



ZBrush v1.23
Reference Manual
rev A

Pixologic™

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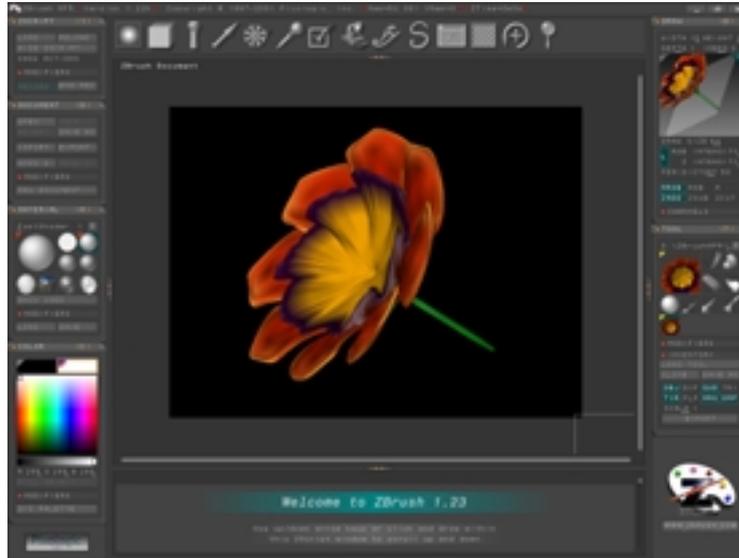
Credits

ZBrush was created and engineered by Ofer Alon. The ZBrush Reference Manual was produced by Gary Nelson and David Duberman. Images on pages [120](#), [121](#), [162](#), and [178](#) courtesy of Glenn Southern (www.southernfx.co.uk.)

Images and illustrations were created using ZBrush.

1 ZBrush 1.23

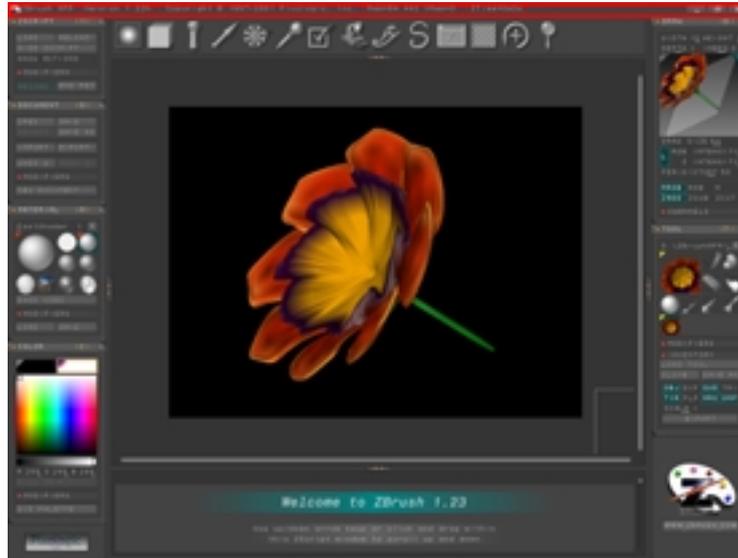
The ZBrush Interface



Overview

ZBrush's interface is how you work with the program. It's composed of a variety of elements that give you access to all of the program's functionality. This chapter covers the various interface elements; you'll find descriptions of the actual tools in other parts of this manual.

The Title Bar



The Title bar is perhaps the simplest part of the ZBrush interface. At the very top of the screen is a horizontal bar containing a line of text giving the program name, version, copyright info, and, most importantly, memory usage in megabytes.

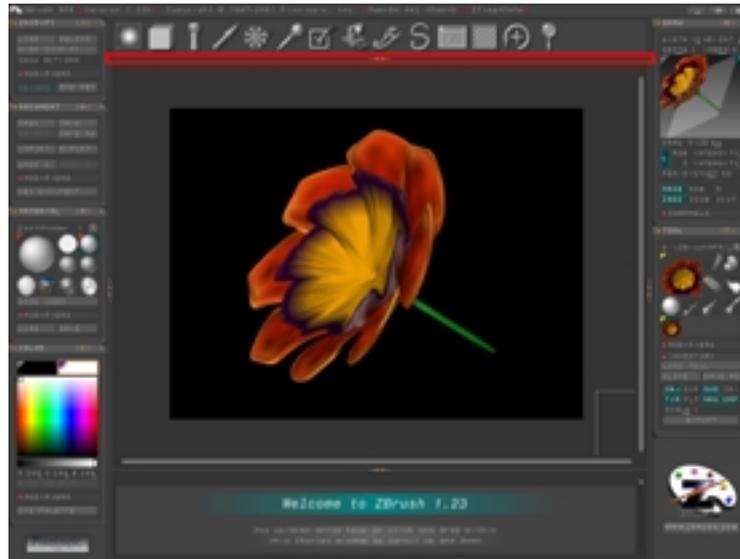
At the right end of this bar are standard icons for minimizing the window, restoring it to its previous size, and closing, or quitting the program.

If the window isn't maximized, you can move it around the screen by dragging the title bar.

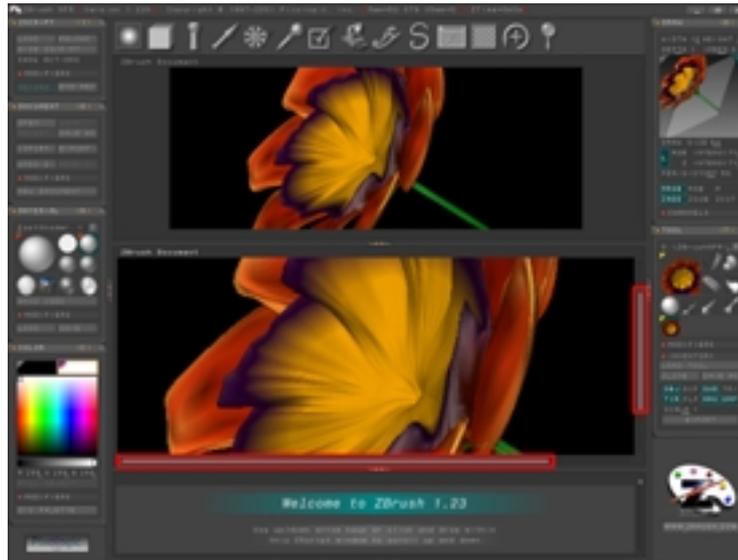
The Document Window

The document window, in the center of the ZBrush workspace, is where you draw and edit your image. The current document name appears in the upper-left corner of the window. The name defaults to ZBrush Document until you save the file, when it changes to the file name and path.

By default, the window contains a single view of your document, but by clicking or dragging the Alt-Document View bar (outlined in red in the following illustration), you can split the window into two views.



Click the Alt-Document View bar to add a second view

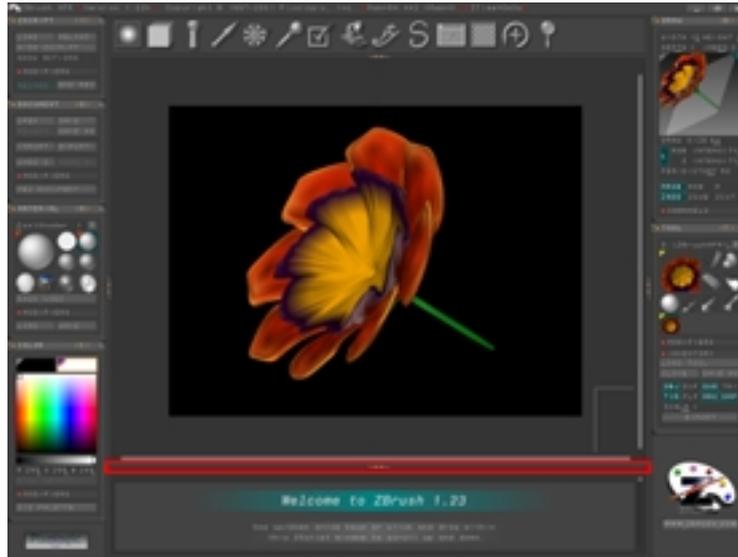


Drag the scroll bars to move to different parts of a zoomed-in view

With two views, you can work on the same document at different zoom levels, using one for an overall view and the second for detail work. When the window is split, you can move the divider vertically by dragging it, and make either view active by clicking in it. When you zoom a view in so that not all of it is visible, you can move to different parts of the view by dragging the scroll bars at the bottom and right side (outlined in red in the above illustration). Or you can use the Zoom Palette to zoom and pan.

Click the Alt-Document view button to alternate between the divider's last position and the top. To return to a single document view, drag it all the way to the top.

The ZScript Window

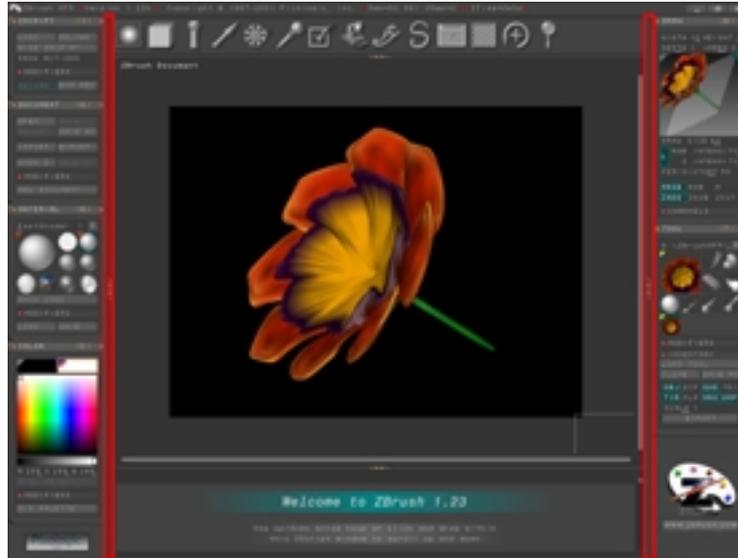


Click the ZScript Window bar to minimize the ZScript Window

Click the ZScript Window bar once to minimize it. Click again to restore. Click and drag to resize it. See [“The ZScript Window”](#) on page 278.

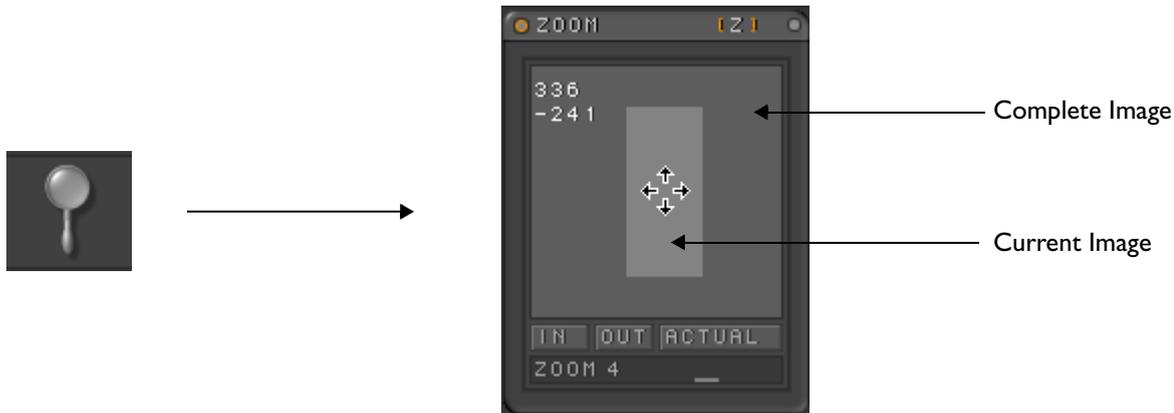
The Palette Panels

Click the side panel dividers to show and hide the palettes on each side of the interface. The workspace will expand to use the extra space that is created.



Click the side panel dividers to show and hide the palettes

The Zoom Palette



Use the Zoom palette to zoom and pan within the active window. The grey square represents the complete image. The smaller, lighter rectangle represents the area you are currently viewing. Click and drag in the window to pan within the document.

In

Click to zoom in. Each click zooms in one level.

Out

Click to zoom out. Each click zooms out one level.

Actual

Returns image to actual size.

Zoom Slider

Click and drag to increase or decrease zoom factor or click once to turn red, then enter a numeric value with the keyboard.

Range= 0.1 to 32. Default= 1.

You can save time while painting with ZBrush by using these keyboard shortcuts. Note that the Zoom shortcuts use the standard keys, not those on the keypad:

- = key: Zoom in (centered on mouse cursor).
- 0 key: Set default zoom level and center view
- - key or Insert: Zoom out
- Spacebar + drag in document view: Pan document

ZBrush Palettes



When you first run ZBrush, a default selection of palettes appears on vertical panels to the left and right of the document window. Each palette contains one or more groups of related ZBrush functions.

Additional groups within a palette are available from sub-palettes. For example, every palette has a Modifiers sub-palette, and most also have an Inventory sub-palette.

Additional palettes are available from a row of icons immediately above the document window. If you click an icon, its palette opens at the top of the left or right side of the interface, while any other open palettes on that side move down and/or collapse to make room. Each palette is preset to open on a particular side. For example, the Light palette normally opens on the right side. However, you can force it to open on the left side by dragging the palette icon to that side. To move an open palette to the other side, drag it by the dot in the upper-right corner. Drag a palette or icon on top of an open palette to place it above that palette. In this way you can position the palettes any way you like. For information about saving and restoring a custom configuration, [See “Saving a Custom Configuration” on page 19.](#)

Using Palettes

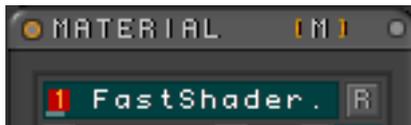
Palette controls take the form of text or icon buttons that you click to activate, and sliders that you drag across to change a numeric setting. If you click a slider or press its keyboard shortcut, it turns red, which means that it's active, and you can enter a new value from the keyboard. Once a control is active, you can toggle forward among nearby visible controls by repeatedly pressing the **Tab** key, or backward with **Shift+Tab**.

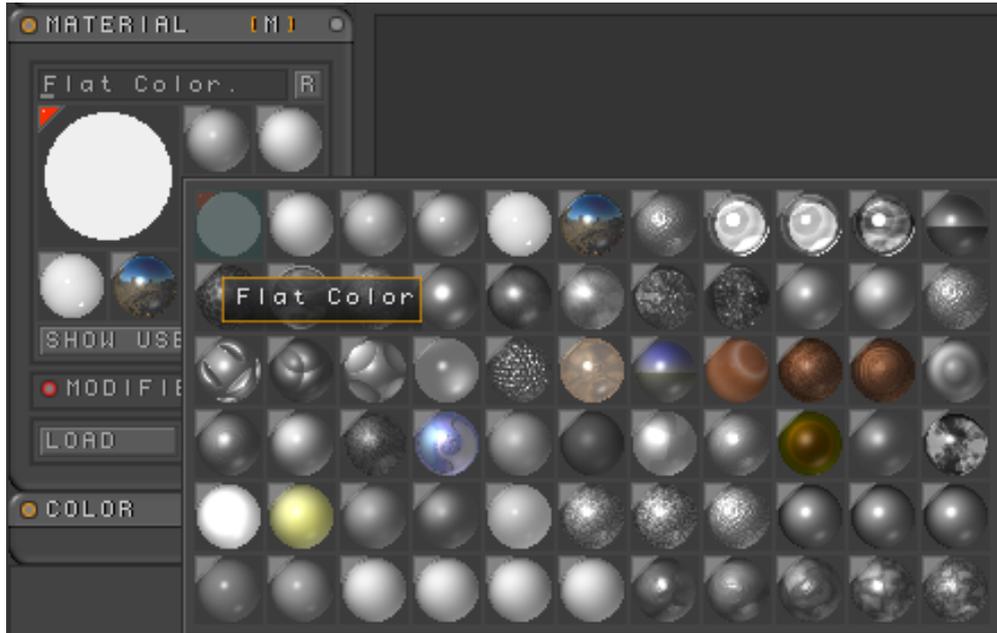
When editing a value from the keyboard, press **Enter** to implement the new value, or press **Esc** to cancel the change.

In the Alpha, Stroke, Material, Tool, and Texture palettes, the buttons containing the primary functions take the form of thumbnails (see illustration of Material palette, below). The large thumbnail in the upper-left corner shows the item currently in use, and the smaller thumbnails near it show some of the other available items. If you click a small, unselected thumbnail, its image is placed in the large thumbnail area, and it becomes active. Additional indicators that a small thumbnail is active are that the triangle in the button's upper-left corner turns red, and the button background color changes from gray to teal. If you click the large thumbnail or a small, active thumbnail, a pop-up menu of all available choices appears. Choose a new option, or, to close the pop-up menu, simply move the mouse cursor away from the menu.

At the top of each of these five palettes, there is a description of the item currently active. Drag this label sideways to choose another item, or click and enter a different number from the keyboard.

When many modifications to items are made or items are added, the list of items on the main palette can become very long. Clicking the **R** (Restore Default Configuration) button causes the main palette to resize to its default number of choices. Any modifications you added are still available from the pop-up window.





The pop-up menu shows all available choices

In the above illustration, the pop-up menu was opened from a small thumbnail, so the only highlighted icon (red triangle in corner) in the pop-up menu is the one used to open it. If you open the pop-up menu from the large thumbnail in the palette (not on a clone of the large thumbnail in the workspace), colored triangles appear for all elements currently available directly from the palette.

If you choose an item that's not currently on the palette, it's added to the main palette, and it then appears with the colored triangle when you open the pop-up menu from the large icon.

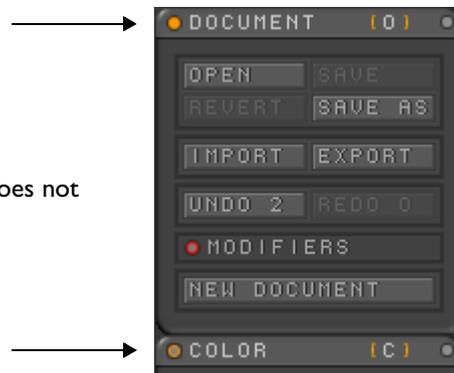
To remove a small thumbnail from a palette, open the pop-up menu from the large icon, and then click its thumbnail. If the item also appears in a custom palette, it's removed from there as well. For more on custom palettes, See [“Customizing the Interface” on page 15.](#)

To open or close a palette manually, click its title bar. You can also open and close a palette's sub-palette, such as **Document > Modifiers**, by clicking its title bar. If you close or iconify a palette (see following paragraph) that has any sub-palettes open, those sub-palettes remain open and appear expanded when you next open the palette.

To return a palette to iconized status, click the dot in the upper-right corner, or use the dot to drag it to the icon bar. You can also use the dot to drag it to the opposite side of the screen. Note that each palette's title bar contains a bracketed letter. Pressing the **Alt** key plus this letter toggles the corresponding palette's iconized state.

If there's no empty space on a side panel when you add or open a palette, currently open palettes close (that is, they collapse to show only the palette title bar) to make room. They close in reverse order of usage; that is, ZBrush tries to keep open the most recently used palettes, while closing those you haven't used lately. You can give a palette priority for staying open, whether you've used it lately or not, by clicking the dot in the upper-left corner. The dot turns orange to indicate this priority, and ZBrush tries to keep the palette open as long as possible.

The Document palette has priority to stay open, but the Color palette does not



Windows and Apple Platforms

ZBrush is equally capable on both platforms and the keyboard shortcuts are the same, since the Macintosh Command key is not used. On Apple keyboards, the Option key is used when the **Alt** key is called for in the manual. Most Apple keyboards are marked **Option/Alt**.

Online Help

All icons and other palette elements in ZBrush have tool tips that display the tool name when you hold the mouse cursor over the item for a few moments. In addition, you can get an expanded explanation of the item by pressing the **Ctrl** key after the tool tip appears.

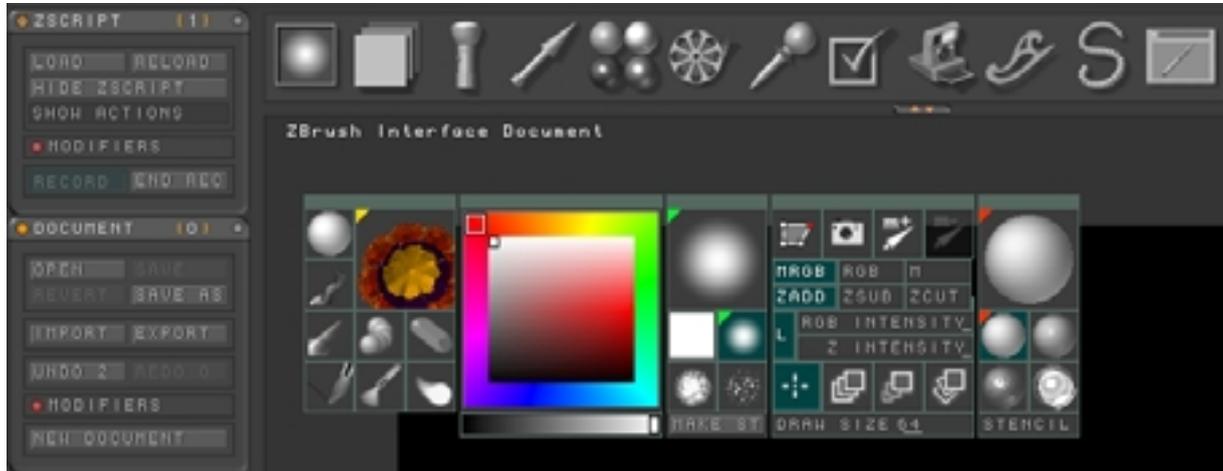
Customizing the Interface

Positioning palettes on either side of the workspace is the most noticeable of ZBrush's custom configuration capabilities, but they don't end there. Here's the rundown:

- You can open and close either side palette panel by clicking the vertical divider bar on its inside edge. The mouse cursor turns into a horizontal double-headed arrow when over this bar.
- You can create custom palettes by holding down the **Ctrl** key and dragging palette elements (an element is a single control, such as an icon used to represent a specific brush or tool) into the workspace. These elements function the same way in these custom palettes as they do in their palette of origin. The only exceptions to this are the **Tool > Modifier** buttons, which vary depending on the current tool. These cannot be moved into custom palettes.
- If, while **Ctrl+dragging** an element, you release the element when it's near an existing custom palette, it “docks” and becomes attached to that palette. You can undock it by **Ctrl+dragging** it to another part of the workspace.
- If you press and hold the **Shift** key before releasing the mouse button, the element still docks, but leaves a slight gap between it and the element(s) it docks to. This lets you build conceptual groups within a single

custom palette. For example, the custom palette in the following illustration contains six groups: five across, plus the single-element group containing the Draw Size setting.

If you change a custom palette's element's icon (e.g., a material) using the pop-up menu, the icon also changes in the palette from which the element was originally taken, and vice-versa.



Create a custom palette for your most often-used commands

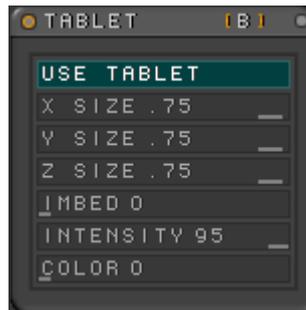
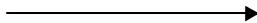
- You can move palette groups around in the workspace by dragging the handle (the blank, colored border above the element(s)).

- Each separate palette group's handle has its own distinctive color, to help distinguish between groups. To change a handle color, select the palette group (click on the handle), then choose a new color from the Color Selector, then click **Preferences palette > Config > Colorize**. The handle color changes to the one you selected.
- You can eliminate a custom palette element from the workspace by **Ctrl+clicking** inside the element.
- To toggle the palette from which an element was originally taken, **Alt+click** the element. Use this to quickly access the palette if you need to add another item from it to your custom palette.



***NOTE:** You can toggle the visibility of all custom palettes with the **Tab** key.*

The Tablet Palette



The Tablet palette contains controls for using ZBrush with a pressure sensitive tablet.

Use Tablet

When a pressure sensitive tablet and the proper driver are installed, the Tablet palette controls become available. Use Tablet is on by default. Turn it off when you wish to disable tablet input.

X Size

Sets the percent change of X size from maximum to minimum pressure. Full pressure= size set in Draw palette. Default= 0.75 See [“Width” on page 81.](#)

Y Size

Sets the percent change of Y size from maximum to minimum pressure. Full pressure= size set in Draw palette. Default= 0.75 See [“Height” on page 81.](#)

Z Size

Sets the percent change of Z size from maximum to minimum pressure. Full pressure= size set in Draw palette. Default= 0.75 See [“Depth” on page 82.](#)

Imbed

Sets the percent change of imbedding from maximum to minimum pressure. Full pressure= imbed value set in Draw palette. Default= 0.75 See [“Imbed” on page 82.](#)

Intensity

Sets the percent change of intensity from maximum to minimum pressure. Full pressure= intensity set in Draw palette. Default= 0.75 See [“RGB Intensity” on page 86.](#)

Color

Sets the stroke color from maximum to minimum pressure. Full pressure= Main color. Minimum pressure= Secondary color. See [“Main and Secondary colors” on page 25.](#)

Saving a Custom Configuration

Once you've set up an interface configuration you like, you can let ZBrush restore it automatically for you at the start of each session. To do so, click **Preferences palette > Config > Store Config**, or use the keyboard shortcut: **Ctrl+Shift+I**. An alert appears to let you know that the configuration has been saved, and will be restored whenever you run ZBrush. The alert also advises you to use **Restore Config** to return to ZBrush's default configuration.

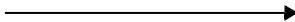


***NOTE:** After using **Restore Config**, quit and then restart the program*

Click OK to continue.

ZBrush saves your custom configuration in a file named **ZCfgxxx.cfg** (the values of x depend on the version number), in the ZBrush program folder (at the same level as the **ZBrush.exe** program file). To archive your custom configuration, or to use the configuration on a different computer, make a copy of this file. For example, if you use Windows Explorer to copy and then paste the file, it names the new file **Copy of ZCfgxxx.cfg**, and ZBrush ignores it. At any time thereafter, you can return to the configuration defined in that file by renaming it **ZCfgxxx.cfg**.

2 ZBrush 1.23 The Document Palette

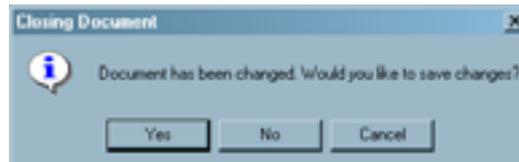


← Background color switch

The document palette contains buttons that allow you to load or save ZBrush documents, import background images, export output images, resize the canvas, and set the background color.

Open

Opens previously saved ZBrush documents. If a document is open with unsaved changes, a warning will appear.



Save

Saves ZBrush document as a .zbr scene file with the currently assigned name.

Revert

Reloads the last saved version of the open document.

Save As

Saves the current ZBrush document as a .zbr scene file with a new file name.

If you click OK, the current document will be closed without saving changes and the new file can be selected. To save the current document and open a new one, click Cancel, then Save, then Open again.

Import

Imports .bmp (Windows Bitmap), .psd (Photoshop), or PICT (Mac) as a background image. ZBrush will resize the image to fit the current canvas size. The currently selected Material will be applied to the image and if there are objects or paint strokes with depth present, they will be shaded with the imported image.

Export

Exports .bmp (Windows Bitmap), .psd (Photoshop), or PICT (Mac) as a RGB bitmap output to be published or used in another application.

Undo

Click on this button (or use **Ctrl + Z**) to undo the most recent change. The number next to the button indicates how many undo's are available.

Redo

Click on this button (or use **Ctrl +Shift + Z**) to redo the most recent change. The number next to the button indicates how many redo's are available.

Modifiers

Half

Resizes the canvas size to exactly one half of its present dimensions

Double

Resizes the canvas size to exactly double its present dimensions.

Width

Shows the current width and can set a new width for the canvas.

Height

Shows the current height and can set a new height for the canvas.

Pro(portional)

Causes width and height to stay in proportion. When you change one, the other automatically adjusts proportionally.

Resize

Resizes the canvas to newly set values.

Background color

Sets the background color. Set the Color picker to the desired color, then click in the background color swatch. Or, click and drag from the background color swatch to the color picker and release when over the desired color.

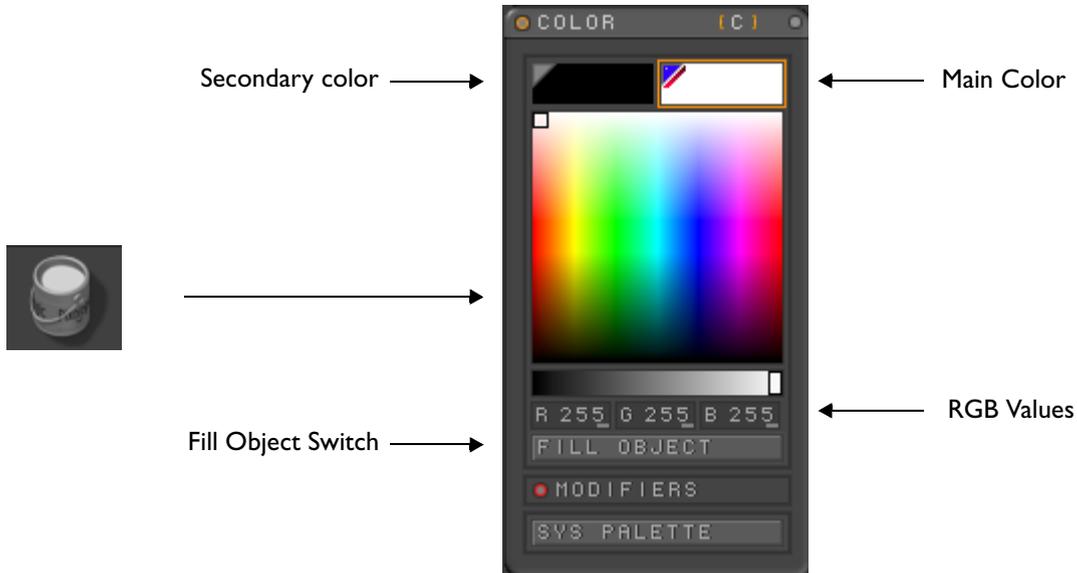


NOTE: It is best to select the background color before painting or adding objects because the object color can blend with the background color at its edges.

New Document

Opens a new document with default settings.

3 ZBrush 1.23 The Color Palette



Choosing Colors with the Color Palette

There are two main methods for choosing a color from the color palette.

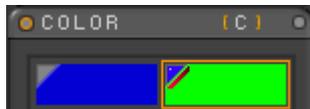
- Click and drag within the color window until the desired color appears in the Main Color window.

- Click and drag from the color window to the screen. A “Pick” icon appears and the color under it will be automatically selected in the color palette. See [“Pre and Post Shaded Colors” on page 26](#).

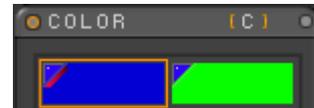
You can also use the RGB sliders or type values directly into them. Other color picker models are available, and are described later in this chapter.

Main and Secondary colors

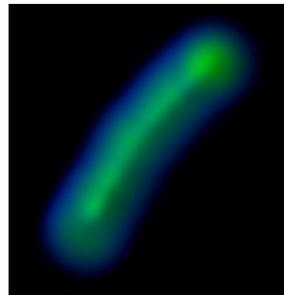
The Simple, Sphere, Alpha, and Fiber brushes are able to use a main and a secondary color. Click on the Main or Secondary swatch to enable color selection. A gold box will appear around the swatch when selection is enabled. Click on the triangle in the upper left corner of the Main and Secondary swatches to make the color selection active. The triangle is blue when active, white when inactive.



Main Active



Main and Secondary Active



A stroke of the Simple Brush with Main= green and Secondary= blue

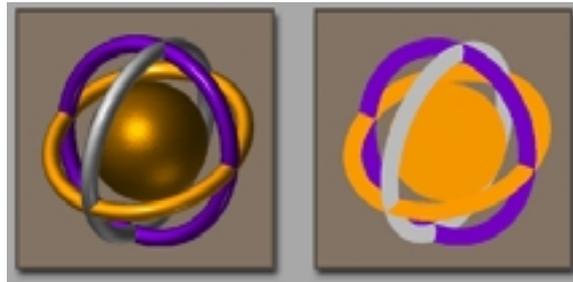
Pre and Post Shaded Colors

Unlike traditional paint programs, ZBrush takes depth and lighting information into account and renders a shaded image. When “Picking” colors from a shaded image, the pre-shaded (flat) color is sampled. For example, in the “Best Render” image below, “Picking” anywhere on the orange ring will show the same orange color in the color palette. See [“Choosing Colors with the Color Palette” on page 24.](#)

To “Pick” the shaded color, press the **Alt** key while picking.



The Render palette with Flat Renderer turned on



Best Render

Flat Render

Fill Object

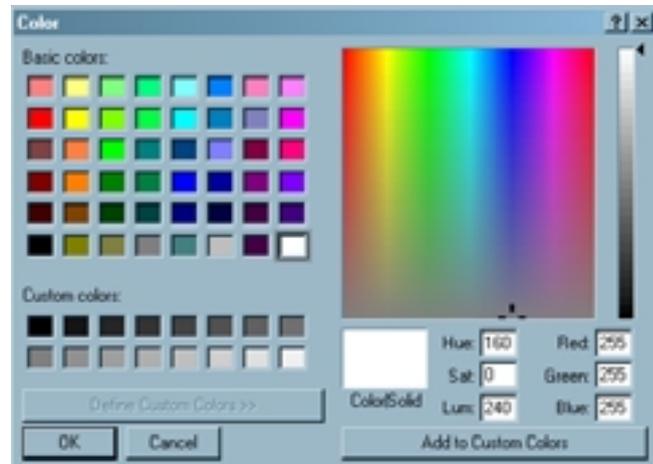
The Fill Object button is active only when you have a 3D object in a transform mode. When pressed, it fills all the polygons of the object with the selected color. You are then able to paint with other colors on the object. See “[Vertex coloring and Texture Maps](#)” on page 29.

Modifiers

Two additional color picker systems are available in the Modifiers sub-palette. All three pickers may be open and active at the same time.



The System Color Palette



4 ZBrush 1.23 The Texture Palette



The texture palette allows creation, import, and export of textures. Textures can be used when drawing or as texture maps for 3D objects. Textures can be created and used within ZBrush or exported for use in other 3D or image processing programs.

Texture information is saved in the .zbr scene file and the scene can be published in .bmp and .psd formats. On the Macintosh, it can also be saved in the PICT format. See [“Export” on page 21](#).

Vertex coloring and Texture Maps



In its default mode, the Texture Palette is in the “Texture Off” mode and no texture map will be applied. When drawing with brushes or creating 3D objects, only the color selected in the Color Palette will be applied.

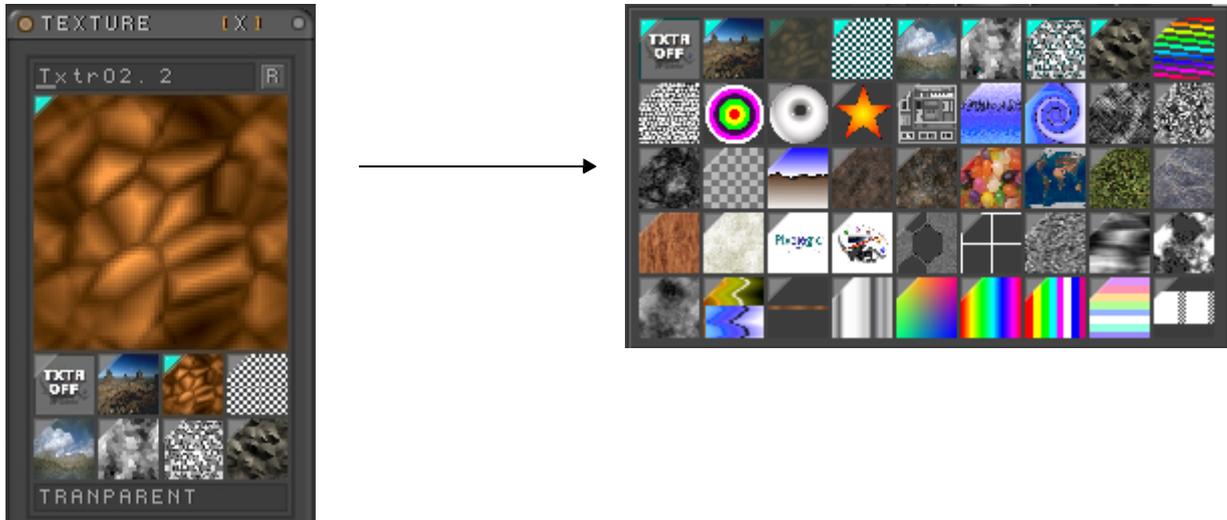
When creating 3D objects, you can give them a base color using the **Color Palette > Fill Object** button. You can then paint on the object and the object will be colored using vertex coloring. Each polygon will be assigned a color which can be blended with adjacent polygons. No texture map will be generated and many 3D programs can utilize the vertex coloring when the object is imported into them. See [“Editing Objects” on page 107](#).

Using vertex coloring produces small file sizes, but the level of detail is low unless the mesh is very fine. The optimum solution is to make the object mesh only as fine as needed to produce the level of detail necessary for the object and to use a texture map for surface coloring.

A texture map is a bitmap that is applied to the object. In ZBrush the texture map can be as large as 6000 x 6000 pixels, allowing an incredible level of detail.

Be sure to read about the 3D Copy function, an innovative method for producing high-definition texture maps using ZBrush paint and 3D tools. See [“3D Copy” on page 118](#).

Selecting Textures



The active texture is shown in the large thumbnail at the top of the palette, which reflects any changes you make to the texture while editing it. Several other textures are shown in smaller thumbnails in the rest of the main palette; you can switch the active texture to one of these by clicking its thumbnail.

You can see the full selection of available textures by clicking the active texture; either its large or small thumbnail in the main palette.



NOTE: If you start by clicking the large thumbnail, the new texture will be added to the list of smaller thumbnails. If you start by clicking the small thumbnail the new texture will replace it in the list.

This opens the above pop-up icon menu, which works the same as others in ZBrush, such as those in the Tool and Material palettes. In this menu, the active texture is grayed out to indicate that you can't select it (again). Textures that

appear in the main palette have a cyan triangle in the upper-left corner of the thumbnail, and textures that aren't displayed in the main palette have a gray triangle.

To see the name of a texture, hold the mouse cursor over its thumbnail for a moment until the label appears. To choose a texture, click its thumbnail. When you choose a texture that doesn't appear in the main palette, it's made the active texture, and its thumbnail is added to the main palette. When you choose a texture that appears in the main palette (excepting the active texture), it's removed from the main palette. The main palette expands or shrinks as necessary to accommodate the displayed thumbnails. When the list becomes too long, you can reduce it to its default size by pressing the **R** button at the top of the palette. See [“Using Palettes” on page 12](#).



*NOTE: You can fill the screen with the selected texture by pressing **Ctrl + F**.*

Transparent

When active, portions of the texture that are pure black (rgb 0,0,0) are rendered as transparent.



*NOTE: For best results, turn off the **Grd** (gradient) button in the **Tool > Modifiers > Texture sub-panel**.*



Texture 08 applied to double-sided sphere with Transparent enabled.

Applying Textures

The ZBrush paint tools will apply the currently selected texture. Just select the texture you wish to use and paint. Each tool remembers its texture, so if you switch tools and want to use the same texture, you need to choose the texture again.

When applying textures to an object, the currently selected texture will be applied when the object is created. When an object is still floating (transform or edit active), simply click on a different texture to apply it.



FlipH

Flips the texture left-to-right.

FlipV

Flips the texture top-to-bottom.

Rotate

Rotates the texture 90 degrees per click.

Negative

Causes inverse coloring.

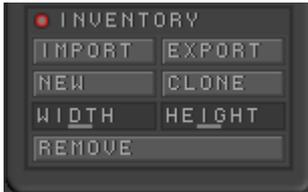
Clear

Clears the texture to the currently selected main color.

Make Alpha

Adds a grayscale version of the current texture to the Alpha palette as the active alpha. [See “The Alpha Palette” on page 38.](#)

Inventory



Import

Imports .bmp, .psd and PICT (on Mac). You can select multiple texture images and load them all at one time.

Export

Exports .bmp, .psd and PICT (on Mac).

New

You can create a new texture at any time by selecting a base color with the color picker, inputting the desired height and width and clicking New.

Clone

To create a copy of the current texture at a different size, set the new width and height and click Clone.

Width

Displayed when the cursor is over the slider. Move the slider to the new value or click to turn red and then type in the new value. The current value is also shown when holding the cursor over the small thumbnail previews.

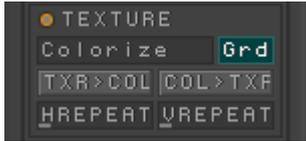
Height

Displayed when the cursor is over the slider. Move the slider to the new value or click to turn red and then type in the new value. The current value is also shown when holding the cursor over the small thumbnail previews.

Remove

Removes the currently selected texture from the list (not the hard drive.)

The Tool > Modifiers > Texture Sub-Palette



When working with 3D objects, additional texture controls are available in the Tool Palette. The sub-palette contains controls for:

Colorize

Fills every polygon with the selected color. Automatically turned on by pressing **Color Palette > Fill Object**. See [“Vertex coloring and Texture Maps” on page 29](#).

Grd

Gradient blends colors between adjacent polygons.

TXR > Col

Uses the existing texture to colorize the mesh directly (vertex coloring.) No texture map is needed with a mesh of this type. Each polygon is assigned a color.

Col > Txr

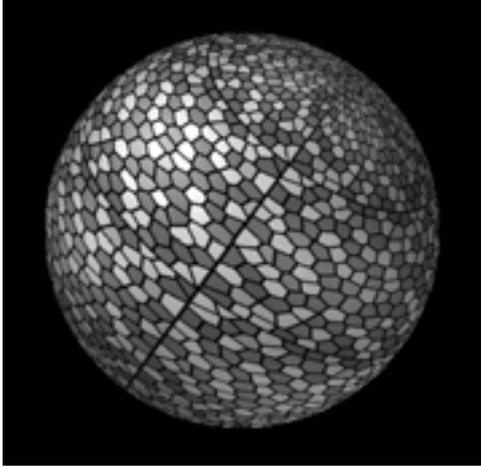
Creates a texture map based on the current vertex coloring of the object.

HRepeat/VRepeat

Sets the number of times that the texture will be repeated on the object in the horizontal or vertical direction. Range= 1 to 32. Default= 1.

Seamless Textures

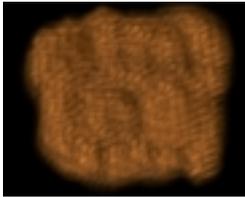
When repeating textures over a 3D object it is important that the right edge matches the left edge and that the top edge matches the bottom edge. If they do not, a “seam” will be visible where they meet when tiled over the object.



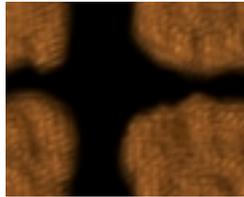
A texture repeated 4 times vertically and 4 times horizontally with visible seams.

Here is a simple method for creating seamless textures in ZBrush:

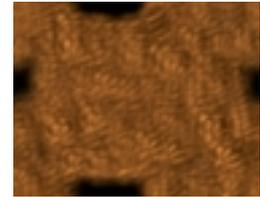
- 1 Use any brushes or objects to create the texture. **Important:** do not draw to the edge of the screen.
- 2 Hold down the Tilde (~) key and click and drag on the canvas to offset the image.
- 3 Fill in the blank areas, being careful not to go to the edges again.
- 4 Repeat steps 2 and 3 until the image is completely filled in.
- 5 Grab the completed texture with the MRGBZ grabber. See [“MRGBZ Grabber” on page 148](#).
- 6 Choose the “grabbed” texture in the Texture Palette and tile it onto a 3D object by setting **Tool > Modifiers > Texture > HRepeat** and **VRepeat** to values greater than 1 and then creating the object.



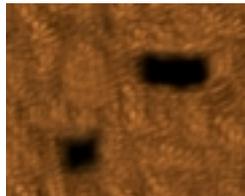
Step 1



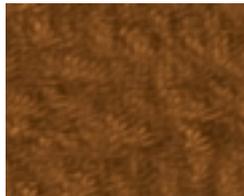
Step 2



Step 3



Step 4

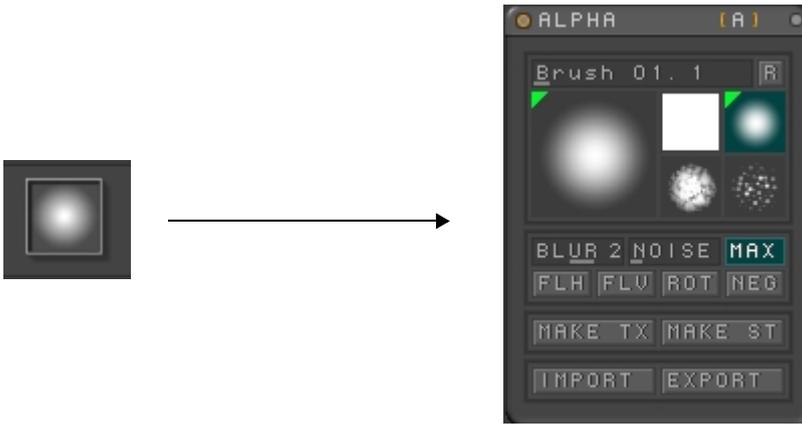


Step 5



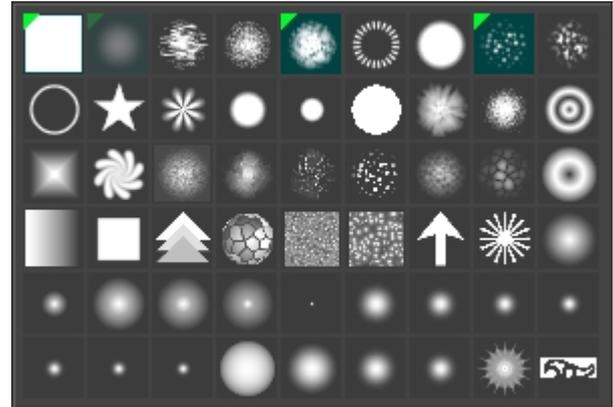
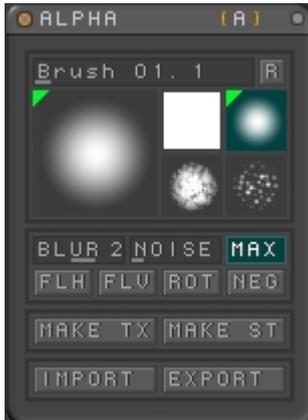
Step 6

5 ZBrush 1.23 The Alpha Palette



In ZBrush, 8-bit grayscale images used for masking are referred to as alphas. They are used to control the shape of paint brushes and for other masking operations. See [“Selection Sub-palette” on page 191](#).

One unique use of alpha is with the MRGZB grabber. When you grab an object, ZBrush calculates a 16-bit alpha that represents depth and adds it to the Alpha Palette. The larger bit depth is necessary to represent 3D objects with the alpha. See [“MRGBZ Grabber” on page 148](#). You can use the grabber to create alphas from any object on the canvas.



Selecting Alphas

The active alpha is shown in the large thumbnail at the top left of the palette. Several other alphas are shown in smaller thumbnails in the rest of the main palette; you can switch the active alpha to one of these by clicking its thumbnail.

You can see the full selection of available alphas by clicking the active alpha; either its large or small thumbnail in the main palette.



NOTE: If you click the large thumbnail and then choose a new alpha, the new alpha will be added to the list of smaller thumbnails. If you click the small active thumbnail instead, the new alpha will replace it in the list.

This opens the above pop-up icon menu, which works the same as others in ZBrush, such as those in the Tool and Material palettes. In this menu, the active alpha is grayed out to indicate that you can't select it (again). Alphas that appear in the main palette have a green triangle in the upper-left corner of the thumbnail, and alphas that aren't displayed in the main palette have a gray triangle.

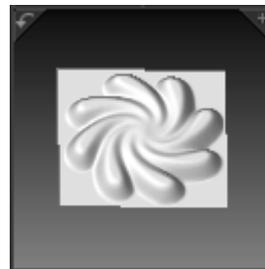
To see the name of an alpha, hold the mouse cursor over its thumbnail for a moment until the label appears. To choose an alpha, click its thumbnail. When you choose an alpha that doesn't appear in the main palette, it's made the active alpha, and its thumbnail is added to the main palette. When you choose an alpha that appears in the main palette (excepting the active alpha), it's removed from the main palette. The main palette expands or shrinks as necessary to accommodate the displayed thumbnails. When the list becomes too long, you can reduce it to its default size by pressing the **R** button at the top of the palette. See [“Using Palettes” on page 12](#).

Applying Alphas

The ZBrush paint tools will utilize the currently selected alpha. Just select the alpha and brush you wish to use and paint.



NOTE: With most brushes, to see a 3D representation of the selected alpha, open the Draw palette and reposition the preview.



Modifiers

Blur

Blurs the alpha image to smooth it. Negative values will sharpen. Range= -15 to +15. Default= 2

Noise

Adds noise to the alpha image. Range= 0 to 100 Default= 0.

Max

Maximizes tonal range of the current alpha. Like an auto-level setting, it adjusts the lightest part of the existing alpha to pure white and the darkest part to pure black.

FlipH

Flips the alpha left-to-right.

FlipV

Flips the alpha top-to-bottom.

Rotate

Rotates the alpha 90 degrees per click.

Negative

Produces an inverse image of the alpha.

Make Tx

Creates a texture from the currently selected alpha and adds it as the active texture to the texture palette.

Make St

Creates a stencil from the currently selected alpha and adds it to the stencil palette. [See “The Stencil Palette” on page 232.](#)

Import

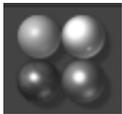
Imports .bmp (Windows Bitmap), .psd (Photoshop), or PICT (Mac). You can select multiple alpha images and load them all at one time. If you import color images, they will automatically be converted to grayscale.

Export

Exports 8-bit .bmp (Windows Bitmap), .psd (Photoshop), or PICT (Mac).

6

ZBrush 1.23 The Material Palette



The Material palette, with Modifiers sub-palette expanded

In ZBrush, the way a surface looks is the result of a combination of factors, including its base coloring or texture, the lighting, and its material. The ZBrush Material palette gives you a great deal of control over the appearance of object surfaces by letting you specify various surface properties such as shininess, transparency, and reflectivity, using numeric settings as well as interactive graphs. You can use materials with any tool that adds pixols to the document, including the 3D brush, the Sphere brush, and the 3D objects.

The most important thing to remember about materials in ZBrush is that they're always “live.” In other words, if you use a particular material to create pixols, and then modify that material later, any pixols that use that material will change in appearance to reflect the modified material. With certain materials, you might need to use the **Render palette > Best Renderer** mode to see changes.

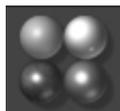


NOTE: Although this is not a tutorial, to best understand the concepts discussed in this section, have the ZBrush program open and try out the various functions as you read about them.



NOTE: ZBrush has a special feature that lets you combine the appearance of materials on a surface. The Bake function, found in the Layers palette, “bakes” any material effects on all surfaces into the document as the Flat material (material 00).

Opening the Material Palette



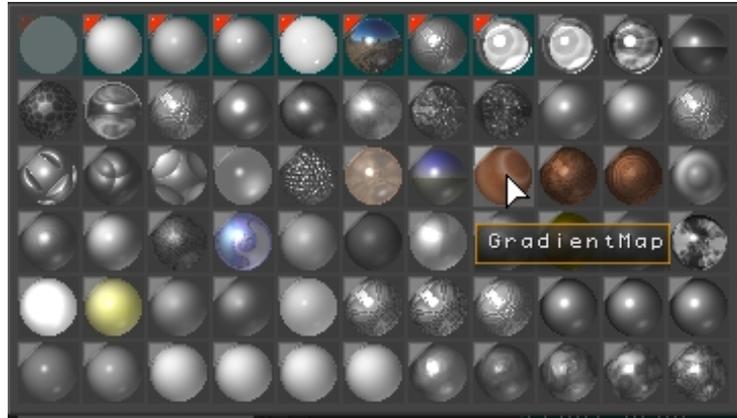
The Material button

By default, the Material palette opens when you start ZBrush. To close it, click the Close button in the upper-right corner. To reopen it if it's closed, click the Material button in the row of icons above the document window.



The Material palette, default view

Like many other palettes in ZBrush, the Material palette shows only some of the available materials. The active material is shown in the large thumbnail in the upper-left, which reflects any changes you make to the material while editing it. Several other useful materials are shown in smaller thumbnails in the rest of the main palette; you can switch the active material to one of these by clicking its thumbnail.



View all materials by clicking the large thumbnail

You can see the full selection of available materials by clicking the active material; either its large or small thumbnail in the main palette. This opens the above pop-up icon menu, which works the same as others in ZBrush, such as those in the Tool and Texture palettes. In this menu, the active material is grayed out to indicate that you can't select it (again). Materials that appear in the main palette have a red triangle in the upper-left corner of the thumbnail, and materials that aren't displayed in the main palette have a gray triangle.

To see the name of a material, hold the mouse cursor over its thumbnail for a moment until the label appears. To choose a material, click its thumbnail. When you choose a material that doesn't appear in the main palette, it's made the active material, and its thumbnail is added to the main palette. When you choose a material that appears in the main palette (excepting the active material), it's removed from the main palette. The main palette expands or shrinks as necessary to accommodate the displayed thumbnails.



NOTE: To remove the active material from the main palette, first make a different material active by choosing it from the main palette or the pop-up material menu.

Show Used

Click the Show Used button to remove all thumbnails from the main palette except for those currently used on surfaces in the document. This is a convenient way to determine whether you've used a particular material.

The Modifiers Sub-palette

This section deals with the administrative controls in the Modifiers sub-palette. For a discussion of the material-editing functions, See “Using the Material Palette” on page 49.

Render

When you're manipulating materials in ZBrush, you normally work in Preview Renderer mode for fast feedback. Some components, such as ray-traced Reflectivity, can be seen only in Best Renderer mode. But if you use that mode all the time, feedback can be slow, because every time you change any material component the program pauses while it re-renders the document. In such cases, stay in Preview mode, and, whenever you want to view changes that require Best Renderer, click the Render button at the bottom of the Modifiers sub-palette.



NOTE: If you work in Best Renderer mode on a floating object, changing the material properties updates the bounding box of the floating object rather than the entire document.



*NOTE: For even faster rendering, use the Fast Renderer mode in the Render palette. The only surface properties displayed in this mode are a global, predefined ambient and diffuse (specified in **Render panel > Modifiers > Fast Render**), so be sure to activate Preview Render mode to see all surface properties (such as Specular, Noise and Bump).*

Cursor

Alternatively, to best-render only part of the document (a 128x128-pixel square), click on and drag the Cursor button to the document area you want to render. Thereafter, when you click the Cursor button, the same area is best-rendered. Or, to render a different area, drag the Cursor button to the new area.

Load

Click the Load button to load a new material from a disk file into the active material slot. A number of material files are included with ZBrush, and you can create and save your own with the Save function.



NOTE: Loading a material from disk completely replaces the active material, not only in the palette but on any pixels that use that material. If you haven't saved the material, you can get it back by quitting and restarting ZBrush.

Save

Click the Save button to store the active material to disk in the ZMaterial (.zmt) format. Thereafter you can replace the active material with the saved material with the Load function.

Using the Material Palette

The most straightforward way to use the Material palette is to choose a material, choose a tool that creates pixels, such as the 3D brush or a 3D object tool like Sphere3D, and then start drawing. Whatever you draw will use the current material. If you choose a different material, under normal circumstances nothing changes in the document. Of course, anything you draw after switching materials will use the new material.

If, however, you draw a 3D object such as a sphere, and it's still floating in the document (that is, you activated Transform or Edit mode immediately after drawing the object), you can change its material by first activating a transform mode (for example, press W to enter Move mode), and then choosing another material. Or you can choose a different material, and then activate a transform mode. The new material is then applied to the floating object automatically.

Materials are depicted accurately in the document when you're using the default Preview renderer, with a few exceptions. For example, you won't see the full effect of the ColorizeGlow material unless you're using Best Renderer mode, or until you render the document. You can save time by rendering part of the document in this way: Drag the Cursor button from the Material or Render palette to the area you want to render.



NOTE: Another good way to see the results of material editing is to have a floating object that uses the material being modified; parameter changes are reflected immediately in the object.

Modifiers: Editing Materials

A material comprises one or more shaders, available in the Modifiers sub-palette via the buttons S1 - S4. Each shader is made up of several settings. Most materials in ZBrush use the "basic" shader, which is made up of the components described below. The basic shader is always the last one; that is, if a material uses two shaders, then the basic shader is S2.

You modify a material by editing its shader components. In this document we'll describe the most common shader components, and present examples of some of the other component



Some shader settings use a numeric component and a graph curve

A number of the basic shader settings use two components: a numeric parameter that determines the overall strength of the setting, plus a curve parameter that lets you use a graph to specify and to vary the strength according to the direction of each affected pixel's surface normal (except for Noise). When a setting has an available curve component, such as Diffuse, the graph appears below the numeric component in a vertically compressed format, as in the above illustration. To open the full graph, click the Curve component slot. For example, click DiffuseCurve to open the Diffuse graph. Clicking a different graph component closes the previously opened graph.

To view the current value for a numeric setting, such as Diffuse, position the cursor over the setting.



Hold the cursor over the number component to see its current value

When you do so, the mouse cursor turns into a horizontal, double-headed arrow to indicate how to edit the value. To change the value with the mouse, click the setting and drag left or right. As you drag, the horizontal bar at the bottom of the setting slot updates in real time, as does the material thumbnail in the mail palette. When you release the mouse button, ZBrush redraws the document to show the change's effect.

Alternatively, click the setting with the mouse, whereupon the numeric setting is highlighted in red. This means you can edit it from the keyboard by typing a new value and pressing **Enter**.

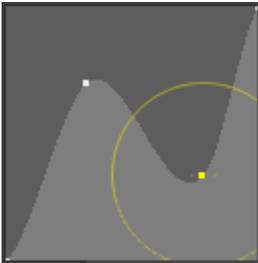
Using the Graph



Click a curve component slot to see its graph

All material component graphs in ZBrush, except Noise, work like this: The right end of the graph indicates the center of the effect. In the case of the Diffuse component, it's the part facing the light, and with Specular, it's the part halfway between the light and the front. With positive values of Transparency and Reflectivity, it's the part facing front, and with negative values, the curve determines how the underlying colors affect the properties. The left end indicates the farthest extents of the surface; the parts facing the side. The top of the graph indicates the current numeric setting of the respective component (the highest available value), while the bottom indicates the value 0.

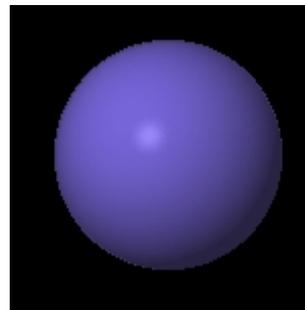
In the case of Noise,



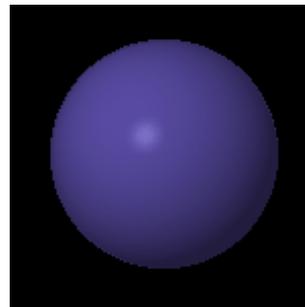
Graph with endpoints and intermediate points connecting spline curves

Each graph contains two control points, one at either end, plus any number of additional intermediate control points in between, with line segments connecting them. The control points are visible only when the cursor is over the graph.

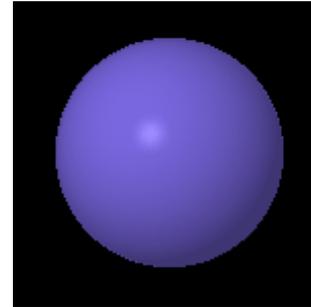
You can insert additional intermediate control points by clicking on a line segment. Intermediate points appear initially as small squares. To remove an intermediate point, drag it off the graph. You cannot remove curve endpoints. You can move the curve endpoints vertically to raise or lower the corresponding setting. For example, with the Diffuse component, lowering the control point at the right end of the graph makes the hot spot dimmer, as well as all in-between shades, while raising the left-hand control point makes the darkest area brighter, as well as all in-between shades. This is shown in the following illustrations:



This curve gives an extended dynamic range



Lowering the right side of the curve decreases the highlight intensity



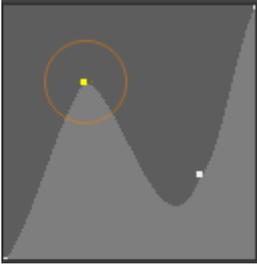
Raising the left side of the curve brightens the shadows

You can move an intermediate control point in any direction by dragging it.

By default, the line segments connecting a control point to its neighbors are spline curves, which help to create smooth transitions between shading levels. To change the curvature of the curves adjacent to a control point, first click the point to select it—it turns yellow to show that it's active, and a yellow circle appears around it. Click anywhere on the yellow circle, and drag toward the control point to reduce the curvature, or away from the control point to increase the curvature.



NOTE: If a circle around the control point is not at its default radius, it turns orange to show that the curvature has been changed. To return to the default curvature, drag the circle until it turns yellow again.



The control points' curvatures were edited by dragging the circles

You can zoom in on a selected control point for finer control by clicking it. It zooms to show only the line segments between the point and its immediate neighbors. To zoom back out, **Alt**-click again, or simply move the mouse cursor out of the graph.

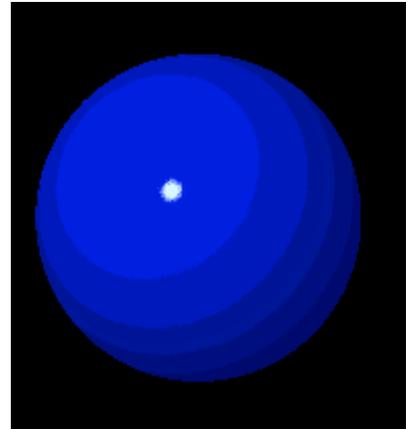
You can create more abrupt transitions by changing the line segments between control points to straight lines. To do so, drag the point off the graph and then back on without releasing the mouse button. The control point's color changes from white to black when using straight-line connecting segments. To change the point type back, repeat the operation.



NOTE: The curvature of straight-line segments cannot be edited.



Graph with straight-line segments to create cartoon shader



Sphere shaded with a cartoon shader

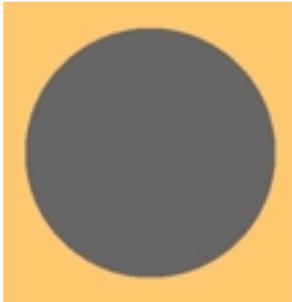
The ability to apply detailed modifications to material components by adding and moving control points and changing how they connect with neighboring points gives you a great deal of control over your materials' appearances. For instance, as shown above, by creating a "stair-step" DiffuseCurve graph, you can create a cartoon-style shader with discrete levels of shading instead of a continuous ramp.

Ambient

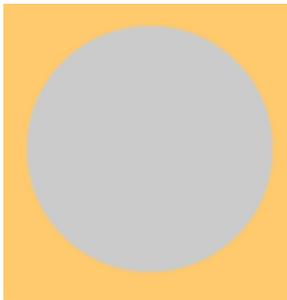
20 Ambient

Most materials in ZBrush contain an Ambient component. Ambient refers to a uniform shading, representing light illuminating the scene from every direction. The easiest way to think of the Ambient setting is as a percentage of the base color without regard for lighting.

In the following illustrations, a white sphere was drawn on a colored background. The sphere uses the default FastShader material, which contains only two components: Ambient and Diffuse.



Setting Ambient to 25 gives the sphere a 25% gray color:



And setting Ambient to 65 gives a 65% gray:

Diffuse



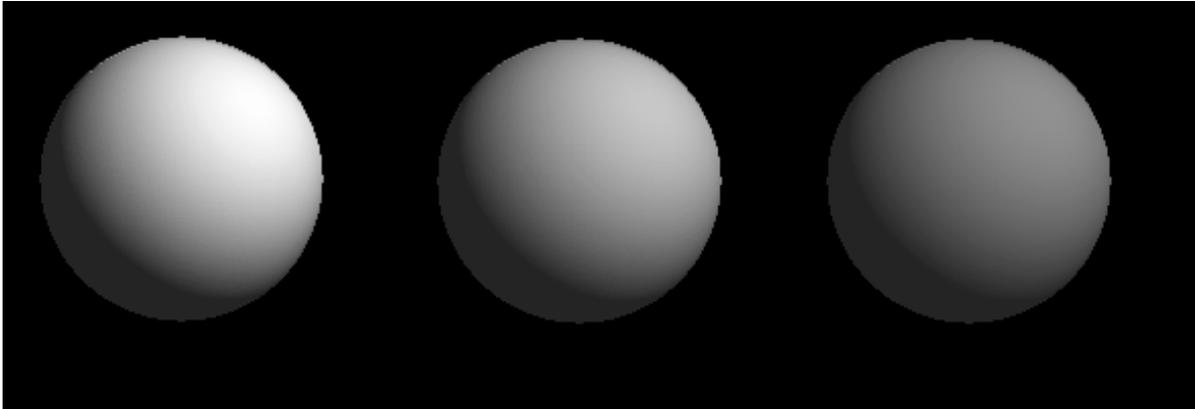
The Diffuse material component is what you use to add three-dimensional shading to your ZBrush images. Diffuse shading is always brightest where the surface faces the light source, and becomes darker as the angle between the surface and the light source increases. The Diffuse component uses the color of the object as well as the light color.



NOTE: The diffuse color is multiplied by the light color. With a white light, the diffuse is the same as the base color. Each of the RGB components of the base color is multiplied by the corresponding component in the light color. For example: A white sphere with 0 ambient and 100 diffuse lit by a single light source will look blue if the light source is blue. A red sphere with 0 ambient and 100 diffuse will look red if the light is red.

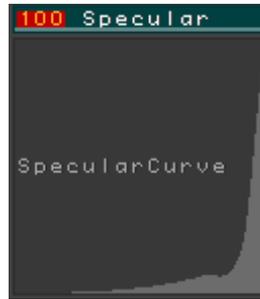
In most materials, Diffuse uses two settings: a numeric setting and a graph. The numeric setting determines the intensity of the "hot spot"—the brightest part of the diffuse shading. Specifically, the Diffuse numeric setting is the reflected percentage of the amount of light striking the surface facing the light source. And because the adjacent areas' illumination is a proportion of the hot spot, these decrease as well.

In the illustrations below, Diffuse is set to 100, 75, and 50, from left to right. The light is from the upper right, and the Ambient and Specular components are set to 0.



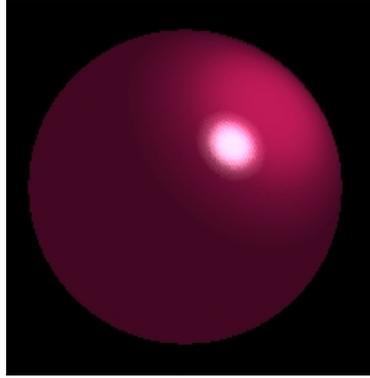
The Diffuse graph, found below the numeric setting, displays and lets you edit the illumination falloff from the "hot spot" (the right side of the graph) to the area of least illumination (the left side). By default this is a straight line.

Specular



The Specular material component adds a shiny look to surfaces in ZBrush by displaying a specular highlight, which looks like a reflection of the light source. It uses two settings: a numeric setting and a graph. The numeric setting determines the intensity of the highlight. The graph lets you vary the highlight falloff using the controls described in the Using the Graph section, above.

By default, the Specular component respects the color of the light, and disregards the object color. Thus, for example, if you have a red sphere illuminated by a white light source, the specular reflection will normally be white, as shown in the following illustration.



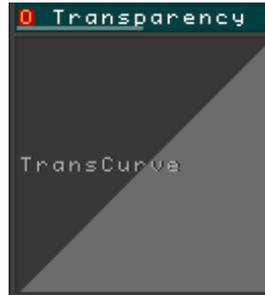
A white light source produces a white specular highlight



NOTE: You can change this with the Metalicity property, which lets you obtain a more metallic look by coloring the specular highlight with the surface's base color or texture. See "Metalicity" on page 69.

Another difference between the Specular and the Diffuse component is that, while Diffuse is always brightest where the surface is closest to the light source, the specular reflection bisects the angle between the viewer, the surface, and the light source. For example, in the above illustration, the sphere uses the shiny ToyPlastic material. The single light source is in the upper right, as indicated by the brightest part of the diffuse illumination. However, the bright, white specular highlight, which gives the material its shiny appearance, is halfway between the brightest part of the diffuse hot spot and the front of the sphere, where the viewer is located.

Transparency



The Transparency component determines the amount of light that passes through a surface. Transparency in ZBrush requires the use of multiple layers. To be able to see through a transparent surface, it must be in a different layer from the surfaces "below" it.

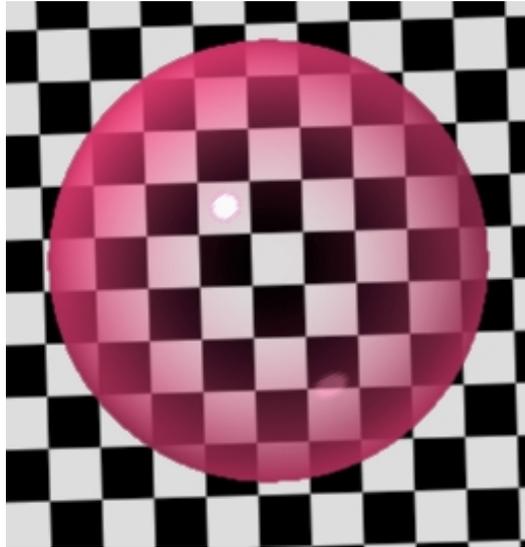


*NOTE: In order to see transparency, you must turn off the Flatten Layers option in the **Render palette > Modifiers** sub-palette. This feature is on by default, and speeds rendering of multiple layers, but prevents transparency from being displayed.*

To create transparent pixels, follow this procedure:

- 1 In **Render palette > Modifiers**, turn off Flatten Layers (it's the only option on by default). This is necessary to see transparency between layers.
- 2 Create the background pixels in one layer.
- 3 Add a layer (**Layers palette > Inventory > Create**). This automatically activates the new layer.
- 4 Use a transparent material to create pixels in front of the background pixels. The background pixels show through the transparent material.

You can make any material except Flat Color and FastShader transparent by setting Transparency to a value other than 0.

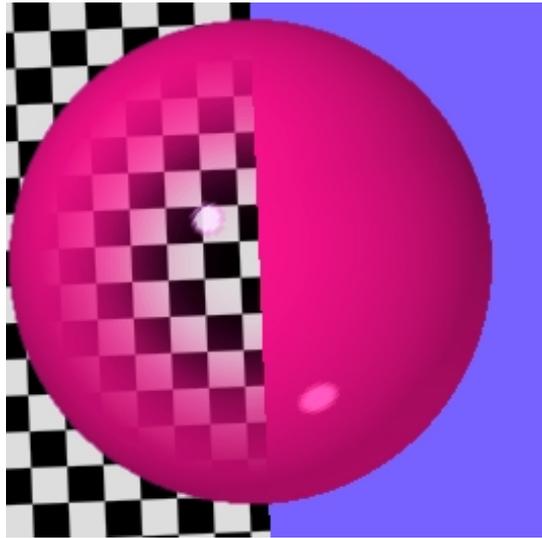


Using two layers to produce transparency

In the above illustration, the checkered plane is in Layer 1, while the red, transparent sphere is in Layer 2. However, the order of the layers doesn't matter; what's important is that the transparent pixels should be in front of the background image.

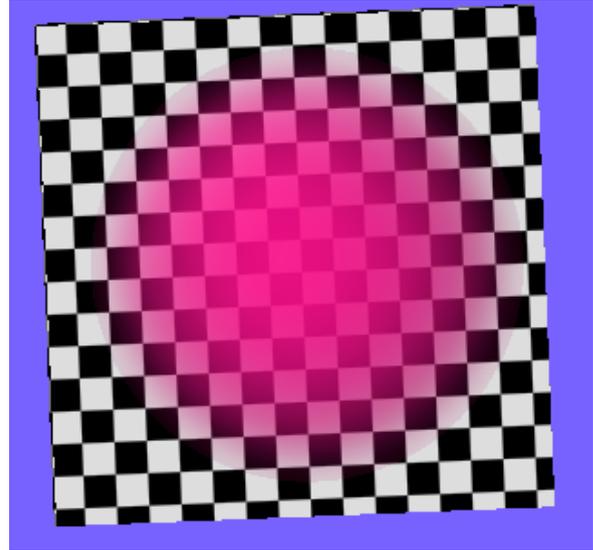


NOTE: For best results with transparency, make sure that checkered plane pixels fill the entire area behind the transparent surface. Any blank areas in the document will not show through the transparent pixels. For instance, in the following image, the document background color was set to blue, and then the red, transparent sphere was drawn half over the checkered plane and half over the blank background. The sphere looks opaque where only the blank background appears behind it.



For a glass-like effect with your transparent objects, as in the above images, use the default graph, or a close variation thereof. This causes edges to appear less transparent than the center, which replicates the way a real-world glass object bends light more at the edges than at the center. For an even more realistic glass effect, add reflectivity, or simply use ZBrush's built-in `ReflectedMap` material, which uses a special shader that reflects an environment map. This gives the illusion of reflecting an environment map without incurring the computation penalty of ray tracing. For more information, See [“Reflectivity” on page 66](#).

Conversely, for a foggy effect, set the transparency to be greatest at the edges, and least at the center. In the following illustration, the `Transparency` graph on the left was used in the sphere's material.



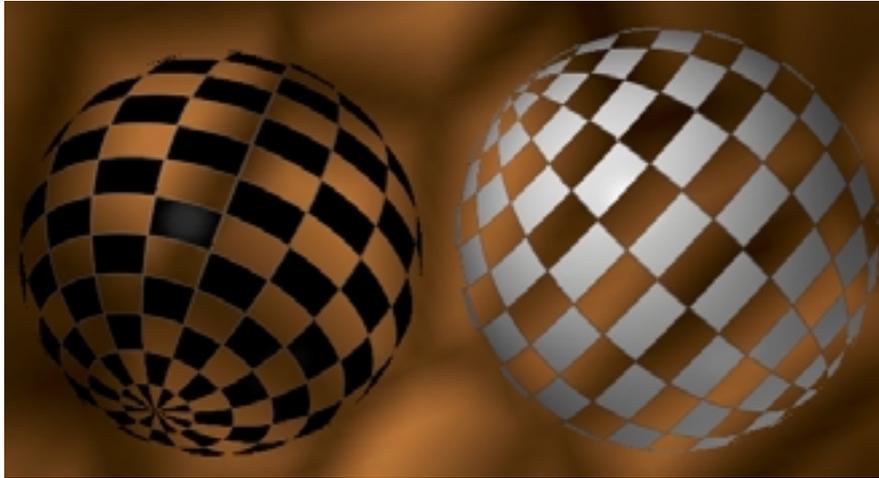
Reverse the Transparency graph slope for a foggy material

The Transparency setting can be positive or negative. When positive, the curve works normally, with the right side affecting the pixels facing the viewer, and the left side affecting the pixels facing sideways.

With negative Transparency settings, the degree of transparency is based on the value (or brightness) of the underlying surface coloration. The left side of the graph determines the transparency of the darkest pixels, while the right side determines the transparency of the brightest pixels. Say, for example, you have an object whose pixels are colored with a black-and-white texture, and Reflectivity is set to -100. If you use a curve that's high on the left side and low on the right side, only the black pixels will be transparent, and if you use a curve that's high on the right side but low on the left side, then only the white pixels will be transparent.

In the following illustration, the spheres are colored with a black-and-white checkerboard texture. The materials on both spheres have Transparency set to -100. But the material for the left-hand sphere uses the left-hand Transparency curve

shown below, so only the checkerboard texture's white pixels are transparent, while the right-hand sphere's material uses the right-hand Transparency curve, so only the black pixels are transparent.



Negative Transparency settings let the surface coloration control transparency

Reflectivity



The Reflectivity component in ZBrush materials offers a variety of methods of letting surfaces reflect their surroundings, or some other aspect of the environment. This works hand in hand with the settings in the **Render palette > Environment sub-palette**.

A reflective surface can reflect an environment texture, specified in the Texture slot to the left of the Render and Cursor buttons. To change this texture, click the Texture slot and choose a new texture from the pop-up menu.



NOTE: If you choose Texture Off, ZBrush uses the default texture.)



A reflective surface can also use ray tracing to reflect the actual scene around it. To see scene reflections, you must turn on **Render palette > Environment > Scene**, and use the Best Renderer.

The Reflectivity setting can be positive or negative. When positive, the curve works normally, with the right side affecting the pixels facing the viewer, and the left side affecting the pixels facing sideways.

With negative Reflectivity settings, the intensity of the reflection is based on the value (or brightness) of the underlying surface coloration. The left side of the graph determines the reflectivity of the darkest pixels, while the right side determines the reflectivity of the brightest pixels. Say, for example, you have an object whose pixels are colored with a black-and-white texture, and Reflectivity is set to -100. If you use a curve that's high on the left side and low on the right side, only the black pixels will be reflective, and if you use a curve that's high on the right side but low on the left side, then only the white pixels will be reflective.

In the following illustration, the spheres are colored with a black-and-white checkerboard texture. The materials on both spheres have Reflectivity set to -100. But the material for the left-hand sphere uses the left-hand Reflect curve shown below, so only the checkerboard texture's white pixels are reflective, while the right-hand sphere's material uses the right-hand Reflect curve, so only the black pixels are reflective.



Negative Reflectivity settings let the surface coloration control reflections



The ReflectedMap Material

The ReflectedMap material is a unique material that uses the basic shader as Shader 2 (S2), and has additional reflection capabilities provided by the special Shader 1 (S1). The Shader 1 settings are as follows:



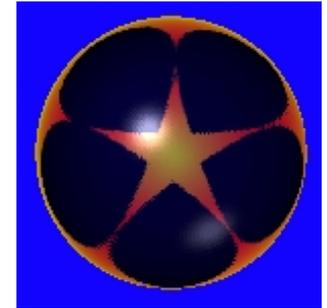
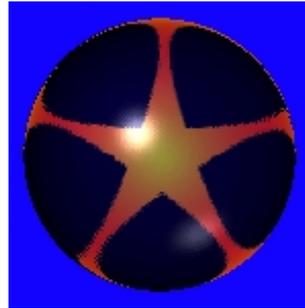
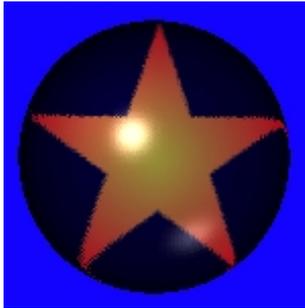
Add/Sub Reflection

The Add Reflection and Sub(tract) Reflection controls let you reflect brighter and darker colors by different amounts. Add Reflection controls the reflection of pixels brighter than underlying pixels, while Subtract Reflection controls the reflection of pixels darker than underlying pixels. For instance, if Add Reflection is higher than 0, and Subtract Reflection is 0, it means that the S1 reflection can only make the surface brighter, never darker. An example of this would be a shiny metallic surface, like a car.

Further, the two controls work on a differentiated RGB basis; that is, the software compares the brightness values individually for the red, green, and blue components of each pixel/pixel pair. The curve works normally, with the right side affecting the pixels facing the viewer, and the left side affecting the pixels facing sideways.

Spherical

This setting determines the extent to which ZBrush uses surface curvature to warp a reflection. In the real world, a reflection in a curved surface is distorted, and by default ZBrush reproduces this distortion accurately. To reduce the amount of distortion, lower the Spherical setting.



Spherical= 0 (left), 50 (center), 100 (right)

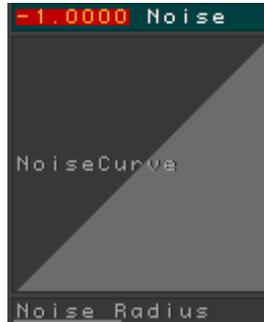
Metallicity

One of the differences between the properties of plastic and metallic surfaces is that plastic surfaces' specular highlights are the color of the light source or sources, while metallic surfaces' specular highlights take on the color of the metal. When a material uses the Specular property, you can specify that the highlights should be colored the same as the surface's basic color or texture by increasing the Metallicity setting.



Metallicity= 0 (left), 50 (center), 100 (right)

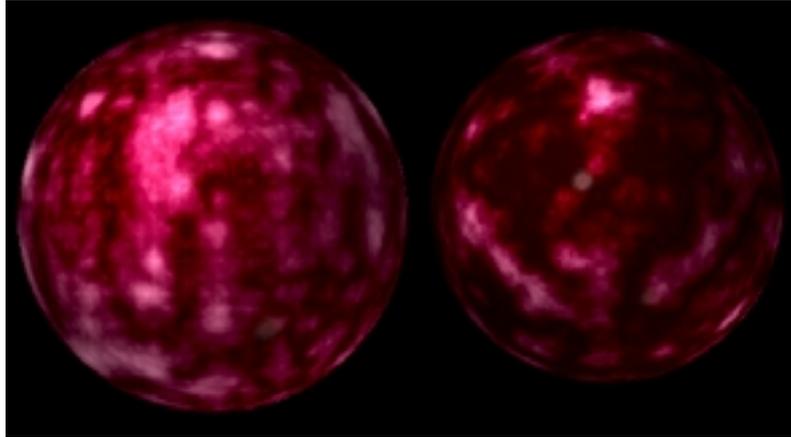
Noise



The Noise component adds an uneven appearance to surface coloring by varying the color intensity in random patterns. There are two types of noise in the basic shader:

- Positive values of the Noise setting give standard noise, created using fractal math.
- Negative values give recursive noise, often resulting in more complex patterns.

Using the default curve, both types look the same, but you can vary them by changing the curve. In the following illustration, both materials use the same settings, including the curve (see below), but the one on the left uses recursive noise (Noise= -1), while the one on the right uses standard noise(Noise= 1).



Recursive noise (left), standard noise (right)

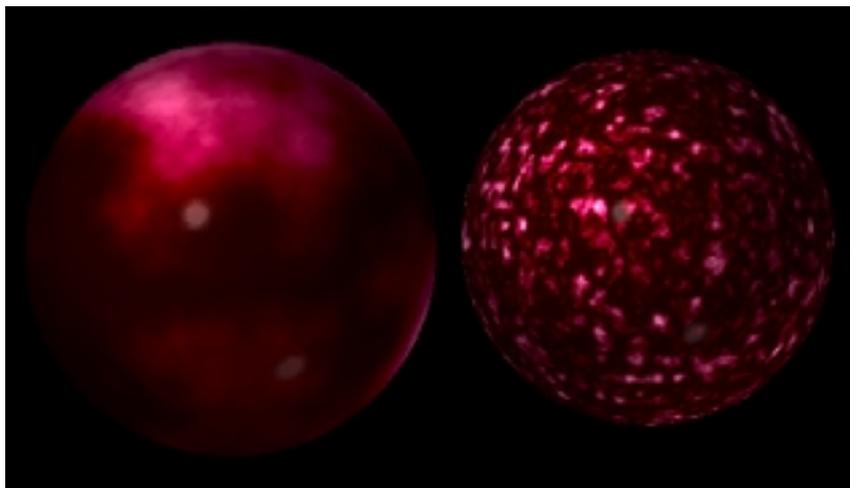


The noise curve used for the above materials

The Noise setting ranges from -1 to 1. Increasing the absolute value of the Noise setting provides a greater dynamic range to the noise effect.

The Noise Curve lets you specify which parts of the noise pattern use the surface color and which parts use black. The default curve, going from the lower-left corner to the upper-right corner of the graph, gives the greatest variation in the noise pattern. You can reverse the shading of the pattern by making the graph go from upper-left to lower-right. Countless other variations are available by editing the curve.

The Noise Radius setting, which ranges from 0 to 500, determines the resolution of the noise effect. Lower settings provide finer-grained noise, while larger values result in broader, cloud-like noise patterns.



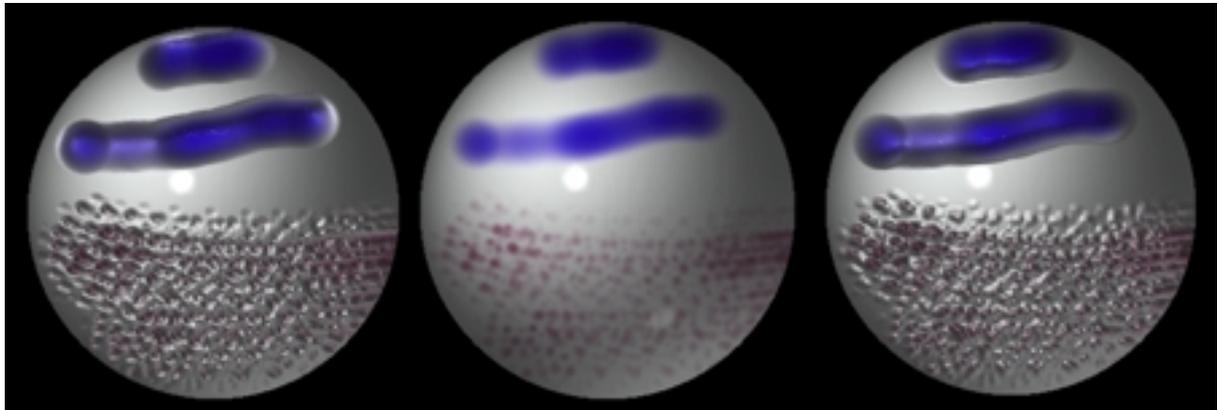
Noise Radius= 173 (left), Noise Radius= 11 (right)

The noise pattern exists in "world space" rather than locally on surfaces to which it's applied. Thus, if you rotate an object with noise applied, the noise pattern does not change. But if you move the object the pattern will change, because it's then occupying a different part of the global noise effect. The best way to alter the noise pattern without moving the object is to change the Noise Radius setting by a small amount, say 1 or 2.

Color Bump

The Color Bump setting uses variations in the surface coloration to create a bump-map effect. The value ranges from -20 to 20. With negative values of Color Bump, the lighter parts of the surface are higher than the darker parts. With positive values, the effect is reversed.

The Bump effect takes into account any surface coloration, whether produced by painting the surface, applying a texture, applying Noise, or any combination thereof.



Color Bump= -20 (left), 0 (center), 20 (right)

Gel Shading

The Gel Shading value can be 0, 1, or 2. The effects are:

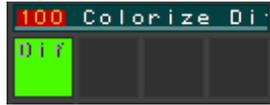
- 0 - Normal
- 1 - Jelly Bean, emulates a transparent effect
- 2 - Gel, emulates a different transparent effect



The GelShaderA material with Gel Shading= 0 (left), 1 (center), 2 (right)

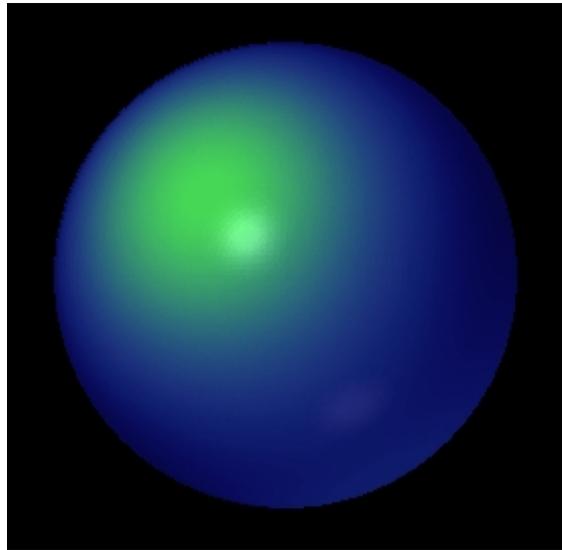
ZBrush comes with several Gel-based materials that provide a useful starting point for experimenting with this effect. Add an object, go to Edit Object mode, and apply one of the materials: GelShaderA, GelShaderB, or ReflectionGelShader. Then change the Gel Shading setting to see the differences.

Colorize Diffuse



Normally, the diffuse reflection of light on a surface is based on the surface color. The Colorize Diffuse property lets you specify an arbitrary color for diffuse reflection. To use it, set the numeric value of Colorize Diffuse and the diffuse color in the Dif slot.

Examples of usage include simulating a colored light source, and surfaces with translucent outer layers such as skin, so that shining a light on them reveals a differently colored inner surface.



The blue sphere has Colorize Diffuse set to green

Environmental Reflections

100 Env. Reflect

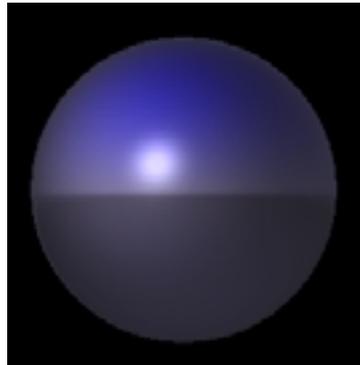
The source images for environmental reflections are created in the Render palette. See “Environment” on page 273. The amount that the image created there is reflected on current material is set here. Range= 0 to 100%. Default= 0.

Special Shaders

A number of materials in ZBrush use one or more special shaders in addition to the basic shader. In general, these are found in the lower-numbered shader slots (S1, and possibly S2 and S3). In most cases, their functionality is self-evident. For example, the GradientSky shader, shown in the following illustrations, lets the material simulate a reflected sky gradient and ground plane. The HorizonSharpness setting appears only in the rendered image.

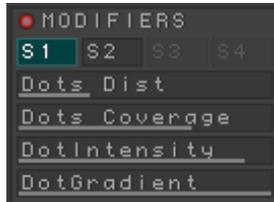


Gradient Sky settings

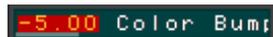
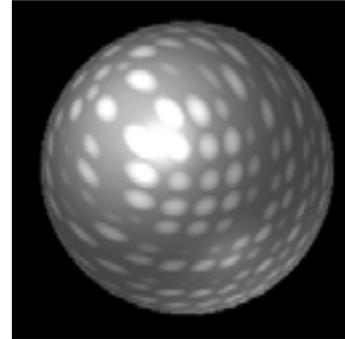


Gradient Sky applied to a sphere and rendered

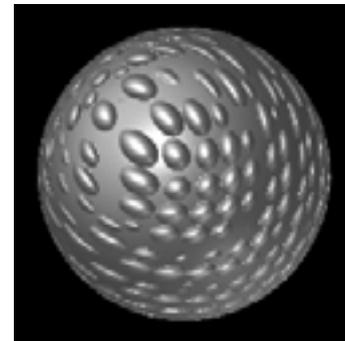
Certain materials apply their affects cumulatively. For example, in the Dots0metal 1 material, the first shader, S1, lets you specify a dot pattern, which the Color Bump control in S2 can then act upon.



The Dots0metal 1 S1 shader produces dots ...



... which are acted upon by the Color Bump setting in the S2 shader

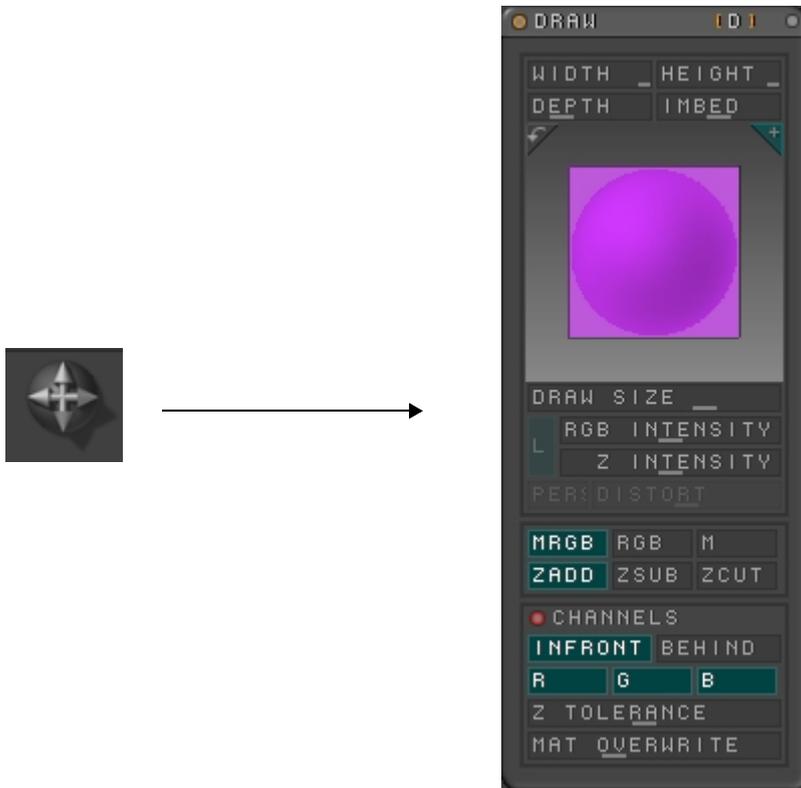


Conclusion

ZBrush's Material palette gives you a wealth of options for applying different looks to the surfaces in your image. As with all aspects of this program, the more you explore the possibilities, the more powerful your artwork will become.

7

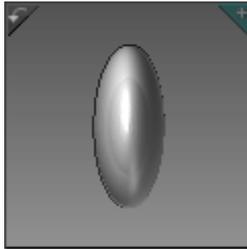
ZBrush 1.23 The Draw Palette



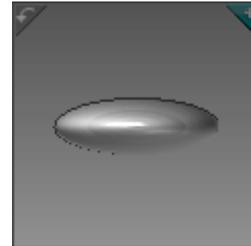
The Draw palette contains controls for modifying the current drawing tool. You can change a tool's size, shape, opacity, how new strokes interact with existing objects and strokes, and other functions.

Width

Sets the width of the brush. By default, Width is set to 100%; reducing it produces a brush that's higher than it is wide. Range= 0% to 100%.



Sphere brush with Width set to 40%



Sphere brush with Height set to 30%

Height

Sets the height of the brush. By default, Height is set to 100%; reducing it produces a brush that's wider than it is high. Range= 0% to 100%.



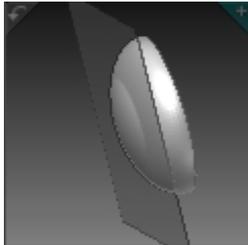
NOTE: When adding a 3D object, you can control its width and height interactively. First drag in one direction to set the object's overall size, and then, without releasing the mouse button, drag in the opposite direction to decrease the width and height simultaneously.

Depth

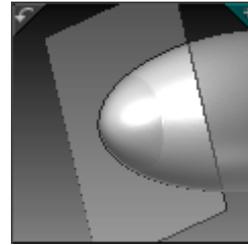
Sets the size of the brush on the in-out axis. By default, Depth is set to 1.00. Reducing it gives a shallow brush, while increasing it produces a relatively tall or deep brush. Range= 0.00 to 10.00.



NOTE: To best see the results of changing the Depth setting, first drag the mouse a short distance in the preview window so that you're viewing it from a slight angle



Sphere brush with Depth set to .61



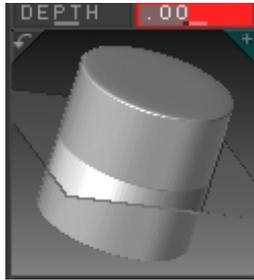
Sphere brush with Depth set to 2.24

Imbed

Sets the position of the brush or object relative to the surface being drawn on. By default, Imbed is set to .80. Reducing the Imbed setting moves the brush farther above the drawing surface, while increasing it moves the brush lower in relation to the drawing surface. The position at which the brush intersects the plane in the preview window indicates where the brush will intersect the drawing surface. Range= -2.00 to 2.00.



NOTE: To best see the results of changing the Imbed setting, first drag the mouse a short distance in the preview window so that you're viewing it from a slight angle. Also, make sure the plane is visible in the preview window; if not, click the + icon in the window's upper-right corner. The plane represents the position of the drawing surface. For example, a Cylinder 3D object is set by default so that its center intersects the object it's drawn on, as shown in this image:



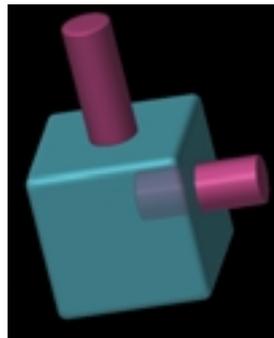
Cylinder 3D object with Imbed set to .00



Cylinder 3D object with Imbed set to -1.00

If you want to draw a cylinder sitting on the surface of another object, you need to set Imbed to -1.00, so that its end is above the plane:

The following illustration shows two cylinders with different Imbed settings drawn onto a cube. The cylinder on the cube's top was drawn with Imbed set to .00 (the default), and the cylinder on the cube's side was drawn with Imbed set to -1.00.



Cube with cylinders added



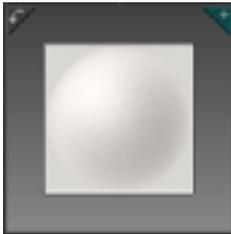
*NOTE: By default, a 3D object's pivot point is at its center, and the Imbed setting adds an offset from the center. You can, however, change the location of a 3D object's pivot point using **Tool > Modifiers > Image** (move the red crosshairs), thus altering the location from which Imbed defines its offset.*

Current Tool Preview

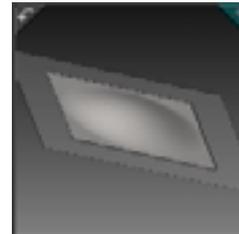
The Current Tool Preview window shows the current drawing tool or object, and reflects the effect of changing the basic tool characteristics in real time. The exception is that, when using a 3D tool, such as Sphere 3D or Cube 3D, this window shows the current object. Thus, when you're using a brush, you can see it in the preview window, but when you're editing a 3D object, you can't.

If you add a 3D object, and then change its shape with the Draw tools, ZBrush automatically creates a modified version of the object, which appears in the Tool palette and is active. If you then add a new 3D object without changing the Tool selection, ZBrush uses the modified shape. Editing a 3D object always uses a brush as defined in **Transform > modifiers**. See [“Editing Objects” on page 107](#).

When you first start ZBrush, the Preview window depicts the Simple brush in its default state.



Default state of Current Tool Preview window



Current Tool Preview window viewed from an angle

You can rotate the view around the window contents by dragging the mouse inside the window. For example, if you drag a short distance toward the upper right, the window changes to a view from an angle.

In the upper-left corner is a small curved-arrow icon. Clicking this icon toggles continuous rotation of the window view. While the continuous rotation option is active, you can change the direction and speed of the rotation by dragging inside the window. Also, you can temporarily halt the rotation by clicking in the window. At any time, click the curved-arrow icon to return to the default, head-on view of the tool.

In the upper-right corner is a small + icon. Clicking this icon toggles display of the plane used to show the position of the drawing tool relative to the surface; that is, the effect of the Imbed setting.

Draw Size

Sets the overall size of the brush, scaling it in all three dimensions simultaneously. The current brush size is reflected by the white-outline square attached to the mouse/tablet cursor in the image area. Default= 64. Range= 1 to 128.



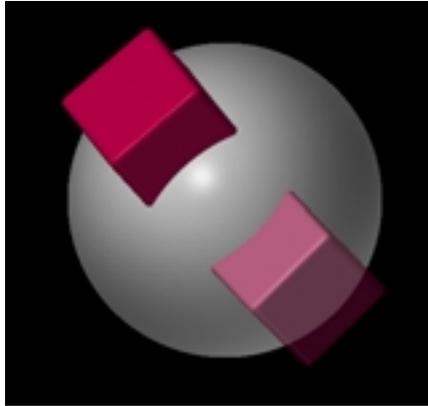
NOTE: After you change the Draw Size setting, ZBrush automatically zooms the view in the preview window so that the brush fits in the window. This doesn't affect the brush size.

Lock RGBZ

Locks the RGB Opacity and Z Opacity settings together. To adjust each separately, turn Lock RGBZ off.



NOTE: Some brushes, such as the Simple brush, don't let you turn this off.



RGB Intensity

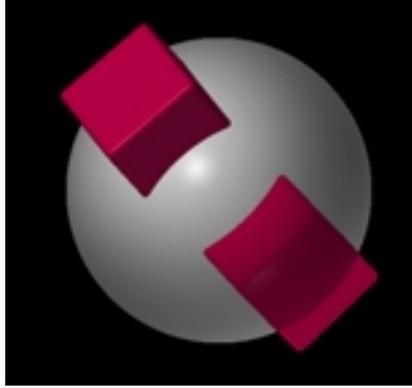
Sets the intensity of the color applied with the brush or in the current object. Default= 100%. Range= 0% to 100%.

In the illustration above, a 3D cube primitive was added with a high RGB Intensity at the top of the sphere, and a low RGB Intensity at the bottom.

Z Intensity

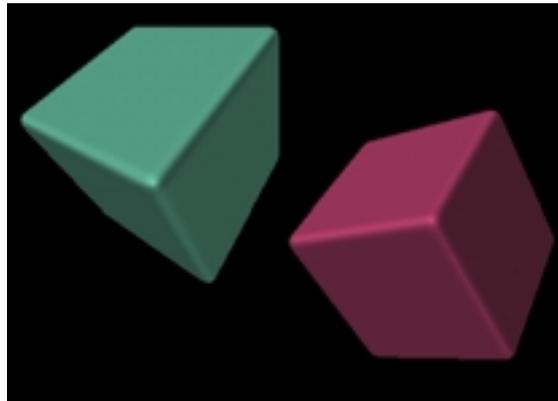
Sets the intensity of the depth information applied with the brush or in the current object. The lower the Z Intensity setting, the less the existing depth information is impacted by added strokes and objects. Thus, setting Z Intensity to 0% has the same effect as turning off the Z options (see ZAdd / ZSub / ZCut, below). Default= 100%. Range= 0% to 100%.

In the following illustration, a 3D cube primitive was added with a high Z Intensity at the top of the sphere, and a low Z Intensity at the bottom.



Per(spective) Distort(ion)

Lets you apply perspective distortion on a per-object basis. Although ZBrush's screen presents an orthogonal view, you can add a degree of perspective distortion (in which closer surfaces appear larger than those farther away) to "live" 3D objects. Immediately after drawing an object, or while editing it, click the PER button, and then drag the Distort slider to change the perspective. Default= 50%. Range= 0% to 100%.





NOTE: Perspective Distortion works only when in an object transform mode (not in the edit mode). To see how it works, follow this example:

- 1 Add a 3D cube object.
- 2 You can see the distortion best when viewing the cube at an angle. To rotate it, choose **Transform panel > Edit Object**, and drag in the workspace away from the object.
- 3 Click Edit Object again to turn it off, and then click a transform tool (Move Object, Scale, or Rotate).
- 4 Click **Draw panel > Per**, and then drag the Distort slider to the right to increase distortion, or to the left to decrease distortion.



NOTE: You won't see the result of changing the perspective distortion until you release the mouse button.

MRGB / RGB / M

Sets whether you're drawing with the material and color (MRGB), just the color (RGB), or just the material channel (M). Only one channel option can be active at a time.

If you want to affect only the depth information, turn all three options off (click the active item) and use one of the Z options (see next item).



NOTE: Some materials have color built in, so will change the object color even if you're using the M option.

ZAdd / ZSub / ZCut

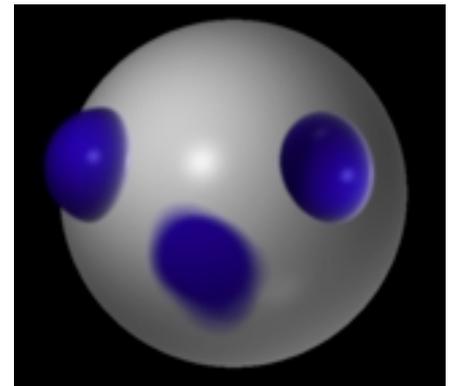
Sets whether you're adding to or subtracting from the existing drawing; how you're impacting existing depth information in the image. Only one option can be active at a time.

- ZAdd adds pixels to the drawing. This works like a standard Boolean union operation.
- ZSub subtracts pixels from the drawing. With a 3D object, any front-facing polygons in front of the active 3D object do not display.
- ZCut subtracts pixels from the drawing. With a 3D object, front-facing polygons in front of the active 3D object do display.



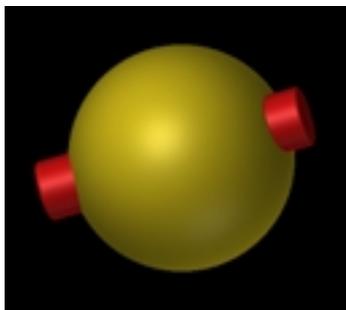
NOTE: When painting, think of ZAdd and ZSub simply as add and subtract operations; you don't need to use the more compute-intensive ZCut at all. However, when working with 3D objects, you should generally use ZCut for subtraction operations. Read on for further explanation of the differences between ZSub and ZCut. Alternatively, with no Z option on (click the active button to turn it off), you can paint without impacting the depth information at all.

Sphere painted with ZAdd (left side), ZCut (right), and Z options off (bottom)



The effects of this setting vary depending on whether you're using a standard brush, such as the Simple brush, or working with a 3D object. If using a standard brush, the Z setting affects brush strokes you make after you change the setting. If working with an active 3D object, the Z setting affects how the object interacts with the rest of the image. This is primarily where ZSub and ZCut differ: With ZSub, any existing pixels in front of the rearmost pixels placed by the 3D object are removed. With ZCut, however, only pixels within the volume of the 3D object are removed. This is best illustrated graphically:

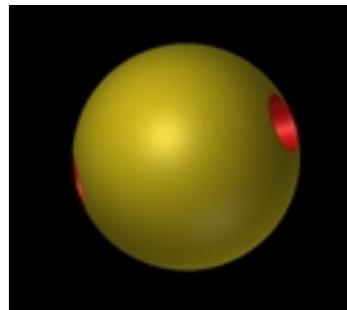
The following three images show the interaction of an active 3D object (the red cylinder) with existing pixels (the yellow sphere) using the various Z modes:



ZAdd



ZSub



ZCut

Channels

The controls in the Channels sub-palette provide additional painting, masking, and 3D options, but are not normally used.

There are four possible combinations of INFRONT and BEHIND: Either on, both on, or neither on. These masking options can take effect when creating an object or in a Edit/Transform mode (Edit, Move, Scale, Rotate).

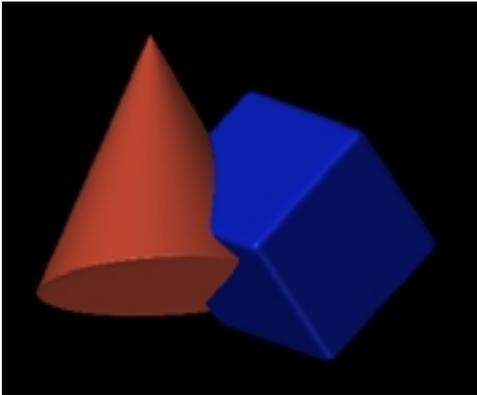
The next three items cover all four combinations of INFRONT and BEHIND.



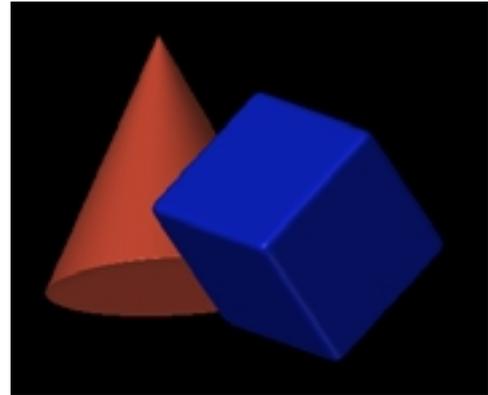
NOTE: In the following illustrations, the cone was drawn first, and the cube was drawn second. Thus, the different options determine how the cone's pixels mask the cube's.

INFRONT

This option is also called Near Masking, and is automatically turned on when you use ZAdd mode. When INFRONT is on and BEHIND is off, existing pixels can mask newly drawn pixels. When both are off, no masking takes place and new pixels always appear in front of others.



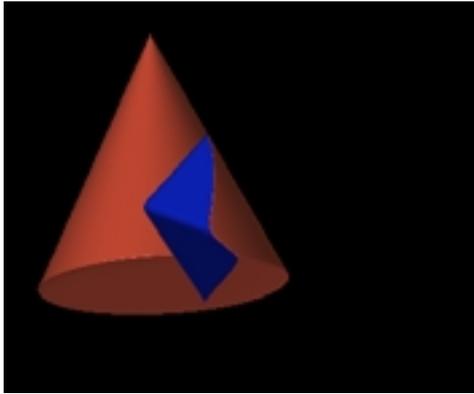
With INFRONT on, normal masking takes place



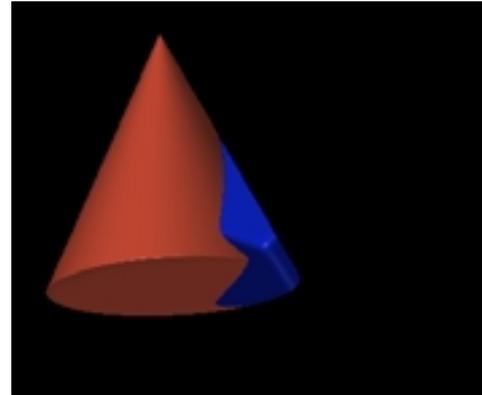
With INFRONT off, no masking takes place

BEHIND

This option is also called Far Masking, and is automatically turned on when you use ZSub mode. When BEHIND is on and INFRONT is off, only the farthest pixels appear when strokes or objects are added to existing pixels.



With BEHIND on, only the farthest pixels appear



Turning both INFRONT and BEHIND on produces a standard cut

INFRONT+BEHIND

Both INFRONT and BEHIND are automatically turned on when you use ZCut mode. With both on, added strokes and objects are "cut into" existing pixels, removing parts of the drawing only where new depth information coincides with existing depth information.

R / G / B

These buttons let you turn the red, green, and blue channels on and off.

Z Tolerance

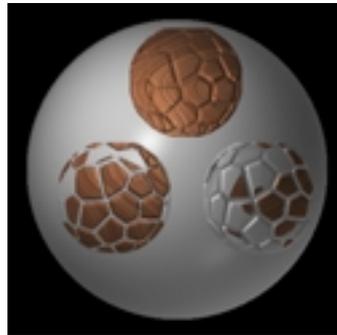
Sets the range of depth that a tool can affect, based on where you click to begin drawing. Pixels whose Z-axis distance from the pixel at the starting point is less than or equal to the Z Tolerance setting are affected, while those outside that range are not. The effect also depends on the type of tool being used. Default= 1.00. Range= 0.00 to 10.00.

When Z Tolerance is set to .00 (the lowest setting), it's effectively turned off, so all pixels in the image are equally affected by the drawing tool.

Mat(erial) Overwrite

Specifies the degree to which the current brush's alpha image (used to control the brush's shape) determines how much of the current material is applied along with the depth information. At lower settings, the material is applied to all of the depth information. At higher settings, however, the material is applied only to the brightest pixels in the alpha image. Default= 0.02. Range= 0.00 to .50.

For example, in the following image, the Simple Brush with Alpha Brush 30 was applied to the sphere with three different Material Overwrite settings: .02 (top), .07 (lower left), and .17 (lower right). As the Material Overwrite setting increases, the material is applied to successively fewer of the "lower" pixels produced by the brush. Creative use of this feature can produce endless combinations of bump mapping with materials.



8

ZBrush 1.23 The Transform Palette



The ZBrush Transform palette provides tools for moving, rotating, and scaling 3D objects, as well as powerful facilities for editing object shapes. It also gives you access to ZBrush's special Marker and 3D Copy functions.

Introducing the Transform Palette

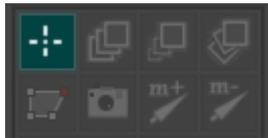
Opening the Transform Palette

By default, the Transform palette doesn't open when you start the program. To open it, press **Alt+F** or click the Transform button in the row of icons above the document window:

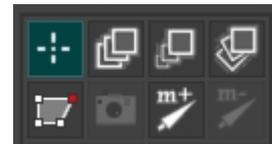


The Transform icon

When you first open the Transform palette, the only active control in the upper two rows of buttons is the Draw Pointer button in the upper-left corner:



When first opened



After drawing

This means that dragging in the document window produces new paint strokes or objects using the current tool, stroke, and other program settings.

After you draw something, other Transform palette controls may or may not become available, depending on the current combination of settings. In the most typical case, immediately after you add a 3D object such as a sphere or cube, all but two of the controls become available:

Less typically, when you use certain combinations of tools and stroke types, ZBrush makes available all or some of the Transform tools. For example, if you use the Eraser tool in conjunction with the Drag Rectangle stroke type, you then have access to two Transform functions: Move and Scale. With these, you can change the position and size of the erasure.



The Drag Rectangle stroke creates a 3D object that can be moved and scaled

Whichever brush and stroke type you use, the way you apply the Transform functions is the same.

Basic Transforms

By default, the Draw pointer is active, which means that dragging in the workspace draws with the current tool.



Draw

After drawing a 3D object, you can use the Transform palette functions to move it around the workspace, rotate it around its pivot point, and scale it with respect to the pivot point. To start, click the respective icon.



Move

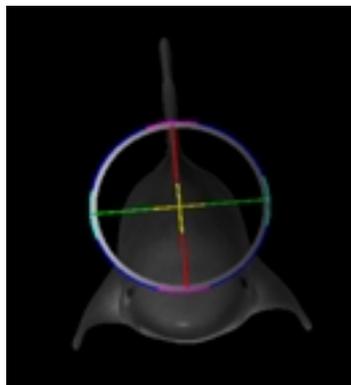


Scale



Rotate

When you activate a transform mode, the most obvious thing that happens is that the Gyro tool appears superimposed on the object in the document window.



The Gyro is a three-dimensional transform assistant that consists of three multicolor rings that move and rotate along with the object, plus a fourth, gray ring that moves with the object, but always stays parallel to the view plane. The colored rings let you perform transformations with respect to any local axis or plane of the object. The gray ring lets you perform move and rotate transforms with respect to the view plane, no matter what the orientation of the Gyro is.

When you draw an object on a blank background, its *Z* axis is perpendicular to the view plane. If you then activate a transform mode, you can see the Gyro's blue ring, which allows rotation about the *Z* axis, but because you're viewing the green and red rings edge-on, they appear to be lines. Note that other colors mark the ring intersections; for example, the intersection of the red and green rings is yellow. We'll cover the reason for these different colors shortly.



NOTE: *The Gyro's size remains constant throughout any transforms. Sometimes it's smaller than the object it's attached to, but sometimes it's larger.*



NOTE: *In the current version of ZBrush, you cannot undo transforms. Thus, it's a good idea to save a version of the current document before experimenting with the transform tools. However, when you save a .zbr file (Document palette > Save/SaveAs—uses the ZBrush format), the object is stamped. You can save the object as a .ztl file (Tool palette > Inventory > Save As) and re-create it if necessary.*



Rotating Objects

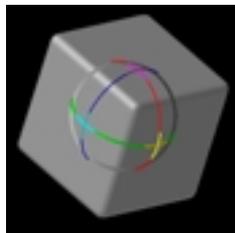
When you first draw a 3D object in ZBrush against a blank background, you can move it only in the screen/viewing plane. But if you rotate it first, you can then move it on any axis. That's why this section begins with object rotation. (Drawing a 3D object on top of an existing pixel automatically orients the object with respect to the pixel's normal, which can effectively provide an initial rotation.)

Immediately after adding a 3D object on a blank background or a surface that's parallel to the viewing plane, selecting the Rotate icon or press the **R** key presents you with two initial choices for rotation using the mouse or tablet:

- To rotate the object on its *Z* (in/out) axis, drag the ring around the outside of the Gyro. At this point, the gray ring coincides with the blue ring, so you can drag either the gray or blue part of the outside ring to achieve the same rotation.
- To rotate the object freely, drag anywhere inside the Gyro except on the other rings.
- To move the object in and out, drag vertically outside the Gyro.
- Once you've rotated the object so that the blue ring is not coincident with the gray ring, as shown in the illustration below, you can then rotate the object around any local axis by dragging one of the colored rings. When you drag a ring, you're rotating the object around an imaginary axis that goes through the center of the ring, perpendicular to the plane of the ring.



NOTE: To rotate in 10-degree increments, press and hold the **Shift** key as you drag. Dragging the ring intersections (colored cyan, magenta, and yellow) has no effect with the Rotate tool.



As before, you can still drag the gray ring to rotate the object around the screen in-out axis, and inside the Gyro, away from the other rings, to rotate the object freely.



Moving Objects

As you saw in the previous section, Rotate uses the colored rings for rotation around an object's local axis, but not the ring intersections. Move, on the other hand, uses the axis intersections for single-axis local translation, and the rings for planar translation. But there are several other modes as well: You can move the object parallel or perpendicular to the screen, or with respect to the drawing, so that it constantly reorients itself depending on the surface normal of the existing pixols.

After adding a 3D object, to enter Move mode, click the Move icon or press the **W** key. If you've added the object on a blank background or on a surface that's parallel to the screen, it uses the default orientation, as shown in the illustration below.



A cube at the default orientation

At this point, you have several alternatives for moving the object, depending on where you click when you start to drag:

- To move the object parallel to the screen, drag the gray/blue circle, away from the ring intersections.
- To move the object along the line between the intersections of the blue and green axes, drag either of the cyan intersections.
- To move the object along the line between the intersections of the blue and red axes, drag either of the magenta intersections.
- To move the object perpendicular to the screen, that is, on the screen in-out axis, drag outside the Gyro in a vertical direction. Dragging upward moves the object away from you, and downward moves it toward you.

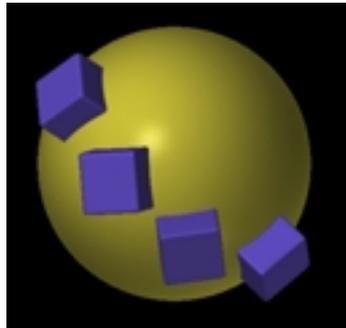


NOTE: Because ZBrush's window presents an orthogonal view—it doesn't use perspective—an object doesn't seem to change in size as it moves closer and farther. It simply changes position with relation to other parts of the drawing.



NOTE: If you move an object very far back, it first becomes partly covered by the back clipping plane, and if you keep moving it back, it becomes fully hidden.

- To move the object along the drawing, so that it reorients itself to align with the pixels immediately under it, click inside the ring on the object surface, and then drag in any direction.



The cubes are automatically aligned to the sphere's surface



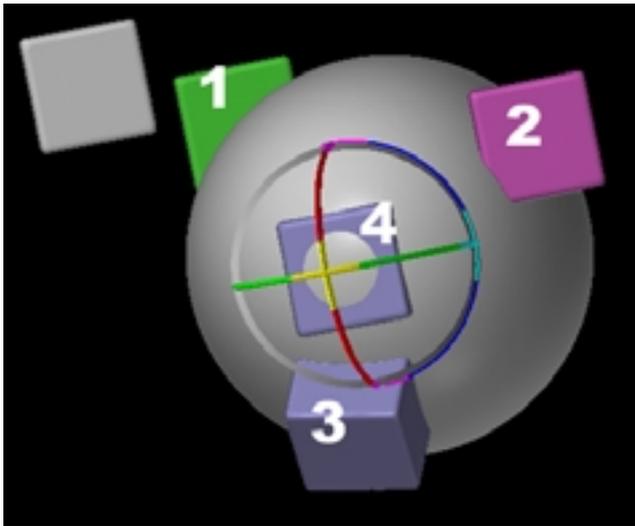
NOTE: This reorientation always overrides any existing rotation you've made to the object. If you want to keep an existing orientation as you move an object, drag using the rings.

Also, if you move an object over the background using this method, it automatically snaps to the back clipping plane. If you then rotate it, parts of the object may move behind the clipping plane and become hidden by it. In such cases, move the object forward by positioning the cursor outside the Gyro and dragging downward.

Two additional move modes become available after the cube has been rotated, whether explicitly with the Rotate function, or implicitly with the last function.

- To move the object along the line between the intersection of the red and green axes, drag either of the yellow intersections.
- To move the object along the plane formed by any two of its local axes by dragging the corresponding circle, between the intersection of the red and green axes by dragging either of the yellow intersections.

In the following illustration, the sphere was added first. The cube was then added on the background, and then converted to pixels (via Snapshot) and moved several times. The green cube (#1), on the sphere's upper left, was dragged by the gray/blue circle. The magenta cube (#2), on the sphere's upper right, was dragged first by the gray/blue circle, and then was moved closer to the viewer by dragging downward outside the circle. The blue cube (#3), at the bottom of the sphere, was dragged by the cube surface, inside the circle, so that it automatically aligned itself to the sphere surface. Finally, the blue cube (#4), in the center, was dragged by the cube surface inside the circle, and then moved closer to the sphere's center by dragging the yellow intersection upward.



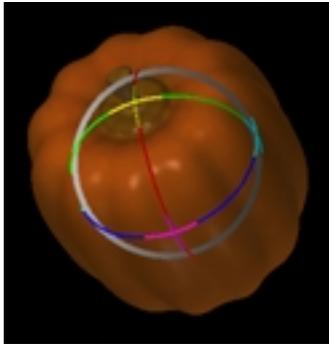
The cube copies were moved using four different meth-



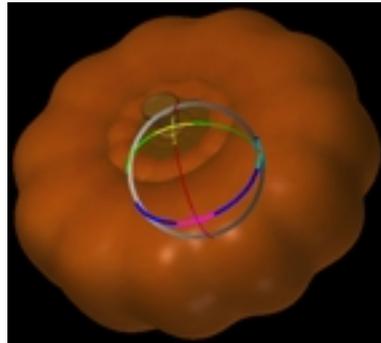
Scaling Objects

Scaling objects in ZBrush is fairly straightforward. As with Move, Scale uses the rings to resize objects in two dimensions, and the ring intersections to resize in one dimension, although you can't scale on the yellow (in/out) axis until you've rotated the object slightly. Once the object is rotated, and the blue ring is no longer concentric with the gray ring, you can't scale using the gray ring; that would distort the object's shape. To scale in three dimensions, drag anywhere away from the rings.

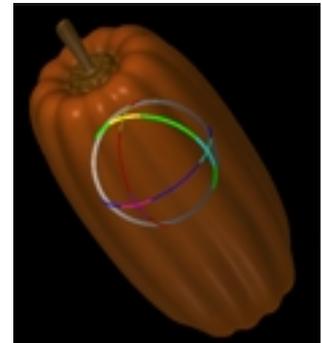
The following illustrations show several different types of scaling, using a rotated object.



The pumpkin before scaling

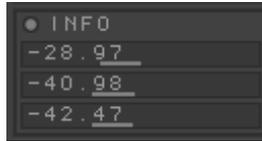


Scaled in two dimensions using the blue ring



Scaled in one dimension using the yellow intersection

The Info Sub-palette



The Info sub-palette is a useful utility in ZBrush that shows current transform information, and lets you input numeric settings for precise transforms. To access it, click the Info header in the Transform palette.

The Info sub-palette shows data for the X, Y, and Z axes, from top to bottom, relevant to the current transform mode:

- When the Draw Pointer is active, the Info sub-palette displays the current cursor position in pixels. The Z-axis value becomes higher the farther away the cursor is. That is, negative values indicate closer distances, while positive ones indicate farther distances.

When you're just moving the cursor around the workspace, the Z-axis display shows the default cursor position when over the background. But when the cursor is over a drawn surface, the Z-axis display shows that surface's position. When drawing with most tools, the default Z-axis position is at the rear clipping plane, which puts strokes drawn on the background at a suitable distance away from the "front" of the workspace. When drawing 3D objects, the default Z-axis position is 0, which places the objects drawn over the background in the center of the workspace depth.

In this mode, you cannot change the Info settings.

- In Move mode, the Info sub-palette displays the position of active object's pivot point. To set a precise position for the object, click a field and drag horizontally to move the slider, or enter new data from the keyboard. When using the keyboard, press **Enter** to input the new data, and press **Tab** and **Shift+Tab** to move forward and backward between the fields.
- In Scale mode, the Info sub-palette shows the active object's scaling factors as multipliers. For example, if you draw a medium-size sphere, its scaling factors might be 90, 90, and 90. To make it egg-shaped, change the

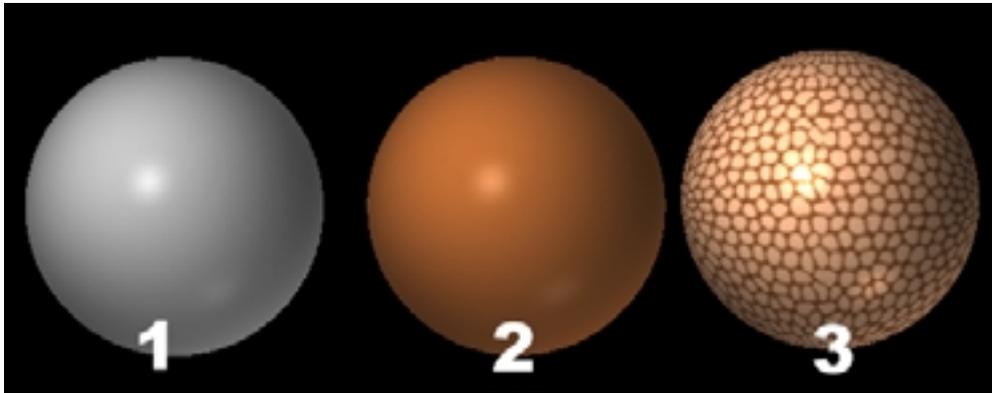
second factor to 140 by clicking a field and dragging horizontally to move the slider, or entering new data from the keyboard. When using the keyboard, press **Enter** to input the new data, and press **Tab** and **Shift+Tab** to move forward and backward between the fields.

- In Rotate mode, the Info sub-palette shows the active object's orientation in degrees. To set a precise orientation for the object, click a field and drag horizontally to move the slider, or enter new data from the keyboard. When using the keyboard, press **Enter** to input the new data, and press **Tab** and **Shift+Tab** to move forward and backward between the fields. Range= -180 to 180.
- The Info sub-palette shows the h and v values within a button or palette when the cursor is over the interface. This information will be useful when manually writing ZScripts.

Changing Object Color and Material

An important aspect of ZBrush is that, whenever any transform mode is active, any change you make to the active color and/or material is applied immediately to the current object. You use the Color palette to change the active color, and the Material palette to change the material. These palettes are covered in greater depth in their own sections of this manual, but we'll provide a brief example here.

In the following illustration, a white sphere (#1) was added, converted to pixols with Snapshot (covered later in this section), and moved, and then the color was changed to orange (#2). It was then converted to pixols and moved again, and the material was changed to Metal Spherical Blend (#3).



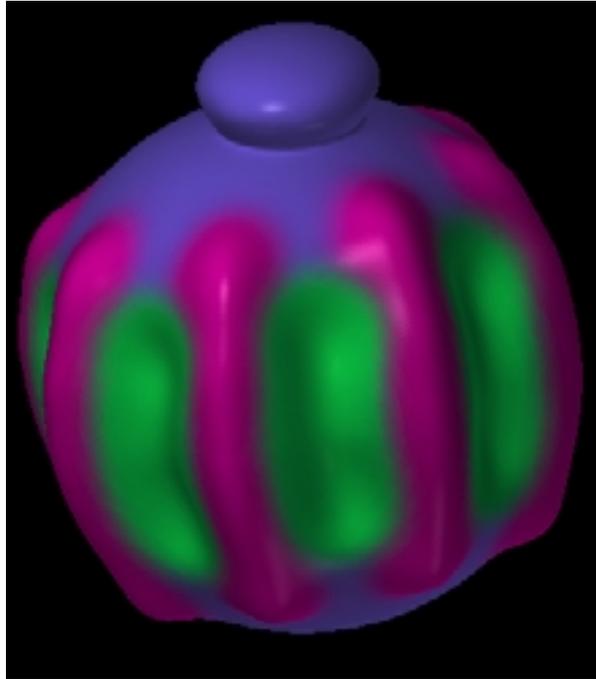
Three copies of a sphere with color added (center), and then material (right)





Editing Objects

The first icon in the second row of the Transform palette is the Edit Object tool. After activating Edit Object, you can use a special customizable brush to sculpt objects and/or paint them, adding physical detail as well as color wherever you like. You can also move and scale parts of the object using editing functions.



To begin editing an object using the default settings, simply click Edit Object or press the **T** key, and then drag the mouse/tablet cursor over the object surface. As you drag, you'll see the raised-surface effects immediately.

While you're editing, the object remains three dimensional, and you can rotate it to draw on other sides. In fact, you don't even need to switch modes—simply drag on the background to rotate the object freely. To rotate on the in-out (Z) axis only, press and hold the **Shift** key, click and hold outside the object, release the **Shift** key, and then drag the mouse.



***NOTE:** Using the Draw pointer, you can pull and push convex and concave areas on your object at the same time as you add color. However, in order to do both simultaneously, you must first turn on the **Tool palette > Image sub-palette > Colorize** switch. If you don't do this first, changing the current color simply applies that color to the entire object.*

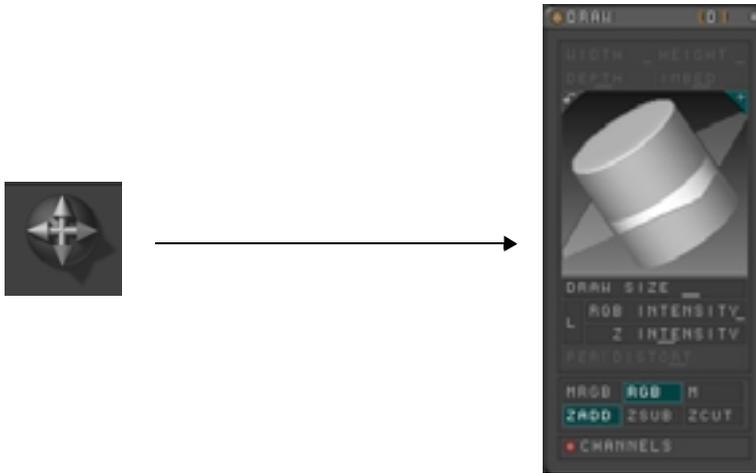


***NOTE:** When you turn on Colorize, the base object turns the default gray color—thereafter, editing applies the current color.*

Another method, which lets you set the base color and then begin editing with color, is this: First choose a color for the base object, and then set the color opacity for the new base color with the **Transform palette > Color slider**. (To completely repaint an object, set Color to 100%.) Next, in the Color palette, click Fill under the color picker. Then set any other color and it will be used to paint the object as you edit.

Editing Controls

During editing, the following Draw palette controls are available:



Draw Size:

Sets the size of the brush used for drawing as well as for transforms. This setting is reflected by the size of the circular cursor ZBrush uses when editing. Default= 64. Range= 0 to 128.

ZAdd/ZSub:

Determines whether the brush pushes or pulls geometry. ZSUB causes concave editing; ZADD causes convex editing. In the illustration above, the red lines used a ZADD setting, while the green lines used a ZSUB setting .

RGB Intensity:

Sets the opacity of the color applied when drawing. Use lower settings to blend with existing color, or higher settings to override existing color. Default= 100%. Range= 0% to 100%.

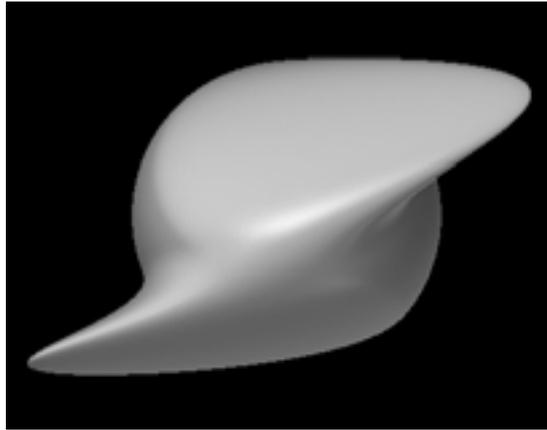
Z Intensity:

Controls the amount of push or pull applied by the brush. Default= 25%. Range= 0% to 100%.



Move Object

If you turn this on in Edit mode, dragging on an object moves a part of it whose size is determined by the Draw Size setting.

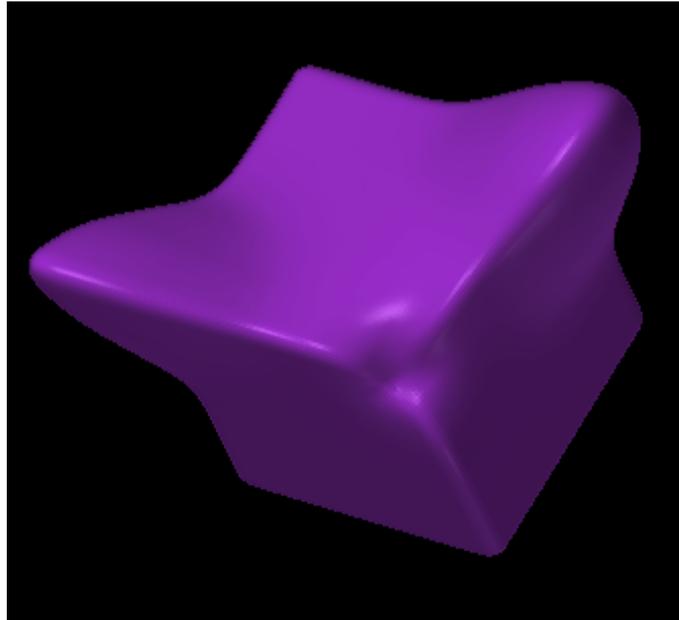


The top and bottom areas of a sphere moved in opposite directions in Edit > Move mode



Scale Object

If you turn this on in Edit mode, dragging on an object scales a part of it whose size is determined by the Draw Size setting, with the center of the scaling determined by where you click before dragging. In the picture of the edited cube, below, two corners were scaled up during editing, and a third corner was scaled down.



A cube's corners scaled larger and smaller in Edit > Scale mode

Other Transform Controls

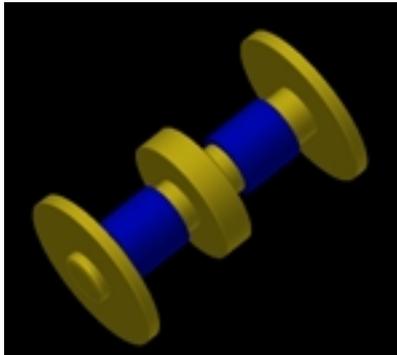
This section covers additional controls in the Transform palette that aren't directly related to editing 3D objects.



Snapshot

While using the Transform tools, it's useful to be able to convert the visible part of a 3D object into pixels, thus placing it into the drawing, and then go on and manipulate the original 3D object some more. To convert a geometric object into pixels, first apply any transforms and/or editing, position it where you want it, and then use the Snapshot tool. The easiest way to do this is by pressing and holding the **Ctrl** key, and then clicking anywhere in the workspace.

For example, by combining Move, Scale, and Snapshot with a simple cylinder, you can make a geometric composition like the illustration below.



Snapshot was used to copy the cylinder after each transform

Note that, when an object is copied, the copy is no longer an independent 3D object; it simply becomes part of the drawing. Only one 3D object at a time can exist as a transformable entity in ZBrush.



***NOTE:** You may have encountered the term "stamp" in earlier versions of the ZBrush documentation. This function is now called Snapshot.*



Mark Object Position

Places a marker for the currently active object. See [“Introducing Markers”](#) on page 238.

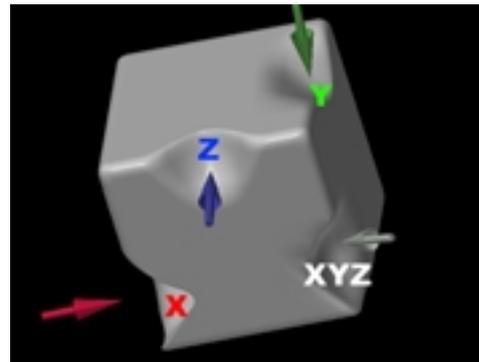
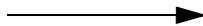


Unmark Object Position

Removes a marker from the currently active object. See [“Introducing Markers”](#) on page 238.

Modifiers

The Transform palette's Modifiers sub-palette offers switches for editing using specific axes and combinations of axes, as well as controls for modifying the shape of the brush used in Edit Object mode.



A cube deformed with different axes selected in Modifiers (labels added)

Axis Selector

The first row of buttons in the Modifiers sub-palette lets you specify any combination of the three axes for deformation using the Edit Object brush.

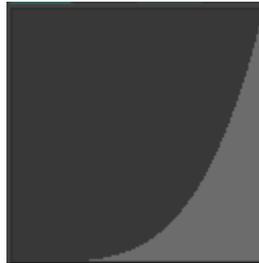
In the previous illustration, a cube was edited using the three different single-axis modes as well as all three combined. Using the X axis, the deformation occurred from left to right. Using the Y axis, the deformation occurred along the vertical axis. Using the Z axis, the deformation took place on the cube's in-out axis. And using the XYZ setting, the cube was indented perpendicular to its surface.



***NOTE:** You can combine any two of the single axes for deformation along both.*

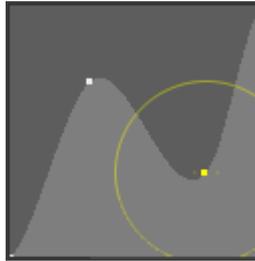
The Brush Shape

By default, ZBrush uses a pointed brush to draw on objects in Edit Object mode. You can see a representation of this brush by looking at the graph in the Modifiers sub-palette. The graph shows a cross-section of the top-left corner of the brush. In other words, the left side of the graph shows the outer edge of the brush, and the right side shows the center. Thus, by default, the reshaping caused by painting in Edit Object mode is strongest at the center of the brush.



Default brush profile

You can reshape the brush in one or more of several different ways:



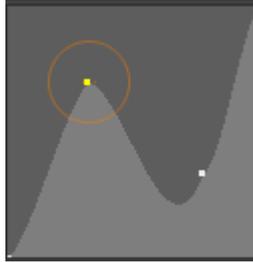
Graph with endpoints and intermediate points connecting spline curves

Each graph contains two control points, one at either end, plus any number of additional intermediate control points in between, with line segments connecting them. The control points are visible only when the cursor is over the graph. You can insert additional intermediate control points by clicking on a line segment. Intermediate points appear initially as small squares. To remove an intermediate point, drag it off the graph. You cannot remove curve endpoints. You can move the curve endpoints vertically to raise or lower the corresponding setting. You can move an intermediate control point in any direction by dragging it.

By default, the line segments connecting a control point to its neighbors are spline curves, which help to create a smooth brush shape. To change the curvature of the curves adjacent to a control point, first click the point to select it—it turns yellow to show that it's active, and a yellow circle appears around it. Click anywhere on the yellow circle, and drag toward the control point to reduce the curvature, or away from the control point to increase the curvature.



NOTE: *If a circle around the control point is not at its default radius, it turns orange to show that the curvature has been changed. To return to the default curvature, drag the circle until it turns yellow again.*



The control points' curvatures were edited by dragging the circles

You can zoom in on a selected control point for finer control by clicking it. It zooms to show only the line segments between the point and its immediate neighbors. To zoom back out, **Alt**-click again, or simply move the mouse cursor out of the graph.

You can create more abrupt transitions by changing the line segments between control points to straight lines. To do so, drag the point off the graph and then back on without releasing the mouse button. The control point's color changes from white to black when using straight-line connecting segments. To change the point type back, repeat the operation.



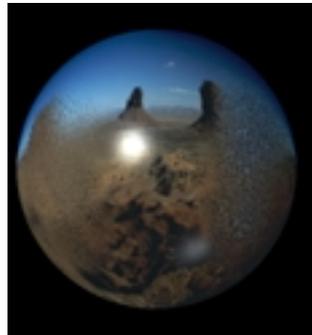
NOTE: *The curvature of straight-line segments cannot be edited.*

Noise:

When modeling organic objects, adding noise to the brush profile quickly produces realistic 3D texturing. You can make the brush surface rougher by changing the N (noise) setting. Default= 0. Range= 0 to1.0



The brush has a rougher surface by adding noise



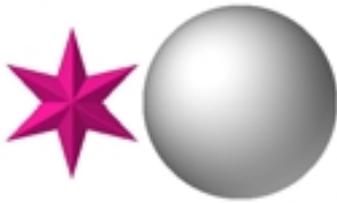
Noisy brush applied to smooth surface

3D Copy

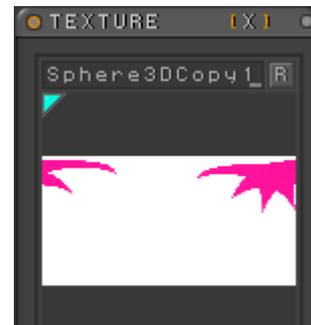
ZBrush contains an innovative tool that gives you powerful control over your texturing process. If you do texturing, you owe it to yourself to learn the 3D copy function.

In ZBrush, you can paint directly on 3D objects, but the resolution of the texture is dependent on the mesh of the object. To show fine details, you must use a very high resolution mesh or a texture map. Using a texture map is preferable, since a high resolution mesh uses many more resources. The best solution is to use a high resolution texture map with a low resolution mesh. To produce the very highest quality details, use the 3D copy tool.

The fundamental action of the tool is to copy the texture on the canvas to an object in front of it. The 3D copy does all the distortion of the texture needed, based on the uv co-ordinates of the texture and the object.



First, a star is drawn, then a sphere is drawn next to it.



The sphere is moved over the star, and 3D copy is pressed

The texture is generated and is automatically distorted to map correctly to the sphere

The real power of the 3D Copy tool is shown when you are modifying an existing texture or creating one from scratch.

Although this is not a tutorial, here is a simplified procedure for creating a new texture:

- 1 Turn on the Texture option in the **Marker > Modifiers** sub-palette. See “Texture” on page 243.
- 2 Import or model an object. Create a new texture by going to **Texture palette>Inventory**, setting width and height and pressing new.
- 3 Orient the object so that the area you wish to texture is facing you and add a marker.
- 4 Choose a brush. When you do, the texture is “stamped” on the canvas.
- 5 Paint on the texture (remember to turn off Zadd in the Draw palette) See “ZAdd / ZSub / ZCut” on page 89.
- 6 Select the original object from the tool palette and click on the marker you placed in step 3. ZBrush will re-create the object directly in front of the texture you just created in step 5.
- 7 Enter the **transform>edit** mode and press 3D Copy to copy the texture from the canvas into the existing texture on the object. The texture appears on the object and in the texture preview of the Texture palette.
- 8 The texture you created in step 5 is still on the canvas directly behind the object. Clear the canvas by typing **Ctrl + N**.
- 9 Rotate the object to a new position and modify or create a new texture again. By rotating the object and using 3D Copy, you can create a seamless texture for the entire object.



NOTE: *Tutorials are available on <http://www.ZBrushCentral.com> for this topic and many others.*

In the this example, the texture map for a face is created with a degree of detail that could not be achieved by drawing directly on the object.



A photograph from a digital camera is the basis of the texture. Painting around the face stretches the image that will be 3D Copied onto the head model. Using Symmetry, a head is modeled to match the shape of the face. The image is placed in the background ready to 3D Copy



The head is placed over the texture using the Gyro to fine tune the location. The 3D Copy button is used to apply the texture onto the model. Then the simple brush is used to detail the skin and hair line.



The finished head from several perspectives



3D Copy Controls:

S= Shaded:

By default, this is off, and when you grab a texture, ZBrush uses only the base colors of the area you grab. (To see the base colors, turn on **Render palette > Flatrender.**) When you turn on shaded, ZBrush grabs the colors as they are shaded by the lighting in the scene.

Autoint:

Enables the Autointensity function below.

Autointensity curve:

Controls the extent to which the copied object's color overrides or blends with that of the object it is applied to. By using a low value of intensity at the edges and rotating the object between applications, you can produce a seamless texture over the entire 3D object.



NOTE: *Autointensity is only available when a texture is selected.*

TDT:

Texture distance tolerance. This is an expert level control that sets the distance threshold for wrapping a texture in front of or behind an object. Normally left at default setting

Conclusion

As you can see, ZBrush's Transform palette offers much of the modeling power of a full-fledged 3D graphics program, and some features not found in most 3D programs. When you use the Transform options in conjunction with other ZBrush features, such as the Symmetry option in the Tools palette, you'll find even more ways to express your artistic vision in 3D.

9 ZBrush 1.23 The Tool Palette



The ZBrush Tool palette is probably the most complex aspect of ZBrush for a number of reasons. First and foremost, tool usage is affected by many other parts of the program, so you should always be aware of other palettes' settings in order to understand what a particular brush is doing. Also, most tools have one or more modifiers that affect how they work, especially the 3D object tools.

The Tool palette is dynamic: Whenever you change a tool's Modifiers setting, the modified tool is added to the thumbnail area of the palette. The same thing happens when you edit a 3D object tool. See [“The Transform Palette” on page 94](#). In addition, when you choose a tool that doesn't currently appear on the palette—by clicking on the large thumbnail in the upper-left corner and then clicking a tool in the pop-up menu—it's added to the palette. ZBrush adds rows as necessary to accommodate the additional thumbnails.



*NOTE: To use a modified tool again in another session, you must save it using the **Inventory sub-palette > Save As** command, and then reload it in the future session.*



Opening the Tool Palette

By default, the Tool palette doesn't open when you start ZBrush. To open it, press **Alt+T** or click the Tool button in the row of icons above the document window:

By default, only 12 of ZBrush's 36 tools appear on the Tool palette. To access the rest, click the large thumbnail in the upper-left corner of the Tool palette. When you do so, an icon menu of all the tools appears. To close this menu, move the mouse away from it. Any tools on the pop-up menu that also appear on the Tool palette are highlighted with teal backgrounds and yellow upper-left corners, as shown in the illustration. (This is not the case, however, if you invoke the pop-up menu from a custom palette.) With the exception of the active tool, which is grayed out in the pop-up menu, if you click a highlighted icon from the pop-up menu, the tool is removed from the Tool palette.



Pixels and Pixols

At this point, we need to introduce the concept of the pixel. You've probably heard of pixels, which are the tiny individual dots of color that make up a bit mapped computer graphics image. Incidentally, the term stands for picture element (someone must have decided that “pixel” sounded better than “picel”). In most computer graphics programs, you're limited to working with pixels, which are typically defined with eight bits (256 values) each of red, green, and blue (RGB). In combination, these three color channels give you about 16 million different color values to paint with. Some programs also give you an additional eight bits to define transparency; this is called the alpha (A) channel. The .psd (Photoshop) format that ZBrush uses supports alpha channels.

ZBrush adds two channels to the standard RGB pixel definition to create the pixol, which is unique to this program. The first additional channel uses 32 bits to define depth. So each dot of color in a ZBrush document has a unique value for position on the Z axis. This adds a significant amount of three-dimensional functionality, as you'll see when you learn about ZBrush's different tools. ZBrush also uses eight bits to index a pixol's material, which defines such surface characteristics as diffuse and specular reflection.

Using the Tool Palette

To select a tool to use, click its icon.

To see the name of any tool, hold the mouse cursor over its icon for a second—a text label appears showing the tool name. At this point, if you press and hold the **Ctrl** key, further information on the use of the brush appears on the label. There are basically two types of tools in ZBrush: Pixel-based tools and 3D objects. Each is covered in its own section, below.



*NOTE: Most of ZBrush's tools, including the 3D objects, can be used to apply any combination of depth, color, and material to the document. You prevent the tool from applying depth by going to the Draw palette and turning off whichever of these three options is on: ZAdd, ZSub, or ZCut. When you do so, and then draw on the background, you're still applying the current color and/or material, assuming **Draw palette > MRGB, RGB, or M** is on. However, you might not be able to see the results, because the colored pixels actually appear behind the clipping plane. To see the effects of applying only color and/or material, turn on the Render palette Flat Renderer mode. Or, you can draw with a tool that moves the pixels closer, such as the Sphere tool—don't forget to turn on ZAdd first.*

Here are some more important points about ZBrush's tools:

- You can use tools to change only the color and/or material of existing pixels in the document. You do this by first turning off the **Draw palette > Zadd/Zsub/Zcut** buttons. Then, also in the Draw palette, you use the default MRGB option to apply color and material; the RGB option to apply only color; or the M option to apply only material information. The sphere to the right was “painted” with different colors and materials.
- When you edit or modify a tool, a new copy of the changed tool is added to the Tool palette, so you can use it later on during the current session. ZBrush doesn't automatically save this tool. Use the **Tool palette > Inventory sub-palette > Save As** function to store the tool in a disk file. Then, to use it in a future session, use the Load function to place it back in the Tool palette.

Pixel-based Tools

Pixel-based tools let you create or modify pixels in the document. With these tools, you can transform pixels in the document by changing their depth and/or X/Y position. At the same time, or alternatively, you can use these tools to change pixels' color and/or material.

You can combine tools with different permutations of settings in various other ZBrush palettes for a practically infinite variety of effects. Palettes that effect how most of the pixel-based tools work include:

- The Draw palette controls affect the tool size, aspect ratio, depth, and the intensity with which (or whether) it interacts with existing pixels' depth, color, and material information.
- The Alpha palette settings effect the tool's basic shape, except for the Sphere brush and a few others.
- The Color palette settings determine the tool's basic color.
- The Material palette settings determine the basic shaders used by the tool, including pattern, diffuse and specular reflectivity, and more.
- The Picker palette can effect the tool's orientation, color, material, and other aspects.
- The Stroke palette settings affect, among other things, whether the tool is applied continuously, repeatedly or one time only when you drag in the document.
- The Texture palette settings can be used to apply images and patterns to the brush strokes and 3D objects.
- If you're drawing with a digitizing tablet, the Tablet palette effects how tools interact with the document.

Each pixel-based tool is covered in its own section, following:



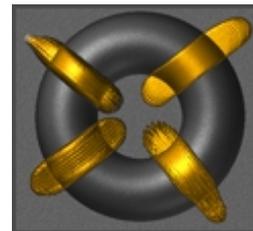
Simple Brush

The Simple brush is the default tool, active when you first start ZBrush. While it can be used for adding pixels to the document, it's best used for modifying depth and/or color and/or material information in an existing drawing. If you turn off the Z options in the Draw palette, the Simple brush acts very much like a standard brush in other painting software.

The best way to think of the Simple brush is as a tool that adds to and blends with existing depth information in the drawing. For example, in the illustration below, the Simple brush was used to draw a gold stroke on top of the existing gray ring. Note that the depth information already present in the drawing was not erased, but simply added to.

Following are several additional important points about Simple brush functionality:

- It's not sensitive to abrupt changes in depth in the drawing, so the Z Tolerance setting has no effect. In other words, it affects all pixels equally, regardless of depth. For an example of this, [See “Sphere Brush” on page 131](#). There, the Simple brush is compared with the Sphere brush.
- It requires that the **Draw palette > RGB Opacity** and **Z Opacity** settings be the same. Thus, when using the Simple brush, you cannot turn off the **Draw palette > Lock RGBZ** toggle.

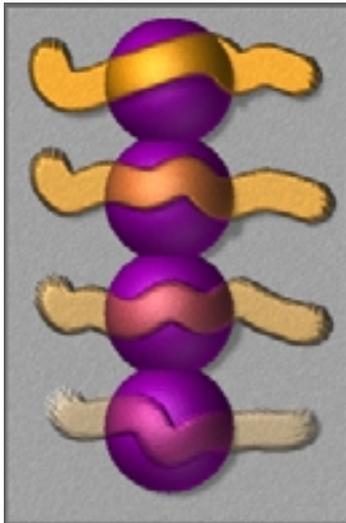




Single Layer Brush

The Single Layer brush is very similar to the Simple brush. The main difference is the ability to limit the impact of each brush stroke to the current setting of the intensity value. This brush applies only one coat of paint/depth with each brush stroke. It doesn't build up color intensity or depth with overlapping strokes unless you pick up the stylus or release the mouse button between strokes.

In the image below, four brush strokes were drawn on top of four identical spheres. The top-most stroke used an intensity of 100%, which caused the color of the stroke to fully overwrite the existing sphere color. The second stroke used an intensity of 75%, which resulted in a final color composed of 75% of the stroke color plus 25% of the existing sphere color. The next stroke used 50%, which resulted in an even blend between the brush and the sphere colors. The last brush stroke used an intensity of 25%, which resulted in final color composed of 25% of the stroke color plus 75% of the existing sphere color.



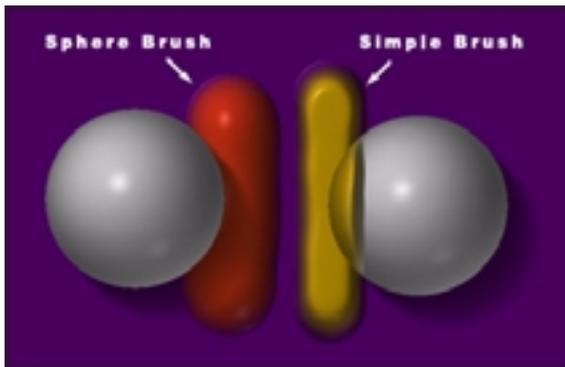


Sphere Brush

The Sphere brush lets you draw with a mathematically calculated hemisphere, so that its edge is always perfectly round, no matter how big you make it. This brush is ideal for building up smooth-edged volumes in the drawing. For best results, move the mouse or tablet stylus in small circles as you draw.

As with the Simple brush, RGB Opacity and Z Opacity sliders are always locked together with the Sphere brush. Also, the hemisphere it uses is always perpendicular to the background. The Alpha brush is the exact same brush, but it lets you use any Alpha image.

Unlike the Simple brush, the Sphere brush respects the depth information in the document, and uses it for auto-masking. For example, in the illustration below, we started with two spheres on a purple background. On the right-hand side, we drew with the Simple brush on the background and intersected the sphere. On the left-hand side, we drew the same stroke with the Sphere brush. Note that the Simple brush stroke partially covers the sphere, even though it started in back of it. However, the Sphere brush takes the depth priority into account, thus allowing the sphere to mask the brush stroke.

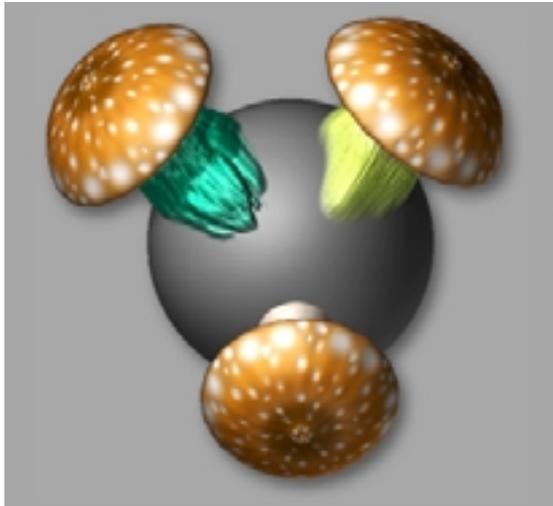




Alpha Brush

The Alpha brush is, like the Sphere brush, useful for building up volumes in the drawing. The primary difference is that the Alpha brush can use any Alpha image for its shape.

As with the Simple brush, the RGB Opacity and Z Opacity sliders are always locked together when you use the Alpha brush. Also, the Alpha image it uses is always parallel to the background. Lastly, the Alpha brush respects the depth information in existing pixels, so that it doesn't draw over pixels that are in front of where you're drawing. For instance, in the drawing below, the Alpha brush was used with two different Alpha images to draw from the big sphere along two of the "mushroom stems." As you can see, the mushroom caps weren't covered by the Alpha brush pixels.

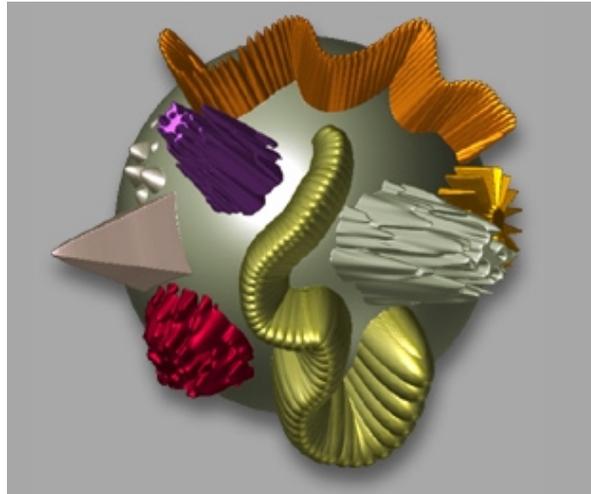


Use the Alpha brush tool to build up volumes using any shape of brush



3D Brush

The 3D brush uses an alpha bitmap to create an elevation field. It uses the orientation of the surface you draw on. You would typically use the 3D brush with the default Dots stroke type to draw continuous copies of the elevation field, or with the Drag Rectangle Stroke type to draw one at a time. In the former case, the size is set by the Draw palette settings, but with Drag Rectangle, you set the overall size by dragging. You can still alter the Drag Rectangle depth and aspect ratio with the Draw palette settings and further modify the size and orientation by using the TRANSFORM palette.



Using the 3D brush with different Alpha images

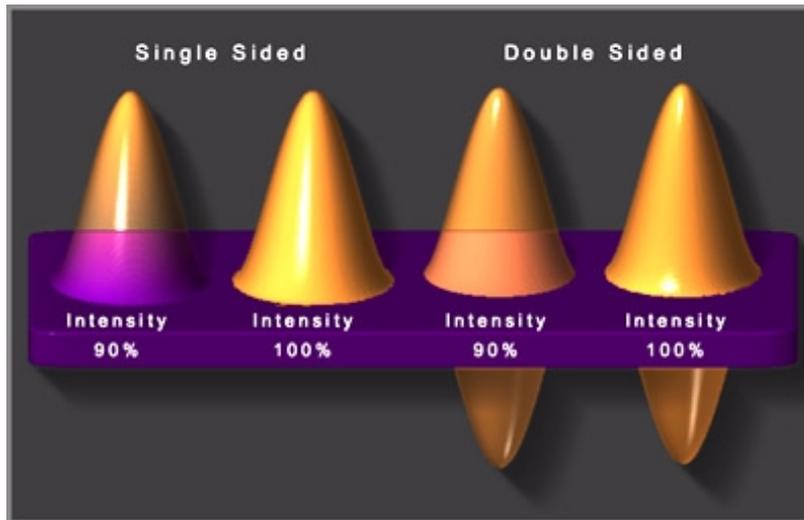


NOTE: In addition, the Depth brush can use differing settings for RGB Opacity and Z Opacity, if you turn off the Lock RGBZ toggle in the Draw palette.

Modifiers:

DoubleSided

This option effectively places the alpha bitmap back to back. If you use a Depth brush set to DoubleSided on a thin object, the brush may protrude through the back side of the object. This effect is shown in the illustration below; the two brush strokes on the right side are set to DoubleSided, while the two on the left are not. Also, when you turn DoubleSided on, the tool is “solidified,” so that the RGB opacity and Z opacity are distributed evenly over the brush surface. When DoubleSided is off, relative opacity is based on the alpha mask. This is also shown in the illustration below.

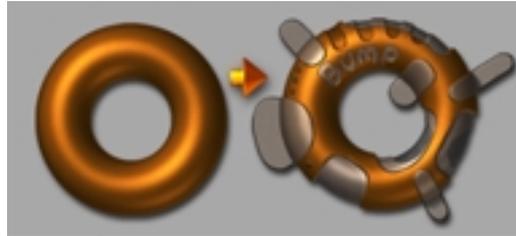


The Depth brush applied with DoubleSided off (left) and on (right)

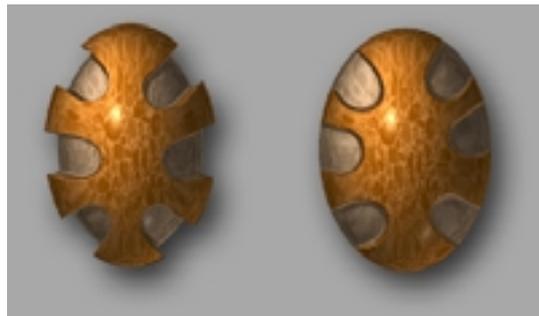


Bump Brush

The Bump brush is similar to the Simple and Single Layer brushes, except that it uses the surface normal of any pixels you draw on with it. This is true whether you simply click to draw with it, or drag to draw a longer stroke. In the image below, the Bump brush was used to add details to the right-hand ring, with the each new pixel raised or subtracted perpendicular to the surface it was drawn on.



You can also use the Bump brush in ZCut mode to subtract portions of objects realistically, because the default behavior works with respect to the surface normals. It is possible to use the picker to specify other orientations. In the below illustration, the egg was “cut Into” with the Bump brush on the left side, and with the Simple brush on the right side. The latter doesn't look quite right, because it always cuts perpendicular to the picture plane, whereas Bump cuts perpendicular to the surface it's applied to.

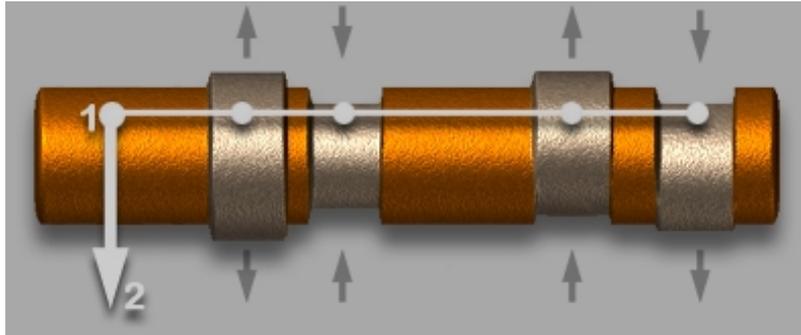


The Bump brush (left) adds/Sub depth perpendicular to the drawing surface

Modifiers:

Constant

When this is turned on, the Bump brush moves pixels in the same direction for the duration of each stroke. The direction is determined by the surface normal of the pixel on which you begin the stroke.



In the image above, four brush strokes applied to the golden pipe. Each stroke started in a similar corresponding point (1) and dragged down to a similar endpoint (2).

Stroke setting (from left to right)...

ZAdd with Constant turned Off. The pipe has increased its thickness.

ZSub with Constant turned Off. The pipe has decreased its thickness.

ZAdd with Constant turned On. The pipe has been pushed up.

ZSub with Constant turned On. The pipe has been pushed down.

NOTE: In order to correctly produce the strokes on the right, the auto-depth masking was disabled by selecting ZAdd or ZSub and then turning off the Draw palette > Channels > Infront and Draw palette > Channels > Behind.

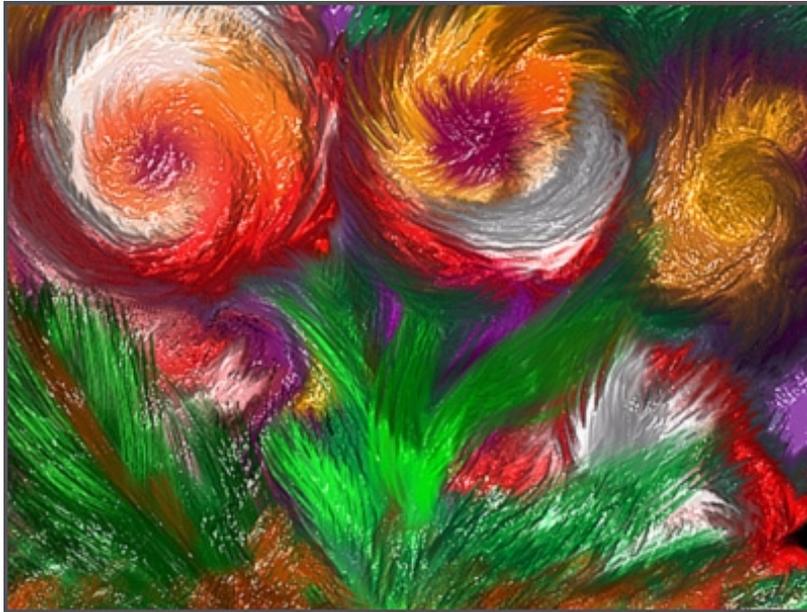
Sample Size

The Bump brush “samples” pixels in the vicinity of the cursor to determine the surface orientation. The Sample Size setting controls the size of the area sampled to determine orientation. When drawing on an uneven surface, use a high setting to smooth out the results, or a low setting to reflect the unevenness. Default= 1. Range= 0 to 8.

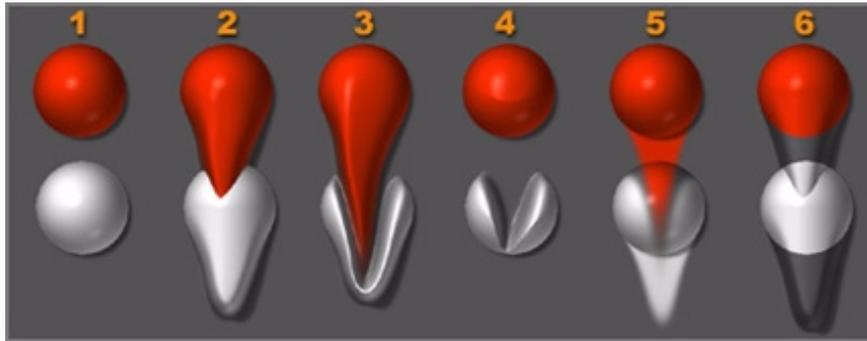


Smudge Tool

The Smudge brush moves pixels around on the screen, like pushing wet clay with your thumb. It doesn't add color (unless the Control key is pressed), but it does respect pixel depth information. In the illustration below, blobs of pure color were placed on the canvas, then the Smudge tool was used to move pixels.



NOTE: If you hold down the Control key while using the smudge tool, the tool becomes the simple brush and will apply color and depth.



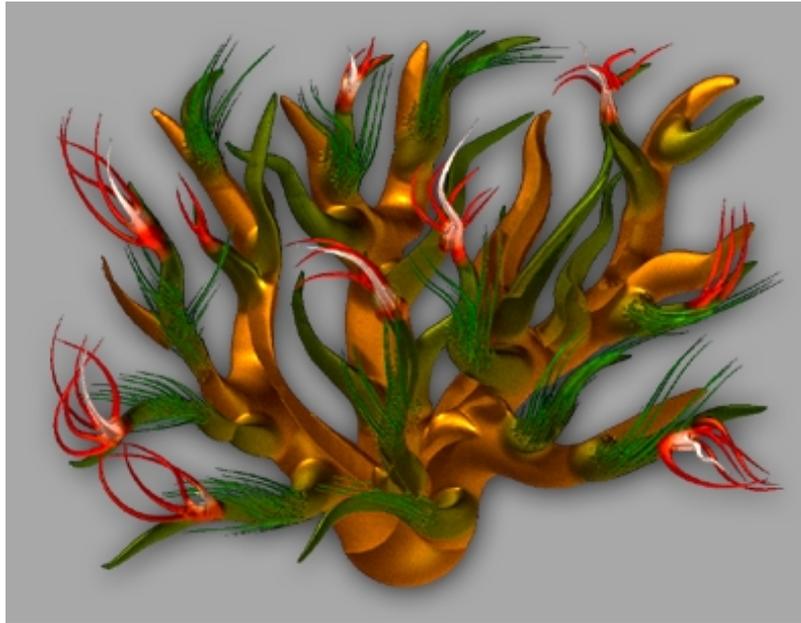
In the above image the smudge tool was used to “smudge” the red sphere into the white sphere. The setting of active channels and masking mode affect the behavior of the smudge brush.

- 1 The two spheres before applying the smudge stroke.
- 2 ZAdd and MRGB are on. INFRONT masking is active.
- 3 ZAdd and MRGB are on. Masking is disabled.
- 4 ZAdd and MRGB are on. BEHIND masking is active.
- 5 ZAdd is disabled. Only MRGB is enabled.
- 6 ZAdd is enabled while MRGB is disabled.



Snake Hook Brush

The Snake Hook brush pulls pixels out from the image, towards the viewing plane, while using the brush motion to shape the extrusion profile. For instance, you can create spiral or wavy extrusions by moving your hand in the corresponding way.

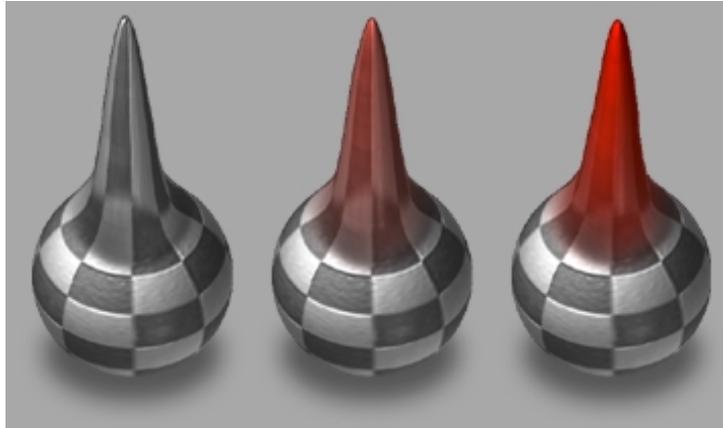


This image started as a single orange Sphere that was drawn in the bottom portion of the image. The Modifier “Color Blend” was set to a high value and colors were changed for different areas of the plant.

Modifiers:

Color Blend

This setting determines how the current Main Color (in the Color palette), or the currently selected Texture Colors interact with the existing pixel color. The lower the value, the more existing pixels retain their original coloring, and the higher the value, the more they take on the Main Color coloring. Default= 50%. Range= 0% to 100%.



Main Color= Red. Color Blend= 0% (left), 50% (center), 100% (right)

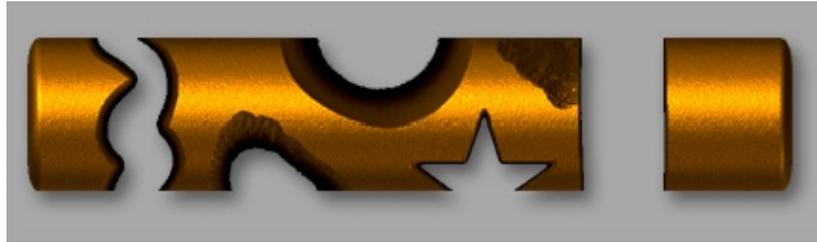
Resolution

ZBrush automatically sets the resolution of the brush. This setting is a multiplier that increases the sub-division of polygons at higher values, resulting in smoother surfaces with slower rendering speeds. Default= 0. Range= 0 to 3.



Eraser Brush

The Eraser Brush paints with the background color and the background depth using the selected alpha shape and the RGBZ intensity setting.



Erasing by using various Alpha and Intensity settings

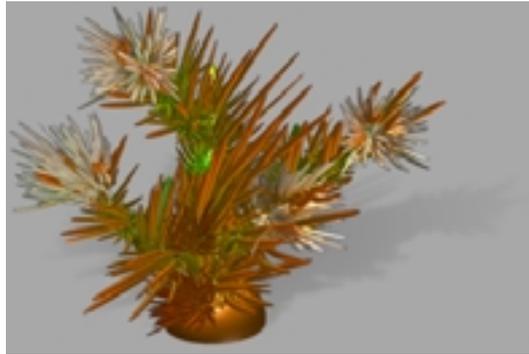


NOTE: For a more gradual erasure, set RGBZ opacity to a low value.



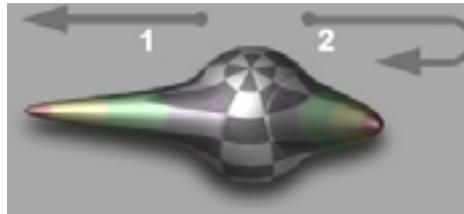
Hook Brush

The Hook brush, like the Snake Hook brush, lets you pull pixels out of the image toward the viewer, but it interprets your hand motion differently.



The basic technique is to drag in one direction to in order to set the length of the extrusion in order to set the length of the extrusion, and then, without releasing the mouse button, drag in a reverse direction to set the angle of the extrusion. If the second drag is in the opposite direction of the first, and the same distance, the extrusion ends up pointing straight out at the viewer.

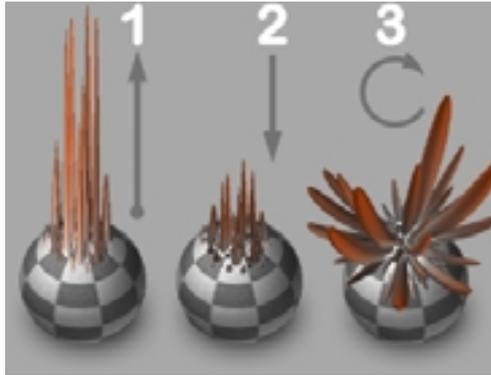
In the image below, the left-hand extrusion (1) was produced by applying the Hook brush in one direction only, while the right-hand one (2) was the result of dragging right and then left.



Use the Hook brush to create straight-line extrusions in any direction

The Hook brush has a special scaling capability that you can apply by moving the cursor in a circular direction at the end of the stroke. If you move the cursor clockwise, an expansion or increased separation occurs (depending on the Alpha image); if you move the cursor counter-clockwise, a shrinking or moving together occurs. The longer you move the cursor, the greater the effect.

In the below image, using Alpha image 07, the Hook brush was used to pull perpendicular to the sphere (1), then reversed direction to point the spikes toward the viewer (2), then with clockwise rotation to scale (3).
Scaling the Hook extrusion up by moving the cursor in circles



Modifiers:

Color Blend

This setting determines how the current Main Color or Texture interacts with the existing pixel color. The lower the value, the more existing pixels retain their original coloring, and the higher the value, the more they take on the Main Color coloring. Default= 50%. Range= 0% to 100%. (See [“Snake Hook Brush” on page 139.](#))

Resolution

ZBrush automatically sets the resolution of the brush. This setting is a multiplier that increases the sub-division of polygons at higher values, resulting in smoother surfaces with slower rendering speeds. Default= 0. Range= 0 to 3.



Fiber Brush

The Fiber brush lets you add 3D hair-like strands to the image. It respects the surface normals of pixels you draw on, and, by default, draws the hairs perpendicular to the surface. You can use the orientation picker to change to another mode. The Draw Size setting controls the size of the brush and the length of the fibers is controlled by the Depth setting.



NOTE: The RGBZ Opacity settings default to 50% when you choose the Fiber brush. Set them higher for coarser fibers, or lower for finer fibers. Also, adjust the fiber length with the Draw palette > Depth setting.

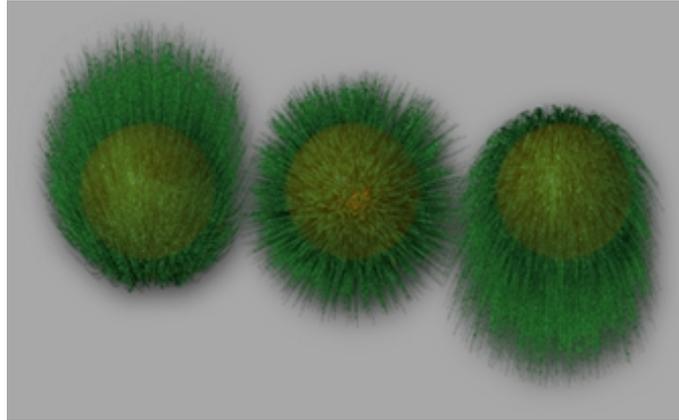
Modifiers:

Density

Controls the amount of fibers produced. Default= 19%. Range= 0% to 100%.

Gravity

This setting lets you apply gravity or anti-gravity to the fibers. With Gravity set to a negative amount, the fibers curve upward. With Gravity set positive, they curve downward. Set the 0%, Gravity has no effect, and fibers stick straight out from the surface they're drawn on. Default= 19%. Range= -100% to 100%.

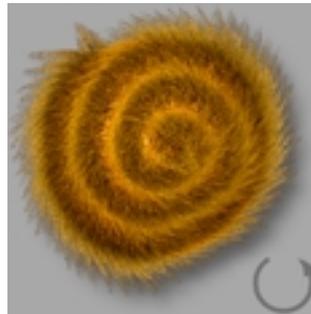


Gravity set to: -100% (left), 0% (center), and 100% (right)

Grooming

This setting lets you “comb” the hair—that is, you control the fiber angle by the direction you draw in. The higher the setting, the more the angle is influenced by drawing direction. Default= 0%. Range= 0% to 100%.

In the illustration below, Grooming was set to 100%, and then the fibers were drawn in a circular motion.



Turbulence

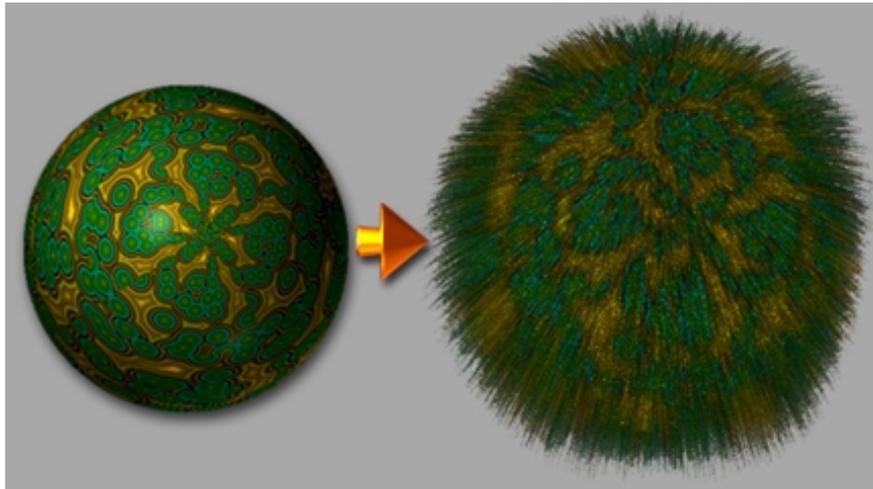
You can add randomness to the direction of each fiber by increasing the Turbulence setting. Default= 0%. Range= 0% to 100%.

Back Color

When Back Color is on, the fibers are colored with a gradient, starting with the secondary color at the “bottom” and going to the main color at the “top” (the end of the fibers). When Back Color is off, the fibers are colored only with the main color. Default= on.



*NOTE: You can obtain interesting effects with the fiber brush when drawing on a multicolor surface by turning on **Picker palette > Continuous Color**. For best results, also turn off **Back Color**. Each fiber uses the color of the pixel it's drawn on, so you get multicolored “hair” that matches the surface it's drawn on.*



Use the Continuous Color option for multicolored fibers

Source Color

When Source Color is on, the fibers are colored with a gradient, starting with the color of the object at the “bottom” and going to the main color at the “top” (the end of the fibers). Default= off.

RGB Antialiasing

When turned on, produces fibers with antialiased edges.

Thickness

Controls the overall thickness of the fibers. Range= 1 to 16. Default= 1

Shape

Controls whether the fiber is equilateral or rectangular. Range= -100 to +100. Default= 0. When set to zero, the fibers are equilateral. Negative values produce fibers that are rectangular with a larger h value. Positive values produce fibers that are rectangular with a larger v value.

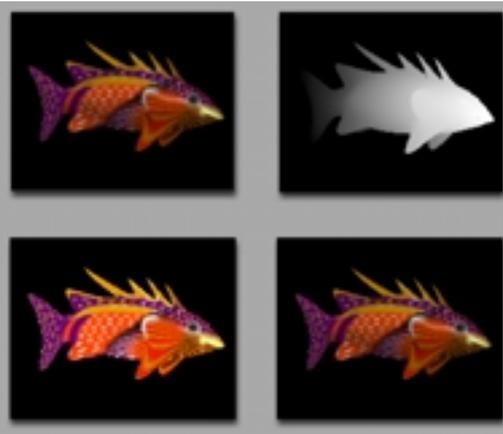


MRGBZ Grabber

This tool lets you grab part of the image as a texture and as a gray scale depth image. Drag a rectangle over the area you wish to “grab,” starting at the center. When you release the mouse button, the color (and optionally, shading) of the area inside the rectangle is added to the Texture palette. At the same time, the depth image is added to the Alpha palette. You can then use the texture and alpha image with most other tools.

It is possible to export an alpha channel with intensity values that correspond to the depth of each pixel. This alpha channel can later be used in Photoshop (or any other program that can read Photoshop format) for depth enhanced-editing (such as depth-cueing, fog, and such).

“Grabbed” Object



Depth Image

Unshaded Texture

Shaded Texture

Modifiers

Shaded RGB

By default, this is off, and when you grab a texture, ZBrush uses only the base colors of the area you grab. (To see the base colors, turn on **Render palette > Flat Render.**) When you turn on Shaded RGB, ZBrush grabs the shaded colors.

Autocrop

When autocrop is enabled (lit), the dragged rectangle will automatically resize to the object being grabbed.

Color Correction Brushes

Following is a list of all of the color correction brushes in ZBrush.

Each color correction brush has its own set of Initialize sub-palette parameters, which can profoundly alter the brushes behavior. The following parameters are common to many of the brushes, thus are not listed in the individual entries:

Sample Size

The size of the volume that is used to evaluate the action of the brush. At a size of 5, a cube 5 pixels on each side is used for evaluation of the brush action. Range= 1 to 7, Default= 2.

As with the other brushes, the Draw palette sets values for the brush, including: size, shape, opacity and effect on depth. For more information, [See “The Draw Palette” on page 80.](#)



*NOTE: The action of most color correction brushes can be reversed by holding down the **Alt** key. Thus the Blur will become Sharpen, Intensity becomes subtract Intensity, etc.*



Blur

The Blur brush is basically similar to a Blur filter in a paint program, with the added capability to blur depth; it simply blurs pixels that you draw over. Use it to smooth out sharp edges or abrupt color transitions.



Sharpen

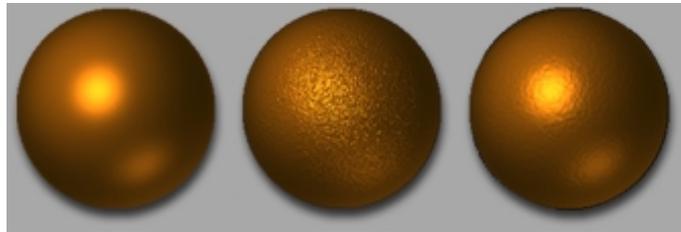
The Sharpen brush is basically similar to a Sharpen filter in a paint program, with the added capability of sharpening depth; it simply sharpens pixels that you draw over. Use it to bring out details in an image.



Noise

The Noise brush is basically similar to a Noise filter in a paint program, with the added capability of applying noise to the depth channel; it simply adds random variation to pixels that you draw over. Use the RGBZ Opacity setting to determine the extent of the noise effect.

The Noise Brush was used in the image below to apply noise to a sphere and then the Blur Brush was used in order to soften the rough surface.



Base sphere

Noise applied

Blur applied



Highlight

The Highlight brush adds color to the color already present. The method used is dependent on the Modifier setting.

Modifiers:

Auto Color

Samples the existing color and adds the same color to itself,

White

Adds white to the existing color.

Main

Adds the color selected in the color palette to the existing color.



Intensity Brush

The Intensity brush increases the intensity of the color it is applied to.



Glow Brush

The Glow brush spreads color from the highest intensity color to the pixels around it.



NOTE: The Glow brush can be used for smoothing depth when only Z is enabled and is a better choice than the Blur brush to smooth near edges.



Colorize Brush

The Colorize brush applies the selected color or texture.

Modifiers:

Max Intensity

When on, uses the maximum intensity of the color selected so that successive applications do not build up darkness.

When off, uses the unmodified color. Default= on.



Saturation Brush

The Saturation brush increases the saturation of the color it is applied to.



Hue Shifter Brush

The Hue Shifter brush moves the color it is applied to across the hue range. Usually not used for dramatic change, but for slight adjustments, such as adjusting skin tone.

Modifiers:**Shift Rate**

Adjusts the amount and direction of shift

Alpha Shift

Shifts hue by an amount determined by the applied alpha channel.

**Shader Enhancer Brush**

The Shading Enhancer brush is used to add or subtract “shine”. In a rendered image, shading is calculated mathematically. Use the Shading Enhancer to make small corrections or additions or to make the image more painterly.

Modifiers:**Intensity**

Amount of effect. Range= -100 to +100. Default= 50. Negative values subtract shine.



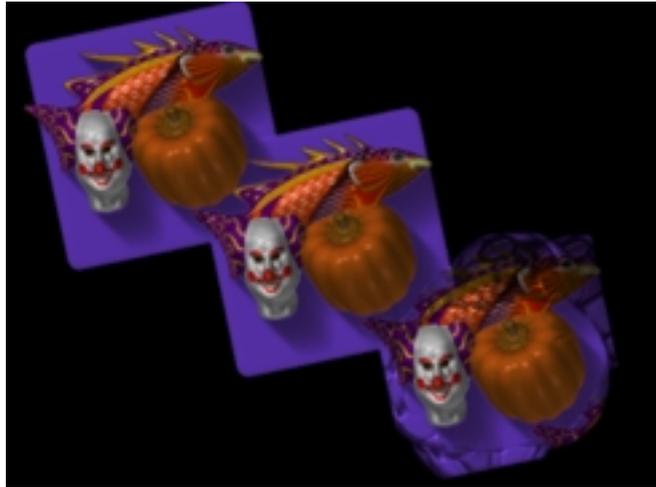
Cloner Brush

The Cloner brush lets you copy part of the document within a layer, or from one layer to another. Use of the Cloner brush is a two-step process:

- 1 **Ctrl-click** the center of the area that you want to copy.
- 2 Click again in a different part of the document to set the offset distance.

The second click actually draws the first stroke of the copy. To continue copying, drag without releasing the second click. Each time you click and drag again, using the Cloner brush, you make an additional copy of the original area at a distance that's a multiple of the original offset.

You can use any Alpha image with ZBrush's Cloner brush. This lets you copy the image while controlling the intensity and shape of the clone with a gray scale Alpha image. In the image below, the third copy used ZBrush's Brush 30 Alpha image.



Use the Cloner brush to copy part of the image

You can fundamentally change how the Cloner brush works with its modifiers; be sure to see the Modifiers section, below.



NOTE: ZBrush remembers the last offset you set and uses it throughout the current session until you set a different one. So, after setting an offset, you can clear the screen, start a new drawing, and then use the Cloner brush with the same offset.

You can achieve the same effect as multiple-click cloning with a single click-and-drag by turning on the **Picker palette > Dynamic** option. This lets you make multiple copies at an equal distance from each other.

Modifiers:

Layers Mode

When this is turned on, the Cloner brush copies pixels from all visible layers to the active layer, ignoring any pixels in the active layer. In the illustration below, the clown assemblage is in layer 1, the yellow sphere is in layer 2, and the red cylinder is in layer 3. Layer 2 was active when we used the Cloner brush and Layers Mode turned on, so only the pixels from layers 1 and 3 were copied. The copied pixels were added to layer 2.



Use Layers Mode to copy pixels from other layers to the active layer

For more information about ZBrush's Layers feature, See [“The Layers Palette” on page 244.](#)

Shaded

Embeds the shading into the cloned image's base color.

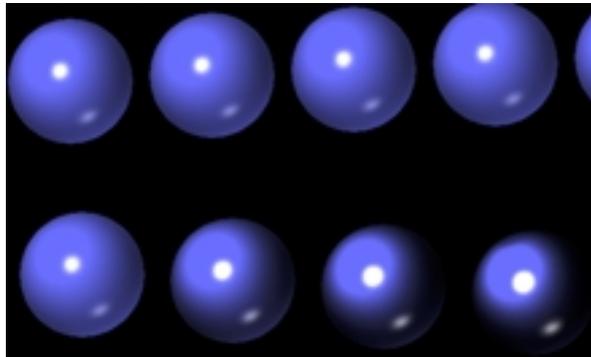
In order to understand how Shaded works, it's necessary to know that a tool in ZBrush can derive its coloring simultaneously from two different sources:

- The base color, which can be a solid color or a bit mapped texture
- The material, which is made up of one to four shaders. The shaders modify the base color with properties such as specularity, diffuse reflection, and optionally a reflection-map image.

When the Shaded switch is active, the Cloner brush copies the shaded color rather than the base color. You can see this most easily by turning on the **Render palette > Flat Renderer** switch, which prevents display of any shading in the document, showing only base colors.

If you clone an area repeatedly—which, incidentally, you can do in a single stroke by turning on the **Picker palette > Dynamic** switch—the shading is reapplied to each successive copy, becoming increasingly intense.

For example, in the illustration below, the sphere, which used the BasicMaterial 02 shader, was cloned using the Dynamic option with Shaded turned off on the top, and then with Shaded enabled on the bottom. Each successive clone in the lower row uses the shading from the previous one, so the shading is increasingly pronounced in the later clone “generations.”

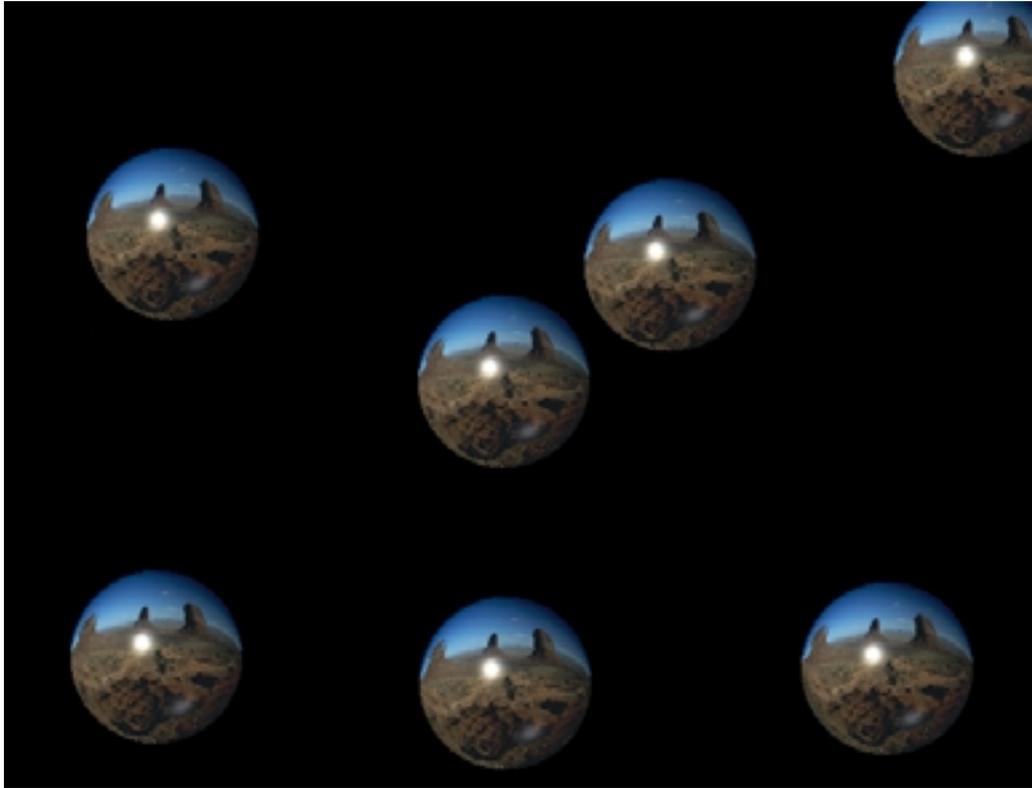


Use the Shaded switch to clone the shaded color

RetainCenter

By default, the Cloner brush remembers the offset you indicate with the first click after you **Ctrl-click** to set the center of cloning. But you can override this and set a new angle and offset with each successive click by turning on the RetainCenter switch. With RetainCenter on, the original center of cloning is copied to any location you click.

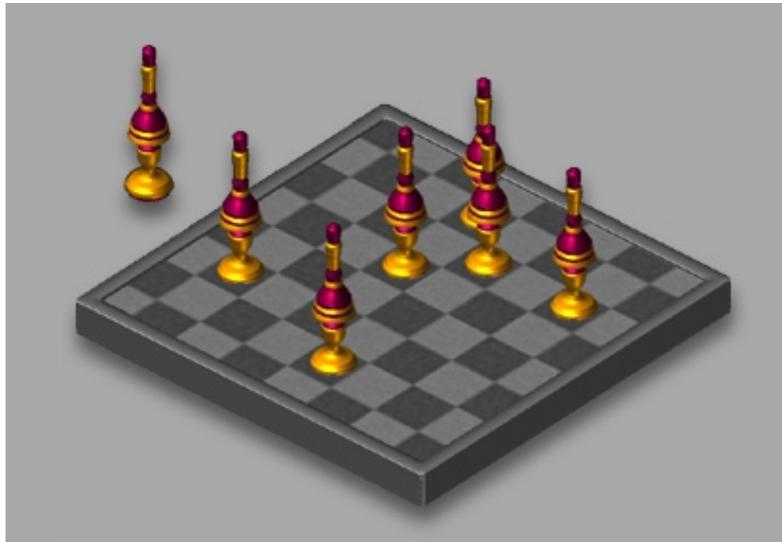
In the illustration below, the original sphere was in the center of the document. It was then set to be the cloned area. Thereafter, clicking anywhere in the document copied that area to the location clicked on.



ZOffset

When on, places cloned pixols at the pixol depth of the clone destination point. Normally, pixols are cloned at the same depth as the source pixols. Turn on ZOffset to have ZBrush use the depth of pixols at the destination, potentially resulting in a different depth for each clone.

In the illustration below, the chess piece on the left was cloned six times on the tilted chess board. ZOffset was turned on, so each clone was positioned at the correct depth relative to the part of the board it was drawn on.



Use ZOffset to place clones at the depth of the destination surface

3D Tools



3D objects are tools, such as 3D Sphere and 3D Cube, whose primary function is to let you add pixels to a ZBrush document. These tools produce true three-dimensional objects that you can move, scale, rotate, and edit to change their shape. You can also save them as tools for later use in ZBrush, as well as export them in 3D format for use in other programs.

The most important thing to remember when using a 3D object is that, once you choose another tool, the object no longer “floats”—it has been added to the image as pixels. That’s why it’s important, when you’ve customized a 3D object and think that you might want to use it again in another session, to use the Save As function to store the object as a disk file in the .ztl (ZBrush Tool) format. You can find Save As in the **Tool palette > Inventory** sub-palette. Once you’ve saved the file, you can load it into any ZBrush document for further manipulation and/or adding pixels.

Here are some more important points about ZBrush's 3D objects:

- Once you've drawn a 3D object, you can use the Transform palette controls to move, rotate, and scale it, as well as apply custom deformation with the Draw functions.
- When you draw a 3D object and then change the current color and/or material, the changes aren't applied to the object unless you are in transform or edit mode.
- Using **Tool palette > Image sub-palette > Colorize** command, you can apply color at the same time as you deform the object. Using the Fill command in the Color picker will apply color to the object and automatically turn on the Colorize switch.
- ZBrush's 3D objects use the Drag Rectangle stroke by default. To draw a 3D object using the default stroke type, drag in any direction in the document. If you release at this point, the object is drawn at its default proportions. Optionally, before releasing, drag in the opposite direction to reduce the object's width and height, while retaining the original depth. Using this method, you can, for example, easily create an ovoid with the Sphere 3D tool.



List of 3D Objects

Following is a list of all of the basic 3D objects in ZBrush. You can create variations on these tools by changing Modifiers settings (See “3D Object-Specific Modifiers” on page 186.); the modified tool is added to the palette for the current session. Each entry in the list includes the object's tool icon and an image showing the tool used several times in a drawing, with different transforms and modifiers applied.

Whenever a 3D object tool is active, a number of sub-palettes appear in the Tool palette; these are the same for all 3D objects, and are covered in the next section: 3D Object-Specific Sub-palettes.



NOTE: The best way to see the result of sub-palette setting changes, including Initialize parameters, is to observe the rotatable preview in the Image sub-palette.

Each 3D object has its own set of Initialize sub-palette parameters, which can profoundly alter the object's appearance. The following parameters are common to many of the objects, thus are not listed in the individual entries:

X Size: Relative size on the X axis, or width. Default= 100%. Range= 0% to 100%.

Y Size: Relative size on the Y axis, or height. Default= 100%. Range= 0% to 100%.

Z Size: Relative size on the Z axis, or depth. Default= 100%. Range= 0% to 100%.

HDivide: Horizontal subdivision count, or number of polygons used to create the object across its width. Default and range vary per object.

VDivide: Vertical subdivision count, or number of polygons used to create the object across its height. Default and range vary per object.



NOTE: Higher settings for HDivide and VDivide produce higher-resolution objects. This is particularly helpful when applying deformations and editing, but requires more memory and processing power. If you want faceted objects, reduce the HDivide and VDivide settings and, in the Image sub-palette, turn off SH and SV. Sphere 3D



Sphere 3D

Initialize Parameters:

Coverage

The extent of the “sweep” used to produce the sphere, in degrees. Use lower settings to take a “slice” out of the sphere. Use 180 to produce a hemisphere. Default= 360. Range= 0 to 360.



Sphere 3D					
Default Sphere	Coverage 180	Coverage 90	HDivid= 16 VDivid= 8 SH,SV= off	HDivid= 12 VDivid= 3 SH= off SV= off	Coverage 270 VDivid= 6 SV= off



Sphereinder 3D

Initialize Parameters:

Coverage

The extent of the “sweep” used to produce the sphereinder, in degrees. Use lower settings to take a “slice” out of the sphereinder. Default= 360. Range= 0 to 360.

TRadius

Radius of end spheres. Range 0 to 100. Default= 25

TCurve

Curvature of end spheres. Range 0 to 100. Default= 50



Sphereinder 3D					
Default Sphereinder	Coverage 180	Coverage 90	Coverage 290 TR= 70 TC= 80	HDivid= 4 VDivid= 16 SH= off SV= off	HDivid= 4 VDivid= 16 SH= off SV= on



Cube 3D

Initialize Parameters:

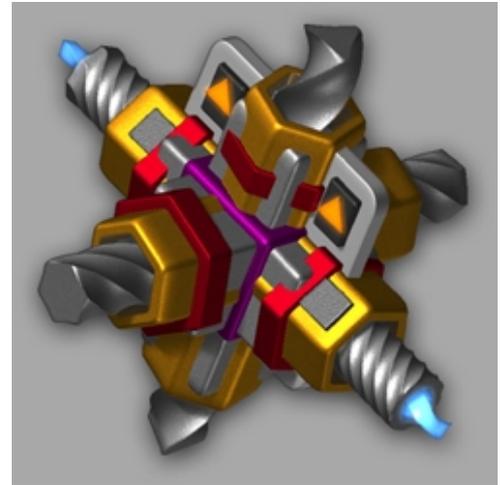
Sides

The number of sides of the cube. Use 3 to produce a prism, and higher settings to produce an increasingly cylindrical object.

Default= 4. Range= 3 to 32.

Twist

Produces a twisted cube, with spiral sides. Default= 0. Range= 0 to 4.



Cube 3D			
Default Cube	Sides= 6	Sides= 6 Twist= 0.25 (90 degrees)	Sides= 6 Twist= 0.25 (360 degrees)



Cylinder 3D

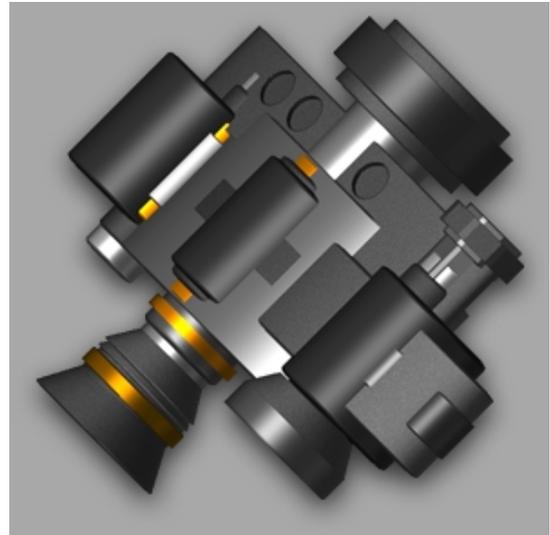
Initialize Parameters:

Inner Radius

Controls the relative size of the cylinder's inner radius; any value other than 0 produces a tube. Default= 0%. Range= 0% to 100%.

Taper Top

Controls the relative size of the cylinder's upper (closer) end; any value other than 0 produces a conic shape. Default= 0%. Range= 0% to 100%.



Cylinder 3D					
Default Cylinder	IRadius= 50	Taper= 50	IRadius= 50 Taper= 50	HDivid= 6 SH= off	HDivid= 8 SH= off ZSize= 15



Ring 3D

Initialize Parameters:

SRadius (Small Radius)

The size of the ring's inner radius relative to its outer radius. Use this setting to change the ring's thickness. Default= 38%. Range= 0% to 100%.

Coverage

The extent of the "sweep" used to produce the ring, in degrees. Use lower settings to take a "slice" out of the ring. Default= 360. Range= 0 to 360.



Ring 3D					
Default Ring	Coverage 270	Coverage 270 Scale= 0	Coverage 270 Scale= 0 SDivid= 4 SV= off	Coverage 270 Scale= 0 SDivid= 4 SV= off SRad= 80	Coverage 270 Scale= 0 SDivid= 8 SV= off

Scale

The size of the end of the sweep relative to its start. The lower this setting, the greater the change in thickness of the ring around its circumference. Default= 1. Range= 0 to 1.

Initial Twist

Not in my version

Twist

Produces a twist effect around the ring by successively rotating the circular cross-sections by increasing amounts. This is most visible when you use low SDivide and LDivide settings and turn off smoothing (**Image sub-palette > SH and SV** switches). Default= 0. Range= 0 to 1440.

SDivide

The number of subdivisions in the circular cross-section of the ring. Use 3 or 4 for a triangular or square cross-section, respectively. Default= 16. Range= 3 to 128.

LDivide

The number of subdivisions along the length of the ring. Use 3 or 4 for a triangular or square shape, respectively. Default= 32. Range= 3 to 128.



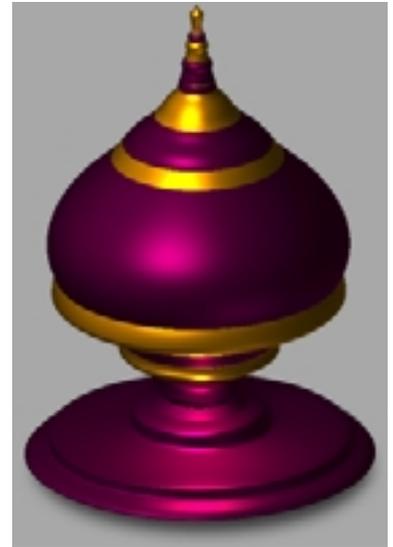
Sweep Profile 3D

Creates a 3D sweep of customizable curves.

Initialize Parameters:

The upper part of the Sweep Profile 3D tool's Initialize sub-palette consists of two graphs that show curves for profile and thickness. To create the object, these curves are swept 360 degrees about a vertical axis at the left edge of the graphs.

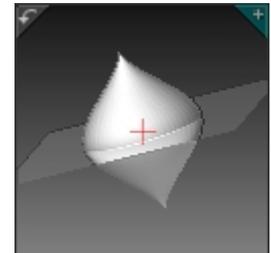
You modify the swept curve, and thus the shape of the object, simply by modifying the graphs. For directions for graph modification, See [“The Brush Shape” on page 114](#). The following illustration shows the default graphs together with the resultant preview.



Initialize sub-palette



Modify the graphs to modify the swept curve



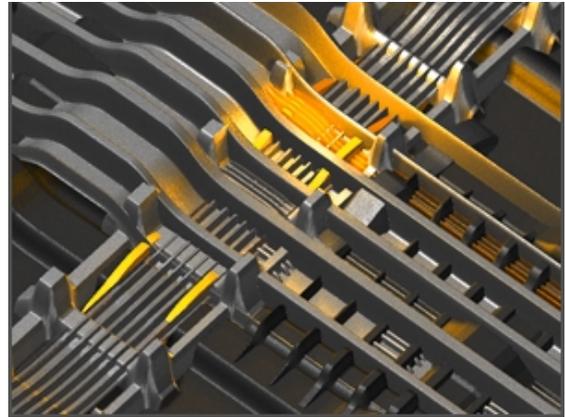


Terrain 3D

Creates a 3D terrain object.

Initialize Parameters:

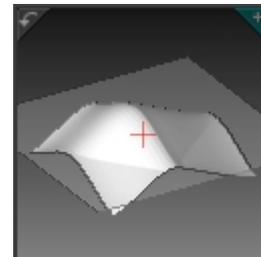
The bottom of the Terrain tool's Initialize sub-palette consists of two graphs that show profile curves used to create the tool. You modify the extruded curves, and thus the shape of the terrain, simply by modifying the graphs. For directions for graph modification, See [“The Brush Shape” on page 114](#). To create the terrain, the two curves are positioned at right angles to each other, and extruded to form a common surface.



The following illustration shows the default profiles together with the resultant preview.



Initialize sub-palette



Draw in the profile views to modify the terrain object



Arrow 3D

Creates a 3D arrow.

Initialize Parameters:

TipR(adius)

Sets the radius of the arrow tip. Increase this to create an umbrella-like object, or set it to 0 to remove the tip. Default= 30%. Range= 0 to 100%.

TipH(eight)

Sets the height of the tip relative to the overall height of the arrow, which also affects the angle of the tip. Lower values produce short, flatter tips, while larger values produce longer, steeper tips. Default= 60%. Range= 0 to 100%.



Arrow 3D					
Default Arrow	Tip H= 80	Tip H= 80 Tip R= 80 Base H= 50	Tip H= 80 Double= on	Tip H= 80 Double= on HDivid= 9 SH= off	Tip H= 80 HDivid= 7 SH= off

InnerR(adius)

Sets the relative width of the arrow shaft where it meets the tip. Changing the setting results in a tapered shaft. Default= 11%. Range= 0 to 100%.

InnerI(nset)

Sets the relative distance from the bottom of the tip to where the tip's inner surface meets the shaft. At 0, the distance is the same, resulting in a right angle between the bottom of the tip and the shaft. At higher values, the inside edge of the inner surface moves up toward the tip end, resulting in a concave inner-tip surface. Default= 19%. Range= 0 to 100%.

BaseR(adius)

Sets the relative width of the arrow shaft at its base; the end opposite the tip. Changing the setting results in a tapered shaft. Default= 11%. Range= 0 to 100%.

BaseI(nset)

Produces a concave base. At the default setting, the base is flat; increasing the setting increases the concavity. Default= 0%. Range= 0 to 100%.

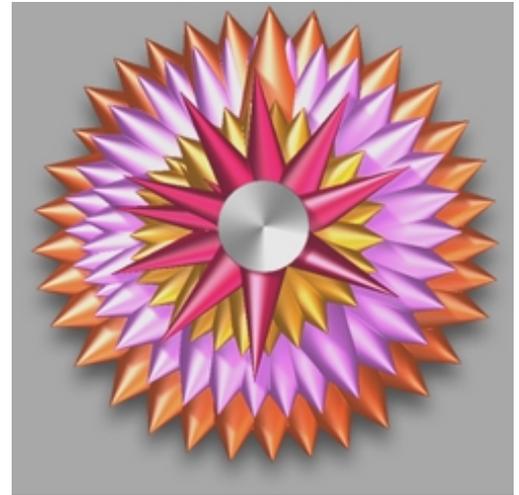
Double (Sided)

When on, produces a double-headed arrow. The length stays the same, so the tips and shaft become smaller than with a single-headed arrow, all other settings being equal.



Cone 3D

Creates a 3D cone.



Cone 3D					
Default Cone	Z Size= 50	Z Size= 50 HDivid= 8 SH= off	Z Size= 50 HDivid= 6 SH= off	Z Size= 25 HDivid= 4 SH= off	Z Size= 10 HDivid= 3 SH= off



Plane 3D

Creates a 3D planar square. Although flat, the square is double-sided so it's visible from both sides.

Initialize Parameters:

H Radius/V Radius

These are equivalent to the X Size and Y Size settings for other 3D objects, in that they set a relative horizontal and vertical size.





Circle 3D

Creates a 3D disk by sweeping a line through an arc; by default the arc is 360 degrees. Although flat, the disk is double-sided so it's visible from both sides.

Initialize Parameters:

ORadius/ORadius (Outer Radius Start/End)

To create a circle, ZBrush sweeps a radial line through an arc, starting at 6 o'clock and rotating counter-clockwise. By default, this line stays the same size throughout the sweep. By using different ORadius settings, you can cause the radius to change its length progressively during the sweep. If Outer Radius Start is smaller than Outer Radius End, the radius increases in length during the sweep, and vice versa. Default= 100%. Range= 0% to 100%.

IRadius/IRadius (Inner Radius Start/End)

These settings let you create a hole in the center of the circle object. As with the ORadius settings, they define the length of the hole radius at the beginning and end of the sweep. If both settings are the same, the hole is circular. If the settings are different, the hole radius varies throughout the arc, creating an irregular-shaped opening. Default= 0%. Range= 0% to 100%.

Coverage

The extent of the “sweep” used to produce the circle, in degrees. Use lower settings to take a “slice” out of the circle. Default= 360. Range= 0 to 360.



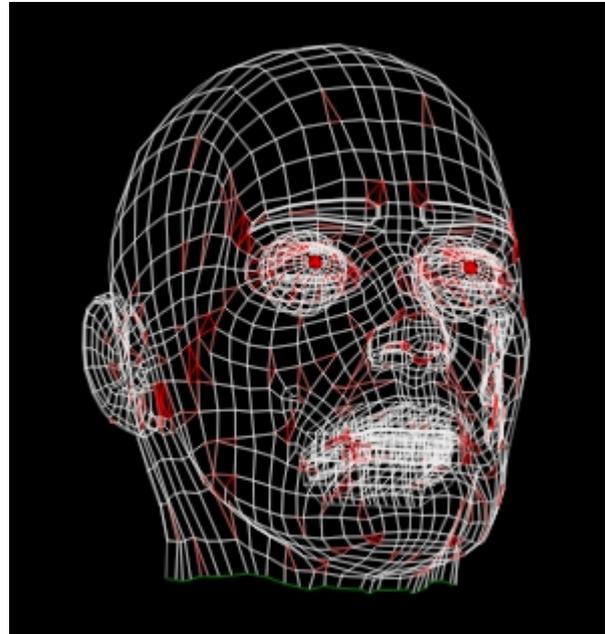


Polymesh 3D

The Polymesh 3D tool, also known as the Star tool, can create a six-pointed 3D star, but its main purpose is to import geometry.

All 3D tools can export objects in the .obj and .dxf format. The only way to import objects into ZBrush is with the Polymesh tool. Import objects to use in a scene or to modify and export back to their source application.

ZBrush will retain the number of polygons, vertices, and their order, so it is ideal for generating morph targets for animation programs.

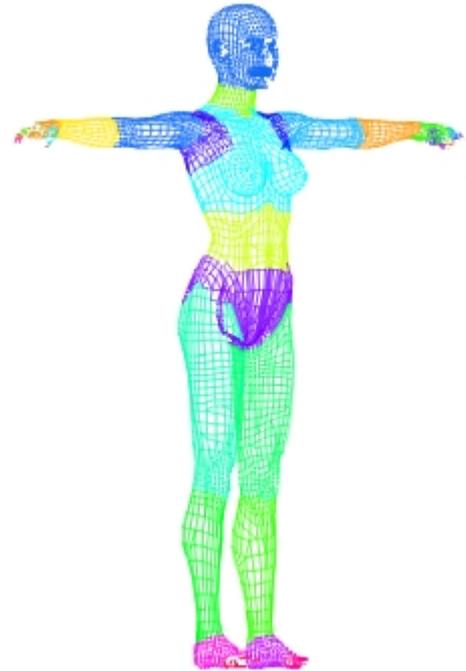


To see the object in the colored wireframe mode, go to the Preferences palette and turn on Dots.

When the object is in the edit mode and acted upon— typically rotated, the display will change to a color coded wireframe with three colors:

- White= Quad (four-sided) polygons. Quads are preferred by ZBrush
- Red= Triangles
- Green Line= Polygons enclosed by a green line are not connected to the polygons around them.

If the imported file is composed of groups of objects, turn on Grpc in the Preferences palette to see the color-coded groups...



Modifiers:

Smooth

Controls the amount of polygon sub-division when rendering. Range= 0 to 1. Default= 0.

Divide

Controls how many polygons will be rendered for each smoothed polygon. Range= 1 to 32. Default= 3.

Double

If some polygons appear to be missing, some may be facing in and some out. Choosing Double will force all polygons to be double sided, so that all can be seen. Use only when needed, since the memory requirements for the mesh will double.

Flip

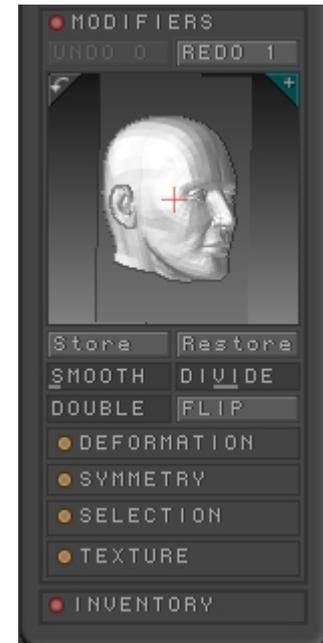
If the object imports with the polygons facing inward, Flip can be used to turn them all outward.

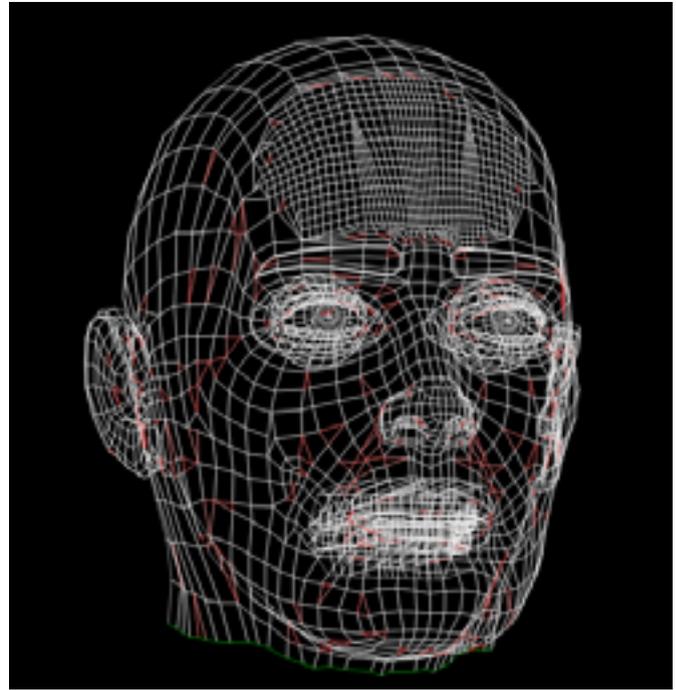
Deformation

The same deformation controls are available for all 3D objects.

Symmetry

The same symmetry controls are available for all 3D objects.





Selection

The same selection controls are available for all 3D objects.

With Polymesh objects, you can sub-divide the polygons in an area that you wish to add more surface detail to. Hold down the Control key and draw on the object in the area to be sub-divided to produce a mask. Invert the mask using **Tool > Modifiers > Selection > Inv.**

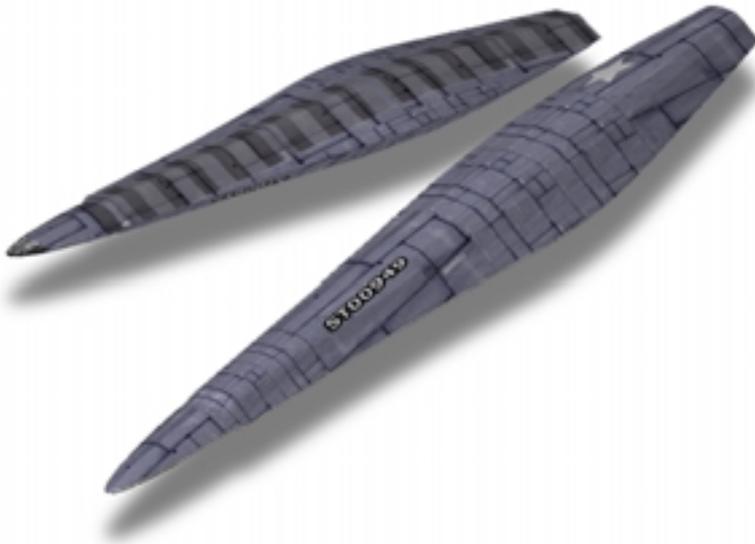
Sub-divide the selected area by pressing **Tool > Modifiers > Deformation > Divide** as many times as needed. With a finer mesh, you can model finer details.

Texture

Object textures must be loaded separately. After the object has been imported, go to the Texture palette and choose **Inventory > Import** and navigate to the texture associated with the object.

Depending on the file format, some texture maps may import upside down. Simply press **Flip V** in the Texture palette to invert them.

Remember, when creating your own textures or modifying existing ones, the 3D Copy function is far superior to painting directly on the object.



Modifiers > Texture palette:

Colorize

Fills every polygon with the selected color.

Grd

Gradient: Blends colors between adjacent polygons.

TXR > Col

Uses the existing texture to colorize the mesh directly. No texture map is needed with a mesh of this type. Each polygon is assigned a color.

Col > Txr

Creates a texture map based on the current coloring of the object.

UVC

Changes current UV mapping to cylindrical.

UVP

Changes current UV mapping to planar.

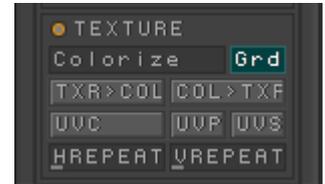
UVS

Changes current UV mapping to spherical

. HRepeat/VRepeat

Sets the number of times that the texture will be repeated on the object in the horizontal or vertical direction.

Range= 1 to 32. Default= 1.



Import options:

ZBrush will import objects composed of quads and/or triangles. If the imported object has polygons with more than four sides, ZBrush will display an alert message and then convert the polygons to three and four sided.



Mrg

Merges points that occupy the same space.

Add

Allows multiple meshes to be imported. Import the first mesh, then press Add and import the next.

Tri2qua

Converts adjacent triangles to quads when importing. Maximum angle between adjacent triangles to be converted to quads is set by the slider. Range= 0 to 90 degrees. Default= 45



NOTE: Tri2qua must be set to zero if the imported geometry is to be used as a morph target.

Weld

If two points less than the distance apart set here, they are combined into a single point. Range= 0 to .01. Default= 0



NOTE: Weld must be set to zero if the imported geometry is to be used as a morph target.

Export Options:

Obj

Exports the object in the .obj format and automatically chooses quad polygons.

Dxf

Exports the object in the .dxf format and automatically chooses triangular polygons.

Qud

Sets the object polygons to quads, regardless of the export format.

Tri

Sets the object polygons to triangles, regardless of the export format.

.

Txr

Includes uv co-ordinates in exported .obj output.

Flp

Flips the exported texture top to bottom for target applications that require it.

Mrg

Merges points that occupy the same space.

Grp

Includes grouping information in the exported output.

Scale

Scales the exported object size.

Range= 0.1 to 100. Default= 1

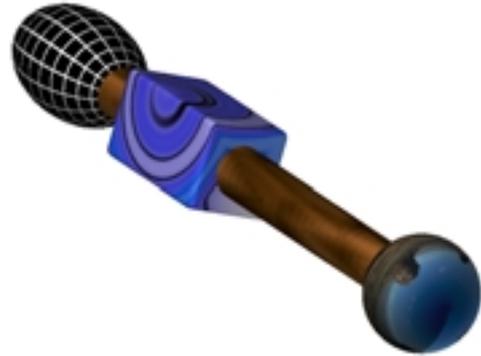


MultiMarker

Use the MultiMarker tool to manage multiple objects in ZBrush.

You can mark objects as you create them, clear the screen, and then use the Multi Marker tool to draw an object that is the combination all of the marked objects.

You can reposition individual objects in the group and you can save as a polymesh at any time.

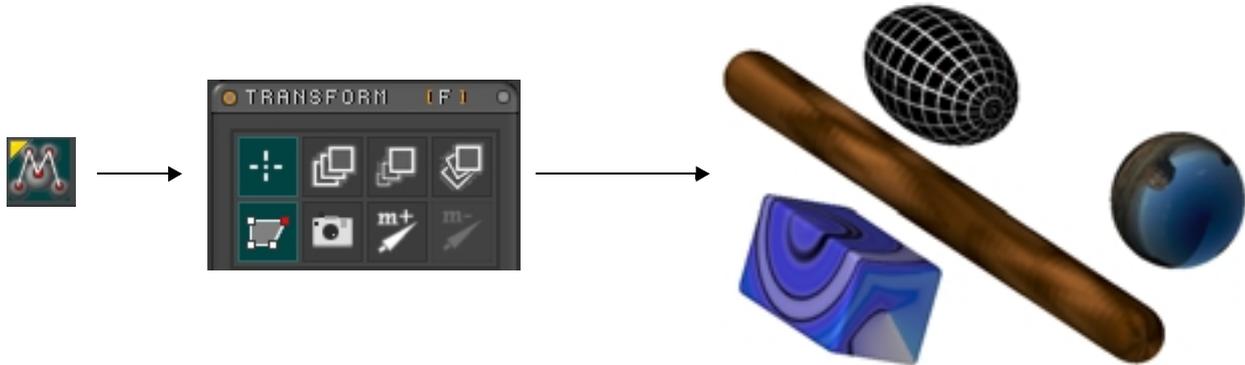


A multi-part object created with a marker in each part

The MultiMarker tool gives you complete control of 3D objects. Here's how to use it:

- 1 Turn on Texture and Material options in the Marker Modifiers. See [“Introducing Markers” on page 238](#).
- 2 Place a marker in every piece of your complex object as you build it. See [“Mark Object Position” on page 113](#). The object above contains four Markers, one for each piece.
- 3 When the object is complete, clear the canvas by pressing **Ctrl + N**
- 4 Choose the MultiMarker tool from the Tool palette and click and drag on the canvas. Be careful not to begin on one of the existing markers. The complex object is re-created, using the information contained in each marker.
- 5 Reposition parts. See [“Repositioning Parts” on page 183](#). If no repositioning is needed you can convert to a polymesh. See [“Conversion to Polymesh” on page 184](#).

Repositioning Parts



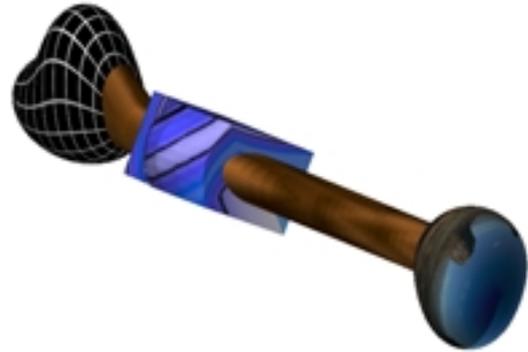
Each part can be moved independently

After the object is re-created with the MultiMarker, you can move each part independently with the **Transform > Edit** tool.

Click and drag on a part to move it. Click and drag outside the parts to move the whole group.



NOTE: You can make all the parts of a complex object without positioning them, and after conversion to a multimarker object, position each part independently.



Edited Polymesh object

Conversion to Polymesh

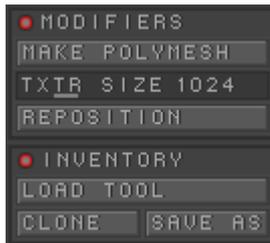
When the Multimarker object is converted to a polymesh, it can be deformed and edited like any other Polymesh tool. See [“Polymesh 3D” on page 174](#).

To convert to polymesh:

- 1 Press “Make Polymesh” in the Modifier section. The MagicMesh will be added to the Tool menu.
- 2 Turn off **Transform > Edit** and clear the canvas by pressing **Ctrl + N**
- 3 Choose the MagicMesh tool from the Tool menu and click and drag to create the polymesh object. Be careful again not to begin on one of the existing markers.
- 4 Turn on **Transform > Edit and** turn off MRGB, RGB and M in the Draw Palette.
- 5 Deform, edit and save or export.



The conversion to Polymesh generates a composite bit map of the textures on each part and assigns UV co-ordinates for correct mapping.



Modifiers

Make Polymesh

Creates a polymesh tool from the MultiMarker and adds it to the Tool palette.

Texture Size

Sets the size of the texture map that will be generated when making a polymesh.

Reposition

Moves the markers to a new position if you have moved any parts.

Inventory

Load Tool

Loads any previously saved .ztl tool.

Clone

Duplicates the currently selected tool.

Save As

Saves the currently selected tool as a .ztl file.

3D Object-Specific Modifiers

The following sub-palettes appear under Modifiers in the Tool palette whenever a 3D object tool is active. The commands included in these sub-palettes offer a wide range of functionality, including masking, deformation, changing the center of rotation, and much more.

Most changes that you make to a basic tool in the Modifiers sub-palettes add a new tool with the modified characteristics to the Tool palette. If you make changes to a modified tool, they are applied directly to that tool; ZBrush does not create another new version.



Object Preview

This window works similarly to the preview window in the Draw palette. The main difference is that it contains a red cross, which you can drag around in the window to set the object's center of rotation. Also, dragging the cross pans the window when you drop the cross, setting the new center at the drag location. Dragging elsewhere in the preview window rotates the contents.



*NOTE: Any changes that you make to the **Tool > Modifier** settings that alter the tool's appearance are reflected immediately in the preview. They are also reflected in the active object in the document if the **Transform palette > Move/Scale/Rotate/Edit Object** mode is turned on. Otherwise, the changes appear the next time you add a copy of the tool to the document.*

Store (Orientation)

After rotating the object in the preview window, click this button to set the current orientation as the default orientation for the object. This is convenient if you're always rotating objects after you add them; just set the default orientation here first.

Restore (Orientation)

Restores the default orientation for the preview window. If you've changed the default orientation.

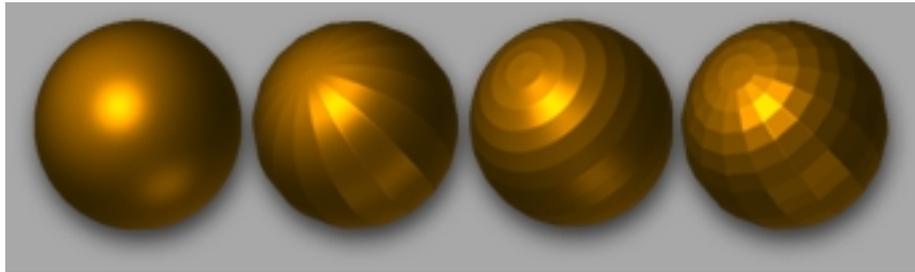
SH (Smooth Horizontal)

Smooths horizontally across the polygon edges. Default= on.

SV (Smooth Vertical)

Smooths vertically across the polygon edges. Default= on.

3D objects in ZBrush are composed of rectangular polygons. By default, all edges are automatically smoothed so that the individual polygons aren't apparent. But you can turn off smoothing horizontally, vertically, or both. The illustration below uses all four possible combinations of SH and SV settings with a low-resolution (16 x 16) sphere, as follows:



SH,SV= on

SV= on

SH= on

SH,SV= off

Smoothing a sphere in different dimensions

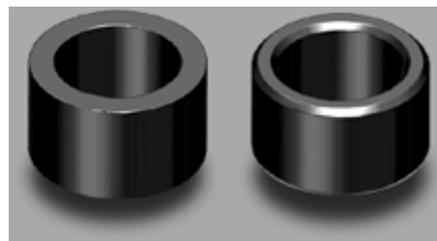
BH (Horizontal Corner)

Bevels horizontally across edges. Default= 0. Range= 0 to 100. Only active when SH (Smooth Horizontal) is off.

BV (Vertical Corner)

Bevels vertically across edges. Default= 0. Range= 0 to 100. Only active when SV (Smooth Vertical) is off.

Depending on the object type, you can subdivide polygons or bevel edges to different degrees using the BH and BV settings. In the illustration to the right, the cylinder object was given a vertical bevel (BV) in order to eliminate the sharp corner and give the object a more realistic/pleasing finish. The degree of bevel is dependent on the resolution (HDivide & VDivide) of the object and is more pronounced in a lower-resolution object.



BV= 0%

BV= 100%

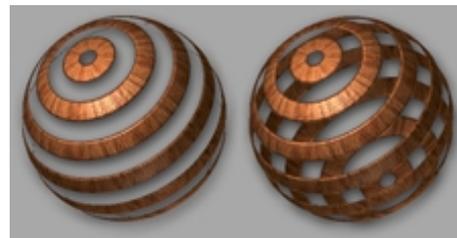
Divide

Controls sub-division of the mesh while drawing an object. Increasing the sub-division will result in a finer mesh and will increase the draw time.

Active only while drawing. Range= +32 to -32. Default= 0.

Double

Sets all polygons to render as double-sided. To avoid unnecessary processing overhead, turn this on only with objects that have holes, so you can see the inside surface. Object with holes is shown in the image to the right with 'Double' off (left) and on (right)



Flip

Reverses the direction that the polygons are facing.

Symmetry Sub-palette



You normally use the Symmetry settings when editing an object with the **Transform palette > Edit** command. Using symmetry, you can modify two or more areas of an object the same way; the software makes additional copies of any edits you apply. Moreover, you can mirror symmetrical edits, so that they go in opposite directions, or not, so they go in the same direction. Radial symmetry is a powerful way to make multiple edits simultaneously, all the way around an object's perimeter.

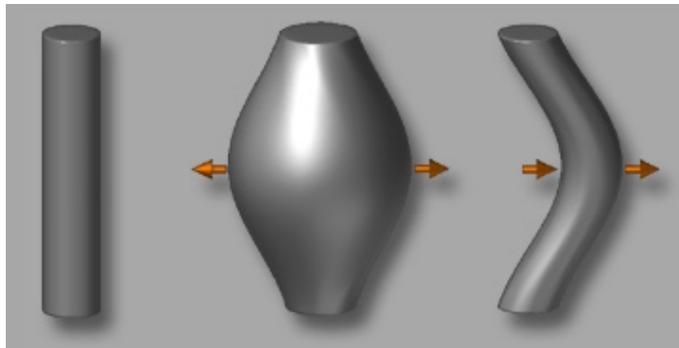


NOTE: When you turn on symmetry and then position the cursor over the active object, red dots appear on its surface where the additional edits will be applied. Large dots indicate edit locations on surfaces facing you, while small dots indicate edit locations on surfaces facing away from you.

M(irror)

When on, the symmetry is mirrored, so that if you make an edit on the side of an object, an edit is made on the opposite side, in the opposite direction. When off, a symmetrical edit on the side of an object causes a push-out effect on one side and a push-in effect on the other side.

Mirror is available only when X, Y, and/or Z is on. Default= on.



Z-axis radial symmetry with Mirror on (Middle) and Mirror off (right)

X/Y/Z

Sets the axis or axes of symmetry. You can use just one of these, or combine them in any way you like. **R**(adial): Standard symmetry makes a single extra copy of each edit per axis. With Radial symmetry, you can specify any number of copies of each edit to be distributed evenly about any axis or combination of axes. Radial is available only when X, Y, and/or Z is on. Default= off.

Radial Count

Sets the number of symmetry points about the specified axis or axes. Default= 8. Range= 2 to 100.



6 points radial-symmetry was used while transforming a 3D sphere into a flower

Selection Sub-palette



ZBrush lets you select or mask parts of a 3D object so that when you apply operations such as deformation functions, editing, and painting (also part of editing), the operation affects only part of the object. Masking can be applied with variable intensity—up to 256 levels—so that the strength of applied effects varies according to the intensity of the mask.

You apply masking manually while editing an object simply by holding down the **Ctrl** key as you drag over the object. This automatically turns on the Selection sub-palette's **View Mask** option; the mask appears as a dark gray shading. The darker the mask, the less effect operations applied to it will have.

You can also apply masking algorithmically or with an alpha bitmap. The following lists the masking options available in the Selection sub-palette.

View Mask

Causes masking to be visible; the mask appears as a dark gray shading. The darker the mask, the less effect operations applied to it will have. This is automatically turned on when you apply masking when editing an object.

In the illustration below, a mask was applied to the upper part of a cylinder, and then the SBend deformation was applied to the cylinder. Only the unmasked lower area was affected by the bending.



Cylinder with masking applied to upper area, and then SBend applied



NOTE: If you convert a 3D object that contains visible masking into pixels using any standard method such as Snapshot, the masking becomes part of the affected pixels' coloring.

Inv

Inverts the masking.

In the following illustration, the masking on the above cylinder was inverted, and then SBend was applied again.



Cylinder with masking inverted

Clear

Removes any masking.

MaskAll

Masks the entire object. Use MaskAll or any other method to apply a mask before using Row, Col, or Grd, which act only on masked areas.

Row

Deselects alternating rows of a masked object, based on the Sel and Skp settings.

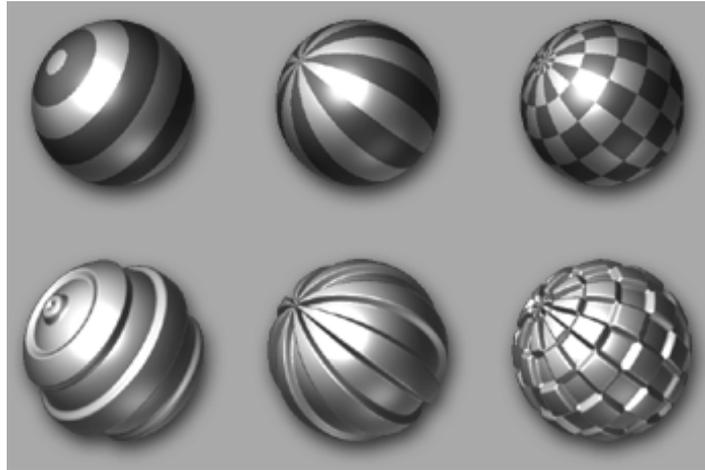
Col(umn)

Deselects alternating columns of a masked object, based on the Sel and Skp settings.

Grd (Grid)

Deselects alternating rows and columns of a masked object, based on the Sel and Skp settings.

In the following illustration, a sphere was masked with Row, Col, and Grd from left to right across the top, and then the Inflate deformation was applied to the same object across the bottom.



A sphere inflated with row, column, and grid masking (left to right)

Sel(ect)

The width of rows and columns affected by the Row/Col/Grd commands, measured in polygons. For example, if you use this on a completely masked cylinder that has the default VDivid amount of 32 (that is, it's 32 polygons high) and use the default Sel setting of 8, the result is four bands: two of selected (masked) polygons and two of unselected polygons. (Actually, one of the latter bands is split between the top and bottom of the cylinder, so in fact there are $1/2+3+1/2$ bands.) Default= 8. Range= 1 to 32.

Skp (Skip)

The width of rows and columns skipped by the Row/Col/Grd commands, measured in polygons. If Skp is set to 0, ZBrush uses the Sel setting to determine the skip width. Default= 0. Range= 0 to 32.

Int(ensity): The strength by which masking is removed by the Row/Col/Grd commands. Use different Sel/Skp settings with different Int amounts to vary masking strength on different parts of the object. Default= 100%. Range= 0% to 100%.

Bln (Blend)

The degree to which a new masking operation mixes with an existing mask. This lets you, for instance, combine a Row/Col/Grd mask with an Alpha mask. To use, create a mask, then set the Blend amount, and then apply a second mask, and so on.



*NOTE: The next three settings—Int, Hue, and Sat—let you derive a mask from a texture applied to an object. They are available only when a texture is applied to an object. To apply a texture, make sure the object is in Edit or Transform mode, and then simply select the texture from the Texture palette. For more information on texture usage, see **The Texture Palette** on page 28. To use Int, Hue, and Sat, first apply a texture, then click the appropriate button to apply the masking. Then, to best see the result, turn off texturing by clicking the TXTR OFF button in the Texture palette.*

Int(ensity)

Derives a mask from the intensity values in an applied texture. Darker areas receive higher masking values than do lighter areas.

Hue

Derives a mask from the colors in an applied texture. Masking values of different colors are arbitrarily assigned based on the order of colors in the Color Selector, with the masking value at 100% at the left edge, decreasing to 0% at the right edge.

Sat(uration)

Derives a mask from the saturation values in an applied texture. Highly saturated areas receive higher masking values than do less-saturated areas.

Alp(ha)

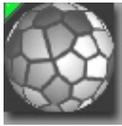
Derives a mask from the current alpha bitmap, selected in the Alpha palette.



NOTE: The bitmap is applied on a per-polygon basis, so be sure the object has a high enough mesh resolution to support the alpha bitmap resolution; otherwise, the result will be blocky.

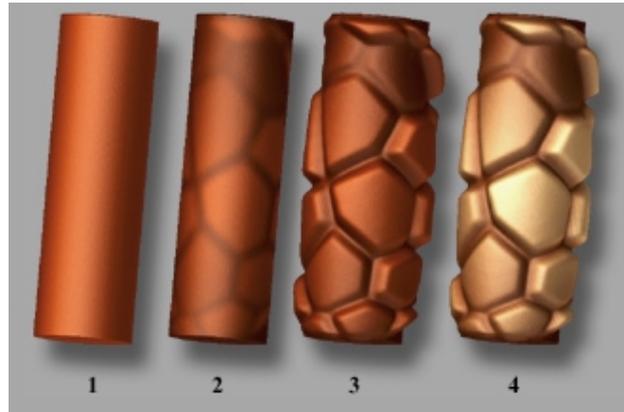
Create Alpha

Creates an alpha image from the current masking and adds it to the Alpha palette as the current selection. See [“The Alpha Palette” on page 38.](#)



In the illustration to the right, a cylinder was set to 128 HDivid x 128

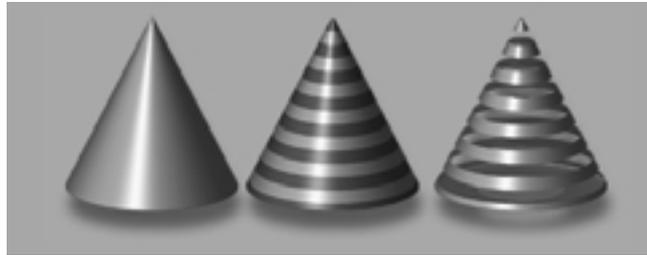
VDivid, and while in Edit Mode, **Color > Fill** as applied with the base brown color (1). The appropriate alpha was selected and applied as masking to the cylinder. Note that the darker shades of brown represent the higher levels of masking. (2). **Deformation > Inflate** was used in order to inflate the cylinder based on the current masking (3). A light brown color was selected and **Color > Fill** was used again to colorize the cylinder based on the current masking(4).



NOTE: You can use a mask from any part of the current document by first creating an alpha bitmap from it with the Tool MRGBZGrabber.

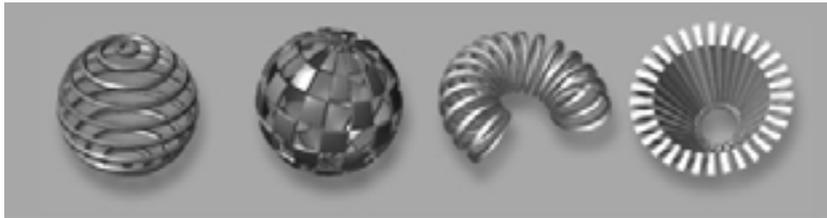
HidePt

Hides any completely or partially non-masked parts of an object. This effectively lets you “cut away” part of an object, leaving only the masked areas. HidePt leaves only parts of an object on which the masking is 50% or greater.



In the above example a default Cone 3D (left image) was masked by using the “Row” option with Sel= 2 (see above for info about “Row”). Note that the dark region of the cone (middle image) represents a masked area and therefore is not modified by the next step. HidePt was used to hide all the unmasked polygons (right image). This operation automatically turns on the “Double” property of the object, which lets you see both the outside and the inside of the cone.

Similar procedures used to create the following objects...

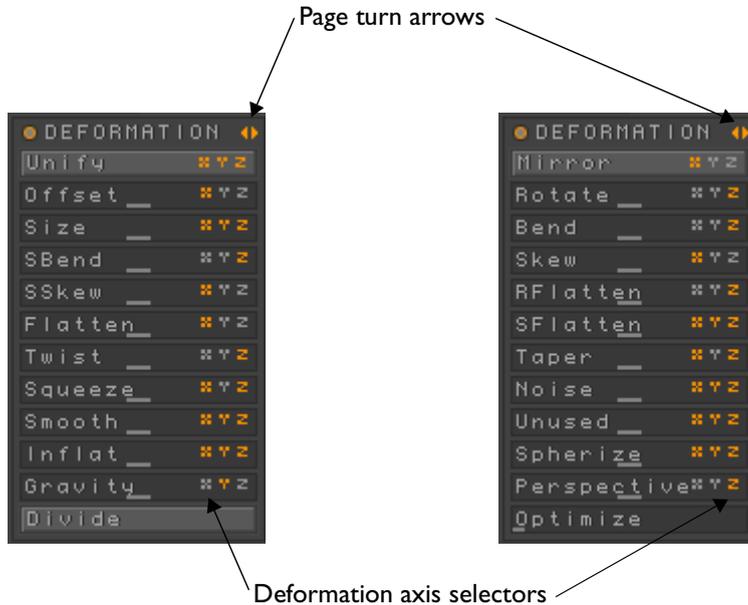


NOTE: If you change a masked object's Initialize settings, any masking is automatically removed. If you try to use a Selection command and nothing happens, chances are you're not in an edit or transform mode.

ShowPt

Restores visibility of any parts of an object hidden with HidePt.

Deformation Sub-palette



There are two “pages” of controls in the Deformation Sub-palette. Click on the orange arrows in the upper right corner to toggle the pages. Choose the axis of deformation by clicking on the x, y, and z letters. When a letter is orange, that axis will be deformed by the amount set. You can choose any combination of x, y, and z.

These controls are applied to the current 3D object tool, as reflected in the view of the tool in the Image sub-palette's Object Preview window. Normally, changes appear in the document when you next draw an object with that tool. But if a Transform palette function—Move, Scale, Rotate, or Edit—is active, changes occur to the current object immediately. If you've made changes to an object in the document that weren't reflected in the tool preview—for example, scaling on one or two axes—you may get unexpected results from applying a deformation to the object.

For best results, follow this procedure:

- 1 Select the tool.
- 2 Open the Image sub-palette and set the object up in the preview according to how you want the deformation(s) to affect it. For example, if you want to bend a cylinder into a C shape, rotate it so its long axis is vertical.
- 3 Apply the deformation(s).
- 4 Add the modified tool to the document.

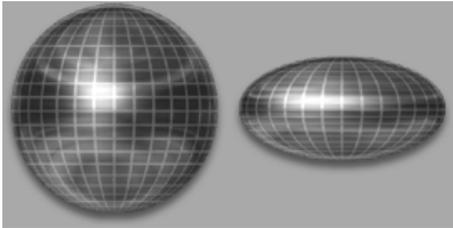
Most of the numeric settings in this sub-palette default to 0%, and return to 0% after you change the setting. Thus, they can be applied repeatedly, with cumulative effects. Also, most sliders can be dragged left or right, with opposite results depending on which direction you drag. Because of the way the deformations are applied, dragging in one direction and then an equal distance in the opposite direction doesn't always return the object to its previous shape. In such cases, you can use Undo (**Ctrl+Z**) to abandon changes.



NOTE: you can apply all deformations on selected parts of an object by using masking for an unlimited range of effects. See "Selection Sub-palette" on page 191.

Unify

While editing an object it is possible for the overall dimensions of the object to change, causing it to become too big or small to display properly within the preview window. By applying Unify, ZBrush uniformly scales the object to maintain an optimal size.

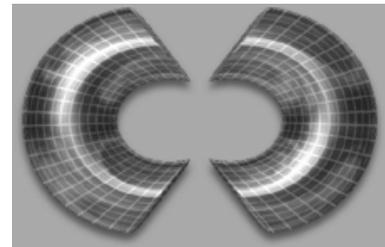


Sphere deformed 100% with SizeX (left) and then with Unify (right)

Mirror

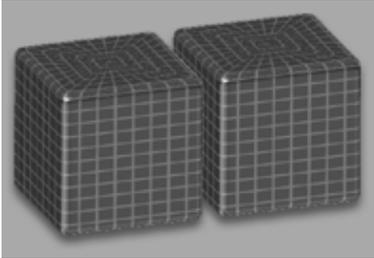
Flips the object horizontally. Use this to make a horizontally symmetrical image with a 3D object; use Snapshot to "paste" one side, and then use Mirror to create the opposite image.

Cylinder deformed with SBend (left) and then flipped with Mirror (right)



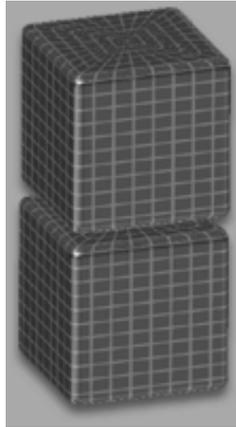
MovX/MovY/MovZ

Moves the object along the X, Y, or Z axis with respect to the center of rotation. This is the opposite of moving the center of rotation in the preview window, but has the same net result. Default= 0%. Range= -100% to 100%.

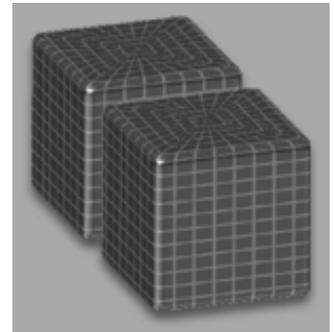


MoveX (original left, moved right)

MoveY (original top, moved bottom)

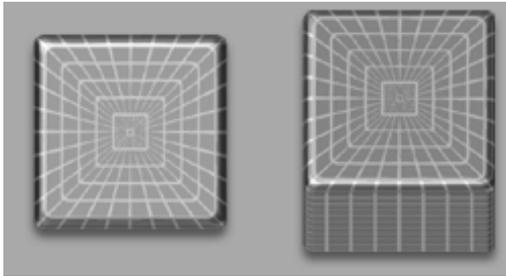


MoveZ (original front, moved back)

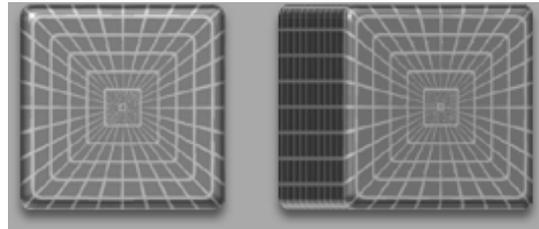


RotX/RotY/RotZ

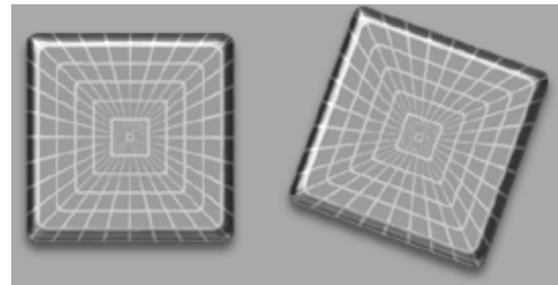
Rotates the object about the X, Y, or Z axis, using the center of rotation. Default= 0. Range= -180 to 180.



RotX (original left, rotated right)



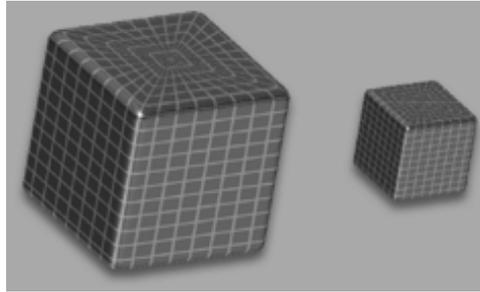
RotY (original left, rotated right)



RotZ (original left, rotated right)

Size XYZ

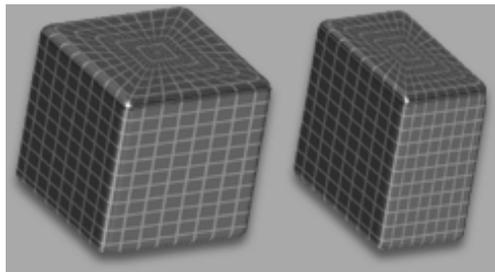
Scales the object up or down uniformly on all three axes. Default= 0%. Range= -100% to 100%.



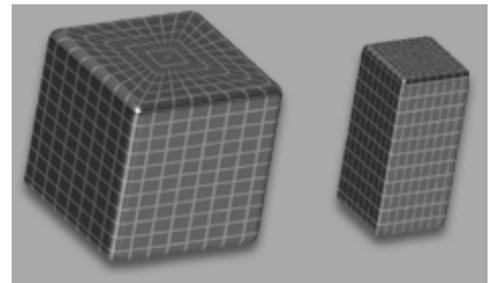
Size XYZ (original left, scaled right)

SizeX/SizeXY

Scales the object along the X axis only, or in the XY plane, respectively. Default= 0%. Range= -100% to 100%.



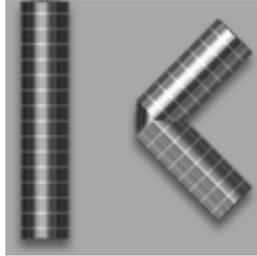
SizeX (original left, scaled right)



SizeXY (original left, scaled right)

Bend

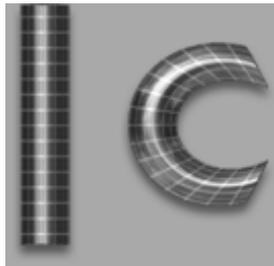
Bends the object around the in-out axis, creating a sharp corner. Uses the pivot point as the center of the bend. Default= 0%. Range= -100% to 100%.



Bend (original left, bent right)

SBend

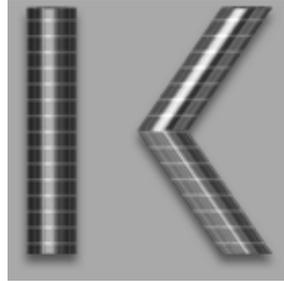
Bends the object around the in-out axis, creating a smooth corner. Uses the pivot point as the center of the bend. Default= 0%. Range= -100% to 100%.



SBend (original left, bent right)

Skew

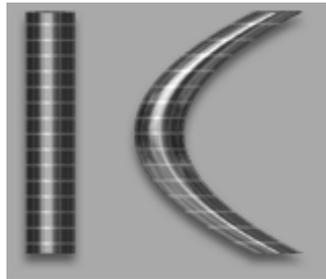
Adds a slant to the object about the in-out axis, creating a sharp corner. Uses the pivot point as the center of the skew.
Default= 0%. Range= -100% to 100%.



Skew (original left, skewed right)

SSkew

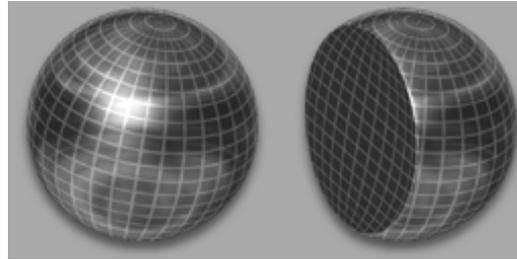
Adds a slant to the object about the in-out axis, creating a smooth corner. Uses the pivot point as the center of the skew.
Default= 0%. Range= -100% to 100%.



SSkew (original left, skewed right)

Flatten

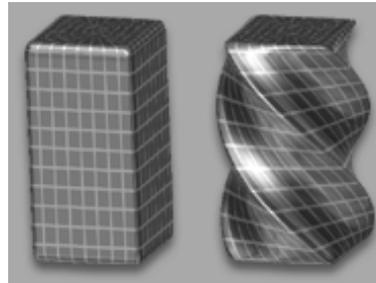
Flattens the object from the left or right edge to the center as viewed in the Image Preview window. The direction of flattening depends on which way you drag the slider. Default= 0%. Range= -100% to 100%.



Flatten (original left, flattened right)

Twist

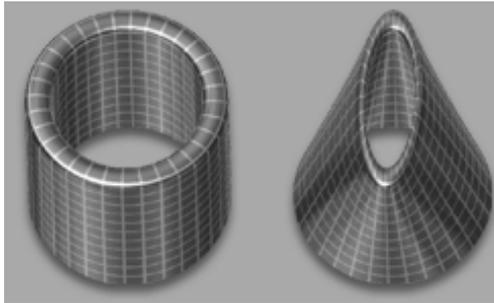
Applies a twist along the in-out axis as viewed in the Image Preview window. The direction of the twist depends on which way you drag the slider. Default= 0%. Range= -100% to 100%.



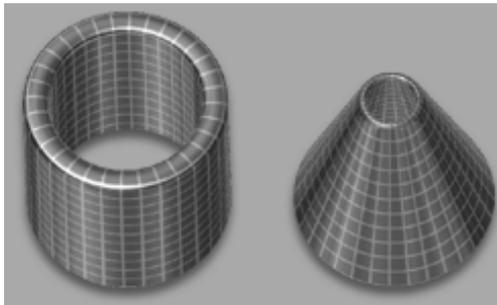
Twist (original left, twisted right)

TaperX/TaperXZ

Tapers the object by scaling it successively smaller or larger from the top to the bottom, as viewed in the Image Preview window. TaperX tapers width only; TaperXZ tapers width and depth simultaneously. Default= 0%. Range= -100% to 100%.



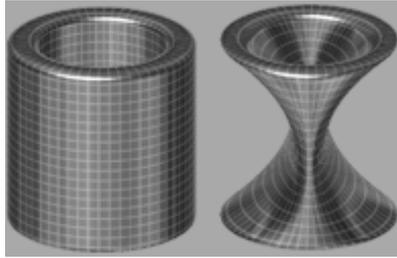
TaperX (original left, tapered right)



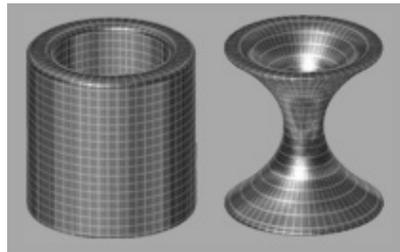
TaperXZ (original left, tapered right)

SquizX/SquizXZ

Squeezes or expands the object about the pivot point, depending on the direction you drag the slider. SquizX squeezes width only; SquizXZ squeezes width and depth simultaneously. Default= 0%. Range= -100% to 100%.



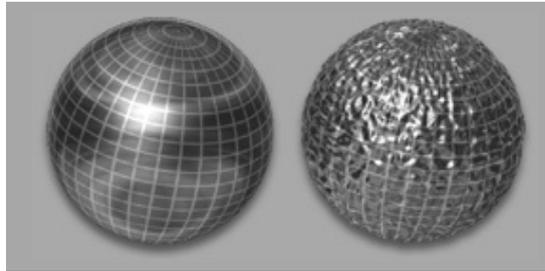
SquizX (original left, squeezed right)



SquizXZ (original left, squeezed right)

Noise

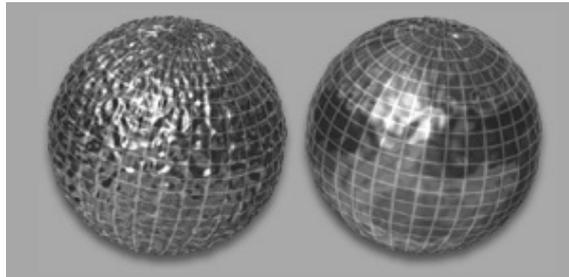
Applies a noise effect to an object, giving it an uneven surface. Default= 0%. Range= -100% to 100%.



Noise (original left, Noise applied right)

Smooth

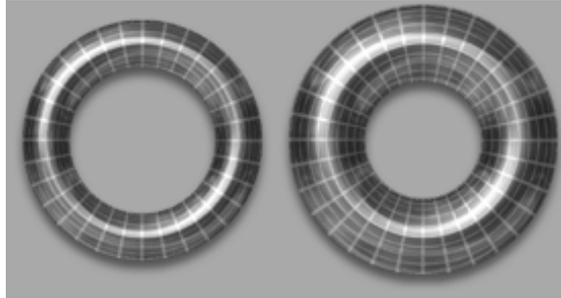
Smooths an object, making the surface more even. Default= 0%. Range= -100% to 100%.



Smooth (original left, smoothed right)

Inflate

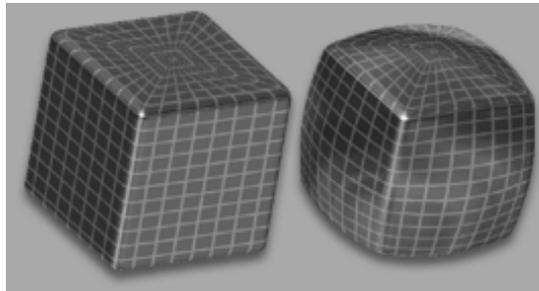
Makes an object larger or smaller on all axes by pushing polygons out or in along their surface normals. This tends to produce smoother edges than simply scaling an object. Default= 0%. Range= -100% to 100%.



Inflate (original left, inflated right)

Spherize

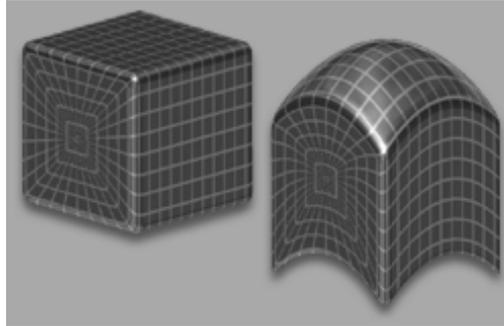
Moves an object's polygons into a spherical shape when dragged to the right. When dragged to the left, can have a deflating effect. Default= 0%. Range= -100% to 100%.



Spherize (original left, spherized right)

Gravity

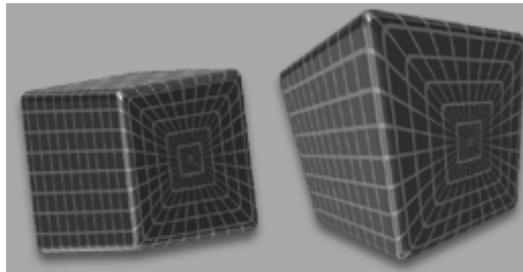
Adds a gravity (or anti-gravity) effect by moving polygons successively downward or upward, depending on their distance from the pivot point. Default= 0%. Range= -100% to 100%.



Gravity (original left, gravity applied right)

Perspective

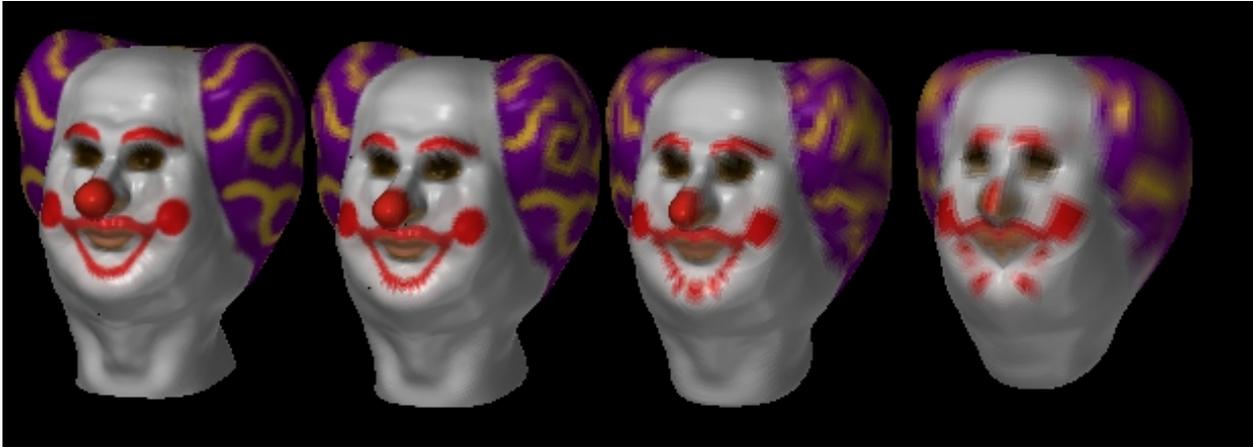
Adds a perspective effect by scaling farther polygons larger and closer polygons smaller. Dragging to the left has the opposite effect. Default= 0%. Range= -100% to 100%.



Perspective (original left, perspective applied right)

Optimize

Intelligently reduces the number of polygons in an object while attempting to retain its shape. The more you optimize an object, the more detail it loses.



Successive optimizations, from left to right: 0, 100%, 200%, and 300%

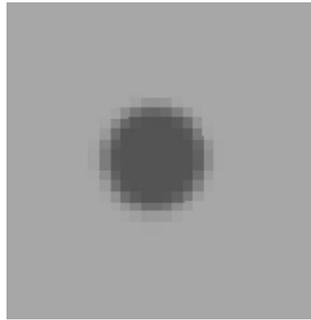
Divid(e)

Increases an object's resolution by subdividing its polygons. Use this to enable the addition of detail to an object.



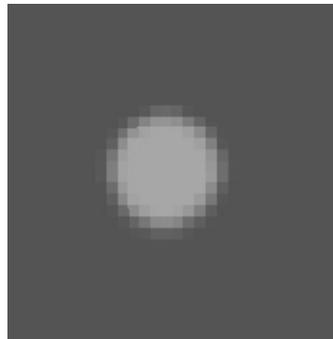
NOTE: You can use masking to better control the Divide operation; the Divide operation is applied to the unmasked area. Typically, parts of the masked area will be subdivided as well, but not as much as without masking. Here's the procedure:

- 1 Draw a 3D object in the canvas. This example uses the Plane 3D tool.
- 2 Press **T** to enter Edit mode, and then **Ctrl-drag** on the object to paint a mask on the area or areas you want to subdivide. To change the size of the Edit brush, use the **Draw palette > Draw Size** slider.



Mask painted onto default plane

- 3 In the Tool palette, under **Modifiers > Selection**, click the Inv button to invert the selection. This unmask what you painted in step 2, and masks everything else. Masked areas won't be subdivided, for the most part.



Mask Inverted

- 4 In the Tool palette, under **Modifiers > Deformation**, set **Divid** to about 50%. This adds resolution to the unmasked area(s) as well as all connecting polygons. Thus, these areas can support more highly detailed sculptural and painting operations.



Divid applied at 50% (stripes result from subdivision of connected polygons)

Initialize Sub-palette

The Initialize sub-palette settings vary with each 3D object. You can find definitions of the Initialize settings common to most 3D objects in the introductory topic to this section—[List of 3D Objects](#)—and of settings unique to each tool in the respective tool's section, above.

Inventory Sub-palette



Load Tool

Loads a tool in ZBrush's ZTool (.ztl) format, and adds it to the Tool palette.

Clone

Creates a copy of the current tool and adds it to the Tool palette.

Save As

Saves the current object in ZBrush's ZTool (.ztl) format, for use in later sessions.

Export Options

Set all the options in this group before exporting.

Obj

Sets the .obj format for export.

Dxf

Sets the .dxf format for export.

Qud

Uses Quad (four sided) polygons for export. The preferred method for .obj

Tri

Uses triangular polygons for export. The preferred method for .dxf

Txr

Includes the applied texture with the exported output

Flp

Flips the texture top to bottom at export for applications that require it.

Mrg

Merges points that are in the same location at export.

Grp

Includes grouping information in export.

Scale

Scales the entire export. Range= 0.1 to 100. Default= 1.

Export

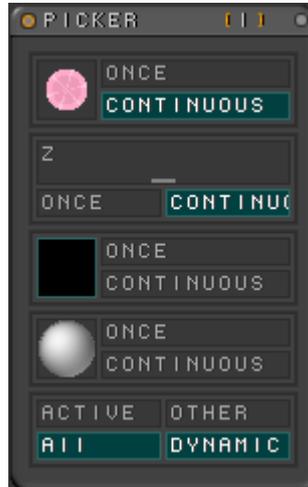
Exports the object using the settings above.

Conclusion

In ZBrush's Tool palette resides the heart of the program. The breadth and depth of functionality to be found here is such that you can spend weeks just learning the ropes, and it could conceivably require months to learn to fully exploit the toolset, especially in conjunction with the practically endless combinations of settings available in the other ZBrush palettes. We encourage you to take as much time as possible to explore and use these tools, so you can make the most of them for expressing your artistic inspiration.

As powerful as these tools are, they are only a glimpse of the possibilities inherent in ZBrush. We at Pixologic are committed to continue the addition of innovative new tools and to improve the functionality of the existing tools. This will allow you – the artist - to enhance your creativity and your enjoyment of the art creation process.

10 ZBrush 1.23 The Picker Palette



The Picker palette controls how a new brush stroke will interact with the existing orientation, depth, color, and material values of the pixels on the canvas. Like the Stroke types, choosing different picker combinations will change the behavior of each tool dramatically, effectively giving you hundreds of tools to use.



Pencil Tool

Orientation

The orientation section of the picker determines how new brush strokes and objects align themselves to the existing pixels on the canvas. Default= Continuous.



Once



Continuous



Constant

Once

Orients the new stroke perpendicular to the surface at mouse down and keeps that orientation throughout the stroke.

Continuous

Evaluates the pixels under the cursor and orients the stroke perpendicular to them continuously .

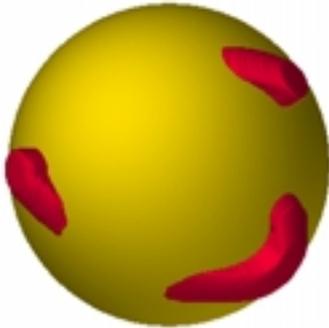
Constant

Orientation is determined by the pencil tool and stays constant throughout the stroke. All objects and strokes will be created at this orientation. Click and drag on the pencil tool to turn on Constant orientation and set the angle.



Depth

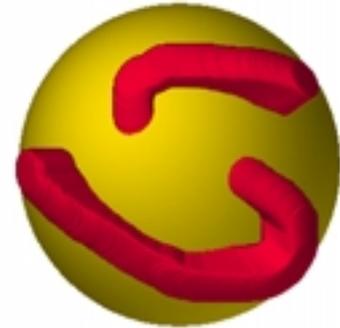
The Depth section of the picker determines how new brush strokes and objects position themselves relative to the existing pixels depth. Default= Continuous.



Once



Continuous



Constant

Once

Aligns to the surface depth at mouse down and keeps that depth throughout the stroke.

Continuous

Continuously evaluates the pixels under the cursor and adjusts to their depth.

Constant

Depth is determined by the Z slider. You can enter a value numerically or click and drag to the canvas and “pick” depth values from it. All objects and strokes will be created at this depth.



Color

The Color section of the picker determines how new brush strokes and objects are colored relative to the existing pixels color. Default= Constant.



Once



Continuous



Constant

Once

Evaluates the surface color at mouse down and keeps that color throughout the stroke.

Continuous

Continuously evaluates the pixels under the cursor and takes on their color.

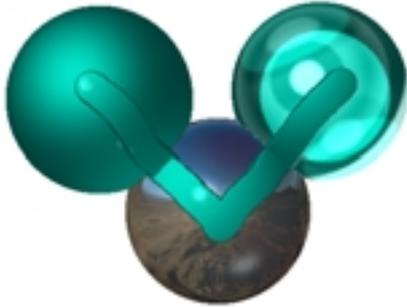
Constant

Color is determined by the main color set in the Color palette.

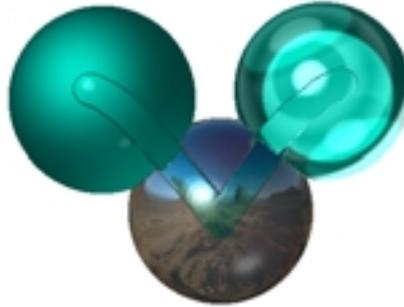


Material

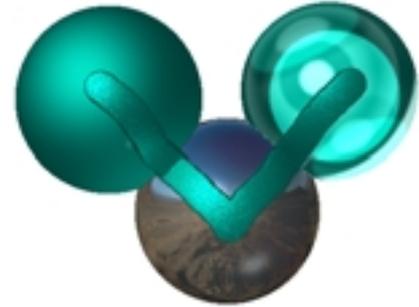
The Material section of the picker determines how new brush strokes and objects are assigned material properties relative to the existing pixels material. Default= Static.



Once



Continuous



Constant

Once

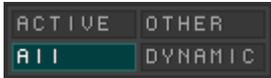
Evaluates the surface material at mouse down and keeps that material throughout the stroke.

Continuous

Continuously evaluates the pixels under the cursor and assigns that material to the current tool.

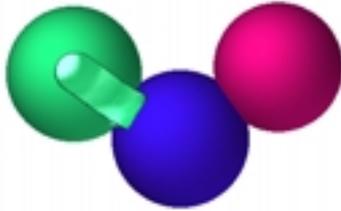
Constant

Material is determined by the active material in the Materials palette.

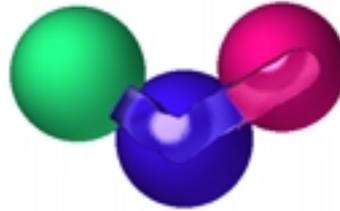


Layer

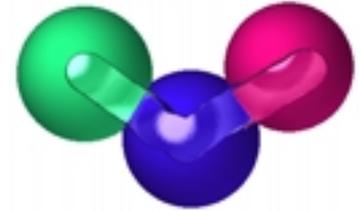
The Layer section of the picker determines how new brush strokes and objects are assigned properties relative to the existing pixels in multiple layers. A control is also available for dynamic build-up. Default= All.



Active



Other



All



Each sphere is on a separate layer

Active

When active, only the active layer is evaluated when assigning values to a stroke.

Other

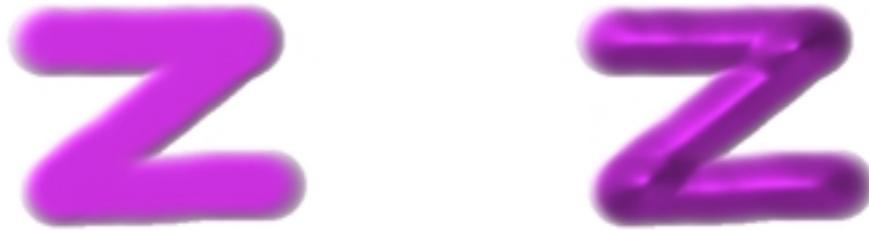
When active, all other layers (not the active layer) are evaluated when assigning values to a stroke.

All

When active, all layers are evaluated when assigning values to a stroke.

Dynamic

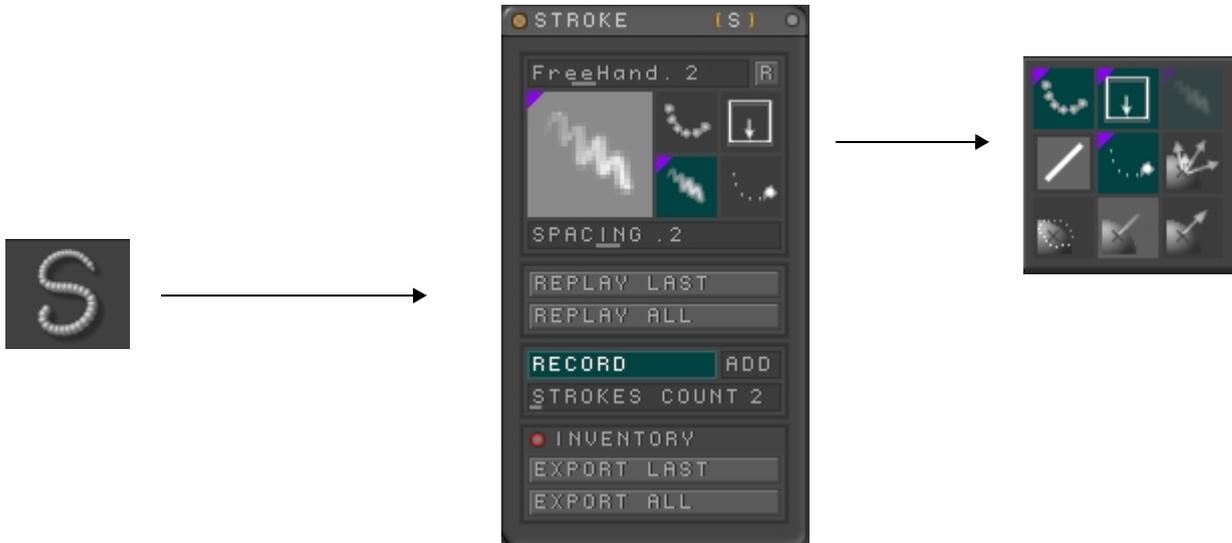
When making a stroke, ZBrush can evaluate one of two images to assign values to the stroke. ZBrush retains an image before the stroke and an image as the stroke is being made. When Dynamic is on, information is taken from the image as it is being made, allowing for build-up effects.



A Simple Brush stroke, with Dynamic off (left) and on (right).

11

ZBrush 1.23 The Stroke Palette



The stroke type determines how ZBrush will interpret mouse down, mouse movement, and mouse up actions with the selected tool. You can change the behavior of each tool by using different stroke types. One tool using four different stroke types is the equivalent of having four tools. Even with the hundreds of combinations already available, more stroke types are being created and will be included in future versions of ZBrush.

Selecting Stroke Types

The active stroke is shown in the large thumbnail at the top left of the palette. Several other strokes are shown in smaller thumbnails in the rest of the main palette; you can switch the active stroke to one of these by clicking its thumbnail.

You can see the full selection of available strokes by clicking the active stroke; either its large or small thumbnail in the main palette.

This opens the above pop-up icon menu, which works the same as others in ZBrush, such as those in the Tool and Material palettes. In this menu, the active stroke is grayed out to indicate that you can't select it (again). Strokes that appear in the main palette have a purple triangle in the upper-left corner of the thumbnail, and strokes that aren't displayed in the main palette have a gray triangle.

To see the name of a stroke, hold the mouse cursor over its thumbnail for a moment until the label appears. To choose a stroke, click its thumbnail. When you choose an stroke that doesn't appear in the main palette, it's made the active stroke, and its thumbnail is added to the main palette. When you choose a stroke that appears in the main palette (excepting the active stroke), it's removed from the main palette. The main palette expands or shrinks as necessary to accommodate the displayed thumbnails.

Stroke Types

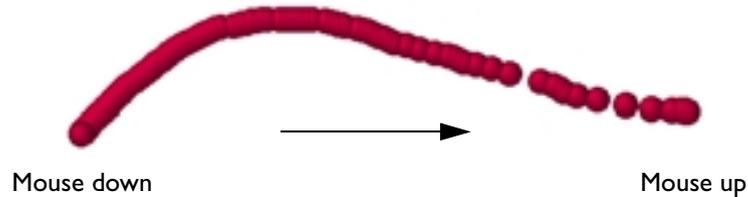
The action of the stroke type depends on which tool is selected, so experimentation is the key to learning all the combinations. Each brush has different capabilities and will react in a unique way. All of the 3D object tools react to stroke type in the same way.

A 3D sphere tool is used for all the following examples:



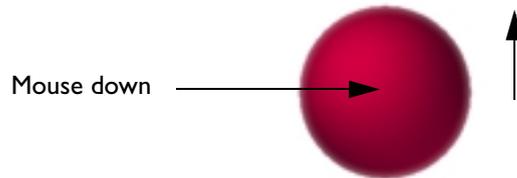
Dots

Mouse down will determine the starting point of the stroke, mouse movement draws spheres with a diameter determined by the Draw Size setting [See “Draw Size” on page 85](#). Spacing is determined by the speed of mouse movement. Mouse up will end the stroke.



Drag Rectangle

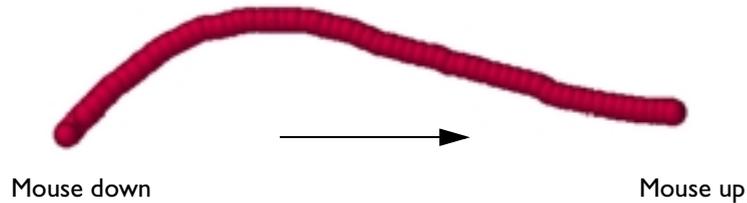
Mouse down will determine placement of the object, mouse movement will determine its size, and mouse up will create the object. This is the default stroke type for 3D objects.





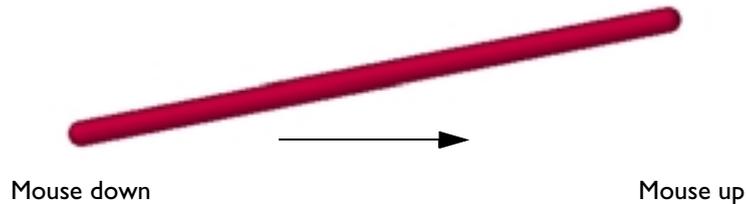
Freehand

Mouse down will determine starting point of the objects, mouse move draws spheres with size determined by the Draw Size setting. Spacing is determined by the spacing slider. Mouse up will end the stroke.



Line

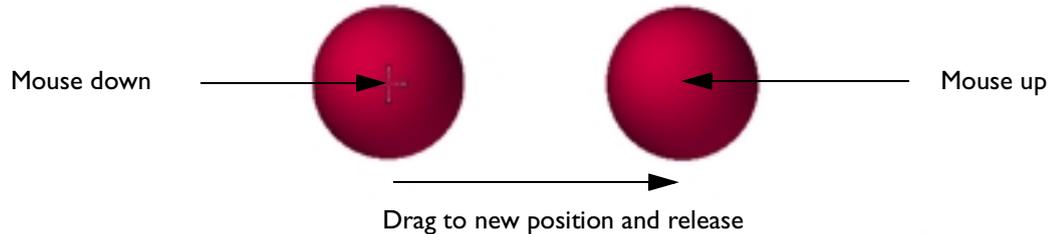
Mouse down will determine starting point of the objects, mouse move draws spheres with size determined by the Draw Size setting. Spacing is determined by the spacing slider. Mouse up will end the stroke in a straight line from the starting point.





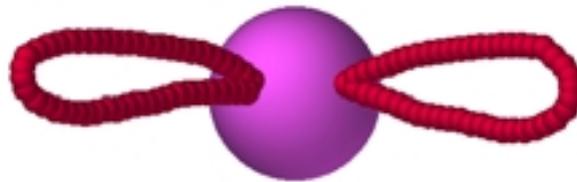
Drag Dot

Mouse down will create one instance of the sphere with size determined by the Draw Size setting. Mouse move will position the sphere and mouse up will place the instance at that position.



Conic

Mouse down will determine starting point and direction of the objects, mouse move draws spheres with size determined by the Draw Size setting and spacing determined by the spacing slider. The initial direction of the stroke is aligned to the surface that the stroke begins on. If the stroke returns to the starting point, its direction will be aligned again. Mouse up will end the stroke.

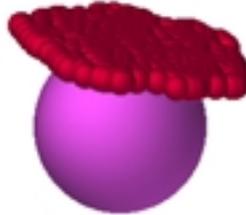


Two Conic strokes



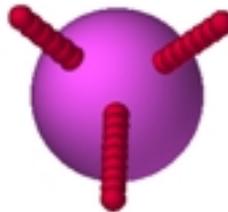
Planar Dots

Mouse down will determine starting point and direction of the objects, mouse move draws spheres with size determined by the Draw Size setting and spacing determined by the spacing slider. The direction of the stroke is aligned tangentially to the surface that the stroke begins on. Mouse up will end the stroke



Line 90

Mouse down will determine the starting point and direction of the line object, mouse move draws a line with diameter determined by the Draw Size setting. The direction of the stroke is aligned perpendicular to the surface that the stroke begins on. Mouse up will end the stroke





Ray 90

Very similar to Line 90, Ray 90 allows build-up of material by moving the mouse back and forth before release.

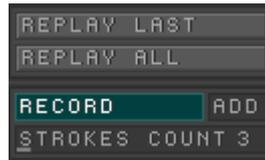


SPACING

Spacing

The spacing slider controls the spacing between the instances in the stroke. A spacing of 0.5 will place the instances one-half of their diameter apart. A spacing of 2 will place the instances two times their diameter apart. Range= 0 to 2. Default= 0.75

Recording and replaying strokes



Replay Last

Replays the last stroke. You can play back the stroke using different tools, colors, and sizes.

Replay All

Replays all recorded strokes. You can play back the strokes using different tools, colors, and sizes.

Record

Press to begin recording strokes. Press again to end recording strokes. Only the stroke is recorded.

Add

When pressed, strokes that are recorded will be added to the current recording. If not enabled, recording will overwrite the current recording.

Strokes Count

Indicates the number of strokes in the current recording.

Inventory



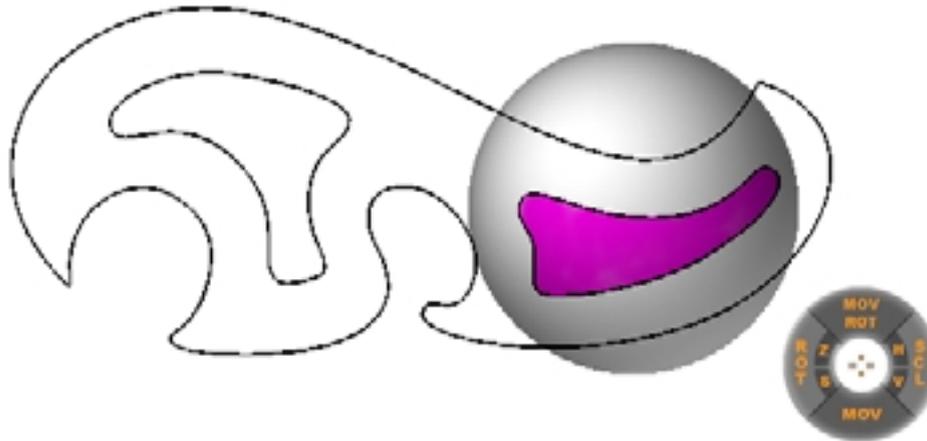
Export Last

Exports the last stroke as a ZScript text file.

Export All

Exports all recorded strokes as a ZScript text file.

12 ZBrush 1.23 The Stencil Palette



Using the Stencil

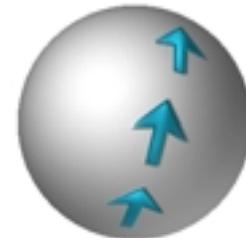
The ZBrush Stencil behaves like the drawing tool we are all familiar with. Position the stencil and paint or model around and through it. Use the default “French Curve” stencil or use a custom shape. Here’s how:

- 1 Open the Stencil palette and activate the stencil. The default “French Curve” stencil will appear.
- 2 Re-size and position using the StencilCoinController. See “The StencilCoinController” on page 236.
- 3 Paint or model around or through the stencil.

Custom Stencil shapes

From standard Alpha shapes

You can create a stencil from the currently selected alpha by pressing the **Alpha > Make ST** button on the Alpha palette. See “The Alpha Palette” on page 38.



From Imported files

The Alpha palette will import .bmp (Windows Bitmap), .psd (Photoshop), or PICT (Mac). If you import color images, they will automatically be converted to grayscale. You can then press **Make Stencil** to use as stencils.

Palette controls

Stencil

Activates the stencil feature.

Inverse

Inverts the properties of the stencil. Open areas become closed. Closed areas become open.

Interactive

Enables the StencilCoinController. See [“The StencilCoinController” on page 236](#).

Stretch

Scales the stencil to fit the canvas area

Actual

Returns the stencil to actual size.

Horiz

Proportionally scaled to fit the horizontal size of the canvas.

Vert

Proportionally scaled to fit the vertical size of the canvas.

Wrap Mode

Fits the stencil to the underlying object topography.

Res

Higher values produce a more accurate wrap with a slower interaction speed. Range= 8 to 256. Default= 64.

Smooth

Higher values produce a smoother wrap. Range= 0 to 32. Default= 4.

Show

Shows/hides the stencil.

R

Stencil color control. When used alone, stencil will be red. Can be used in combination with G and B.

G

Stencil color control. When used alone, stencil will be green. Can be used in combination with R and B.

B

Stencil color control. When used alone, stencil will be blue. Can be used in combination with R and G.

E

Elevation mode. Turns off the usual stencil display and shows it as a tonal variation on the surface of the object.

The StencilCoinController

Place your cursor in an open area of your canvas. Hold down the **Space** bar. The StencilCoinController will appear at your cursor position. Still holding down the **space** bar, click and drag on a command on the control coin to position or resize the stencil.

Move absolute

Moves stencil relative to the object.
The stencil is oriented tangent to the surface of the object.

Scale horizontal

Scales the stencil horizontally

Uniform scaling

Scales horizontally and vertically.

Scale vertical

Scales the stencil vertically

Move relative

Moves stencil relative to the screen.

Rotate S

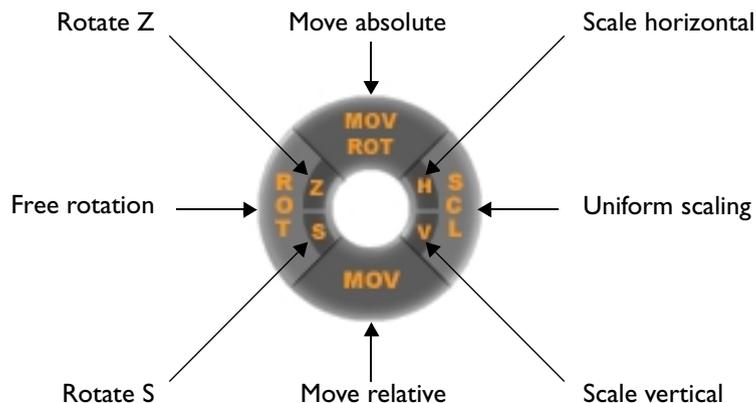
Rotates the stencil on the **Z** axis of the screen.

Free rotation

Rotates the stencil in any direction.

Rotate Z

Rotates the stencil on its **Z** axis.

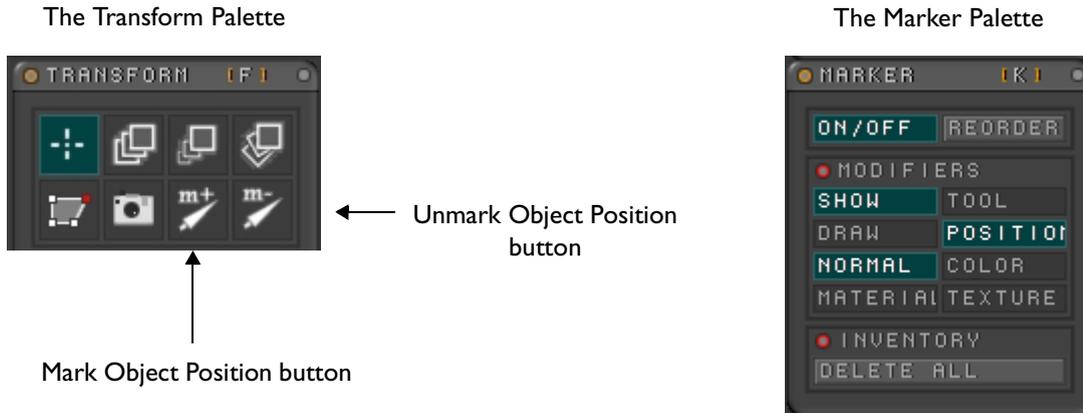


13

ZBrush 1.23 The Marker Palette

Introducing Markers

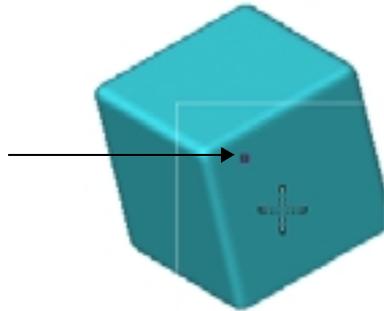
ZBrush uses markers to remember an object's properties, so that you can return to the marker at any time and use it as a reference point for other objects or to re-create the object.



Markers are placed from the Transform palette and their properties are set from the Marker palette. If any markers exist in the current document, you can tell by a small yellow square that appears at the marker position when the cursor is in its vicinity.

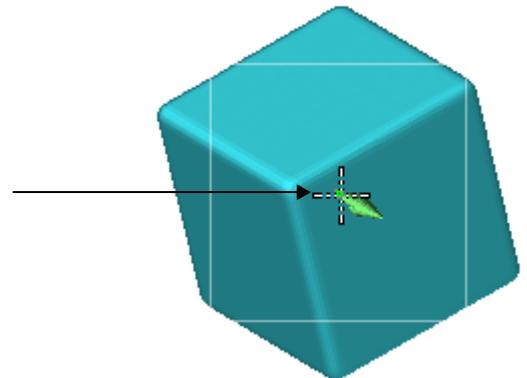
Placing Markers

The small square indicates a marker position

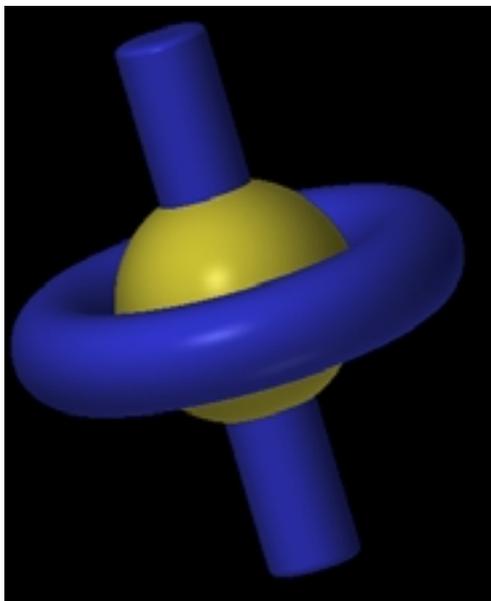


To mark the active 3D object's position, click the Mark Object Position button. You'll see a marker move from the palette to the object, indicating that the marker has been set. Then, when you position the cursor near the marker, a square appears, indicating a marker position. See [“Marker Radius” on page 292](#). When you position the cursor over the marker position, an arrow appears that indicates that the marker will be used as the center of a 3D object, if you draw one. Choose the marker color by setting the main color in the Color palette before placing the marker. See [“Main and Secondary colors” on page 25](#). By default, an object that you draw using a marker also uses the orientation of the object you originally used to place the marker, at the time you placed the marker. That is, the marker remembers any rotations that you made to the object before placing the marker, and can apply that orientation to new objects that you draw using the marker.

An arrow appears when the cursor is directly over a marker



For example, in the illustration below, the sphere was drawn first, then a marker was added, and then the marker position was used to draw the torus and cylinder concentrically with the sphere.



A single marker was used to create several objects with the same center position

Here are several additional facts about markers:

- If you use a marker to draw with the Dot stroke type (use a single click), the tool also remembers any scaling you've applied to the object you used to place the marker. If you've created a drawing using scaled and rotated 3D objects, placing markers for each object, you can then re-create the drawing using different-colored objects by undoing all the objects and using the Dot stroke type with the markers, changing colors as you go.
- You can set up to 64 markers in a document.
- Markers are saved with the document.

- Objects are not saved with the document, but you can take advantage of markers and ZBrush's Layers feature to replace custom objects after you've saved a document. For example, say you create a person's head and a hat, save each as a separate .ztl file, and then place the two objects on separate layers, applying markers to each. Later, you might decide you want to modify the hat. You can go back and delete the layer containing the hat, reload the object into that layer, place it at the original position using the marker, and then apply any transforms and/or editing you like.
- The **Edit palette > Clear** function (**Ctrl+N**) does not remove markers from the document.

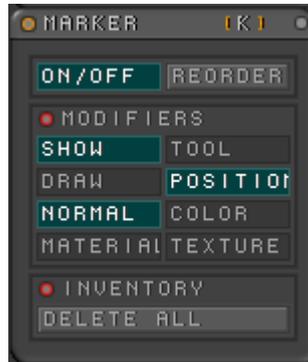
Use the **Unmark Object Position** button to remove a marker from the document. If the document contains only one marker, clicking the icon will remove that marker. If the document contains more than one marker, follow this procedure:

- Determine which marker you want to remove.
- Use that marker to draw any 3D object. This tells ZBrush that this is the marker to remove.
- Click **Unmark Object Position** to delete the marker.
- If you like, use **Undo (Ctrl+Z)** to remove the object you drew in step 2.



*NOTE: The maximum distance that your cursor can be from the marker before its yellow square disappears is set in **Preferences > Marker Radius**.*

The Marker Palette



The default Marker Palette

The Marker Palette contains controls for turning markers on and off and for enabling recall of various properties.

On/Off

Turns all markers on and off without deleting them.

Reorder

Reverses creation order of markers. When two markers occupy the same position, the most recently created will be selected when you click on the position. Reorder markers to select the older marker.

Modifiers:

Show

When Show is off, there is no indication that you are near a marker, but when directly over it, the red arrow appears.

Each Marker remembers all of the properties below, but only the items selected will be recalled:

Tool

Enables recall of the tool used to create the marked object. Click once on the marker to shift to the marked tool, then a second time to re-create the marked object.

Draw

Enables recall of the drawing mode used to create the marked object; for example ZAdd, ZCut.

Position

Enables recall of the position of the marked object.

Normal

Enables recall of the orientation of the marked object.

Color

Enables recall of the color of the marked object.

Material

Enables recall of the material of the marked object.

Texture

Enables recall of the texture of the marked object.

Inventory

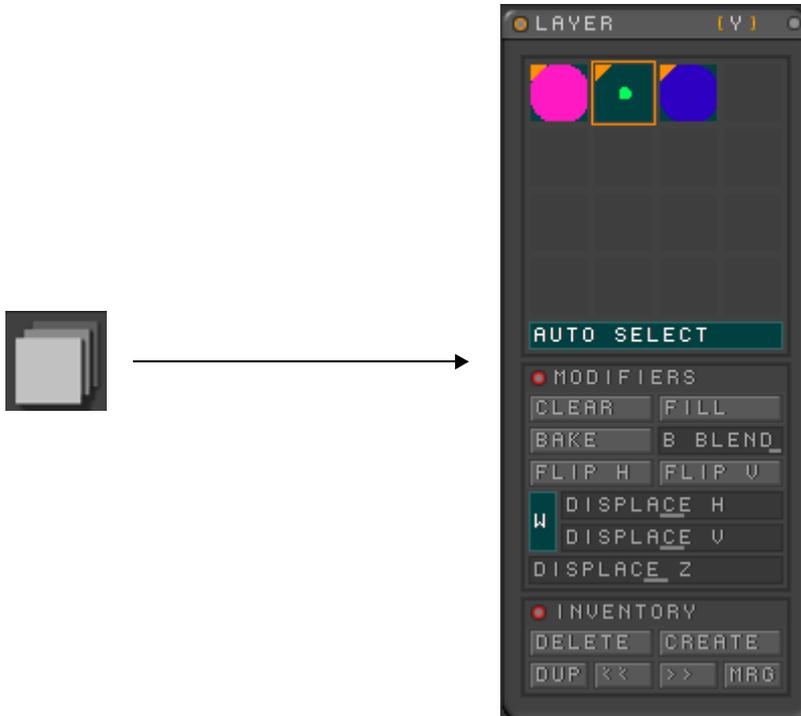
Delete All

Deletes all markers in the file.

Conclusion

ZBrush marker technology is a powerful way to align and edit objects. In addition to the uses mentioned here, markers are used with the MultiMarker tool. [See “MultiMarker” on page 182.](#) All markers will be saved with the ZBrush (.zbr) file.

14 ZBrush 1.23 The Layers Palette



The Layer palette, with Modifiers and Inventory sub-palettes expanded

ZBrush lets you work in a number of different layers in a single document. Each layer is a bit mapped image the full size of your canvas. It essentially serves as a separate document, but its contents can interact with the other layers.

Layer interaction in ZBrush is different from that found in other software you might be familiar with. In most 2D graphics programs, a pixel is visible only if it's in the uppermost layer, or if it's in a lower layer but all pixels above it (that is, in higher layers) are transparent. In ZBrush, the visibility of any given pixel depends only on its height, or Z-axis position. For instance, you can move a layer containing a sphere in front of a layer containing a cube, partially hiding the cube.

By default, ZBrush starts with a single layer. You can add and delete layers, work in any existing layer, move layers in three dimensions, and combine and hide layers. As documented in the Materials chapter, you must use layers for transparency to be visible in the document.

Opening the Layer Palette



The Layer button

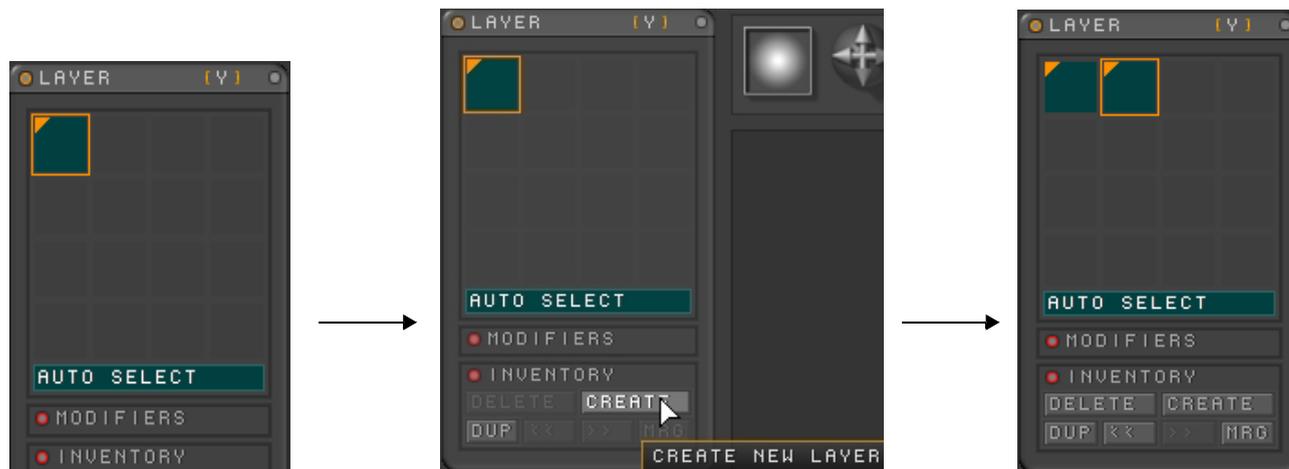
By default, the Layer palette doesn't open when you start ZBrush. To open it, press **Alt+Y** or click the Layer button in the row of icons above the document window. To close it, press **Alt+Y** or click the Close button in the upper-right corner.



The Layer palette, default view

Working with Layers

The Layer palette shows a thumbnail for each layer in a separate slot. When you start ZBrush, only one layer exists. To add a layer, open the Inventory sub-palette, and click the Create button. This creates a new layer above the active layer, and activates it.



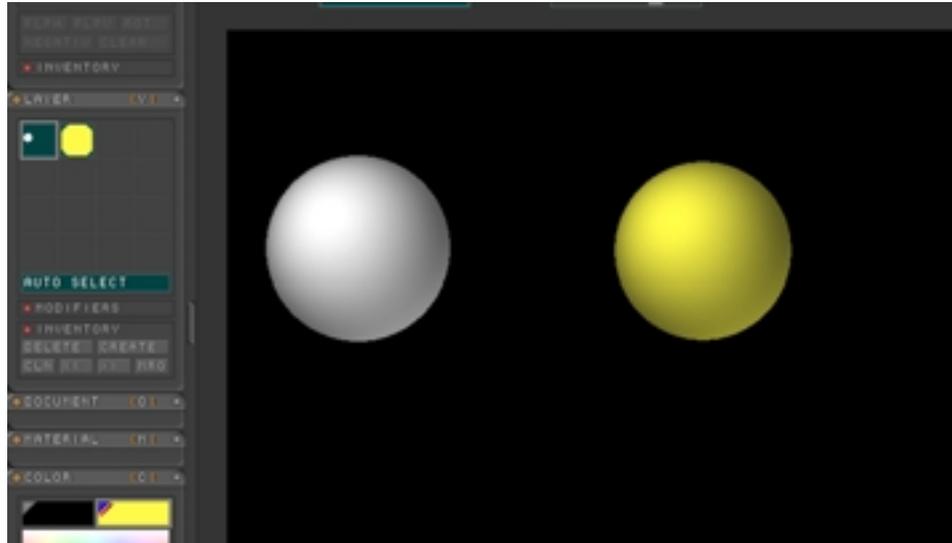
You can continue adding layers, up to a total of as many layers as there are slots in the Layer palette. However, only one layer can be active at a time.

The thumbnail for the active layer is outlined with a gold line. This is the layer that you'll be working in if you draw in or edit the document. To activate a different layer, click it.



NOTE: If you have a floating object in the current layer and then activate or create another layer, the software makes a snapshot of the floating object, so it can no longer be manipulated independently of the rest of the layer.

ZBrush automatically zooms the thumbnails of inactive, visible layers so that their pixels fill the thumbnail. For example, in the following illustration, Layer 1 contains a white sphere, while Layer 2 contains a yellow sphere. Because Layer 1 is active, the yellow sphere in Layer 2 fills the thumbnail.



The inactive Layer 2 thumbnail zooms in on the yellow sphere

To hide a layer, activate it, and then click its thumbnail. The thumbnail's teal background turns gray to indicate that it is now hidden. But as long as the layer is active, its contents remain visible. The layer becomes hidden only when you activate a different layer. To unhide a hidden layer, activate it, and then click it again so that the background becomes teal.



NOTE: To toggle the visibility of all layers, **Shift+click** the active layer.

Drawing in Multiple Layers

When you have pixols in different layers, and you add a new object, by default ZBrush uses the frontmost pixol to determine orientation, regardless of which layer it's in. For example, if you have a sphere in Layer 1, and then you activate Layer 2 and start to draw a cylinder on the sphere, the cylinder is drawn perpendicular to the sphere's surface, even though the sphere is in a different layer.

You can change this behavior with three buttons in the Picker palette. By default, the All option is active, and ZBrush works as described in the previous paragraph. If you turn on the **Picker palette > Active** option, then the software recognizes only pixols in the active layer for drawing new objects. If you turn on the **Picker palette > Other** option, then ZBrush recognizes only pixols in inactive, visible layers.

Auto Select

This feature lets you switch quickly among layers without having to explicitly activate the desired layer. To use Auto Select, press and hold the Tilde key (~), and in the document, click a pixol that belongs to the layer you want to activate. Default= on.



***NOTE:** After activating a layer with Auto Select, release the Tilde key before you start to draw. If you drag the mouse in the active layer with the Tilde key held down, you scroll the layer instead of drawing.*

Modifiers Sub-palette:

Clear

Deletes all pixols from the current layer.

Fill

Fills the current layer with the current color. Or, if a texture is active, Fill uses that texture instead, resizing it as necessary to fill the canvas.

Bake

Converts all pixols in the active layer into base colors. The pixols retain color and position information, including any color changes introduced by shading, but lose material information. All pixols are converted to the Flat Color material.

You can see how this works by starting ZBrush, and then following this procedure:

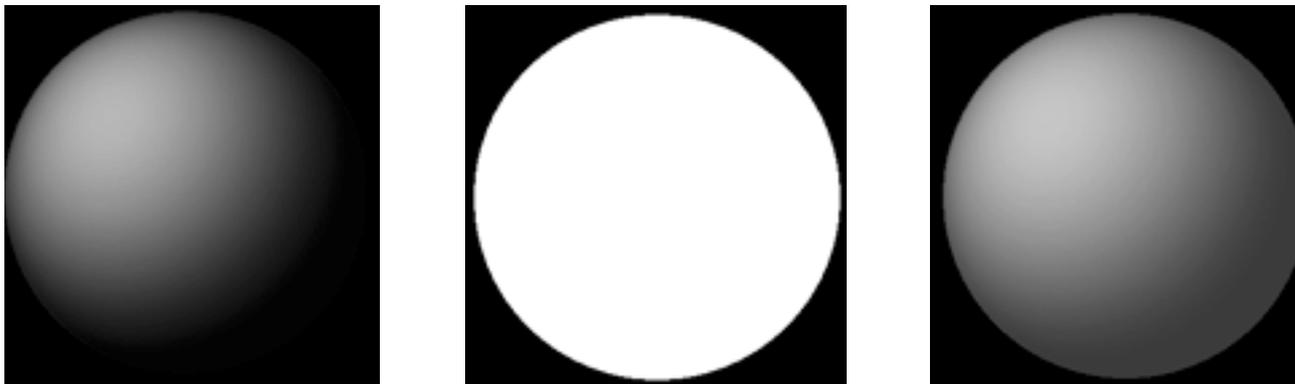
- 1 Add a sphere.
- 2 In the Render palette, click the rightmost icon (Flat Renderer). The sphere's shading is no longer visible.
- 3 Return to the Preview Renderer to make the shading visible again.
- 4 Open the Light palette and move a light source (the gray square over the large sphere) while observing how the shading changes.
- 5 Bake the layer.
- 6 Move the light source again. The shading no longer changes, because the default FastShader pixols have been converted into base colors in the Flat Color material, which doesn't respond to lighting changes.
- 7 Activate the Flat Renderer again. The shading remains, because it has been "baked" into the document's base colors.

B Blend (Bake Blend Amount)

Sets the amount of blending between shaded and unshaded pixols when Bake is performed.

This numeric setting determines the percentage of each shaded pixol to be used, and the setting subtracted from 100 determines the percentage of each unshaded pixol to be used. Take, for example, one pixol of a shaded white sphere. The pixol has a shaded pixol grayscale value of 90, and an unshaded pixol value of 255. If you bake the image at 80% **B Blend**, the software multiplies 0.8 times 90, and adds it to 0.2 times 255, ending up with a pixol grayscale value of 123.

In the following illustration, a sphere is shown with shading (left) and without (center). After baking the layer at 80%, the resulting unshaded image (right) is darker than before, but not quite as dark as the original shaded image.



B Blend lets you control the degree of shading added to the baked image



***NOTE:** Baking a layer at any percentage less than 100 leaves the original shaded pixels (materials, etc.) as they were, and this is combined with the baked image, so the rendered image is usually darker than before. This way, you can set a certain lighting setup, material, etc., bake a percentage of that into the base colors, and then continue modifying lighting, materials, and so on and have that combined with the original setup.*

Flip H/Flip V

Reverses the layer contents horizontally or vertically.

Displace H/Displace V

Lets you move the layer contents horizontally or vertically using the mouse slider, or numerically from the keyboard. If you use the mouse slider, you must release the mouse button to complete the displacement.

You can also move the layer contents horizontally and vertically by holding the Tilde (~) key and dragging in the document window.

W (Wrap Mode)

When on, Wrap Mode causes the pixels in a layer moved horizontally or vertically to "wrap around" to the other side. For instance, if a layer contains a sphere and you move the layer so the sphere moves past the right side of the document, it reappears on the left side. When off, pixels moved past the edge of document are lost. Default= on.

Displace Z

Lets you move the layer contents in and out (in the 3rd dimension) using the mouse slider, or numerically from the keyboard.

You can also move the layer contents on the Z axis by holding the Tilde (~) and **Alt** keys and dragging vertically in the document window. Dragging upward moves the layer away from you, and downward moves it toward you

Inventory Sub-palette

Delete

Deletes the active layer from the document. This operation cannot be undone.

If the document contains only one layer, Delete has no effect.

Create

Adds a new layer to the document above the active layer. The new layer is automatically activated.

Dup (Clone)

Adds a duplicate of the active layer to the document. The new layer appears above the active layer.

Clone is available only if there is at least one empty slot in the Layer palette.

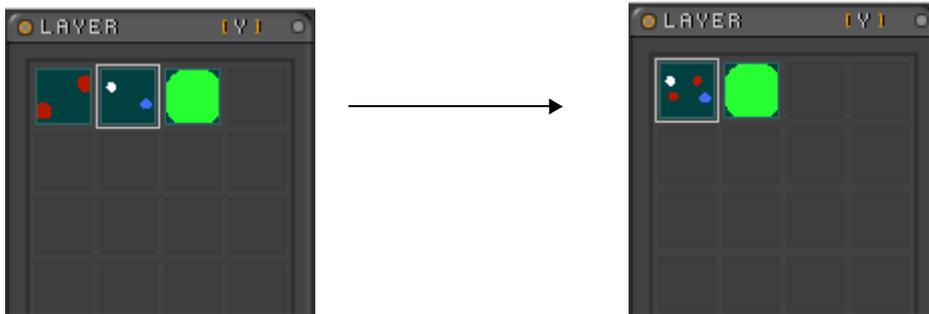
<< (Move Layer Up)/>> (Move Layer Down)

Moves the active layer up or down one slot, switching positions with the layer in the adjacent slot. Use this function to position layers next to one another in preparation for merging them.

Mrg (Merge)

Combines the active layer with the one below it.

In the following illustration, the first layer contains two red spheres, and the second layer contains a blue and a white sphere. After combining the two layers with Merge, the first layer contains all four spheres.



Using Merge on the second layer combines it with the first layer

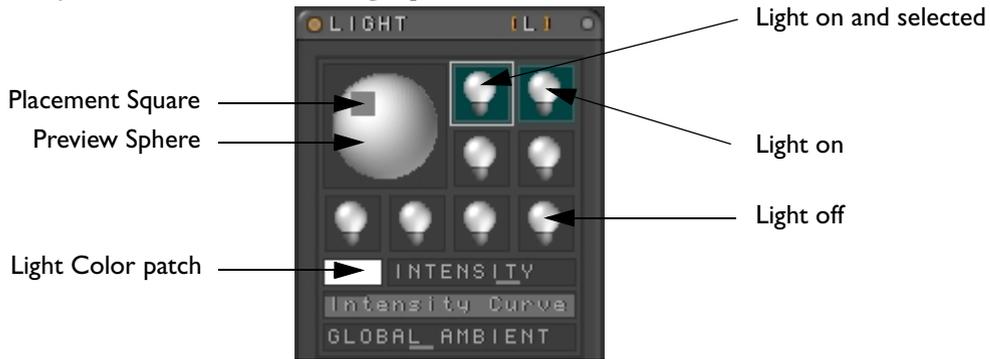
15 ZBrush 1.23 The Lights Palette



Because a ZBrush scene has depth and material properties, virtual lights are required to illuminate the canvas. ZBrush calculates shading based on the number, type, strength, and position of the lights in the scene.

Adding and adjusting lights

You can place up to eight lights in a scene and change their properties at any time. All lighting properties are saved with the ZBrush scene file. By default, ZBrush has one light placed in the scene.



Select a light by clicking on its icon. A white square will surround the icon indicating that it has been selected and the properties of that light will be shown in the rest of the palette. Clicking on the icon again will toggle the light on and off. When the light is on its icon will have a teal background.

The preview sphere in the upper left of the palette shows the combined effect of all the lights in a scene. The small grey square indicates the relative position of the selected light. Click and drag the square to re-position the light or use the Position sub-palette.



NOTE: If you click on the grey square without moving the mouse, the light moves to the back side of the sphere and becomes a back light. Click again to return it to the front.

All of the properties that follow (except Global Ambient) are set for each selected light.

Color

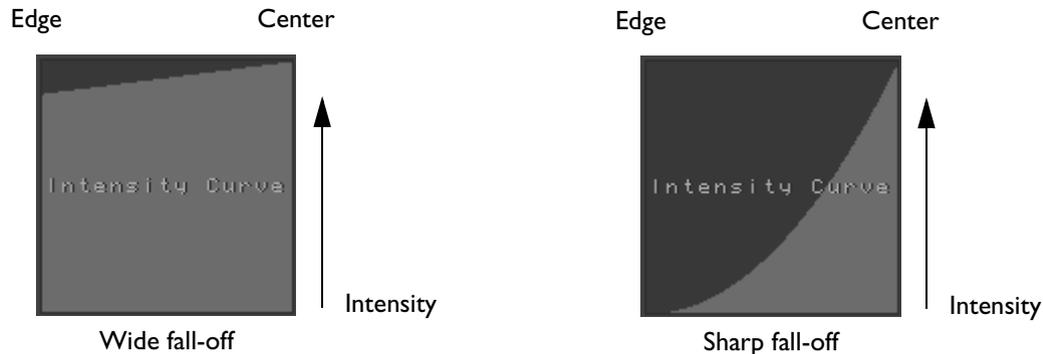
Set by selecting a color with any of the color pickers and clicking on the color patch. You can also click and drag from the patch to the canvas to pick a color. Light color is visible on the preview sphere, but you must be in Best Render mode to see its effect in the scene.

Intensity

Sets the strength of the selected light. Range= 0 to 2.0. Default= 0.85.

Intensity Curve

The intensity curve controls the intensity fall-off from the center of the light to the edge of its effect.



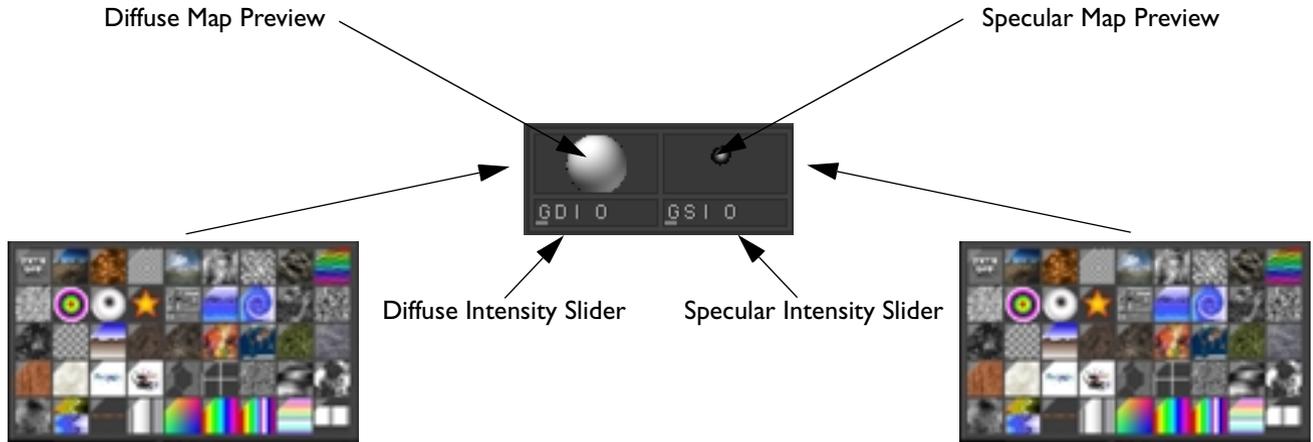
Global Ambient

Sets the amount of non-directional background light. Range= 0 to 100. Default= 15.



NOTE: The amount of ambient light is also set locally for each material in the scene. See "Ambient" on page 56.

Global Light Mapping



Global light mapping is a very efficient way to reduce the amount of system resources needed to light and render a scene. One global light map can replace many lights or free them for other tasks. You can use global light mapping alone or in addition to normal lighting.

The Global Light Mapping Interface

The interface consists of diffuse and specular map previews and their associated intensity sliders. Load a bitmap in either by clicking the preview window and choosing an image from the expanded texture palette that appears.

Global Diffuse Intensity

Range= 0 to 100%. Default= 0.

Global Specular Intensity

Range= 0 to 100%. Default= 0.

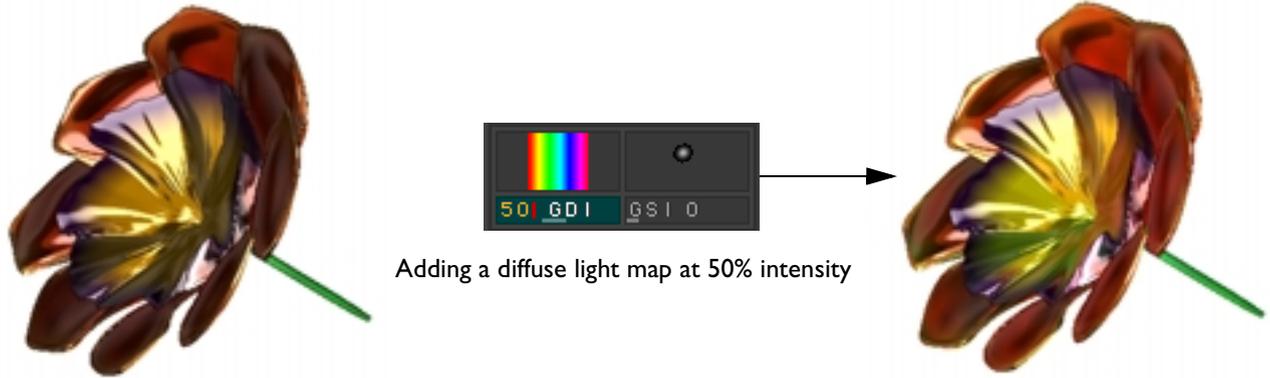
Using Global Light mapping

To make maps that replace existing lights, create diffuse and specular bit map images:

- 1 Light your scene with as many lights as needed.
- 2 Make a new layer. See [“The Layers Palette” on page 244](#).
- 3 Hide the first layer and draw a white sphere with basic material applied. See [“Using the Material Palette” on page 49](#).
- 4 Reduce the material Ambient value to zero. See [“Ambient” on page 56](#).
- 5 Reduce Global Ambient to zero. See [“Global Ambient” on page 256](#).
- 6 Reduce Specular Intensity of the Basic Material to zero. See [“Specular” on page 59](#).
- 7 This white sphere, lit by your unique lighting setup, provides all the information needed for diffuse light mapping. Capture the scene with the MRGBZ grabber. See [“MRGBZ Grabber” on page 148](#). The bit map will be added to your Texture palette.
- 8 Load the diffuse map by clicking on the Diffuse Map Preview and choosing the map you just created.
- 9 Reduce the diffuse intensity of the basic material to zero and return the specular intensity back to its previous value.
- 10 This white sphere, lit by your unique lighting setup, provides all the information needed for specular light mapping. Capture the scene with the MRGBZ grabber. See [“MRGBZ Grabber” on page 148](#). The bit map will be added to your Texture palette.
- 11 Load the specular map by clicking on the Specular Map Preview and choosing the map you just created.
- 12 Hide the current layer and activate the original layer.
- 13 Turn off all lights. See [“Adding and adjusting lights” on page 255](#). Increase Global Diffuse and Global Specular intensity sliders until you duplicate the effect of normal lighting.

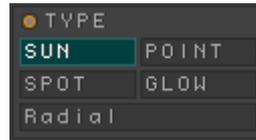
Using Global Light Mapping with existing lights

You can create interesting effects by adding to your existing lighting.



Modifiers

Type

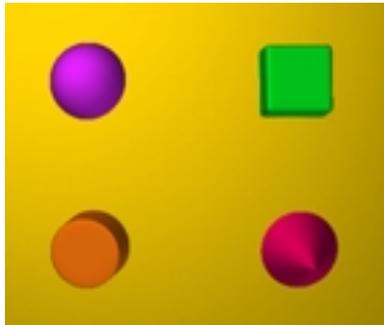


Sun

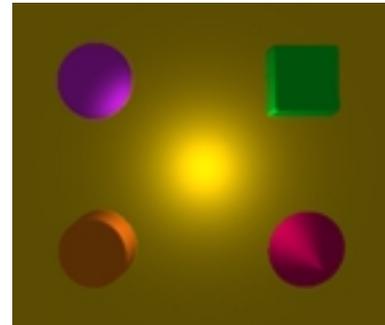
Infinitely far away, the Sun light illuminates the entire scene with parallel rays. The intensity of the light does not diminish with distance, so all objects in the scene receive an equal amount of light.

Point

The point light has a position in the scene and its intensity falls off with distance, so objects further away from the light are illuminated less. Omnidirectional, it casts rays in all directions



Sun Light



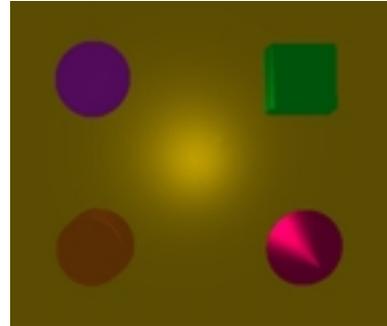
Point Light

Spot

Illuminates in the same manner as the point light, except that it has direction. Use the placement square in the preview window to control direction.



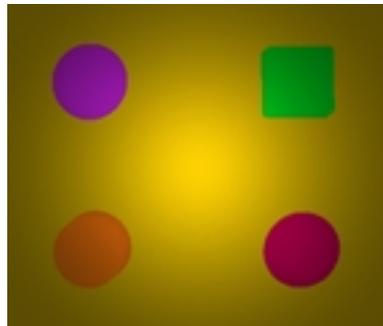
Placement Preview



Spot Light

Glow

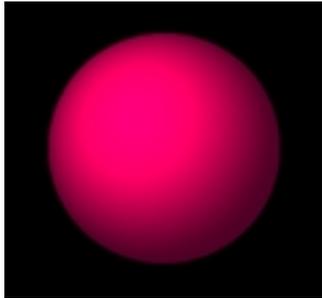
Illuminates all objects within the radius of the light equally, regardless of what direction they are facing.



Glow Light

Radial

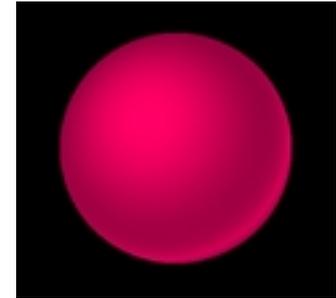
Usual light behavior is to light the areas facing the light brighter than areas facing away from the light. The Radial light illuminates the areas facing away from the light. This makes it a perfect “fill” light when placed at the same position as the main light.



Main light only



Radial light



Main and Radial lights

Placement



P patch

Click and drag from the position patch to the canvas and release to place a light. You can also enter the position of the light numerically:

X Pos

Use the slider or click and type in the X Position here. Range= +1.0 to -1.0. Default= 0.

Y Pos

Use the slider or click and type in the Y Position here. Range= +1.0 to -1.0. Default= -1.

Z Pos

Use the slider or click and type in the Z Position here. Range= +4.0 to -4.0. Default= 1.

Radius

Use the slider or click and type in the radius of the illumination. Range= 0.01 to 4. Default= 0.05.

Shadows



Shadow

Enable shadow casting for the selected light here. Global shadow casting must also be turned on to render shadows. [See “Render Shadows” on page 267.](#)

Intensity

Controls the opacity of the shadow. Range= +4.0 to -4.0. Default= 1.

Length

Since ZBrush scenes are 2 and one-half D, there is no information about the back sides of objects. The shadow renderer treats all objects as if they had infinite depth and the length of the shadow is set here. Range= 0.01 to 4. Default= 0.05.

ZMode

A shadow casting mode that does take object depth into account and produces superior results in some cases. If an object is only partially visible, it may not produce complete shadows.

Blur

Range 1 to 8. Default= 4.

16 ZBrush 1.23 The Render Palette



The render palette controls which methods will be used to calculate the shading of scenes. Lighting, color, and material properties must be evaluated and render level special effects such as fog and depth cueing are included.



Cursor

When you drag the Cursor button to the canvas, a sample area centered around the mouse release position is rendered using the Best Renderer. To re-render the same location after making changes, press **Ctrl-R**.

Render

Causes ZBrush to render the entire document with the current settings.

Best Renderer

Used for the final render, the Best Renderer uses the best (and slowest) methods to produce the highest quality image. Shadows must be rendered using this renderer. If you try to work in the Best Renderer mode, ZBrush will automatically switch to the Preview Renderer. There's one exception to this: if you have a floating object in the scene, you can make changes to its material properties and the Best Renderer will re-render only the object and its bounding box.

Preview Renderer

The default renderer, used when composing a scene. It will show all properties of the scene except shadows. It does show transparency, but the Best renderer is significantly better in most situations.

Fast Renderer

Designed to be used when modeling, the fast renderer does not render materials, only basic shading. This makes it ideal for modeling, since it is very fast and shows surface details due to geometry, not materials. See [“Fast Render” on page 272](#)

Flat Renderer

Allows you to see the scene with no shading, just basic color. See [“Pre and Post Shaded Colors”](#) on page 26

Modifiers



3D Shading

Controls the amount of shading in the render. 0%= flat shading, 100%= fully shaded. Default= 100%

Render Fog

Click to enable the fog effect. The properties of the fog are adjusted in the Fog sub-palette. Used only by the Preview and Best Render mode.

Render Depth Cue

Click to enable the Depth Cue effect. Depth Cue simulates the blurring that results from an object being too close or too far away from a camera. The properties of the depth cue are adjusted in the Depth Cue sub-palette. Used only by the Best Render mode.

Flatten Layers

When active, all document layers are rendered as one layer. Default= on.

Render Shadows

Click to enable shadow rendering. At least one light in the scene must have shadow casting enabled also. Used only by the Best Render mode.

Depth Adjustments

Evaluates which material is assigned to each pixel. Activating Depth Adjustments can clean up intersections between multiple objects in your final render. Enable only when needed. Used only by the Best Render mode.

Color Adjustments

Blurs the image to improve anti-aliasing. See Antialiasing, below. Used only by the Best Render mode.

Antialiasing



Blur

Sets the intensity of the blur. Range= 0 to 100%. Default= 100%.

Edge

Using the depth information in each pixel, ZBrush can blur only the edges in an image. Aliasing is most apparent at the edges of objects. Range 0 to 100%. Default= 25%. A setting of 0% will blur only edges, 100% will blur the entire image.

Size

The number of pixels evaluated when producing the blur. Larger sample sizes produce more blur. Range= 1 to 8. Default= 1.

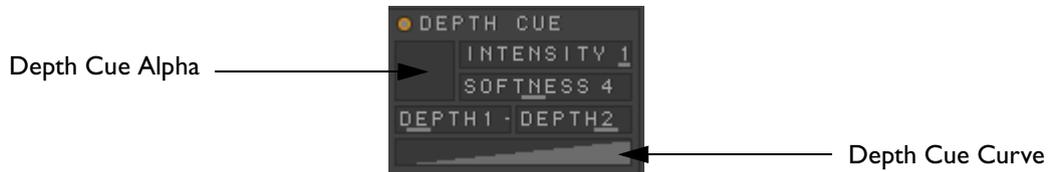
Super Sample

Causes ZBrush to render the same image several times and then average the results for better final quality. Range= 1 to 4. Default= 1. A setting of 2 causes four renders, 3 causes eight renders, and 4 causes 16 renders.



NOTE: The best possible anti-aliasing is produced by working on a canvas that is 2x or even 4x larger than the final size. After rendering, re-size the image to the final size.

Depth Cue



Depth Cue Alpha

You can modify the depth cue effect by using Depth Cue Alpha. Click the Depth Cue Alpha patch to access the texture sub-palette and choose a texture. It will be converted to grayscale and stretched over the entire canvas area. Each pixel of the alpha will determine the intensity of the depth cue at that location. When the alpha is white, there is no effect on the depth cue. When the alpha is black, there is no depth cue effect. Useful for restricting the depth cue effect to a selected area of the canvas.

Intensity

Sets the intensity of the blur at its far point. Range= 0 to 100%. Default= 100%.

Softness

The number of pixels averaged to produce the blur. Higher numbers produce more blur. Range= 1 to 8. Default= 4

Depth 1

Depth 1 is the near point of the depth cue effect. There is no blurring at this distance. The blurring begins as depth increases. Type in the Z depth directly or click and drag from the slider to the canvas to set the value. Pick an object at the depth where you want the depth cue to begin and release.

Depth 2

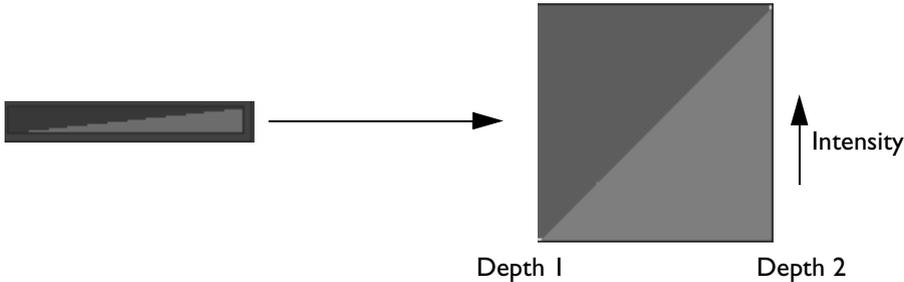
Depth 2 is the far point of the depth cue effect. There is full blurring at this distance. Type in the Z depth directly or click and drag from the slider to the canvas to set the value. Pick an object at the depth where you want the full depth cue effect and release.



A ZBrush fish with Depth 1 set on its nose and Depth 2 set on its tail.

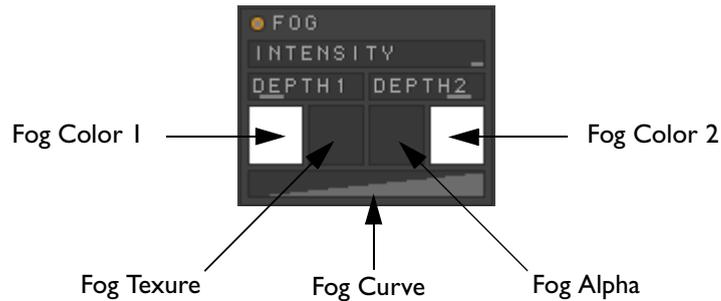


Depth Cue Curve



Clicking on the collapsed Depth Cue Curve area of the sub-palette expands the Depth Cue Curve to its full size. You can adjust the intensity of the depth cue between the near point (Depth 1) and far point (Depth 2) by adjusting the graph. See [“Using the Graph” on page 51](#)

Fog



Intensity

Sets the intensity of the fog at its far point. Range= 0 to 100%. Default= 100%.

Depth 1

Depth 1 is the near point of the fog effect. There is no obscuration at this distance. The fog begins as depth increases. Type in the Z depth directly or click and drag from the slider to the canvas to set the value. Pick an object at the depth where you want the fog to begin and release.

Depth 2

Depth 2 is the far point of the fog effect. There is full fog at this distance. Type in the Z depth directly or click and drag from the slider to the canvas to set the value. Pick an object at the depth where you want the full fog effect and release.

Fog Color 1

Fog Color 1 is the color of the fog at the near point of the fog effect. Set by selecting a color with any of the color pickers and clicking on the Color 1 patch. You can also click and drag from the patch to the canvas to pick a color.

Fog Texture

You can also colorize the fog by using a bitmap texture. You can produce other environmental effects, such as smoke, by using a fog texture. Click and hold on the Fog Texture patch to access the texture sub-palette and choose a texture. It will be stretched over the entire canvas area. Each pixel of the texture will determine the color of the fog at that location.



NOTE: A Fog Texture will override Fog Color 1 and Fog Color 2 settings.

Fog Alpha

You can further modify the fog effect by using Fog Alpha. Click and hold on the Fog Alpha patch to access the texture sub-palette and choose a texture. It will be converted to grayscale and stretched over the entire canvas area. Each pixel of the alpha will determine the intensity of the fog at that location. When the alpha is white, there is no effect on the fog. When the alpha is black, there is no fog effect.

Fog Color 2

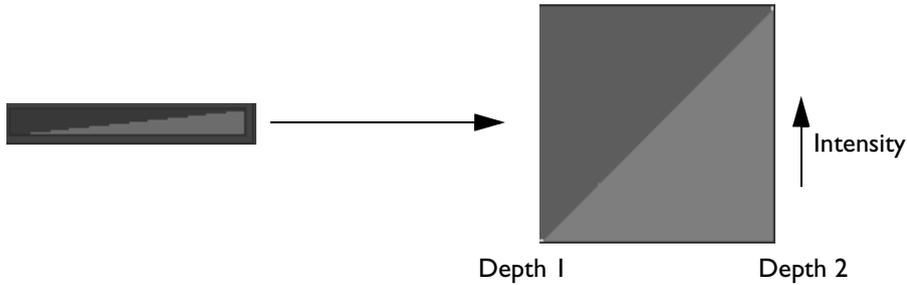
Fog Color 2 is the color of the fog at the far point of the fog effect. Set by selecting a color with any of the color pickers and clicking on the Color 2 patch. You can also click and drag from the patch to the canvas to pick a color.



A ZBrush fish with Depth 1 set on its nose, Depth 2 set on its tail and a light blue Fog color 1 and 2.



Fog Curve



Clicking on the collapsed Fog Curve area of the sub-palette expands the Fog Curve to its full size. You can adjust the intensity of the fog between the near point (Depth 1) and far point (Depth 2) by adjusting the graph. See [“Using the Graph” on page 51](#)

Fast Render



Since the Fast Renderer does not take materials into account, an ambient and diffuse setting for the entire scene is set here.

Ambient

Range= 0 to 1. Default= 0.3.

Diffuse

Range= 0 to 1. Default= 0.8.

Environment



The ZBrush Environment palette allows you to globally reflect a single image or color on all the objects in the scene with reflective surfaces. The amount of environmental reflection is set in the Materials palette for each material. See [“Environmental Reflections” on page 76](#)

Off

Turns off Color, Texture, or Scene reflections. Default= off.

Color

Lets you use a single color for global reflections. Pressing the Color button enables the Environment Color patch.

Txtr

Allows a texture to be used for global reflections. Pressing the Texture button enables the Environment Texture patch.

Scene

Uses the current scene as a source image for global reflections.

Environment Color patch

When enabled, set by selecting a color with any of the color pickers and clicking on the Environment Color patch. You can also click and drag from the patch to the canvas to pick a color.

Environment Texture patch

When enabled, click and hold on the Environment Texture patch to access the texture sub-palette and choose a texture.

Trace D

The trace distance is how far ZBrush will look to find a local object to reflect. Range= 0 to 100% of the current image size. Default= 50%.

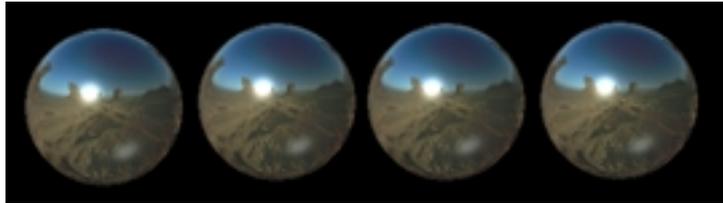
Repeat

Controls how many times a reflective surface can reflect another reflective surface. The effect can be visualized by facing two mirrors at each other. Range= 1 to 5. Default= 1.

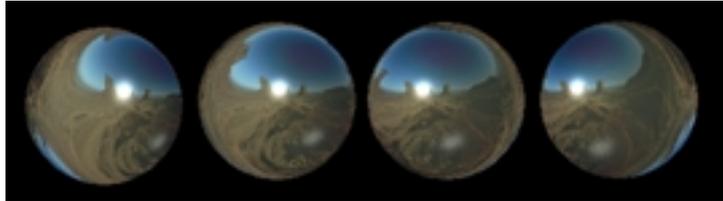
Field of View

Sets the field of view for environmental mapping and lights. A setting of zero degrees causes the point of view to be infinitely far away. A setting of 180 degrees places the point of view right above the canvas. Range= 0 to 180 degrees. Default= 0.

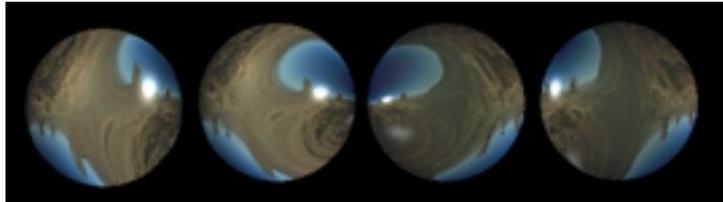
FOV= 0



FOV= 120



FOV= 180



Adjustments



Adjustments allow you to make color corrections to the final render without permanently altering it.

Adjust

Enables the adjustment variables. After the values are changed, the adjustments can be turned on and off with the Adjust button. All adjustment values are saved with the ZBrush scene file.

Clr

Clears all adjustments to their default values.

Contrast

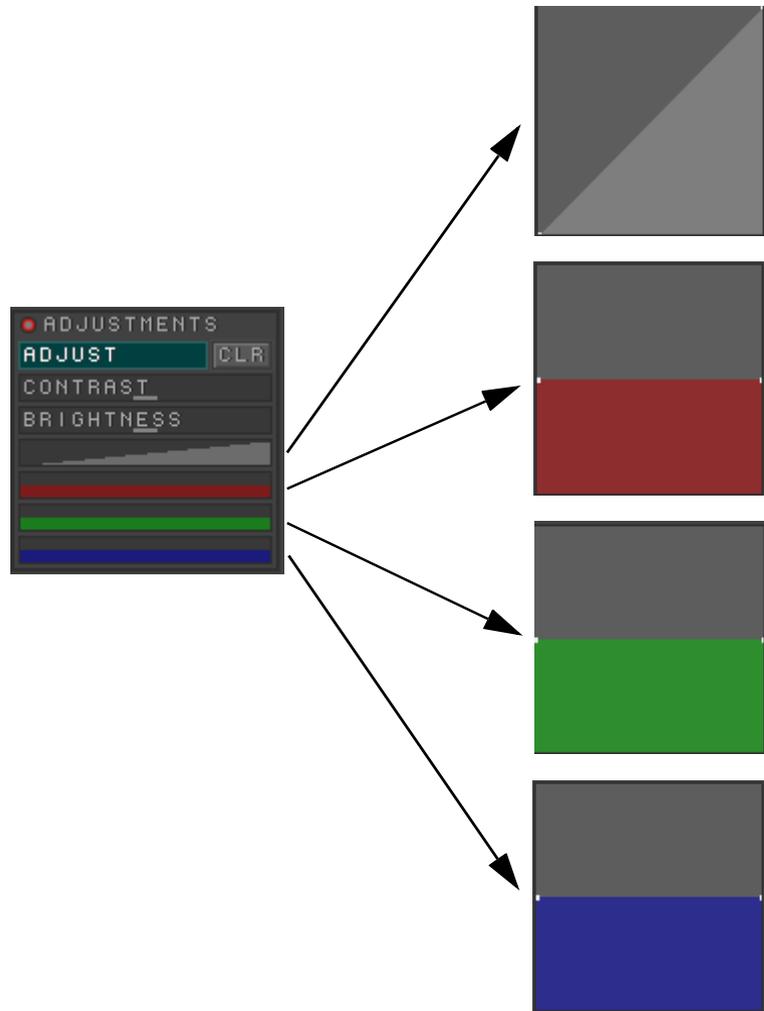
Varies the contrast of the entire image. Range= -100 to 100. Default= 0.

Brightness

Varies the brightness of the entire image. Range= -100 to 100. Default= 0.

Level Curves

Clicking on the collapsed curve area of the sub-palette expands the adjustment curve to its full size. You can adjust the intensity of the colors between their minimum and maximum values by adjusting the shape of their curves. See [“Using the Graph”](#) on page 51



17 ZBrush 1.23

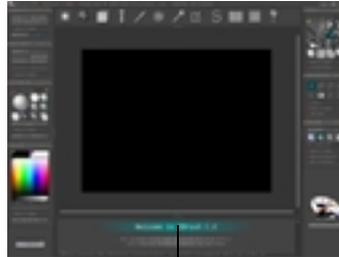
The ZScript Window

Introduction to ZScript

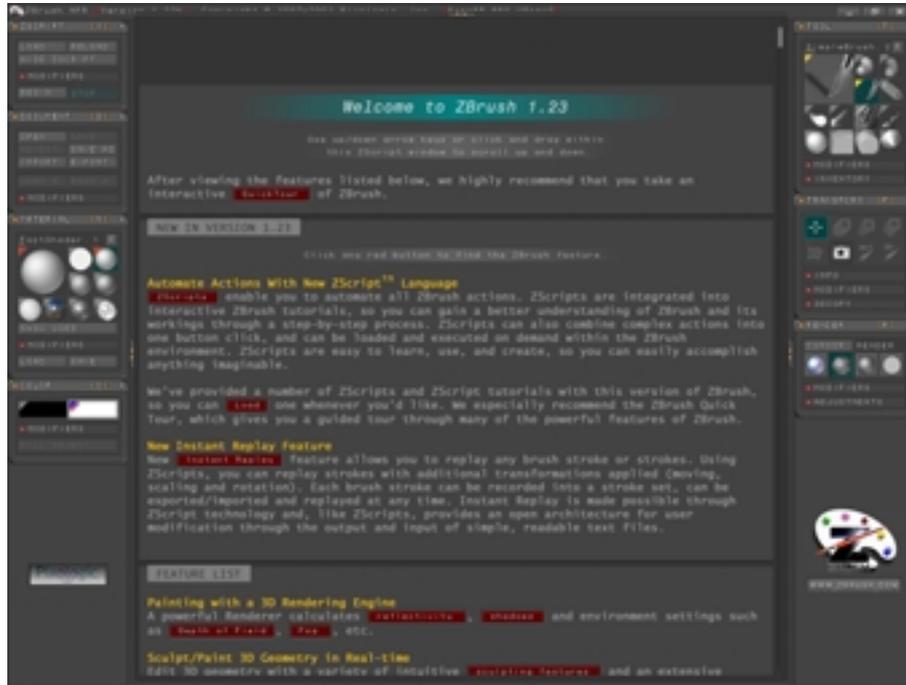
ZScript is a plain text scripting protocol that can control the ZBrush interface. Scripts are created by simply recording actions or by writing interactive, complex “smart” scripts that check settings and perform repetitive tasks.

A complete description of ZScripting is beyond the scope of this manual and will be documented elsewhere.

A default “Welcome to ZBrush” ZScript loads when the program is launched.

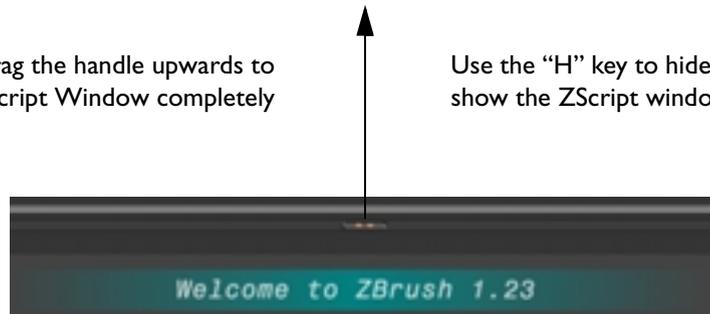


The ZScript Window



Click and drag the handle upwards to open the ZScript Window completely

Use the “H” key to hide or show the ZScript window





Load

Loads a new ZScript. Several sample ZScripts are included in the ZScripts folder of the ZBrush application. After you load a script, follow the instructions in the window to execute it. Recorded scripts will place a “Play” button in the window. Press “Play” to run the script. To halt execution before a script finishes, press Esc.

Reload

Reloads the currently loaded ZScript. Useful for checking changes as you work on a script.

Hide ZScript

Hides the ZScript window. You can also toggle the window on and off with the “H” key.

Show Actions

Each interface action executed by the ZScript will be pointed out during playback.

Modifiers

CMD

Shows the complete command set in the ZBrush window. Use the up/down arrow keys or click and drag within the ZScript window to scroll up and down.

TXT

Displays the currently loaded ZScript as color coded text.

Run

Enables the currently loaded ZScript and shows its interface.

Minimal Stroke

Only essential strokes will be fully replayed. Allows faster playback.

Minimal Update

The screen is updated only at the end of strokes during replay. Allows faster playback.

Export Commands

Exports the entire ZScript command set as a text file.

Record

Begins recording your actions in ZBrush as a ZScript.

End Rec

Stops recording, requests a location to save the ZScript, and places a “Play” button in the ZScript window.

Color Coding

Scripts shown when the TXT modifier is pressed are color coded to make the embedding hierarchy easier to see. For example:

```
[FontSetColor,255,200,0]2D/3D Export/Import
[FontSetColor,160,160,160]
[PD]
[IButton," Load ","Find this feature",
  [IPress,tool:polyMesh3D]
  [IShow,tool:inventory:loadtool,1]
```

The command list shown when the CMD modifier is pressed is color coded to show different types of command variables. For example:

```
{FileNameAdvance base file name,Number of digits (0-4) (i.e. 3= 001 ),Add 'Copy'
string? (0=no, NonZero=yes)}
Output: Updated file Name
T/S Increments the index value contained within a filename string
```

- Yellow= Name of command.
- White= Essential Input variable. A value must be written.
- Light Grey= Non-essential input variable. If no value is written, a default value will be used.
- Teal= Return value.
- Red= Definition of command.
- TOP, SUB, or T/S (T/S= Top/Sub.) Indicates the position of the command in the ZScript hierarchy. Sub commands must be placed within [IButton...] or [RoutineDef...] definitions; Top commands cannot be; and Top/Sub commands can be placed anywhere.
- A complete command is enclosed in red brackets.

ZScript Error Detection

When a script is loaded, ZBrush checks the syntax of the script file and if there is an error, switches to the text mode and shows the offending section. For example:

```
[PenMove,0,2
]
[Title,"      Welcome to ZBrush 1.2      "]
[PD]
[PD]
[Caption," Use up/down arrow keys or click and drag within "]
[Caption,"      this ZScript window to scroll up and down.  "]

After viewing the features listed below, we highly recommend that you take an
interactive
[IButton," QuickTour ","Click here to find the ZScript palette and load the
QuickTour.txt",
```

Using the default ZScript, the last command shown above, IButton, was changed to zButton. When the script was reloaded, the text mode appeared with the words ZScript Error Unrecognized command in red and yellow. The arrow points to the offending command and the remainder of the script is greyed out.

```
[PenMove,0,2
]
[Title,"      Welcome to ZBrush 1.2      "]
[PD]
[PD]
[Caption," Use up/down arrow keys or click and drag within "]
[Caption,"      this ZScript window to scroll up and down.  "]

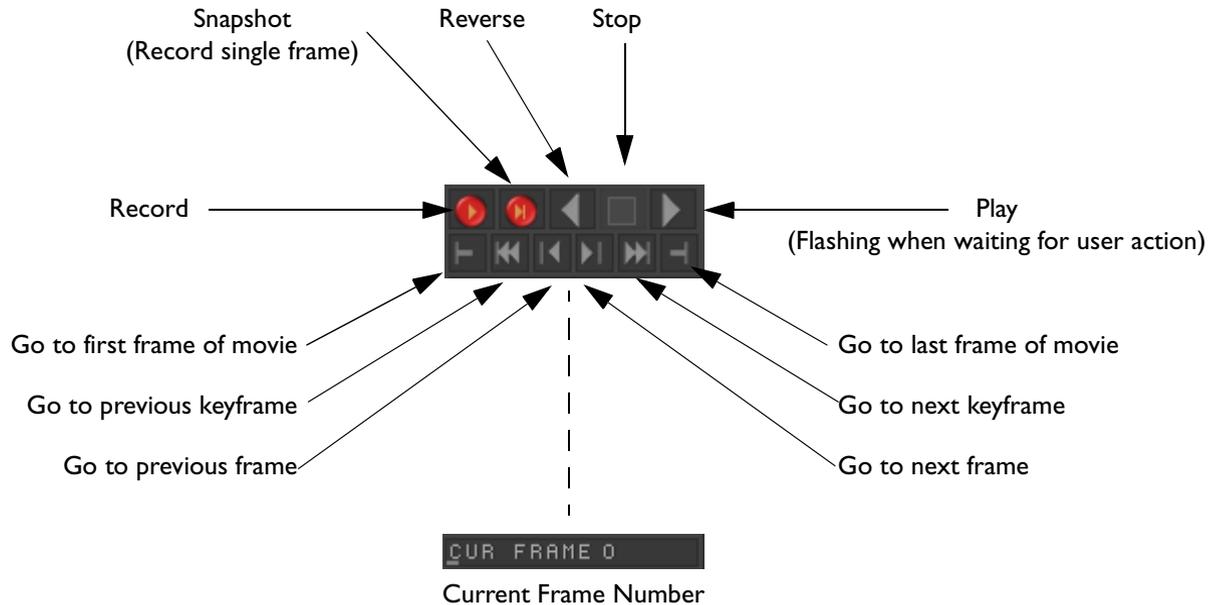
After viewing the features listed below, we highly recommend that you take an
interactive ZSCRIPT ERROR Unrecognized command-->[zButton," QuickTour ","Click here
to find the ZScript palette and load the QuickTour.txt",[iShow,7427,1]] of ZBrush.
[PD][PaintPageBreak][PenMove,0,-2][SubTitle," NEW IN VERSION 1.2 "][PD][PD][Caption,"
```

18 ZBrush 1.23 The Movie Palette



The Movie palette allows you to view movies created by Pixologic or other users. You can create your own movies to send to other users or use them for Web animations.

Player Controls



NOTE: When recording, if you start at frame 1, your recorded session will replace the current movie. If you start recording when the current movie is not at frame 1, your recorded session will be added to the existing movie.

Modifiers

The controls in the modifiers section are used for authoring your own interactive ZMovies and will be documented elsewhere.

Inventory



Load

Loads a .zmv ZBrush movie file. A default movie is loaded when you start the program and there is a ZBrush Tutorial movie in the ZMovies folder.

Save As

Saves the current movie as a .zmv movie with a new file name.

Insert

Inserts a .zmv ZBrush movie at the current time in the movie.

Export

Exports the current frame as a .bmp (Windows Bitmap), .psd (Photoshop), or PICT (Mac) bitmap file.

Mexport

Exports all the frames in the current movie as sequentially numbered .bmp (Windows Bitmap), .psd (Photoshop), or PICT (Mac) bitmap files.

Import

Imports a .psd (Photoshop) image at the current time in the movie.

KB

Current memory usage in Kilobytes.



NOTE: You can “float” a player window and control buttons on the main screen. See “Customizing the Interface” on page 15.



19 ZBrush 1.23 Preferences



The ZBrush Preferences Palette contains controls that set overall application behavior. They are used less often than the controls on the other individual palettes.

All the settings in the Preferences Palette (except for the top row), are saved with the ZBrush Config file.

Preferences

Auto

Switches to Dots mode automatically when drawing or transforming large objects if the width or height of the active 3D object exceeds the amount set. This improves performance. Range= 1 to 10,000 pixels. Default= 800 pixels.

GRPC

When pressed and Dots mode is active, the 3D wireframe is shown with colors assigned to each group. See [“Polymesh 3D” on page 174](#).

Dots

Displays wireframe of 3D object when moved. See [“Polymesh 3D” on page 174](#).

Quick 3D Edit

When a 3D object is in Edit mode, it is shown in preview mode for faster interaction.

Mouse Avg

Controls how many position points are averaged when moving the Mouse or Pen. If your Cursor is “jittery”, increasing the Mouse Averaging will smooth its action. Range= 1 to 8. Default= 1.

Max Brush Size

Sets the Maximum brush radius. See [“Draw Size” on page 85](#). Increase the size to cover very large areas. Range= 1 to 512. Default= 128.

Compact Mem

When System (RAM) memory usage exceeds the amount set here, ZBrush will reduce the memory required by moving some of the data to virtual (Disk) memory. After 5 seconds of inactivity or when switching to another application, ZBrush will automatically compact memory. Range= 32 to 1024 MB. Default= 80 MB.

Doc Undo

Sets the minimum number of undo's saved for document changes. If more undo's are possible with the current amount of System memory, ZBrush will save them. If the minimum number is set high enough to use more than the available System memory, ZBrush will compact the memory and save the undo's. Range= 1 to 64. Default= 1.

Tool Undo

Sets the minimum number of undo's saved for tool changes. If more undo's are possible with the current amount of System memory, ZBrush will save them. If the minimum number is set high enough to use more than the available System memory, ZBrush will compact the memory and save the undo's. Range= 1 to 64. Default= 1.

I Reset

Complete interface reset. Also deletes all layers and removes custom tools.

Config



Colorize

Used to change the handle color of the custom floating palette. See [“Customizing the Interface”](#) on page 15.

Store Config

Saves all the current preferences (except the top line) in the Config file. See [“Saving a Custom Configuration”](#) on page 19.



***NOTE:** If you press Store Config, ZBrush will store the current configuration, with the Preferences Palette open. If you wish to store the current configuration with the Preferences Palette closed, close the palette and use the keyboard shortcut **Ctrl + Shift + I** to store the configuration.*

Restore Config

Restores ZBrush to its default configuration.

Picker



Sample Size

The size of the volume that is used to evaluate the picker result. At a size of 5, a cube 5 pixels on each side is used for evaluation. Use a high setting to smooth out results. Range= 1 to 10. Default= 2.

Auto Front

When creating a 3D object, ZBrush automatically places the object center at $z = 0$ when Auto Front is on. If Auto Front is off, the object is created on the back clipping plane, and if turned, will be clipped. Any objects placed behind it will also be clipped. Default= on.



***NOTE:** The back clipping plane is set at two times the width of the canvas, so with a 640 x 480 canvas, the clipping plane will be at a z value of -1280.*

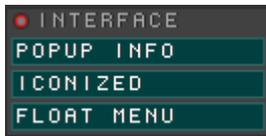
Marker



Marker Radius

The maximum distance that your cursor can be from the marker before its indicator square disappears. See [“Placing Markers” on page 239](#).

Interface



Pop Up Info

When on, holding the cursor over buttons and sliders in the ZBrush interface causes a short description of their function to appear. If you hold down the **Ctrl** key at the same time, more detailed information appears. Default= on.

Iconized

When on, inactive palettes will be shown as icons across the top of the workspace. When off, the palettes will be represented by text, which takes up less space. Default= on

Float Menu

When on, the ZBrush custom floating menu is shown. Default= on

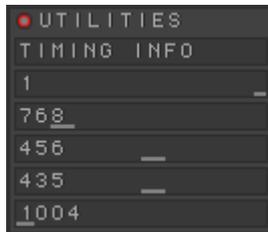
ZScript



Auto Record

Automatically initiates a ZScript recording session when ZBrush is launched.

Utilities



Timing Info

When on, a window appears at the bottom of the screen that shows timing and other internal information. This information is useful to Technical Support when evaluating your installation. Default= off.

Tablet Pressure

Shows current tablet pressure.

Keyboard Status

Shows numeric code for each keyboard key.

Mouse H

Shows current horizontal position of mouse.

Mouse V

Shows current vertical position of mouse.

View Window ID

Shows numeric ID code of the interface window under the cursor.

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