex or Center.
3. In any viewport, drag to define the base of the pyramid.
4. Click, and then move the mouse to define the Height.
5. Click to complete the pyramid.
**Creation Method rollout**

**Base/Apex**— Creates the pyramid base from one corner to the diagonally opposite corner.

**Center**— Creates the pyramid base from the center out.

---

**Creation Method rollout**

**Base/Apex**—

قاعدة الهرم تكون من أحد الأركان إلى الأركان المقابل له

**Center**—

قاعدة الهرم تكون من المركز إلى الحواف الخارجية

---

**Width, Depth and Height**—
Sets the dimension of the corresponding side of the pyramid.

**Width, Depth and Height Segs**—
Sets the number of segments to the corresponding sides of the pyramid.

**Generate Mapping Coords**—
Generates coordinates for applying mapped materials to the pyramid.
Teapot Primitive

To create a teapot:
2. In any viewport, drag to define a radius. As you drag, a teapot emerges with the pivot point at the center of its base.
3. Release the mouse to set the radius and create the teapot.
Creation Method rollout

**Edge**— Draws a teapot from edge to edge.  
**Center**— Draws a teapot from the center out.

**Radius**—
Sets the radius of the teapot

**Segments**—
Sets the number of divisions for the teapot or its individual parts.

**Smooth**—
Blends faces of the teapot, creating a smooth appearance in rendered views.

**Teapot Parts group**
Turn check boxes on or off for teapot parts. By default, all are on, producing a complete teapot.

**Generate Mapping Coords**—
Generates coordinates for applying mapped materials to the teapot. Default=on.
**Plane Primitive**

Create panel > Geometry button > Standard Primitives > Object Type rollout > Plane button
Create menu > Standard Primitives > Plane
Toolbox > Press on the box object to open the flyout > Plane

**To create a plane:**
2. In any viewport, drag to create the Plane.
Creation Method rollout
Rectangle— Creates the plane primitive from one corner to the diagonally opposite corner, interactively setting different values for length and width.
Square— Creates a square plane where length and width are equal. You can change dimensions in the Parameters rollout subsequent to creation.

**Length, Width**—
Sets the length and width of the plane object.

**Length Segs, Width Segs**—
Sets the number of divisions along each axis of the object.

**Render Scale**—
Specifies the factor by which both length and width are multiplied at render time.

**Render Segs**—
 Specifies the factor by which the number of segments in both length and width are multiplied at render time.

**Generate Mapping Coords**—
Generates coordinates for applying mapped materials to the plane.
**3ds max** includes a set of 10 basic primitives.

All primitives have name and color controls, and allow you to enter initial values from the keyboard.

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**Box Primitive**

Create panel > Geometry button > Standard Primitives > Object Type rollout > Box button
Create menu > Standard Primitives > Box

**To create a box:**
1. On the Object Type rollout, click Box.
2. In any viewport, drag to define a rectangular base, then release to set length and width.
3. Move the mouse up or down to define the height.
4. Click to set the finished height and create the box.
**Creation Method rollout**

**Cube**— Forces length, width, and height to be equal.

**Box**— Creates a standard box primitive from one corner to the diagonally opposite corner, with different settings for length, width, and height.

**Length, Width, Height**—
Sets the length, width, and height of the Box object.

**Length, Width, Height Segments**—
Sets the number of divisions along each axis of the object.

Increase the Segments settings to give objects extra resolution for being affected by modifiers.

**Generate Mapping Coords**—
Generates coordinates for applying mapped materials to the box.
To create a cone:
1. On the Create menu choose Standard Primitives > Cone.
2. In any viewport, drag to define a radius for the base of the cone, then release to set it.
3. Move to up or down to define a height, either positive or negative, then click to set it.
4. Move to define a radius for the other end of the cone. Decrease this radius to 0 for a pointed cone.
5. Click to set the second radius and create the cone.

Creation Method rollout
- Edge— Draws a cone from edge to edge.
- Center— Draws a cone from the center out.
**Radius 1, Radius 2**—
Sets first and second radius for the cone.

**Height**—
Sets dimension along the central axis. Negative values create the cone below the construction plane.

**Height Segments**—
Sets the number of divisions along the cone's major axis.

**Cap Segments**—
Sets the number of concentric divisions around the center of the cone's top and bottom.

**Sides**—
Sets the number of sides around the cone.

**Smooth**—
Blends the faces of the cone, creating a smooth appearance in rendered views.

**Slice On**—
Enables the Slice function. When you create a slice and then turn off Slice On, the complete cone reappears.

**Slice From, Slice To**—
Sets the number of degrees around the local Z axis from a zero point at the local X axis.

**Generate Mapping Coords**—
Generates coordinates for applying mapped materials to the cone.
<table>
<thead>
<tr>
<th>Radius</th>
<th>Combinations Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radius 2 is 0</td>
<td>Creates a pointed cone</td>
</tr>
<tr>
<td>Radius 1 is 0</td>
<td>Creates an inverted pointed cone</td>
</tr>
<tr>
<td>Radius 1 is larger than Radius 2</td>
<td>Creates a flat-topped cone</td>
</tr>
<tr>
<td>Radius 2 is larger than Radius 1</td>
<td>Creates an inverted flat-topped cone</td>
</tr>
</tbody>
</table>
To create a sphere:
1. On the Create menu choose Standard Primitives > Sphere.
2. In any viewport, drag to define a radius. As you drag, a sphere emerges with its center at the pivot point.
3. Release the mouse to set the radius and create the sphere.
Creation Method rollout

Edge— Draws a sphere from edge to edge.
Center— Draws a sphere from the center out.

Radius— Specifies the radius of the sphere.
Segments— Sets the number of polygonal divisions for the sphere.
Smooth— Blends the faces of the sphere.
Hemisphere— Increasing values progressively will "cut off" the sphere, starting at the base, to create a partial sphere. Values range from 0.0 to 1.0.

Chop and Squash toggle creation options for Hemisphere.

Chop— Reduces the number of vertices and faces in the sphere by "chopping" them out as the hemisphere is cut off.
Squash— Maintains the number of vertices and faces in the original sphere,
Extended Primitives
To create a standard chamfered box:
1. From the Create menu, choose Extended Primitives > Chamfer Box.
2. Drag the mouse to define the diagonal corners of the base of the chamfered box. (Press CTRL to constrain the base to a square.)
3. Release the mouse button, and then move the mouse vertically to define the height of the box. Click to set the height.
4. Move the mouse diagonally to define the width of the fillet, or chamfer (toward the upper left increases the width; toward the lower right decreases it).
5. Click again to finish the chamfered box.
**Creation Method rollout**

**Cube**—
Forces length, width, and height to be equal. You can change a cube's individual dimensions in the Parameters rollout.

**Box**—
Creates a standard chamfered box primitive from one corner to the diagonally opposite corner, with individual settings for length, width, and height.

**Length, Width, Height**—
Sets the corresponding dimensions of the chamfered box.

**Fillet**—
Slices off the edges of the chamfered box.

**Length, Width, Height Segs**—
Sets the number of divisions along the corresponding axis.

**Fillet Segs**—
Sets the number of segments in the filleted edges of the box.

**Smooth**—
Blends the display of the faces of the chamfered box, creating a smooth appearance in rendered views.

**Generate Mapping Coords**—
Generates coordinates for applying mapped materials to the chamfered box.
ChamferCyl Extended Primitive

Create panel > Geometry button > Extended Primitives > Object Type rollout > ChamferCyl button
Create menu > Extended Primitives > Chamfer Cylinder

Use ChamferCyl to create a cylinder with beveled or rounded cap edges.

Examples of chamfered cylinders

To create a chamfered cylinder:
1. From the Create menu, choose Extended Primitives > Chamfer Cylinder.
2. Drag the mouse to define the radius of the base of the chamfered cylinder.
3. Release the mouse button, and then move the mouse vertically to define the height of the cylinder. Click to set the height.
4. Move the mouse diagonally to define the width of the fillet, or chamfer (toward the upper left increases the width; toward the lower right decreases it).
5. Click to finish the cylinder.
**Creation Method rollout**

**Edge**— Draws the object from edge to edge. You can change the center location by moving the mouse.

**Center**— Draws the object from the center out.

**Radius**—
Sets the radius of the chamfered cylinder.

**Height**—
Sets the dimension along the central axis. Negative values create the chamfered cylinder below the construction plane.

**Fillet**—
Chamfers the top and bottom cap edges of the chamfered cylinder. Higher numbers result in a more refined fillet along the cap edge.

**Height Segs**—
Sets the number of divisions along the corresponding axis.

**Fillet Segs**—
Sets the number of segments in the filleted edges of the cylinder. Adding fillet segments curves the edges, producing a filleted cylinder.
**Sides**
Sets the number of sides around the chamfered cylinder. Higher numbers shade and render as true circles with Smooth on. Lower numbers create regular polygonal objects with Smooth off.

**Cap Segs**
Sets the number of concentric divisions along the center of the chamfered cylinder's top and bottom.

**Smooth**
Blends the faces of the chamfered cylinder, creating a smooth appearance in rendered views.

**Slice On**
Enables the Slice function. Default=off. When you create a slice and then turn off Slice On, the complete chamfered cylinder reappears. You can use this check box to switch between the two topologies.

**Slice From, Slice To**
Sets the number of degrees around the local Z axis from a zero point at the local X axis.

**Generate Mapping Coords**
Generates coordinates for applying mapped materials to the...
To create an oil tank:
1. From the Create menu, choose Extended Primitives > Oil Tank.
2. Drag the mouse to define the radius of the base of the oil tank.
3. Release the mouse button, and then move the mouse vertically to define the height of the oil tank. Click to set the height.
4. Move the mouse diagonally to define the height of the convex caps (toward the upper left to increase the height; toward the lower right to decrease it).
5. Click again to finish the oil tank.
**Creation Method rollout**

**Edge**— Draws the object from edge to edge.

**Center**— Draws the object from the center out.

**Radius**—
Sets the radius of the oil tank.

**Height**—
Sets the dimension along the central axis.

**Cap Height**—
Sets the height of the convex caps.

**Overall/Centers**—
Determines what the Height value specifies.

**Blend**—
Controls the mapping of the oil tank.

**Sides**—
Sets the number of sides around the oil tank.

**Height Segs**—
Sets the number of divisions along the oil tank's major axis.
**Smooth**—
Blends the faces of the oil tank, creating a smooth appearance in rendered views.

**Slice On**—
Turns on the Slice function.

**Slice From, Slice To**—
Sets the number of degrees around the local Z axis from a zero point at the local X axis.

**Generate Mapping Coords**—
Generates coordinates for applying mapped materials to the oil tank.
**Capsule Extended Primitive**

Create panel > Geometry button > Extended Primitives > Object Type rollout > Capsule button
Create menu > Extended Primitives > Capsule

*Use Capsule to create a cylinder with hemispherical caps.*

Examples of capsules

*To create a capsule:*
1. From the Create menu, choose Extended Primitives > Capsule.
2. Drag the mouse to define the radius of the capsule.
3. Release the mouse button, and then move the mouse vertically to define the height of the capsule.
4. Click to set the height and finish the capsule.
Creation Method rollout

**Edge**— Draws the object from edge to edge. You can change the center location by moving the mouse.

**Center**— Draws the object from the center out.

**Radius**— Sets the radius of the capsule.

**Height**— Sets the height along the central axis.

**Overall/Centers**— Determines what the Height value specifies. Overall specifies the overall height of the object.

**Sides**— Sets the number of sides around the capsule.

**Height Segs**— Sets the number of divisions along the capsule's major axis.

**Smooth**— Blends the faces of the capsule, creating a smooth appearance in rendered views.

**Slice On**— Turns on the Slice function.

**Slice From, Slice To**— Sets the number of degrees around the local Z axis from a zero point at the local X axis.

**Generate Mapping Coords**— Generates coordinates for applying mapped materials to the capsule.
**Extended primitives**

*Extended Primitives are a collection of complex primitives for 3ds max*

All primitives have name and color controls, and allow you to enter initial values from the keyboard.

See these topics:

- **Object Name and Wireframe Color**
- **Creating Primitives from the Keyboard** (not applicable to Hedra, RingWave, or Hose)
Spindle Extended Primitive

Create panel > Geometry button > Extended Primitives > Object Type rollout > Spindle button
Create menu > Extended Primitives > Spindle

*Use the Spindle primitive to create a cylinder with conical caps.*

Examples of spindles

*To create a spindle:*
1. From the Create menu, choose Extended Primitives > Spindle.
2. Drag the mouse to define the radius of the base of the spindle.
3. Release the mouse button, and then move the mouse vertically to define the height of the spindle. Click to set the height.
4. Move the mouse diagonally to define the height of the conical caps (toward the upper left to increase the height; toward the lower right to decrease it).
5. Click again to finish the spindle.
**Creation Method rollout**

**Edge**— Draws the object from edge to edge. You can change the center location by moving the mouse.

**Center**— Draws the object from the center out.

<table>
<thead>
<tr>
<th><strong>Parameter</strong></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radius</strong></td>
<td>Sets the radius of the spindle.</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>Sets the dimension along the central axis.</td>
</tr>
<tr>
<td><strong>Cap Height</strong></td>
<td>Sets the height of the conical caps.</td>
</tr>
<tr>
<td><strong>Overall/Centers</strong></td>
<td>Determines what the Height value specifies. Overall specifies the overall height of the object. Centers specifies the height of the midsection of the cylinder, not including its conical caps.</td>
</tr>
<tr>
<td><strong>Blend</strong></td>
<td>When greater than 0, creates a fillet where the caps meet the body of the spindle.</td>
</tr>
<tr>
<td><strong>Sides</strong></td>
<td>Sets the number of sides around the spindle.</td>
</tr>
</tbody>
</table>

![Parameters](image)
**Cap Segs**—
Sets the number of concentric divisions along the center of the spindle's top and bottom.

**Height Segs**—
Sets the number of divisions along the spindle's major axis.

**Smooth**—
Blends the faces of the spindle, creating a smooth appearance in rendered views.

**Slice On**—
Turns on the Slice function.

**Slice From, Slice To**—
Sets the number of degrees around the local Z axis from a zero point at the local X axis.

**Generate Mapping Coords**—
Sets up the required coordinates for applying mapped materials to the spindle.
L - Extended Primitive

Use L-Ext to create an extruded L-shaped object.

To create an L-Ext object:
1. From the Create menu, choose Extended Primitives > L-Ext.
2. Drag the mouse to define the base. (Press CTRL to constrain the base to a square.)
3. Release the mouse and move it vertically to define the height of the L-extrusion.
4. Click, and then move the mouse vertically to define the thickness or width of the walls of the L-extrusion.
5. Click to finish the L-extrusion.
**Creation Method rollout**

- **Corners**— Draws the object from corner to corner.
- **Center**— Draws the object from the center out.

**Side/Front Length**—
Specify the lengths of each "leg" of the L.

**Side/Front Width**—
Specify the widths of each "leg" of the L.

**Height**—
Specifies the height of the object.

**Side/Front Segs**—
Specify the number of segments for a specific "leg" of the object.

**Width/Height Segs**—
Specify the number of segments for the overall width and height.

**Generate Mapping Coords**—
Sets up the required coordinates for applying mapped materials to the object.
Gengon Extended Primitive

Use Gengon to create an extruded, regular-sided polygon with optionally filleted side edges.

Examples of gengons

To create a gengon:
1. From the Create menu, choose Extended Primitives > Gengon.
2. Set the Sides spinner to specify the number of side wedges in the gengon.
3. Drag the mouse to create the radius of the gengon.
4. Release the mouse button, then move the mouse vertically to define the height of the gengon. Click to set the height.
5. Move the mouse diagonally to specify the size of the chamfer along the side angles (toward the upper left to increase the size; toward the lower right to decrease it).
6. Click to finish the gengon.
**Creation Method rollout**

**Edge**— Draws the object from edge to edge. You can change the center location by moving the mouse.

**Center**— Draws the object from the center out.

**Sides**—
Sets the number of sides around the gongon.

**Radius**—
Sets the radius of the gongon.

**Fillet**—
Sets the width of the chamfered corners.

**Height**—
Sets the dimension along the central axis.

**Side Segs**—
Sets the number of divisions around the gongon.

**Height Segs**—
Sets the number of divisions along the gongon's major axis.

**Fillet Segs**—
Sets the number of divisions for the edge filleting.

**Smooth**—
Blends the faces of the gongon,

**Generate Mapping Coords**—
Sets up the required coordinates for applying mapped materials to the gongon.
C-Ext Extended Primitive

Create panel > Geometry > Extended Primitives > Object Type rollout > C-Ext button
Create menu > Extended Primitives > C-Extrusion

Use C-Ext to create an extruded C-shaped object.

Example of C-Ext

To create a C-Ext object:
1. From the Create menu, choose Extended Primitives > C-Extrusion.
2. Drag the mouse to define the base. (Press CTRL to constrain the base to a square.)
3. Release the mouse and move it vertically to define the height of the C-extrusion.
4. Click, and then move the mouse vertically to define the thickness or width of the walls of the C-extrusion.
5. Click to finish the C-extrusion.
**Creation Method rollout**

**Corners**— Draws the object from corner to corner. You can change the center location by moving the mouse.

**Center**— Draws the object from the center out.

**Back/Side/Front Length**—
Specify the length of each of the three sides.

**Back/Side/Front Width**—
Specify the width of each of the three sides.

**Height**—
Specifies the overall height of the object.

**Back/Side/Front Segs**—
Specify the number of segments for a specific side of the object.

**Width/Height Segs**—
Set these to specify the number of segments for the overall width and height of the object.

**Generate Mapping Coords**—
Sets up the required coordinates for applying mapped materials to the object.
RingWave Extended Primitive

Create panel > Geometry button > Extended Primitives > Object Type rollout > RingWave button
Create menu > Extended Primitives > RingWave

Use the RingWave object to create a ring, optionally with irregular inner and outer edges whose shapes can be animated.

Example of ringwave

To create a basic animated ringwave:
1. On the menu bar choose Create > Extended Primitives > Ringwave.
2. Drag in a viewport to set the outer radius of the ringwave.
3. Release the mouse button, and then move the mouse back toward the center of the ring to set the inner radius.
4. Click to create the ringwave object.
5. Drag the time slider to see the basic animation. This is determined by the Inner Edge Breakup group > Crawl Time settings.
6. To animate the ring's growth, choose RingWave Timing group > Grow And Stay or Cyclic Growth.
Hedra Extended Primitive

Create panel > Geometry button > Extended Primitives > Object Type rollout > Hedra button
Create menu > Extended Primitives > Hedra

Use Hedra to produce objects from several families of polyhedra.

To create a polyhedron:
1. From the Create menu, choose Extended Primitives > Hedra.
2. In any viewport, drag to define a radius, then release to create the polyhedron.
3. Adjust the Family Parameter and Axis Scaling spinners to vary the Hedra's appearance.

Examples of hedra
**RingWave Size group**

**Radius**
Sets the outside radius of the ringwave.

**Radial Segs**
Sets the segment count between the inner and outer surfaces in the direction of the radius.

**Ring Width**
Sets the mean ring width as measured inward from the outer radius.

**Sides**
Sets the number of segments in the circumferential direction for both the inner, outer, and end (cap) surfaces.

**Height**
Sets the height of the ringwave along its major axis.

**Height Segs**
Sets the number of segments in the direction of the height.
**RingWave Timing group**

- **No Growth**—
  Sets a static ringwave, which appears at Start Time and disappears after End Time.

- **Grow and Stay**—
  Animates a single growth cycle. The ringwave begins growing at the Start Time and reaches its full size at Start Time plus Grow Time.

- **Cyclic Growth**—
  The ringwave grows repeatedly from the Start Time to Start Time plus Grow Time.

- **Start Time**—
  The frame number where the ringwave appears, and begins to grow if you choose Grow and Stay or Cyclic Growth.

- **Grow Time**—
  The number of frames after Start Time the ringwave takes to reach full size.

- **End Time**—
  The frame number after which the ringwave disappears.
**Outer Edge Breakup group**

**On**—
Turns on breakup of the outer edge.

**Major Cycles**—
Sets the number of major waves around the outer edge.

**Width Flux**—
Sets the size of the major waves, expressed as a percentage of the unmodulated width.

**Crawl Time**—
Sets the number of frames each major wave takes to move around the outer circumference of the RingWave.

**Minor Cycles**—
Sets the number of random-sized smaller waves in each major cycle.

**Width Flux**—
Sets the average size of the smaller waves, expressed as a percentage of the unmodulated width.

**Crawl Time**—
Sets the number of frames each minor wave takes to move across its respective major wave.
**Inner Edge Breakup group**

- **On**—Turns on the breakup of the inner edge.
- **Major Cycles**—Sets the number of major waves around the inner edge.
- **Width Flux**—Sets the size of the major waves, expressed as a percentage of the unmodulated width.
- **Crawl Time**—Sets the number of frames each major wave takes to move around the inner circumference of the RingWave.
- **Minor Cycles**—Sets the number of random-sized smaller waves in each major cycle.
- **Width Flux**—Sets the average size of the smaller waves, expressed as a percentage of the unmodulated width.
- **Crawl Time**—Sets the number of frames each minor wave takes to move across its respective major wave.
**Texture Coordinates**—
Sets up the required coordinates for applying mapped materials to the object.

**Smooth**—
Applies smoothing to the object by setting all polygons to smoothing group 1.
To create a prism with an isosceles triangle as its base:
1. Choose Isosceles on the Creation Method rollout.
2. Drag horizontally in the viewport to define the length of Side 1 (along the X axis). Drag vertically to define the length of Sides 2 and 3 (along the Y axis).
3. Release the mouse, and move it vertically to define the height of the prism.
4. Click to complete the prism.
5. On the Parameters rollout, alter the length of the sides as needed.
**Creation Method rollout**

- **Isosceles** — Draws a prism with an isosceles triangle at its base.
- **Base/Apex** — Draws a prism with a scalene or obtuse triangle at its base.

**Side (n) Length**
Sets the length of triangle's corresponding side (and thus the triangle's corner angles).

**Height**
Sets the dimension of the prism's central axis.

**Side (n) Segs**
Specifies the number of segments for each side of the prism.

**Height Segs**
Sets the number of divisions along the prism's central axis.

**Generate Mapping Coordinates**
Sets up the required coordinates for applying mapped materials to the prism.
**Hose Extended Primitive**

Create panel > Geometry > Extended Primitives > Object Type rollout > Hose button  
Create menu > Extended Primitives > Hose

*The Hose object is a flexible object that you can connect between two objects, whereupon it reacts to their movement.*

Hose models a workable spring on a motorcycle

*To create a hose:*
1. From the menu bar, choose Create > Extended Primitives > Hose.  
2. Drag the mouse to define the radius of the hose.  
3. Release the mouse, and then move it to define the length of the hose.  
4. Click to finish the hose.
**Hose Parameters rollout > End Point Method group**

*Free Hose—*
Choose this when using the hose as a simple object that's not bound to other objects.

*Bound to Object Pivots—*
Choose this when binding the hose to two objects, using the buttons in the Binding Objects group.

**Hose Parameters rollout > Binding Objects group**

*Top (label)—*
Displays the name of the "top" binding object.

*Pick Top Object—*
Click this button and then select the "top" object.

*Tension—*
Determines the tension of the hose curve near the Top object as it reaches for the Bottom object.

*Bottom (label)—*
Displays the name of the "bottom" binding object.

*Pick Bottom Object—*
Click this button and then select the "bottom" object.

*Tension—*
Determines the tension of the hose curve near the Bottom object as it reaches for the Top object.
**Hose Parameters rollout > Free Hose Parameters group**

**Height**
Use this field to set the straight-line height or length of the hose when it is not bound.

**Hose Parameters rollout > Common Hose Parameters group**

**Segments**
The total number of segments in the hose's length.

**Flex Section Enable**
When on, lets you set the following four parameters for the central, flexible section of the hose.

**Starts**
The percentage of the hose length from the starting extremity of the hose at which the flex section begins.

**Ends**
The percentage of the hose length from the end extremity of the hose at which the flex section ends.

**Cycles**
The number of corrugations in the flex section.

**Diameter**
The relative width of the "outside" parts of the cycles.
**Family group**

**تحدد الأنواع (وضع النقاط و الأسطح للمنجم)**

Use this group to select the type of polyhedron to create.
- **Tetra**— Creates a tetrahedron.
- **Cube/Octa**— Creates a cubic or octahedral polyhedron (depending on parameter settings).
- **Dodec/Icos**— Creates a dodecahedron or icosahedron (depending on parameter settings).
- **Star1/Star2**— Creates two different star-like polyhedra.

---

**Family parameters group**

**P, Q—**

**تتراوح قيمتها من (0-1) و بزيادة احدهما ينافض الآخر. و تساعد في تحديد نوع (family)**

Interrelated parameters that provide a two-way translation between the vertices and facets of a polyhedron. They share the following:
- Range of possible values is 0.0 through 1.0.
- The combined total of the P and Q values can be equal to or less than 1.0.
- Extremes occur if either P or Q is set to 1.0; the other is automatically set to 0.0.
- Midpoint occurs when both P and Q are 0.
**Smoothing**—
Defines the geometry that gets smoothed.
- **All**— The entire hose is smoothed.
- **Sides**— Smoothing is applied along the length of the hose but not around its circumference.
- **None**— No smoothing is applied.
- **Segments**— Smoothing is applied only on the inner section of the hose.

**Renderable**—
When on, the hose is rendered using the specified settings. When off, the hose is not rendered.

**Generate Mapping Coords**—
Sets up required coordinates for applying mapped materials to the hose.
Hose Shape group

Round Hose—
Sets a circular cross section.

Diameter—
The maximum width of the hose at the ends.

Sides—
The number of sides of the hose. A Sides setting of 3 gives a triangular cross section; 4 gives a square cross section; and 5 gives a pentagonal cross section. Increase Sides for a circular cross section.

Rectangular Hose—
Lets you specify different settings for width and depth.

Width— The width of the hose.

Depth— The height of the hose.

Fillet— The amount by which the cross-section corners are rounded.

Fillet Segs—
The number of segments across each filleted corner.

Rotation—
The orientation of the hose along its long axis.
**Hose Shape group**

**D-Section Hose**
Similar to Rectangular Hose, but rounds one side for a D-shaped cross-section.

**Width** — The width of the hose.

**Depth** — The height of the hose.

**Round Sides**
The number of segments on the rounded side. Increase for a smoother profile.
Default = 4.

**Fillet**
The amount by which the two cross-section corners opposite the rounded side are rounded.

**Fillet Segs**
The number of segments across each filleted corner.

**Rotation**
The orientation of the hose along its long axis.
**Axis Scaling group**

مقياس النسبة للمجسم على المحاور $(x,y,z)$

Polyhedra can have as many as three kinds of polygonal facets, such as triangle, square, or pentagon. These facets can be regular or irregular.

$P, Q, R$—

المحاور $(x,y,z)$

Controls the axis of reflection for one of the facets of a polyhedron.

**Reset**— Returns axes to their default setting.

الإعادة إلى الوضع الطبيعي

**Vertices group**

تحديد مواقع الذروات للمجسم الماسي

- **Basic**— Facets are not subdivided beyond the minimum.
- **Center**— Each facet is subdivided by placing an additional vertex at its center, with edges from each center point to the facet corners.
- **Center & Sides**— Each facet is subdivided by placing an additional vertex at its center, with edges from each center point to the facet corners, as well as to the center of each edge.
- **Radius**— Sets the radius of any polyhedron in current units.
- **Generate Mapping Coords**— Generates coordinates for applying mapped materials to the polyhedron.
Torus Knot Extended Primitive

Create panel > Geometry > Extended Primitives > Object Type rollout > Torus Knot button
Create menu > Extended Primitives > Torus Knot

Use Torus Knot to create a complex or knotted torus by drawing 2D curves in the normal planes around a 3D curve. The 3D curve (called the Base Curve) can be either a circle or a torus knot.

To create a Torus Knot:
1. On the Create menu, choose Extended Primitives > Torus Knot.
2. Drag the mouse to define the size of the torus knot.
3. Click, then move the mouse vertically to define the radius.
4. Click again to finish the torus.
5. Adjust the parameters on the Modify panel.
**Creation Method rollout**
**Diameter**—
Draws the object from edge to edge. You can change the center location by moving the mouse.
**Radius**—
Draws the object from the center out.

**Knot/Circle**—
With Knot, the torus interweaves itself, based on various other parameters.

<table>
<thead>
<tr>
<th>Radius—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets the radius of the base curve.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Segments—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets the number of segments around the perimeter of the torus.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P and Q—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describes up-and-down (P) and around-the-center (Q) winding numbers. (Active only when Knot is chosen.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warp Count—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets the number of &quot;points&quot; in a star shape around the curve. (Active only when Circle is chosen.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warp Height—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sets the height of the &quot;points&quot; given as a percentage of the base curve radius.</td>
</tr>
</tbody>
</table>
**Radius**—
Sets the radius of the cross section.
 aziada alsm el mn halal aziada half al cyt el mlufqta

**Sides**—
Sets the number of sides around the cross section.

**Eccentricity**—
Sets the ratio of the major to minor axes of the cross section.

**Twist**—
Sets the number of times the cross section twists around the base curve.

**Lumps**—
Sets the number of bulges in the torus knot. Note that the Lump Height spinner value must be greater than 0 to see any effect.

**Lump Height**—
Sets the height of the lumps, as a percentage of the radius of the cross section.

**Lump Offset**—
Sets the offset of the start of the lumps, measured in degrees. The purpose of this value is to animate the lumps around the torus.
Smooth group

Provides options to alter the smoothing displayed or rendered of the torus knot.

- **All**—Smooths the entire torus knot.
- **Sides**—Smooths only the adjacent sides of the torus knot.
- **None**—The torus knot is faceted.

Mapping Coordinates group

**Generate Mapping Coords**—Assigns mapping coordinates based on the geometry of the torus knot.

- **Offset U/V**—Offset the mapping coordinates along U and V.
- **Tiling U/V**—Tile the mapping coordinates along U and V.
**Translation on Face group**

A, B, N—
The first two settings specify the barycentric coordinates on the surface of the face, while the N setting sets the offset along the normal of the face.

**Use Maximum Range**—
When on, forces all three settings to match the maximum value.

**Scaling group**

X, Y, Z %—
Specifies the percent of random scaling along the X, Y, or Z axis of each duplicate.

**Use Maximum Range**—
When on, forces all three settings to match the maximum value.

**Lock Aspect Ratio**—
When on, maintains the original aspect ratio of the source object.
Display Options group

Proxy—
Displays the source duplicates as simple wedges and speeds up viewport redraws when manipulating a complex Scatter object.

Mesh—
Displays the full geometry of the duplicates.

Display %—
Specifies the percentage of the total duplicate objects that appear in the viewports.

Hide Distribution Object—
Hides the distribution object.
**Connect Compound Object**

Select an object. > Create panel > Geometry > Compound Objects > Object Type rollout > Connect
Select an object. > Create menu > Compound > Connect

The Connect compound object lets you connect two or more objects between "holes" in their surfaces.

---

**To create a Connect object:**

1. Create two mesh objects.
2. Delete faces on each to create holes where you want to bridge the objects.
3. Select one of the objects. On the Create panel > Geometry > Compound Object Type rollout, click Connect.
4. Click the Pick Operand button, and then select the other object.
5. Faces are generated connecting the holes in the two objects.
6. Adjust the connection with the various options.
**Connect Compound Object**

*Pick Operand*—
Click this button to connect an additional operand to the original object.

*Reference/Copy/Move/Instance*—
Lets you specify how the operand is transferred to the compound object.

**Operands group**

*Operands list*—
Displays the current operands.

*Name*—
Renames a selected operand. Type in a new name, and then press TAB or ENTER.

*Delete Operand*—
Deletes a selected operand from the list.

*Extract Operand*—
Extracts a copy or an instance of the selected operand.
**Connect Compound Object**

*Instance/Copy*—
Lets you specify how the operand is extracted: as either an instance or a copy.

*Interpolation group*

*Segments*—
Sets the number of segments in the connecting bridge.

*Tension*—
Controls the curvature in the connecting bridge.

*Smoothing group*

*Bridge*—
Applies smoothing between the faces in the connecting bridge.

*Ends*—
Applies smoothing between the faces that border the old and new surfaces of the connecting bridge and the original objects.
Connect Compound Object

Display group

- **Result**—
  Displays the result of the operation.
- **Operands**—
  Displays the operands.

Update group

- **Always**—
  The object is updated constantly.
- **When Rendering**—
  The object is recalculated only when the scene is rendered.
- **Manually**—
  Activates the Update button for manual recalculation.

**Update**—
Recalculates the projection.
ShapeMerge Compound Object

Select an object. > Create panel > Geometry > Compound Objects > Object Type rollout > ShapeMerge
Select an object. > Create menu > Compound > ShapeMerge

ShapeMerge creates a compound object consisting of a mesh object and one or more shapes.

To create a ShapeMerge object:
1. Create a mesh object and one or more shapes
2. Align the shapes in the viewport so they can be projected toward the surface of the mesh object.
Page Compound Objects e 27 of 82
3. Select the mesh object, and click the ShapeMerge button.
4. Click Pick Shape, and then select the shape.

ShapeMerge combines the lettering, a text shape, with the mesh that models the cake.
Pick Shape—
Click this button, and then click the shape you want to embed in the mesh object.
Reference/Copy/Move/Instance—
Lets you specify how the shape is transferred to the compound object.

Operands group
Operands list—
Lists all operands in the compound object.
Delete Shape—
Remove selected shapes from the compound object.
Extract Operand—
Extracts a copy or an instance of the selected operand. Choose an operand in the list window to enable this button.
Instance/Copy—
Lets you specify how the operand is extracted. It can be extracted either as an instance or a copy.
**Operation group**

**Cookie Cutter**—
Cuts the shape out of the mesh object's surface.

**Merge**—
Merges the shape with the surface of the mesh object.

**Invert**—
Reverses the effect of Cookie Cutter or Merge. With the Cookie Cutter option, the effect is obvious.

**Output Sub-Mesh Selection group**

- None— Outputs the full object.
- Face— Outputs the faces within the merged shape.
- Edge— Outputs the edge of the merged shape.
- Vertex— Outputs the vertices defined by the spline of the shape
**Display group**

- **Result**—
  Displays the result of the operation.

- **Operands**—
  Displays the operands.

**Update group**

- **Always**—
  The object is updated constantly.

- **When Rendering**—
  The object is recalculated only when the scene is rendered.

- **Manually**—
  Activates the Update button for manual recalculation.

**Update**—
Recalculates the projection.
Compound objects generally combine two or more existing objects into a single object.

**Scatter Compound Object**

Select an object. > Create panel > Geometry > Compound Objects > Object Type rollout > Scatter
Select an object. > Create menu > Compound > Scatter

The plane of the hill is used to scatter the trees and two different sets of rocks.
A Boolean object combines two other objects by performing a Boolean operation on them.

These are the Boolean operations for geometry:

Union—
The Boolean object contains the volume of both original objects.

Intersection—
The Boolean object contains only the volume that was common to both original objects (in other words, where they overlapped).

Subtraction (or difference)—
The Boolean object contains the volume of one original object with the intersection volume subtracted from it.
Subtraction: $A - B$ (above); $B - A$ (below)

Union (above); Intersection (below)
To create a Boolean object:

1. Select an object. This object becomes operand A.
2. Click Boolean. The name of operand A appears in the Operands list on the Parameters rollout.
3. On the Pick Boolean rollout, choose the copy method for operand B: Reference, Move, Copy, or Instance. (These methods are described in the Pick Boolean rollout section, later in this topic.)
4. On the Parameters rollout, choose the Boolean operation to perform: Union, Intersection, Subtraction (A-B), or Subtraction (B-A). You can also choose one of the Cut operations, described later in the Operation group section.
5. On the Pick Boolean rollout, click Pick Operand B.
6. Click in a viewport to select operand B. 3ds max performs the Boolean operation.
**Pick Operand B**—
Use this button to select the second object to use to complete the Boolean operation.

**Reference/Copy/Move/Instance**—
Lets you specify how operand B is transferred to the Boolean object.

**Operands group**
**Operands list field**—
Displays the current operands.

**Name**—
Edit this field to change the name of the operands.

**Extract Operand**—
Extracts a copy or an instance of the selected operand.

**Instance/Copy**—
Lets you specify how the operand is extracted: as either an instance or a copy.
**Operation group**

**Union**—
The Boolean object contains the volume of both original objects.

**Intersection**—
The Boolean object contains only the volume that was common to both original objects.

**Subtraction (A-B)**—
Subtracts the intersection volume of operand B from operand A.

**Subtraction (B-A)**—
Subtracts the intersection volume of operand A from operand B.

**Cut**—
Cuts operand A with operand B, but doesn't add anything to the mesh from operand B.
**Display group**

- **Result**—Displays the result of the operation.
- **Operands**—Displays the operands.

**Update group**

- **Always**—The object is updated constantly.
- **When Rendering**—The object is recalculated only when the scene is rendered.
- **Manually**—Activates the Update button for manual recalculation.
- **Update**—Recalculates the projection.
Scatter is a form of compound object that randomly scatters the selected source object either as an array, or over the surface of a distribution object.

*To create a Scatter object:*
1. Create an object to be used as a source object.
2. Optionally, create an object to be used as a distribution object.
3. Select the source object, and then click Scatter in the Compound Objects panel.

Scatter objects (the grass) with a high number of duplicates

Results of scattering source object with distribution object visible (above) and hidden (below)
Contains the options for selecting a distribution object.

**Object**—
Displays the name of the distribution object selected with the Pick button.

**Pick Distribution Object**—
Click this button, then click an object in the scene to specify it as a distribution object.

**Reference/Copy/Move/Instance**—
Lets you specify how the distribution object is transferred to the scatter object. It can be transferred either as a reference, a copy, an instance, or moved, in which case the original shape is not left behind.
Scatter Objects rollout

**Distribution group**
These two options let you choose the basic method of scattering the source object.

**Use Distribution Object**—
Scatters the source object based on the geometry of the distribution object.

**Use Transforms Only**—
This option doesn't need a distribution object. Instead, duplicates of the source object are positioned using the offset values on the Transforms rollout.

**Objects group**
Contains a list window showing the objects that make up the Scatter object.

**List Window**—
Click to select an object in the window so that you can access it in the Stack. For example, if your distribution object is a sphere, you can click Distribution: D_Sphere01, open the Stack list, and select Sphere to access the sphere's parameters.
**Source Name**—Lets you rename the source object within the compound Scatter object.

**Distribution Name**—Lets you rename the distribution object.

**Extract Operand**—Extract a copy or an instance of the selected operand. Choose an operand in the list window to enable this button.

**Instance/Copy**—This option lets you specify how the operand is extracted: as either an instance or a copy.

### Source Object Parameters group

**Duplicates**—Specifies the number of scattered duplicates of the source object.

**Base Scale**—Alters the scale of the source object, affecting each duplicate identically.

**Vertex Chaos**—Applies a random perturbation to the vertices of the source object.

**Animation Offset**—Lets you specify the number of frames by which each source object duplicate's animation is offset from the previous duplicate.
**Distribution Object Parameters group**

**Perpendicular**
When on, orients each duplicate object perpendicular to its associate face, vertex, or edge in the distribution object.

**Use Selected Faces Only**
When on, limits distribution to the selected faces passed up the Stack.

**Distribute Using**
The following options let you specify how the geometry of the distribution object determines the distribution of the source object. These options are ignored if you're not using a distribution object.

- **Area**
  Distributes duplicate objects evenly over the total surface area of the distribution object.

- **Even**
  Divides the number of faces in the distribution object by the number of duplicates.

- **Skip N**
  Skips N number of faces when placing duplicates.

- **Random Faces**
  Applies duplicates randomly over the surface of the distribution object.
Objects distributed over a spherical surface with Area turned on

Objects fill a spherical volume with Volume turned on

**Distribute Using**

- **Along Edges**—Assigns duplicates randomly to the edges of the distribution object.
- **All Vertices**—Places a duplicate object at each vertex in the distribution object.
- **All Edge Midpoints**—Places a duplicate at the midpoint of each segment edge.
- **All Face Centers**—Places a duplicate object at the center of each triangular face on the distribution object.
- **Volume**—Scatters objects throughout the distribution object's volume.
Display group

Result/Operands—
Choose whether to display the results of the scatter operation or the operands before the scattering.

Transforms rollout

Rotation group
Specifies random rotation offsets.
X, Y, Z deg—
Enter the maximum random rotational offset you want about the local X, Y, or Z axis of each duplicate.
Use Maximum Range—
When on, forces all three settings to match the maximum value. The other two settings become disabled, and the setting containing the maximum value remains enabled.
Controlling Object Display
Display Properties Rollout

Show Frozen in Gray—
When on, the object turns gray in viewports when you freeze it.

Vertex Colors—
Displays the effect of assigned vertex colors.
Controlling Object Display

You use the Display panel or layers to:
 -- control how objects
 -- and selected objects are displayed in viewports,
 -- and to hide or freeze objects.
 -- and use layers to hide or unhide objects in the viewport.

Display Color Rollout

Display panel > Display Color rollout

<table>
<thead>
<tr>
<th>Wireframe</th>
<th>Controls the color of objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object Color</td>
<td>Displays the wireframes in object color.</td>
</tr>
<tr>
<td>Material Color</td>
<td>Displays the wireframes using the material color.</td>
</tr>
<tr>
<td>Shaded</td>
<td>Controls the color of the object when the viewport is in any shaded display mode.</td>
</tr>
<tr>
<td>Object Color</td>
<td>Displays the shaded objects using the object color.</td>
</tr>
<tr>
<td>Material Color</td>
<td>Displays the shaded objects using the material color.</td>
</tr>
</tbody>
</table>
Hide By Category Rollout

Display panel > Hide By Category rollout

Geometry—Hides all geometry in the scene.
Shapes—Hides all shapes in the scene.
Lights—Hides all lights in the scene.
Cameras—Hides all cameras in the scene.
Helpers—Hides all helpers in the scene.
Space Warps—Hides all space warps in the scene.
Particle Systems—Hides all particle systems in the scene.
Bone Objects—Hides all bones in the scene.
Bones—Hides all bones in the scene.
IK Chain—Hides all IK chains in the scene.
Point—Hides all points in the scene.
All—Hides everything in the scene.
None—Unhides everything in the scene
Invert—Hides everything that is visible and unhides everything currently hidden.
Add—Adds a display filter category to the list.
Remove—Removes a display filter category.
None—Deselects all highlighted display filters in the list.
Hide By Category Rollout

Above: All objects displayed
Below: Lights and shapes are hidden
Hide Rollout

Display panel > Hide rollout

**Hide Selected**
Hides the selected object(s).

**Hide Unselected**
Hides all visible objects except the selected ones.

**Hide by Name**
Displays a dialog you use to hide objects you choose from a list.

**Hide by Hit**
Hides any object you click in the viewport.

**Unhide All**
Unhides all hidden objects.

**Unhide by Name**
Displays a dialog you use to unhide objects you choose from a list.

**Hide Frozen Objects**
Hides any frozen objects.
Freeze Rollout
Display panel > Freeze rollout

**Freeze Selected**
Freezes the selected object(s).

**Freeze Unselected**
Freezes all visible objects except the selected ones.

**Freeze by Name**
Displays a dialog that lets you choose objects to freeze from a list.

**Freeze by Hit**
Freezes any object you click in a viewport.

**Unfreeze All**
Unfreezes all frozen objects.

**Unfreeze by Name**
Displays a dialog that lets you choose objects to unfreeze from a list.

**Unfreeze by Hit**
Unfreezes any object you click in the viewport.
Freeze Rollout

Display panel > Freeze rollout

Above: No layers frozen
Below: Trash can and streetlight are frozen, and displayed in gray
**Display Properties Rollout**

Display panel > Display Properties rollout

**Display as Box**
Toggles the display of selected objects, including 3D objects and 2D shapes as bounding boxes.

**Backface Cull**
Toggles the display of faces and vertices with normals pointing away from view.

**Edges Only**
Toggles the display of hidden edges and polygon diagonals.
Display Properties Rollout

Vertex Ticks—
Displays the vertices in the selected geometry as tick marks.

Trajectory—
Toggles trajectory display for the selected object so its trajectory is visible in viewports.

See-Through—
Makes the object or selection translucent in viewports.

Ignore Extents—
When turned on, the object is ignored when you use the display control Zoom Extents.
1- شريط العناوين

هو عبارة عن شريط يوجد في أعلى الشاشة مكونًا بداخله اسم البرنامج وبيانه كلمة أن العلامة المفتوحة ليس له اسم أو لم يتم حفظه بعد وأن ثم حفظة يتم كتابة الإسم المحموف به.

2- شريط القوائم

هو عبارة عن شريط يحوي مجموعة من القوائم المفصلة والتي من خلالها تتحكم في البرنامج من خلال الأوامر التي يحويها وتكوين شكلة كتابيًا:

Menu Bar

3- شريط الأدوات

هو عبارة عن شريط يحوي مجموعة من الأزرار كل زرار يؤدي وظيفة من الوظائف التي يمكنها أن تنطلق منها من خلال القوائم ولكن تكون بطريقة سريعة حيث أن الأزرار تكون ظاهرة دائمًا.

4- على عين الشاشة توجد مجموعة من المربعات كل زرار من هذه المربعات عند الضغط عليها يظهر مجموعة من النوافذ التي يحويها على مجموعة أوامر التي تمكنها من إنشاء مجموعات جديدة أو إنشاء كاميرات أو إضافة أو عمل تصوير وتكوين كائنات.

5- كما يوجد أسفل هذه النوافذ المذكورة سابقاً مجموعة من الرموز التي تتحكم في طريقة عرض الرسومات أو العناصر الموجودة ورؤيتها من

Title Bar

وفي الصورة يوضح لنا أن العلامة المفتوحة اسمه maxmax.max ولذلك لأن maxeng.max.

Menu Bar

Menu Bar

Tool Bar

نستطيع أن نلاحظ أن العلامة المفتوحة اسمه maxmax.max ولذلك لأن maxeng.max.

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Tool Bar

نستطيع أن نلاحظ أن العلامة المفتوحة اسمه maxmax.max ولذلك لأن maxeng.max.
والنكم بعض الاقتراحات المستخدمة في المسافات فضلاً عن تزييد بوضوح المسافة الحالية التي يتم الضغط على الرمز الخاصة بها.

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وعند الضغط على الجزء بالشكل التالي، يمكنك من اختيار عدد المسافات التي تريدها وتحديدهم والتحكم في خصائصهم وتحديد ترتيبهم وأشكالهم.

- أوامر التحكم في الحركة:
Group
The Group command combines a selection set of objects or groups into a single group.

**To define a group:**
1. Select two or more objects.
2. Choose Group menu > Group.
3. A dialog appears requesting a name for the group.
4. Enter a name for the group and click OK.

**To open a group:**
1. Select one or more groups.
2. Choose Group > Open. A pink bounding box appears, and the objects in the group are now accessible.
Select the pink dummy object of an opened group. > Group menu > Close

To close all opened groups nested within a main group:
1. Select the pink bounding box representing the main group.
2. Choose Group > Close

Select one or more groups. > Group menu > Ungroup

To ungroup a group:
1. Select one or more groups.
2. Choose Group > Ungroup.

All components of the group remain selected, but are no longer part of the group. The group dummy is deleted.
**Explode Group**

Select one or more groups. > Group menu > Explode

To explode a group:
1. Select one or more groups.
2. Choose Group > Explode.
All objects in the groups remain selected but no longer belong to groups. All nested groups are exploded. All group dummies in the selection are deleted.

**Detach Group**

Select a group. > Group menu > Open > Select one or more objects detach. > Group menu > Detach

The Detach command detaches the selected object from its group.

*To detach an object from a group:*
1. Open the group.
2. Choose Group > Detach.
The selected objects are now separate, independent objects, no longer members of the group.
The Attach command makes the selected object part of an existing group.

To attach an object to a group:
1. Select one or more objects to attach.
2. Choose Group > Attach.
3. Click any member of a closed group.
The selected objects become part of the group, which is now selected.
Note: To attach an object to an open group, click the pink bounding box.
Selection Commands
**Using Selection Filters**

*To use the selection filter:*
- Click the Selection Filter arrow and click a category from the Selection Filter list.

**The following categories are available:**
- **All:** All categories can be selected.
- **Geometry:** Only geometric objects can be selected.
- **Shapes:** Only shapes can be selected.
- **Lights:** Only lights (and their targets) can be selected.
- **Cameras:** Only cameras (and their targets) can be selected.
- **Helpers:** Only helper objects can be selected.
- **Warps:** Only space warps can be selected.
- **Combos:** Displays a Filter Combinations dialog.
- **Bone:** Only bones objects can be selected.
- **IK Chain:** Only objects in IK chains can be selected.
- **Point:** Only point objects can be selected.
Select Region Crossing selects objects within the window and also objects it crosses: the trash can, bench, and streetlight.

Select Region Window selects only those objects within the window: the trash can and bench.
Selection commands appear on the quad menu, on the Main toolbar, on the Edit menu, and on the status bar.

**Selection Commands on the Main Toolbar**
- Select Object
- Selection Floater
- Rectangular Selection Region
- Circular Selection Region
- Fence Selection Region
- Lasso Selection Region
- Selection Filter List
- Window/Crossing Selection Toggle
- Named Selection Sets

**Selection Commands on the Edit Menu**
- Select All
- Select None
- Select Invert
- Select By
- Select By Color
- Select By Name (Edit Menu)
- Region
- Region Window
- Region Crossing
- Edit Named Selections
Select Object

Main toolbar > Select Object
Right-click to open quad menu. > Transform quadrant > Select

You can also select objects by name using the Select By Name list; press the H key to access the list.

To add or remove individual objects from a selection set:
- Hold down the CTRL key and select the objects to add or remove.
- Hold down the ALT key and select objects to remove from the current selection set.
Note: Adding and removing objects doesn't change a named selection set.

To select objects and move, rotate, or scale them:
- Use the Select And Move, Select And Rotate, or Select And Scale tools, available from the Main toolbar and the quad menu > Transform quadrant.
Select By Name lets you select objects by choosing them from a list of all objects currently in the scene using the Select Objects dialog.

To select objects by name:
1. Do one of the following:
   - Click the Select By Name button on the Main toolbar.
   - Choose Edit menu > Select By > Name.
   - Press H. The Select Objects dialog appears.
2. Choose one or more objects in the list, or click and then SHIFT+click to select a continuous range of objects and CTRL+click to select noncontinuous objects.
3. Click Select.
Select Objects list

Objects are listed according to the current Sort and List Types selections.

All, None, and Invert—
These buttons alter the pattern of selection in the list window.

Display Subtree—
Displays each item in the list so that its hierarchical branch is included (for example, Thigh/Shin/Foot).

Case Sensitive—
When on, 3ds max considers the case of the characters for each item in the list.

case-sensitive.

Select Subtree—
When this is on and you select an item in the list window, all of its hierarchical children are selected as well.

Select Dependents—
When this is on and you select an item in the list, all of its dependent objects are also selected.
**Sort group**
Specifies the sort order of the items displayed in the list.

**Alphabetical**
Sorts from numeric characters at the top, then A to Z at the bottom.

**By Type**
Sorts by category, using the same order as the check boxes in the List Types group.

**By Color**
Sorts by object wireframe color. The sorting order is arbitrary; the value of this option is that objects of the same color are grouped together.

**By Size**
Sorts based on the number of faces in each object. The object with the least number of faces is listed first, followed by objects with successively greater number of faces.

**List Types group** Determines the types of objects to display in the list.

**All, None, and Invert**
These buttons alter the pattern of activation of the List Types options.
Selecting by Region

The region-selection tools let you use the mouse to select one or more objects by defining an outline or area.

Setting Region Type

Top Left: Selecting face sub-objects with a rectangular region
Top Right: Selecting vertex sub-objects with a circular region
Bottom Left: Selecting edge sub-objects with a fence region
Bottom Right: Selecting edge sub-objects with a lasso region
Selecting by Region

- **Rectangular Region**
  Dragging the mouse selects a rectangular region.

- **Circular Region**
  Dragging the mouse selects a circular region.

- **Fence Region**
  Draw an irregular selection-region outline by alternating between moving the mouse and clicking (begin with a drag).

- **Lasso Region**
  Dragging the mouse outlines an irregular selection region.

- **Paint Region**
  Drag the mouse over objects or sub-objects to be included in the selection.

Setting Region Inclusion

- **Window**
  Selects only objects that are completely within the region.

- **Crossing**
  Selects all objects that are within the region and crossing the boundaries of the region.
Using Named Selection Sets

You can assign a name to the current selection, and then later reselect those objects by choosing their selection name from a list.

You can also edit the contents of named sets from the Named Selection Sets dialog.

**To assign a name to a selection set:**
1. Select one or more objects or sub-objects using any combination of selection methods.
2. Click in the Named Selection field on the Main toolbar.
3. Enter a name for your set. The name can contain any standard ASCII characters, including letters, numerals, symbols, punctuation, and spaces.
4. Press ENTER to complete the selection set.
Viewing and Navigating 3D Space
3ds max defaults to a two-over-two arrangement of viewports. Using the Layout panel of the Viewport Configuration dialog,

**Key View type**

- T: Top view
- B: Bottom view
- F: Front view
- L: Left view
- C: Camera view.
- P: Perspective view.
- U: User (axonometric) view.

None: Right view. Use viewport right-click menu.
None: Shape view. Use viewport right-click menu.
Using Standard View Navigation

View magnification—
Controls zooming in and out.

View position—
Controls panning in any direction.

View rotation—
Controls rotating in any direct

Click Zoom or Zoom All
and drag in a viewport to change the view magnification.

Before and after rotating a viewport

Before and after zooming a viewport
click Field of View (FOV).
The effect of changing FOV is similar to changing the lens on a camera.

Click Zoom Region
to drag a rectangular region within the active viewport and magnify that region to fill the viewport. Zoom Region is available for all standard views.

Zooming to Extents

The Zoom Extents
Zoom Extents Selected buttons zoom the active viewport to the extents of all visible or selected objects in the scene.

The Zoom Extents All,
Zoom Extents All Selected buttons zoom all viewports to the extents of all objects or the current selection.
**Panning a View**

Click Pan View and drag in a viewport to move your view parallel to the viewport plane.

---

**Rotating a View**

*Click Arc Rotate,*

Arc Rotate on Selection, or Arc Rotate Sub-Object to rotate your view around the view center,

*can also activate Arc Rotate by pressing CTRL+R.*

---

*With Arc Rotate Selected,*

selected objects remain at the same position in the viewport while the view rotates around them.

---

*With Arc Rotate Sub-Object,*

selected sub-objects or objects remain at the same position in the viewport while the view rotates around them.
SHIFT+Z, SHIFT+Y
    to undo or redo your navigation.
Forward—W or the UP ARROW
Moves the camera or the viewpoint forward.

Back—S or the DOWN ARROW.
Moves the camera or the viewpoint backward.

Left—A or the LEFT ARROW.
Moves the camera or the viewpoint to the left.

Right—D or the RIGHT ARROW.
Moves the camera or the viewpoint to the right.

Up—E or SHIFT+UP-ARROW.
Moves the camera or the viewpoint up.

Down—C or SHIFT+DOWN-ARROW.
Moves the camera or the viewpoint down.
Edit Poly Modifier
**Edit Poly (Object)**

**Cut**

Lets you create edges from one polygon to another or within polygons. Click the start point, move the mouse and click again, and continue moving and clicking to create new connected edges.

**MSmooth**

Smoothes the object using the current settings.

**MSmooth Settings**

Opens the MeshSmooth Selection dialog, which lets you specify how to apply smoothi
Select an Edit Poly object. > Modify panel > Selection rollout > Vertex
Select an Edit Poly object. > Modify panel > Modify Stack display > Expand Edit Poly. > Vertex
Select an Edit Poly object. > Quad menu > Tools 1 quadrant > Vertex

Vertices are points in space

Remove—
Deletes selected vertices and combines the polygons that use them. The keyboard shortcut is BACKSPACE.

Removing one or more vertices deletes them and retriangulates the mesh to keep the surface intact. If you use the DELETE key instead, the polygons depending on those vertices are deleted as well, creating a hole in the mesh.
Edit Poly (Vertex)

Break—
Creates a new vertex for each polygon attached to selected vertices.

Extrude—
Lets you extrude vertices manually via direct manipulation in the viewport.

Chamfer box showing extruded vertex
Extrude Settings—
Opens the Extrude Vertices dialog, which lets you perform extrusion via interactive manipulation.

Weld—
Combines contiguous, selected vertices that fall within the tolerance specified in the Weld dialog. All edges become connected to the resulting single vertex.

Weld Settings—
Opens the Weld dialog, which lets you specify the weld threshold.

Chamfer—
Click this button and then drag vertices in the active object.

Target Weld—
Lets you select a vertex and weld it to a target vertex.

Connect—
Creates new edges between pairs of selected vertices.
**Edit Poly (Vertex)**

**Remove Isolated Vertices**—Deletes all vertices that don't belong to any polygons.

**Remove Unused Map Verts**—Certain modeling operations can leave unused (isolated) map
**Edit Poly (Vertex)**

**Repeat Last**—Repeats the most recently used command.

**Constraints**—Lets you use existing geometry to constrain sub-object transformation.
- None—No constraints.
- Edge—Constrains vertex transformations to follow edges.
- Face—Constrains vertex transformations to face surfaces.

**Preserve UVs**—When on, you can edit vertices without affecting the object's UV mapping.

Original object (left); Scaled vertices with Preserve UVs off (center); Scaled vertices with Preserve UVs on (right)
Edit Poly (Vertex)

Create— Lets you add vertices to a single selected poly object.

Collapse— Collapses groups of contiguous selected vertices by welding them into a single vertex at the selection center.

Attach— Lets you attach another object in the scene to the selected Edit Poly object.

Detach— Detaches the selected vertices and all attached polygons from the Edit Poly object, creating a separate object or element.
Cut and Slice group

**Slice Plane**— Creates a gizmo for a slice plane that you can position and rotate to specify where to slice.

**Split**— When on, the Slice and Cut operations create double sets of vertices at the points where the edges are divided.

**Slice**— Performs the slice operation at the location of the slice plane.

**Reset Plane**— Returns the slice plane to its default position and orientation.

**QuickSlice**— Lets you quickly slice the object without having to manipulate a gizmo.

**Cut**— Lets you create edges.
**MSmooth**— Smoothes the selection using the current settings.

**Tessellate**—
Subdivides the selection based on the Tessellation settings. Tessellation is useful for increasing local mesh density while modeling.

**Make Planar**—
Forces all selected vertices to become coplanar. The plane's normal is the average surface normal of the selected vertices.

**X/Y/Z**—Makes the selected vertices planar and aligns the plane with the corresponding plane in the object's Local coordinate system.

**View Align**—
Aligns the selection to the plane of the active viewport.

**Grid Align**—
Aligns the selection with the current construction plane.
Relax— Applies the Relax function to the current selection,

Hide Selected— Hides any selected vertices.
Unhide All— Restores any hidden vertices to visibility.
Hide Unselected— Hides any unselected vertices.

Named Selections

Copy— Opens a dialog that lets you specify a named selection set to place into the copy buffer.
Paste— Pastes the named selection from the copy buffer.
Create or select an object. > Modify panel > Modifier List > Object-Space Modifiers > Edit Poly
Create or select an object. > Modifiers menu > Mesh Editing > Edit Poly

**The Edit Poly modifier**
provides explicit editing tools for different sub-object levels of the selected object: vertex, edge, border, polygon, and element.

---

**Edit Poly gives you these options:**

- Transform or **SHIFT**+Clone the selection, as with any object.
- Use the options on the Edit rollouts to modify the selection or object.
- Pass a sub-object selection to a modifier higher in the stack.
Edit Poly (Edge)

Select an Edit Poly object. > Modify panel > Selection rollout > Edge
Select an Edit Poly object. > Modify panel > Modifier Stack display > Expand Edit Poly. > Edge
Select an Edit Poly object. > Quad menu > Tools 1 quadrant > Edge

An edge is a line connecting two vertices that forms the side of a polygon.

Above: Selected edges removed from original object
Below: Unwanted edges removed

Above: Original object
Below: Object with edges selected
**Remove**
Deletes selected edges and combines the polygons that use them. The keyboard shortcut is BACKSPACE.

Removing one edge is like making it invisible. The mesh is affected only when you remove all but one of the edges depending on one vertex. At that point, the vertex itself is deleted and the surface is retriangulated.
Split— Divides the mesh along the selected edges.

Insert Vertex— Lets you subdivide visible edges manually.

Weld— Combines selected edges that fall within the threshold specified in the Weld dialog.

Extrude— Lets you extrude edges manually via direct manipulation in the viewport.

Chamfer box showing extruded edge

When extruding a vertex or edge interactively in the viewport, you set the extrusion height by moving the mouse vertically and the base width by moving the mouse horizontally.
**Target Weld**— Allows you to select an edge and weld it to a target edge.

**Chamfer**— Click this button and then drag edges in the active object.

**Connect**— Creates new edges between pairs of selected edges.

Connecting two or more edges creates equally spaced edges. The number of edges is set in the dialog.
**Create Shape**— After selecting one or more edges, click this button to create a spline shape or shapes from the selected edges, using the current settings from the Create Shape Settings dialog.

**Edit Triangulation**— Lets you modify how polygons are subdivided into triangles by drawing internal edges.

**Turn**— Lets you modify how polygons are subdivided into triangles by clicking diagonals.

An edge selection (right); a smooth shape (center); a linear shape (left)
A border is a linear section of a mesh that can generally be described as the edge of a hole.

To create a polygon that closes the surface at the selected border:
1. At the Border sub-object level, select any open edge. This selects the entire closed loop of continuous open edges that make up the border selection.
2. Click Edit Borders rollout > Cap.
**Edit Edges rollout**

- **Insert Vertex**— Lets you subdivide border edges manually.
- **Cap**— Caps an entire border loop with a single polygon.
- **Extrude**— Lets you extrude a border manually via direct manipulation in the viewport.
- **Bridge**— Connects two borders on an object with a polygon “bridge.” There are two ways to use Bridge in Direct Manipulation mode.
- **Chamfer**— Click this button and then drag a border in the active object. The border need not be selected first.
- **Connect**— Creates new edges between pairs of selected border edges. The edges are connected from their midpoints.
- **Create Shape**— After selecting one or more borders, click this button to create a spline shape or shapes from the selected edges, using the current settings from the Create Shape Settings dialog.
**Edit Tri[angulation]**—
Lets you modify how selected polygons are subdivided into triangles by drawing internal edges.

**Turn**—
Lets you modify how polygons are subdivided into triangles by clicking diagonals.
**Model**
Lets you model using the Edit Poly functions. Operations in Model mode cannot be animated.

**Animate**
Lets you animate using the Edit Poly functions
- animate other parts of the object
- animate repeated applications of the same operation on the same sub-object selection;
- animate repeated applications of a different operation on the same sub-object selection.

**Commit**—using a Settings dialog, (same as the OK button on the dialog).

**Settings**—
Toggles the Settings dialog for the current command.

**Cancel**—
Cancels the most recently used command.

**Show Cage**—
Toggles the display of an orange wireframe that shows the Edit Poly object before further modification.
A *polygon* is a closed sequence of three or more edges connected by a surface. Polygons provide the renderable surface of Edit Poly objects.

**Edit Polygons**

*Insert Vertex*—
Lets you subdivide polygons manually. Applies to polygons, even if at the element sub-object level.

*Extrude*—
Lets you perform manual extrusion via direct manipulation in the viewport. Click this button, and then drag vertically on any polygon to extrude it.
Outline—
Lets you increase or decrease the outside edge of each contiguous group of selected polygons.

Outline is often used after an extrusion or bevel to adjust the size of the extruded faces. It doesn't scale the polygons; only changes the size of the outer edge.
**Bevel**—
Lets you perform manual beveling via direct manipulation in the viewport.

**Inset**—
Performs a bevel with no height; that is, within the plane of the polygon selection. Click this button, and then drag vertically on any polygon to inset it.

![Polygon beveled outward (left) and inward (right)](image)

![Extruded polygons (top), outline expanded (middle), outline reduced (bottom)](image) Note that the size of inner polygons doesn't change.
**Bridge**—
Connects two polygons or polygon groups on an object with a polygon "bridge.

**Flip**—
Reverses the directions of the normals of selected polygons, hence their facing.

**Hinge From Edge**—
Lets you perform a manual hinge operation via direct manipulation in the viewport.

The hinge edge needn't be part of the selection. It can be any edge of the mesh. Also, the selection needn't be contiguous.

Inset works on a selection of one or more polygons. As with Outline, only the outer edges are affected.
**Extrude Along Spline**
Extrudes the current selection along a spline

**Edit Triangulation**
Lets you modify how polygons are subdivided into triangles by drawing internal edges.

You can extrude a single face (1) or a selection of contiguous (2) or non-contiguous faces (3). Extrusion 2 uses Taper Curve and Twist. Extrusion 3 uses Taper Amount; each extrusion has a different curve rotation.

**Retriangulate**
Lets the software automatically perform optimal triangulation on the polygon or polygons currently selected.

In Edit Triangulation mode, you can see the current triangulation in the viewport, and change it by clicking two vertices on the same polygon.
Retriangulate attempts to optimize the subdivision of selected polygons into triangles.

**Turn**

Lets you modify how polygons are subdivided into triangles by clicking diagonals.
The Selection rollout
provides tools for accessing different sub-object levels and display settings and for creating and modifying selections.

**Vertex**
Accesses the Vertex sub-object level.

**Edge**
Accesses the Edge sub-object level.

**Border**
Accesses the Border sub-object level. A border is always composed of edges with faces on only one side of them.

**Polygon**
Accesses the Polygon sub-object level.

**Element**
Turns on Element sub-object level
**Selection rollout**

*Use Stack Selection*—
When on, Edit Poly automatically uses any existing sub-object selection

*By Vertex*—
When on, you can select a sub-object only by selecting a vertex that it uses.

*Ignore Backfacing*—
When on, selection of sub-objects affects only those facing you.

*By Angle*—
When on, if you select a polygon, the software also selects neighboring polygons based on the angle setting to the right of the check box.
Ring selection adds to the selection all the edges parallel to the ones selected originally.

**Ring**
Expands an edge selection by selecting all edges parallel to the selected edges. Ring applies only to edge and border selections.

Loop selection extends your current edge selection by adding all edges aligned to the ones selected originally.

**Loop**
Expands the selection as far as possible, in alignment with selected edges. Loop applies only to edge and border selections, and propagates only through four-way junctions.
**Get Stack Selection**

Replaces the current selection with the sub-object selection passed up the stack. You can then modify this selection using standard methods.

If no selection exists in the stack, all sub-objects are unselected.
Select an Edit Poly object. > Modify panel

Edit Poly (Object) functions are available when no sub-object levels are active.

Repeat Last—Repeats the most recently used command.
لاعادة تطبيق آخر إيقاف على الأجسام المختارة

Constraints—
Lets you use existing geometry to constrain sub-object transformation.

- None: No constraints.
- Edge: Constrains vertex transformations to edge boundaries.
- Face: Constrains vertex transformations to face surfaces.

Create—
Lets you create polygons from isolated vertices and border vertices. All vertices in the object are highlighted.
تساعد على خلق مضلعات جديدة من خلال تحديد نقاط الحدود بعكس عقارب الساعة
**Attach**

Lets you attach another object in the scene to the selected Edit Poly object. Click the object you want to attach to the currently selected Edit Poly object.

Handle inherits material from the cup it is attached to.

**Attach List**

Lets you attach other objects in the scene to the selected Edit Poly object.