

Perspective Lesson 2:

Three-Dimensional Drawing: Cubes, Cones, Columns, and More

Materials Needed:

- Paper
- Pencils
- Erasers
- Rulers

Goal of this Tutorial: Students should be able to draw at least one of these three-dimensional forms step-by-step. These forms will be the foundation of doing any work in realistic drawings for art, diagrams, science, ect. Vocabulary includes Picture Plane,

Preparation Required: Making sure you can easily follow the step-by-step guides on how to draw a cube, column, cone, via the instructions at the back of this tutorial.

“...any object, no matter how complicated...is made up of a sphere, a cube, a cone, a cylinder, or some combination of these forms.” -The Famous Artists Course, Chapter 2: Form-the Basis of Drawing¹

Tutor: Thus far, we’ve learned how to use OiLS to draw objects we are looking at. What are OiLS again?

Today, we’re going to look at how to draw things from imagination that look three-dimensional, but they’re still on a flat sheet of paper. The technical term for the surface of the paper is the **“Picture Plane”**. It’s like an imaginary window you’re looking through to see the scene you’re going to create. When you go to an art museum, you’re looking through the window of the “picture planes” into the various worlds the artists created for you to glimpse.

But first, we have to create shapes that look like they are three dimensional, and do that, we have to be a little tricky.

So, quick review: what are OiLS again?

<Class should be able to rattle this off by now, feel free to re-show or post the OiLS diagram where they can see it.>

Tutor: Very good! So now let’s look at a cube.

<If you have access to something like a cube, (a Rubik’s Cube would be best, but a wooden or foam block, or a box, something like that will work too) show it at this time>

¹ In case you were curious, this was a course my grandmother in law took when she took up painting seriously—in her fifties, after her children were grown and gone. She’s now an accomplished oil and acrylic portraitist. It just goes to show, it’s never too late to start. If you can find it, it is a great course to read through.

Perspective Lesson 2: Three-Dimensional Form

We see this cube has height, the distance from its top to its base, and width, the distance from side to side, and depth, the distance between the side that's closest to our eyes, to the side that's the farthest away.² This is what makes the block a three-dimensional form: Having height-width-and depth.

The two dimensional version of a cube might be what, do you think?

<A Square, or rectangle>

That's right, this shape in two dimensions would be a square, having height and width, but no depth. But our paper, our Picture Plane, is flat, mostly two dimensional. So how can we create the look of a three-dimensional object on a two-dimensional surface?

We cheat slightly. Follow me and see what I mean.

<Draw a cube, step-by-step on the board or a piece of paper. If you need help drawing a cube, a step-by-step tutorial is included. Have the students follow>

Tutor: Does this cube look three-dimensional? Like it has depth? Can we break this cube down into OiLS?

<See what they say-they should be able to find angled lines and straight lines.>

Tutor: Great! Even though this cube has regular sides in real life, and meets at right angles, on paper, having these slightly diagonal lines shows depth, even though there are no actual diagonal lines in the cube itself.

The artists Pablo Picasso³ once said, "Art is the lie that tells the truth." In this case, these diagonal lines show the true depth of a cube.

Look at this photo.

<Show Rubik's Cube Photo>

When you look at a three dimensional object on a flat plane, like a drawing, or a photo, some lines will look diagonal because they are mimicking our eyes' ability to create a three-dimensional world. See how this Rubik's cube looks like it's all diagonals, but our brain says, "oh, that's a cube."

How about a cone?

<Draw a cone on the board or paper-again, if you need them, step-by-step guide is provided..>

Tutor: Can we break this down into OiLS?

<class should be able to find ovals and angled/ straight lines>

Tutor: Notice the curved bottom? That's what tells our brain this is a cone, not a triangle, just like the diagonal lines on the cube tell our brain that's a cube, not a square!

Now, there are four or five basic shapes in art. With these shapes, you can "build" a scene in your pictures just like you build with blocks. These shapes are;

- Cubes
- Columns
- Spheres

² If you've done Perspective Lesson 1: Zero Point Perspective, this is review of these terms. If not, this is quick.

³ Whom we will meet in Cycle 3!

Perspective Lesson 2: Three-Dimensional Form

- Cones
- And sometimes, Pyramids⁴

Take a look at these shapes, and let's see if we can break them down into their OiLS

<spend a few minutes doing this, and show the OiLS of Form poster.>

Tutor: So let's practice drawing these "building blocks".

Activity:

Using the included step-by-step instructions for drawing each of these items, (or your own technique, if you use a different one!) practice drawing cubes, cones, ect., walk your class through drawing these items. Using the "variations" you may like to tackle drawing a long or thin box, or a cone seen from below rather than the side.

For more challenge, tackle shading some of these objects. For shading tips and how-to, see Additional Information: Shading Pgs. 31-38.

If your students catch on quickly, check out Perspective Lesson 3: taking shapes and building things

⁴ Some artists claim pyramids are just cubes balanced on the point and sliced through, which makes them a sub-set of cubes, or they are just cones on a square base, making them a sub-set of cones. Other artists claim all cones are just part of the column family, leaving only three basic shapes: Spheres, Columns, and Cones.

To-may-to, to-mah-to, at this level, that's up to you. No one will be hurt by adding or ignoring it.

What is the Difference Between “Perspective” and “Three Dimensional Drawing”?

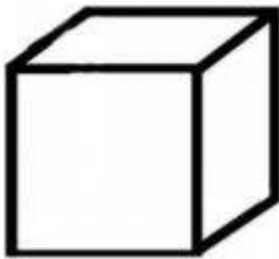
Like a square is a specific type of rectangle, but not all rectangles are squares, so perspective is a type of three-dimensional drawing, but not all three dimensional drawings are perspective.

Three dimensional Drawing is simply a collection of techniques to create the sense of depth in a two-dimensional surface drawing. Within this family, there is a number of ways to create the sense of depth

Overlap: Done throughout history, including ancient Egyptians, Medieval European, Ancient China, and more, overlap is where the closer object obscures part of the farther object. This style of art, depending on how it is used, can look fairly flat, but overlapping establishes which people or things are in the foreground and which are in the background, establishing some space.

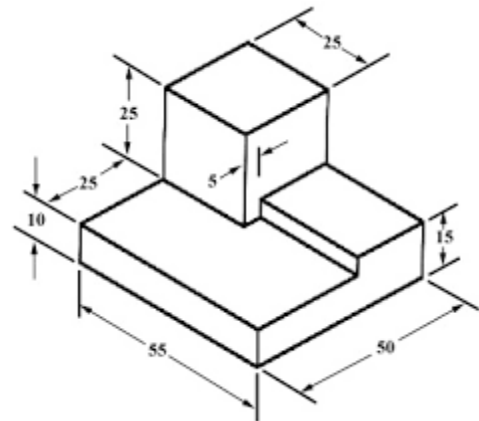


Art,
still
thus



Oblique: Front and back faces of an object are flat to the viewer, while all the other faces are diagonal, connecting the front and back. There is no real recession in size from the front to the back of the object, and is generally used only when drawing objects which are relatively close to the viewer. The box in this tutorial is an example of Oblique style three dimensional work.

Isometric: Where the corner of an object is close to the viewer, and the sides angle away from the viewer at 30 degrees from the horizontal. This is common in some technical and engineering drawings.



Perspective Lesson 2: Three-Dimensional Form

Shading: All three-dimensional objects have mass, and therefore, cause light to bounce off of them at various angles. Where most of the light bounces away from the object (at least from our point of view), we see shadow. Shadows tell our brains, “This is a three-dimensional object” because flat objects don’t throw shadows in the same way three-dimensional ones do.

PERSPECTIVE: When dealing with deep space (“seeing a long distance” in an artistic composition), you are more likely to see and use “Perspective”. Derived from the Italian artist’s term “*Prospettiva*” it has come to mean using a specific visual and mathematical/ratio process to create an accurate illusion of deep space and depth in a painting. Within this family, there are several kinds of Perspective, but most share the use of a horizon and one or more vanishing points.

Informal Perspective/Zero-Point Perspective: Seen most commonly in landscapes, this is a form of perspective in which similar objects get smaller the “farther away” they are from the picture plane.⁵



One Point Perspective, Above

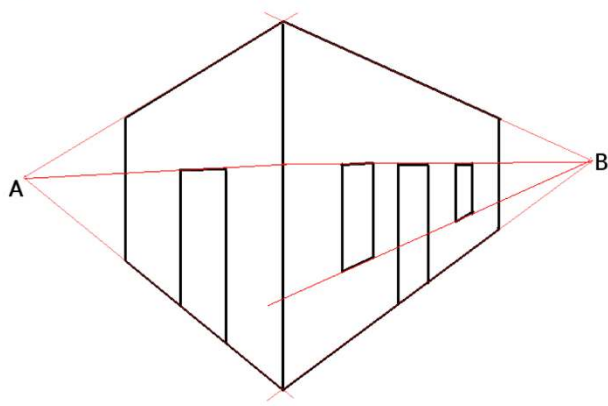


1-point Perspective:

Looks similar to Oblique Drawing because the face of the objects face the viewer head on, and the “sides” recede to the “Vanishing Point” on the Horizon. There is only one vanishing point, and things will get smaller and smaller, until they appear to vanish where the point meets the horizon. The railroad or street vanishing is an example of this Perspective.

⁵See Perspective Lesson 1 for the definition of this word.

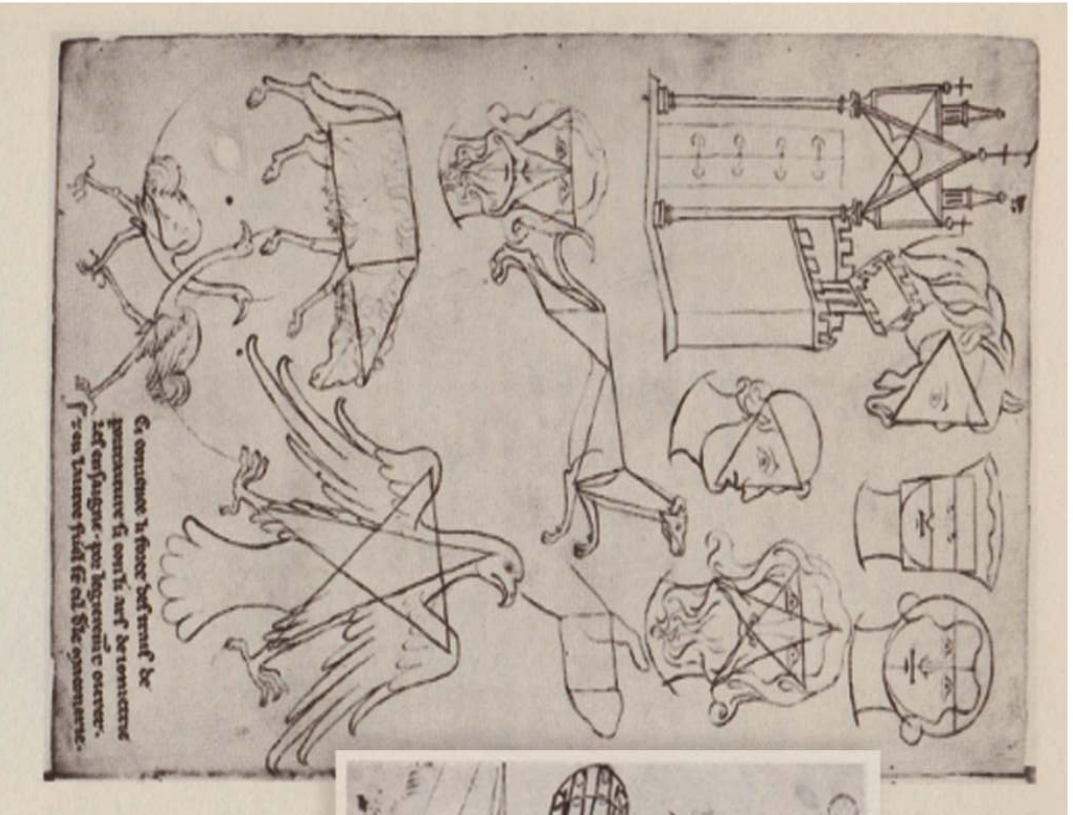
Perspective Lesson 2: Three-Dimensional Form



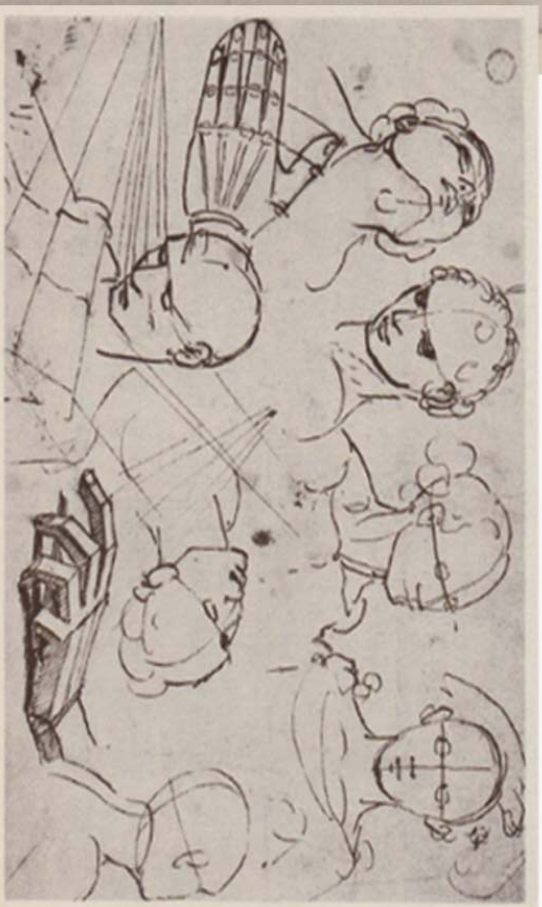
2-Point Perspective. In this view, similar to Isometric, the edge of an object generally faces the viewer and two sides of the object recede to two vanishing points on either end of a horizon. (See left)

3-Point Perspective; in this view, you are standing at the bottom or top of a tall object (like a building) and looking straight up or down. The structure itself will shrink as it gets farther away from you, but the edges of its roof will also angle like a 2-point perspective.

There is also 4-, 5-, and 6- point perspective, Curvilinear Perspective and more! In addition, some coloring techniques artists use create space in a painting. But all Three-Dimensional Drawing techniques help “trick” the eye into seeing space and depth in a two-dimensional surface.



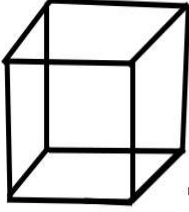
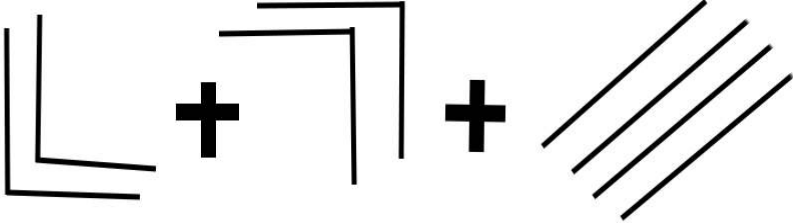
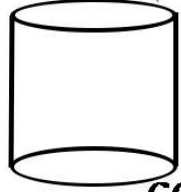
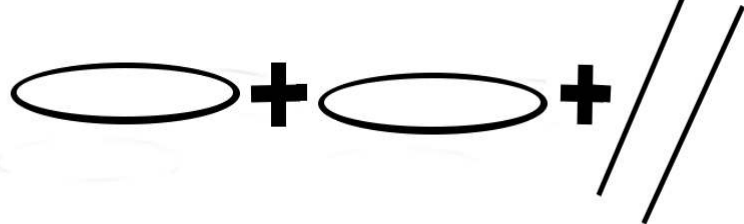

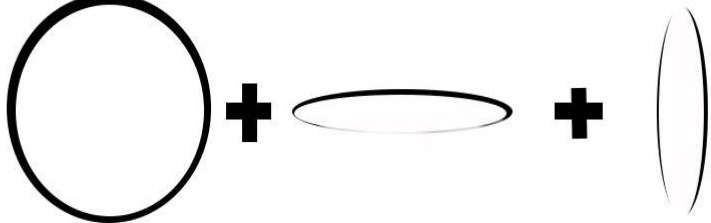
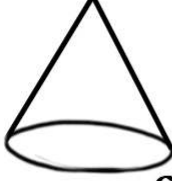
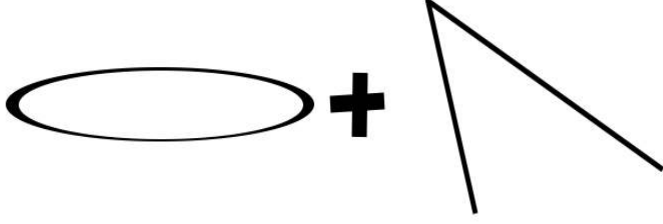
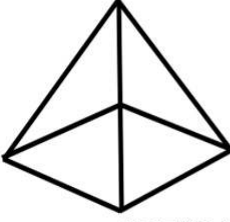
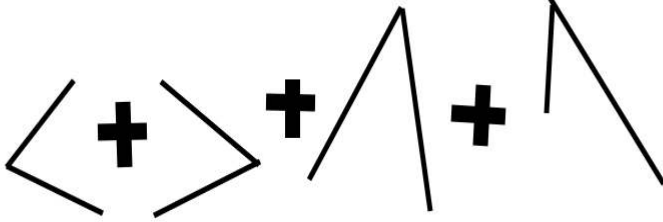
Above: Sketches by Villard de Honnecourt (active c. 1230 - 1240) The inscription in the lower right allegedly says, "[Drawing] as it is taught by the discipline of geometry...is easy to practice."



Below: Sketchbook from Hans Holbein the Younger (c. 1497 - 1543), court painter to King Henry VIII of England

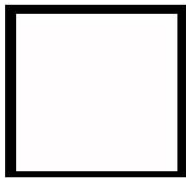
“...any object, no matter how complicated...is made up of a sphere, a cube, a cone, a cylinder, or some combinations of these forms.” -The Famous Artists Course, Chapter 2
“Form-the Basis of Drawing”

The OiLS of Three Dimensional Form

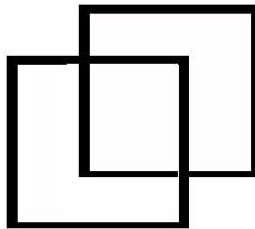
 cube	
 column	
 sphere	
 cone	
 pyramid	

Drawing a Cube

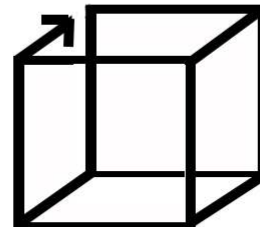
Base Model



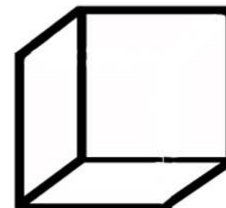
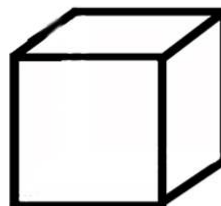
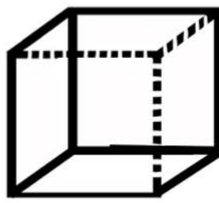
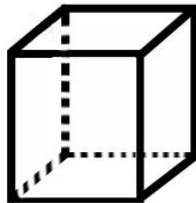
1. Draw a square
(or rectangle)



2. Draw a similar square
just behind the first square

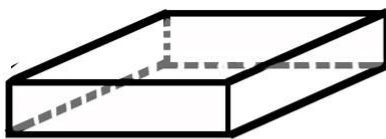


3. Connect four corners
of both squares with
straight lines

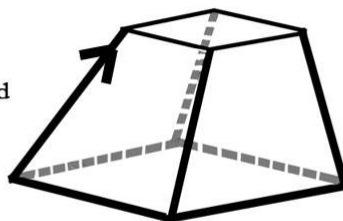


4. (Optional) Half-erase or erase the “back” lines to reveal your completed box.
Practice erasing different lines to find out how to make one part of your box the
“front” and another the “back”.

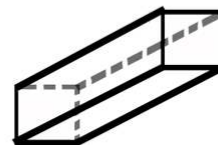
Variations



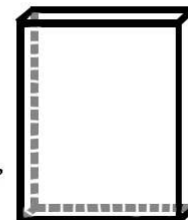
Draw the first two boxes narrow and
so far apart, they don't overlap.



Draw a truncated Pyramid: Draw a diamond-shaped box on the “ground”
and another one above it, then connect the corners!



Draw long boxes



...or flat ones

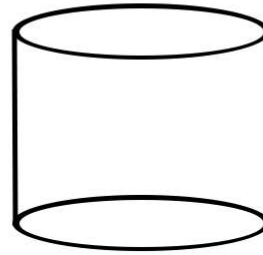
Drawing a Column



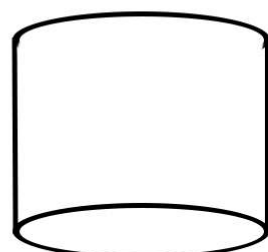
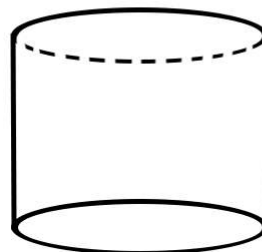
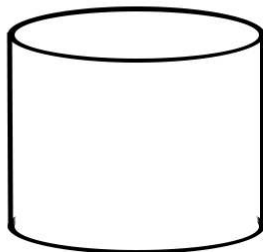
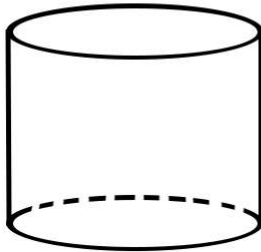
1. Draw an oval



Draw a similar shape and sized oval above or below the first oval

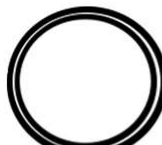
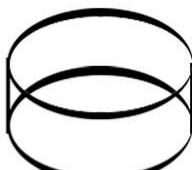
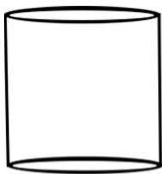


Draw straight lines from one oval to the second oval.

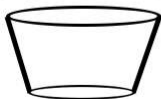


Dot or erase half of one oval to indicate the “back” of the column.
Practice erasing various parts to see how you can “turn” the column one way or another.

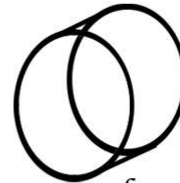
Variations



Like a cone, a column's ovals will look rounder the higher you view the column from, and the straight lines will get shorter. At the top, you'll see one circle directly stacked within another.



Two different sized ovals will make a tapered cylinder.



Draw your cone from the side like the box instructions. (Great for making wheels!)



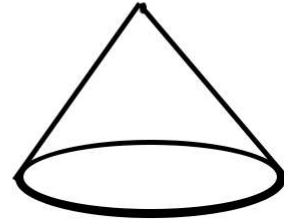
Drawing a Cone



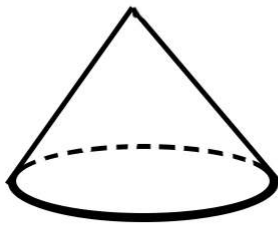
1. Draw an oval



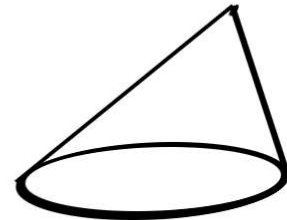
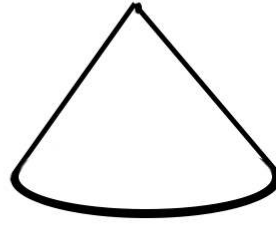
2. Draw a point above,
(or below) the oval.



3. Connect the point
to the edges of the oval
with two straight lines.

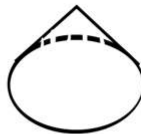
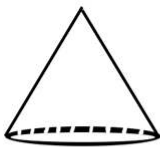


5. (Optional) erase or dot the “behind” line.



Practice different heights or
moving the “point” to
one side or another!

Variations



The more round you make your first oval, the higher you're viewing it from, and the shorter the “straight lines” will appear in relation. If you're directly over a cone, you'd see a circle with a dot in the center.

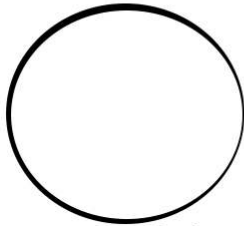


If you leave the oval intact, it can look like you're viewing the cone from the bottom!

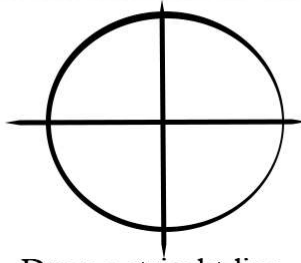


Using a cone as a “skeleton”, add details to make something like a mountain, or a pine tree.

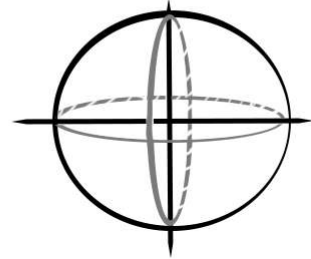
Drawing a Sphere



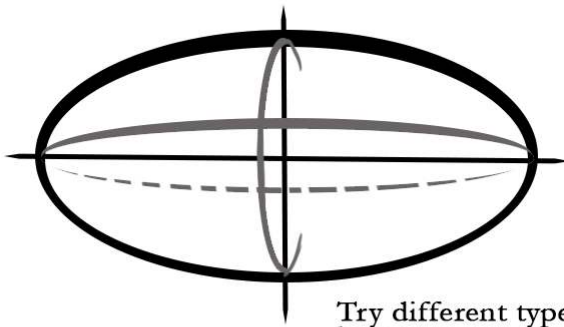
Draw a circle



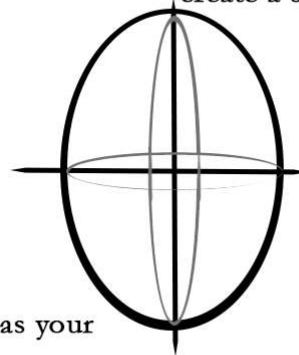
Draw a straight line from top to bottom of the circle (the axis) and side to side through the equator of the circle



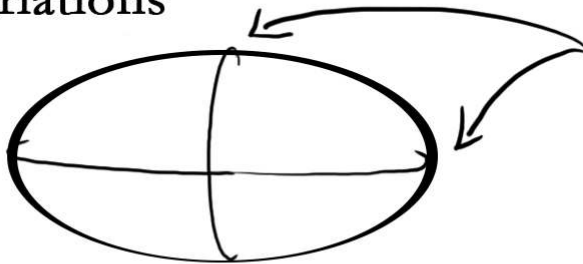
Using these as guides, draw cross-sections of the sphere to show fullness. You can erase the “back” lines to create a solid sphere.



Try different types of ovals as your base!



Variations



Most artists practice spheres to the point where they don't have to follow all these steps. To be honest, spheres are easiest to show through shadow. Here's another way to draw spheres.

This gives me just enough direction and sense of fullness to continue. A finished work of art almost never has these registration marks showing, because they've been covered by the finishing work. But these type of division marks are used frequently.

A simple shadow indicates a sense of solid roundness instead of a flat circle.

