3D Modeling and Design Glossary - Intermediate

Bevel: See "Chamfer."

Chamfer: a symmetrical sloping surface at an edge or corner of a shape, usually cut at a 45 degree angle. You could accomplish this by using the Hole tool and rotating it to subtract from a solid shape.

Concentric: circles or shapes which share the same center.

Emboss: to carve, mold, or stamp a design onto a surface so that it stands out in relief. One way to do this is by importing an SVG file and placing it onto the surface of a shape or part, aligning it to your specifications, and then grouping it all together.

Deboss: to stamp a design into the surface of an object so that it is indented. One way to do this is by importing an SVG file and placing it onto the surface of a shape or part, sinking it and aligning it to your specifications, turning the SVG shape into a hole, and then grouping it all together.

Extrude: to extend a 2D image into a 3D object in a straight line.

Fillet: to make a rounded edge.

File formats: You can export and import a variety of file types in Tinkercad. Keep reading to learn what they do and what they are used for -

File formats commonly used in 3D Modeling & Design

OBJ: this file type is capable of representing a greater degree of texture and color and, as a result, is more commonly used for animation or with high-end printers that can control color. OBJ also supports multiple parts/shapes in a single file where an STL doesn't. OBJ also works where most STL files do, but generally is only used when specifically required.

PNG: a type of graphics file similar to a JPG that Tinkercad uses for sharing still images of your designs.

STL: one of the most commonly used file formats for 3D printing. It is due to the fact that most CAD software has the feature of exporting models in STL format, and most 3D printers support it. The file generates the surface geometry of the modeled object only. STL stands for stereolithography.

SVG: stands for scalable vector graphics. The big difference between "rasterized bitmap images," like PNGs and JPGs, and vector images is that vector images are composed of a fixed set of shapes, whereas the others are made up of a fixed set of pixels. As a result, scaling the rasterized bitmap reveals the pixels, while scaling the vector image preserves the shapes. SVGs are commonly used for any type of image that might require a great deal of flexibility in size (think company logos that must be tiny for business cards but also blown up huge for billboards.) SVG is also the standard file format for laser cutting.

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JavaScript: a scripting language for computers that is used for making shapes in Tinkercad. It is often run in web browser applications to create dynamic content like a popup message or a live clock. It is not related to the programming language Java.

Laser cutting: a technology that uses a laser to cut materials using great precision.

Offset: to move out of alignment.

Orthographic view: two-dimensional view of a three-dimensional object. Orthographic views represent the exact shape of an object as seen from one side at a time as you are looking perpendicularly at it. Depth is not shown. In Tinkercad, you can switch to orthographic view by clicking on the icon that looks like a block at the bottom of the navigation controls. This is useful when you are centering, stacking, or zooming out to analyze your design.

Perspective view: a view of a three-dimensional image that portrays height, width, and depth for a more realistic image or graphic. In Tinkercad, you can toggle between perspective and orthographic views by clicking on the icon that looks like a block at the bottom of the navigation controls.

Shape generator: some of Tinkercad's shapes are created by our community of developers who use JavaScript to program them. If you want to learn how any of the Shape Generators were made, you can click on View Code, and this will take you to the Editor. This is also where you can create your own Shape Generator. Many of the featured shapes offer a greater degree of flexibility in editing - including handles that allow for the creation of curves.

Smart duplicate: To duplicate an object in Tinkercad, use Ctrl + D. To take it a step further, “Smart duplicate” is like a short-term memory that knows what you just did, and will repeat it to create patterns and repetition while copying objects. Remembering all those steps, this feature will allow you to create complex repeating patterns in seconds.

Snap grid: a setting in the lower right of the canvas that allows you to adjust the precision of your commands. For example, you can change the snap to 5 millimeters in order to move a shape more quickly across the workplane, or you could change it to .1 millimeter in order pull out the size of a shape in smaller increments. You can also edit the grid to change the unit of measurement to inches or to resize the dimensions of the grid for compatibility with different 3D printers.

Symmetry: the quality of being made up of exactly similar parts facing each other or around an axis. Symmetry is an important concept for 3D design because it allows you to enhance the complexity of what you are making more efficiently by designing half of a part and then flipping, duplicating, and grouping the two resulting parts into one.

Tangent: a line or plane touching, but not intersecting, a curve or curved surface.

3D printing: 3D printing or additive manufacturing is a process of making three-dimensional solid objects from a digital file. In an additive process, an object is created by laying down successive layers of material until the object is finished. This process can use a wide variety of materials, but the most common is plastic.