



INTERIOR DESIGN

VISUAL PRESENTATION



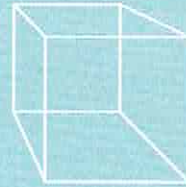
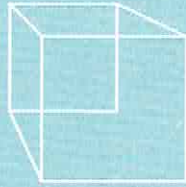
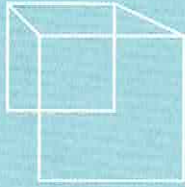
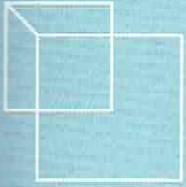
A Guide to Graphics, Models & Presentation Methods



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WILEY



3

Paraline and Perspective Drawings

Drawings depicting three-dimensional views differ greatly from orthographic drawings in that they offer a more natural view of space. It is important to note that these three-dimensional views (also known as perspective drawings) are useful at every phase of the design process and should not be reserved merely as a means of final project presentation.

Current interior design practice requires skills related to both hand drawing and digital production of perspective views. In the early phases of design, hand sketching and drawing can be helpful as one creates quick sketches to brainstorm (*or ideate*) various options or to explore form. As a project moves forward and becomes more refined, digital modeling and three-dimensional perspective sketches are frequently used. This is not always the case as some designers work digitally from beginning to end and others create more drawings by hand. Therefore, while individual practice varies, it is important for students to develop skills in both manual and digital drawing so that they can incorporate the skills into practice as required.

As mentioned in the first chapter, sketching elements, and components by hand allows for a clear understanding of them and can provide clarity in digital modeling. In addition, some designers have mentioned that they use a combination of hand sketching and computer-generated perspective imagery in current practice for project presentations (this is discussed in detail later in the chapter).

The primary focus of this chapter is *quick-sketching* because given the evolution of modeling and three-dimensional drawing programs, highly measured perspective drawings are used less commonly than they were when the early editions of this book were published. For those interested in learning more about the creation of measured, perspective drawings, two methods can be found in the Chapter 4.

Given the broad focus of this book, the “how-to” information on drawing and rendering is focused on quick, sketchy looking drawings and renderings. There is information in Chapter 6 about how to generate quick digital models using SketchUp and basic information about how to create quick color renderings and basic Photoshop rendering in Chapter 7. Only cursory, visual information is provided on more complex rendering programs such as the rendering functions of Revit. In-depth study of those programs falls outside of the scope of this book and requires review of other publications.

Unlike orthographic projections, paraline and perspective drawings allow for a single depiction of a large portion of an interior space, which can help designers to see and explore the entire volume of space and make design decisions accordingly. This type of drawing can also help clients to clearly understand the design of a project.

Paraline and perspective view drawings can be created as line drawings and used in presentations or rendered upon completion (rendered by hand or digitally). The tools and materials used in three-dimensional view drawings are similar to those used in orthographic projection drawings and the other forms of graphic communication.

An abundance of tracing paper is an important material in the production of this type of drawing. The transparency and low cost of tracing paper make it highly useful as a visualization tool. As soon as a drawing becomes confusing to sort out, a new sheet of tracing paper can be overlaid on it. A variety of colored pencils can be used to provide a visual aid in the construction of paraline and perspective drawings.

Paraline Drawings

Paraline drawings are quick, accurate, and useful in the communication of interior form. The method of construction of these drawings is based on the relationship of three principal axes (x, y, and z). Although there are several types of paraline drawing, all share common characteristics: (1) paraline drawings have parallel lines drawn as parallel, and lines do not converge to vanishing points; (2) vertical lines are drawn as true verticals in paraline drawings; and (3) paraline drawings are drawn using some method of proportional scale.

Plan Oblique Drawings

One type of paraline drawing commonly used in the communication of interior environments is known as a *plan oblique*. Figure 3-1 provides a quick reference of plan oblique construction. Plan obliques can be constructed quickly because they

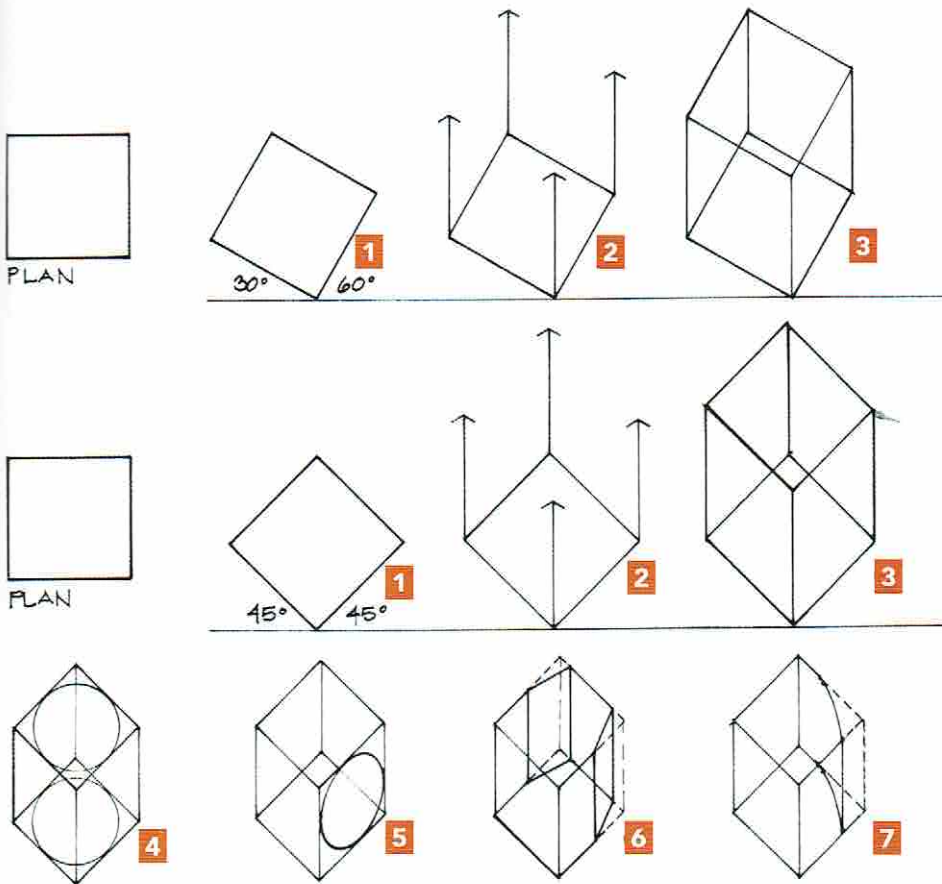


FIGURE 3-1

Quick reference: Plan oblique construction.

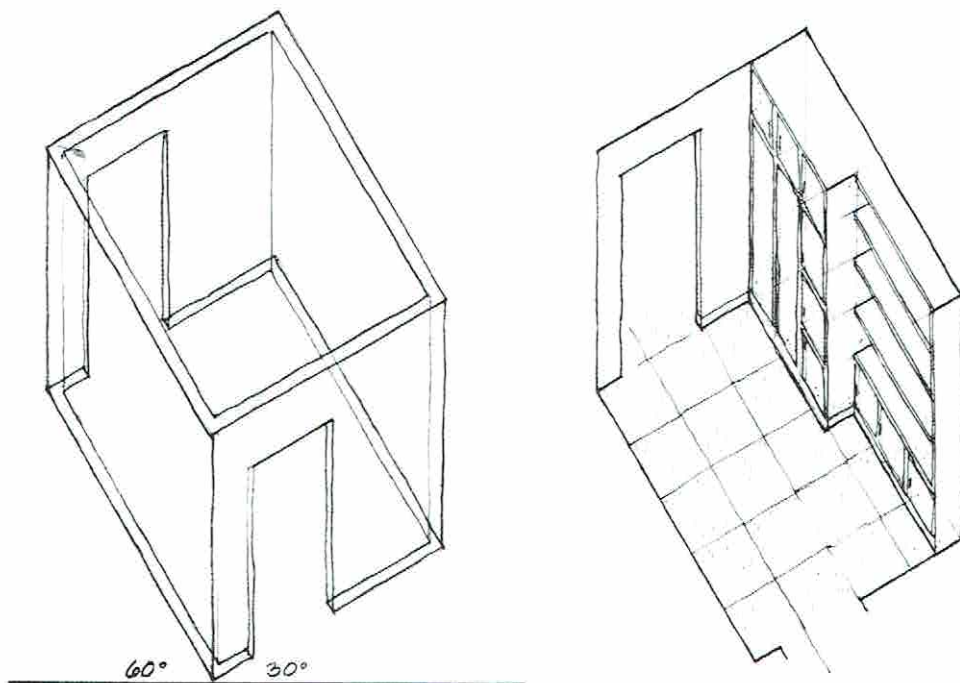
1. Rotate scaled plan to appropriate angles (shown here, 30 degrees–60 degrees and 45 degrees–45 degrees).
2. Draw vertical lines upward to appropriate height in scale.
3. Lines parallel to the base plane (the floor plan) are drawn at the same angles as plan.
4. Circles found on the plan and its parallel planes are drawn as circles.
5. Circles found on vertical planes are drawn as ellipses.
6. Create an enclosing box to measure and locate nonaxonometric lines.
7. Create an enclosing box to measure and plot irregular and curvilinear lines and planes.

are drawn by projecting directly off the floor plan. Drawing a plan oblique requires the rotation of the floor plan to appropriate angles as measured against a horizontal baseline. The most common angles of plan rotation or orientation are 30 degrees–60 degrees and 45 degrees–45 degrees, although plan obliques may be drawn at any two angles that together equal 90 degrees. Vertical elements are drawn by projecting locations vertically from the plan to the appropriate height. Horizontal elements are drawn using the same angles as those used in the orientation of the plan as indicated in Figure 3-1.

Because they are generally projected from existing plans, these drawings are created quickly and can be used throughout the design process as an aid in seeing and understanding the environment. The angle of rotation changes the orientation of the drawing and must be considered in the construction of these drawings. The angle of rotation used allows for varying views and emphasis on particular portions of the space. Often, plan obliques employ some method of visual elimination of portions of walls to depict the space successfully. This is often done by cutaway views or by ghosting in portions of walls as shown in Figure 3-2.

FIGURE 3-2

A plan oblique drawing of a residential mud room area. The drawing on the left shows all walls in place. The drawing on the right shows foreground walls moved to provide a view into the room interior.



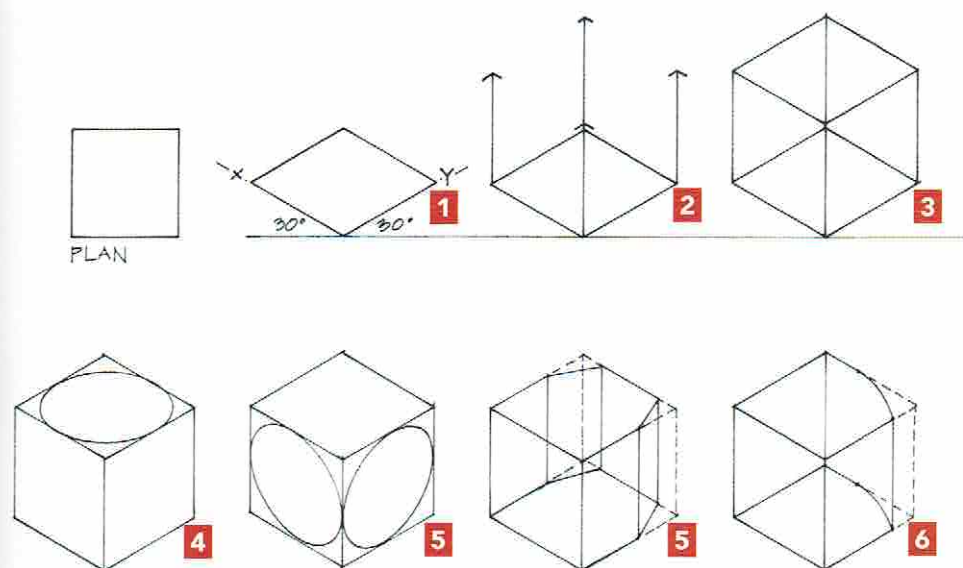


FIGURE 3-3
Quick reference:
isometric construction.

1. Redraw plan, in scale, with x and y axes at 30 degrees.
2. Draw vertical lines upward to appropriate height in scale.
3. Lines parallel to the x and y axes are drawn at the same angles as plan.
4. All circles are drawn as ellipses in an isometric drawing.
5. Create an enclosing box to measure and locate nonaxonometric lines.
6. Create an enclosing box to measure and plot irregular and curvilinear lines and planes.

Plan oblique drawings are quick to create and are useful as an aid in the design process. Using the structure of a plan oblique is an efficient way to create quick ideation sketches, as illustrated in Figure 3-3. However, although they are a simple and effective means of visualization for the designer, they can be confusing for clients who are not accustomed to viewing this type of drawing, especially when used to illustrate complex spaces.

Isometric Drawings

An *isometric* is a paraline drawing based on the use of 30-degree angles. Unlike plan obliques, isometrics cannot be constructed by simple rotation and projection of the plan. Instead, the drawing of an isometric requires the reconstruction of the plan in scale with the two ground-plane axes (x and y axes) at 30 degrees. All elements that are parallel to the ground plane are drawn at 30 degrees. As in other types of paraline drawings, vertical elements remain vertical in isometric drawings. Scale measurements can be made along any of the three principal axes (x , y , and z). Figure 3-3 provides a quick reference of isometric construction.

All circles and circular lines in isometric drawings are drawn as ellipses. Readily available isometric ellipse templates can be used in isometric drawing. Additional information on ellipse construction can be found later in this chapter. Isometric drawings offer a balanced view and the least distortion of any paraline drawing.

Isometric drawings can be used at any phase of the design process as a means of communicating form and spatial relationships. Isometrics are also used in technical and construction documents. Although isometrics offer some advantages, they are somewhat inflexible and do not emphasize any particular portion of the space.

Perspective Drawings

Perspective drawing offers a natural view of interior space and is therefore useful in design presentations. An understanding of basic perspective principles allows designers to draw quickly and fairly accurately. Quick perspective drawings are helpful as visualization tools for designers. In addition, an understanding of basic principles and estimated sketching techniques allows for the creation of fresh, attractive drawings that can be used in design presentations.

Perspective Basics

Creating successful perspective drawings requires a working knowledge of basic principles of perspective. The following list contains information on principles of perspective drawing.

Basic Perspective Concepts:

Picture plane

An imaginary transparent plane through which the area to be drawn is viewed and visualized as a giant sheet of glass standing between the viewer and the area to be drawn, as shown in Figure 3-4.

Once the drawing is begun, the surface of the drawing paper represents this picture plane.

Horizon line (HL)

All three types of perspective employ a *horizon line* representing the viewer's eye level.

A box held high above the viewer's eye level (horizon line) allows a view of the bottom of the box.

As the box is moved below the eye level of the viewer (the horizon line), a view of the top of the box is possible.

Vanishing point (V.P.)

In all types of perspective drawing, perspective lines converge to a *vanishing point* (or points, in two- and three-point perspectives).

Station point (S.P.)

It is from this point in space that the item or scene is seen by the viewer.

Cone of vision (C.V)

The *cone of vision* represents the angle of view, or sight range of the viewer. This concept is based on the reality that humans cannot view all of a space at a given time. The cone of vision, or angle of view, can be seen as representing the natural limits of human sight.

Elements that exist within the cone of vision of the viewer can generally be drawn without excessive distortion. Those elements that exist outside of the cone of vision can become distorted looking.

Diminution of size

In perspective drawings, items decrease in size as they move away from the viewer, and this is referred to as *diminution of size*.

A box drawn correctly will appear larger when closest to the viewer and smaller as it moves away from the viewer.

Because items diminish in size, they cannot be measured consistently in scale; therefore, a variety of methods of measurement have been devised.

Note that the concepts listed are also illustrated in Figures 3-7 through 3-9.

It is the relationship of an object to the picture plane (and to the location of the viewer) that creates a given perspective view of the object. For example, a box that has its front face (plane) parallel to the picture plane is in a position that creates a *one-point perspective* drawing (see Figure 3-4). Turning the box so that the entire front corner is on edge and parallel to the picture plane creates a *two-point perspective* view of the box (see Figure 3-5). Tweaking the box so that only the top (or bottom) corner touches (or could touch) the picture plane creates a *three-point perspective* view of the box (see Figure 3-6).

Although there are a number of nuances that create more complicated relationships, perspective concepts shared by all types of perspective are illustrated in Figures 3-7, 3-8, and 3-9, and each figure provides additional information about each type of perspective view.

FIGURE 3-4

The picture plane is an imaginary transparent plane through which the area to be drawn is viewed. Once the drawing is begun, the surface of the drawing paper represents the picture plane. A box drawn in one-point perspective has its front plane parallel to the picture plane.

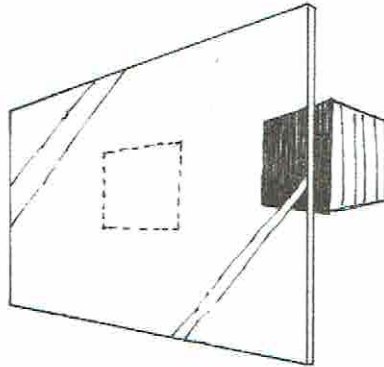


FIGURE 3-5

Two-point perspective. A box drawn in two-point perspective has its front corner viewed on edge in relation to the picture plane.

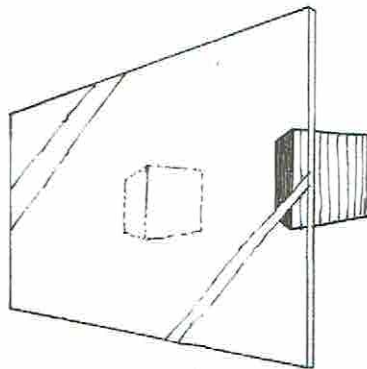
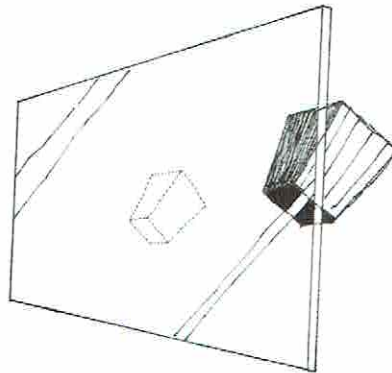


FIGURE 3-6

Three-point perspective. All planes of the box are oblique to the picture plane when viewed in three-point perspective. DRAWINGS FOR FIGURES 3-4 THROUGH 3-6 BY JUSTIN THOMSON



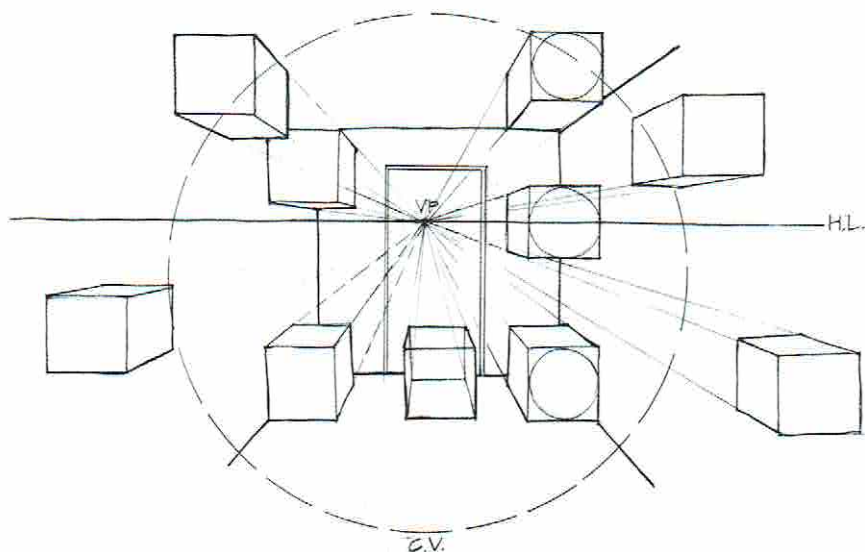


FIGURE 3-7

Quick reference:
One-point perspective
principles.

- Perspective lines converge to a single vanishing point (VP), located on the horizon line (HL).
- The front faces of the cubes and the back wall of a room are viewed parallel to the picture plane. Only those elements with faces touching the picture plane can be drawn in scale.
- One-point perspective drawings have true vertical, horizontal, and perspective (depth) lines.
- Items located outside of the cone of vision (CV) tend to appear distorted.
- Items appear to diminish in size as they recede from viewer.

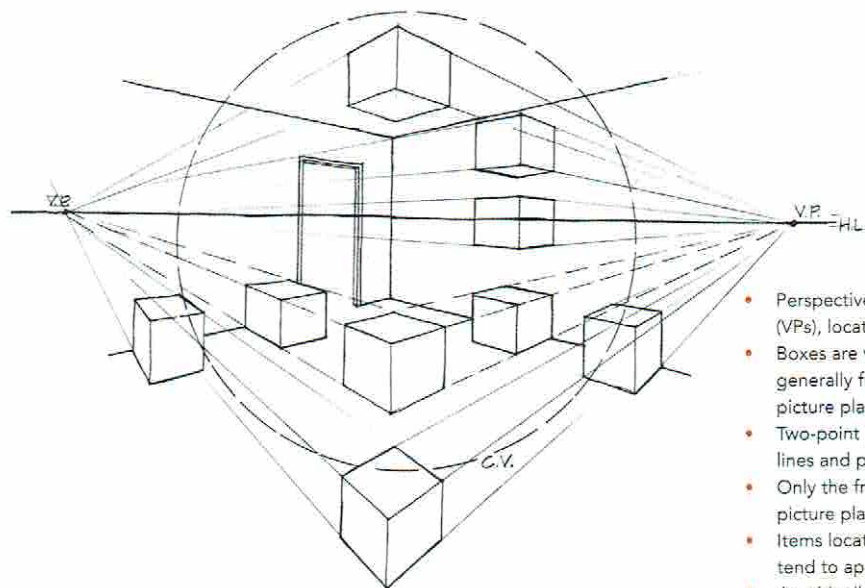


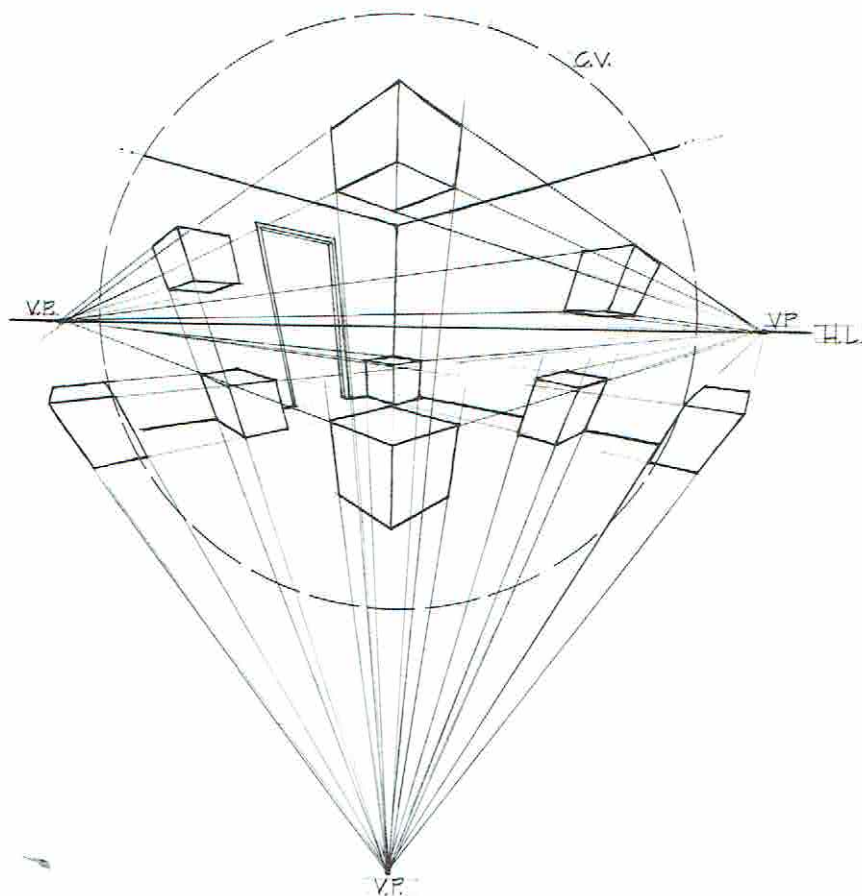
FIGURE 3-8

Quick reference:
Two-point perspective
principles.

- Perspective lines converge to two vanishing points (VPs), located on the horizon line (HL).
- Boxes are viewed from the front corner, and rooms generally from the back corner, in relation to the picture plane.
- Two-point perspective drawings have true vertical lines and perspective (depth) lines.
- Only the front edge (or back edge) touching the picture plane can be measured in scale.
- Items located outside of the cone of vision (CV) tend to appear distorted.
- As with all forms of perspective, items appear to diminish in size as they recede from viewer.

FIGURE 3-9

Quick reference:
Three-point perspective principles.



- Perspective lines converge to three vanishing points (VPs), two located on the horizon line (HL) and one usually above or below the horizon line.
- All planes of a box are oblique to the picture plane.
- All lines converge to a vanishing point.
- No portion of a three-point perspective drawing can be measured in scale.
- Items located outside the cone of vision (CV) tend to appear distorted.
- As with all forms of perspective, items appear to diminish in size as they recede from the viewer.

One-Point Perspective

One-point perspective views portray an object or environment with one plane parallel to the picture plane. One-point perspective views make use of only *one vanishing point*, located along the horizon line, to which all perspective lines converge. One-point perspective can be the easiest type of perspective to draw because the entire plane that is parallel to the picture plane can be measured in scale. Figure 3-7 illustrates one-point perspective principles.

Ease of construction of one-point perspective is also based on the fact that lines that are vertical in reality remain vertical, horizontal lines remain horizontal, and only lines indicating perspective depth are drawn converging to the vanishing point. Although they are easy to draw, one-point perspective views can be unnatural-looking and can become distorted. Despite their drawbacks, one-point perspective drawings are useful during the early stages of design, especially for idea generation.

Two-Point Perspective

Two-point perspective drawings portray objects and volumes on edge in relationship to the picture plane. Another way of stating this is that two-point perspective depicts the primary faces of a volume oblique to the picture plane. This means that two-point perspectives offer a view of the front corner of objects or the rear corners of rooms and environments. In two-point perspective, an object's edge (or the corner of a room) is drawn first and can be used as a vertical measuring line from which perspective lines recede toward two vanishing points. The two vanishing points lie on the horizon line, one to the left and one to the right. As with one-point perspective drawings, the horizon line is always horizontal and represents the viewer's eye level. Figure 3-8 illustrates the principles of two-point perspective.

Apart from the horizon line and elements that lie along the horizon line, there are no horizontal lines found in accurate two-point perspective drawings. Only one vertical measuring line can be drawn in scale owing to the fact that perspective lines converge to two vanishing points, causing objects to look smaller as they recede away from the viewer toward the vanishing points. While a bit more demanding to draw and measure, two-point perspective drawings appear more natural and suffer from less distortion than other types of perspective.

Three-Point Perspective

Three-point perspective is not commonly used in illustration of interior space. Three-point perspective portrays an object or volume with all principal faces oblique to the picture plane. All lines in this type of perspective converge to vanishing points. Often, three-point perspectives are constructed with two vanishing points on the horizon line, one to the left and one to the right, with an additional vanishing point above or below the horizon line. It is best to center the third vanishing point above or below the left and right vanishing points. Figure 3-9 is a quick reference to three-point perspective principles.

The use of three vanishing points creates highly dynamic drawings that may easily become distorted. Because *all* lines converge to vanishing points, no true-scale measuring line can be employed. This means that drawing three-point perspectives requires good visualization skills. Three-point perspective is most useful for portraying single objects, such as furniture or products, that by design should be dynamic, unusual, or attention-grabbing.

Developing Visual Skills

To develop visual skills and learn to “see” in perspective, students should practice drawing simple square-looking boxes in one-, two-, and three-point perspectives.

An effective way to become skilled at drawing in perspective is to practice drawing simple boxes in various relationships to the picture plane and to the horizon line in one- and two-point perspective. The ability to sketch a box in perspective in such various relationships allows for the eventual capability to draw more complex objects constructed from boxlike forms.

Figure 3-10 illustrates important principles of perspective sketching. Review the caption for Figure 3-10 carefully as it covers distortion, use of a vertical measuring line, diagonal division, and drawing slanting planes.

Ellipses

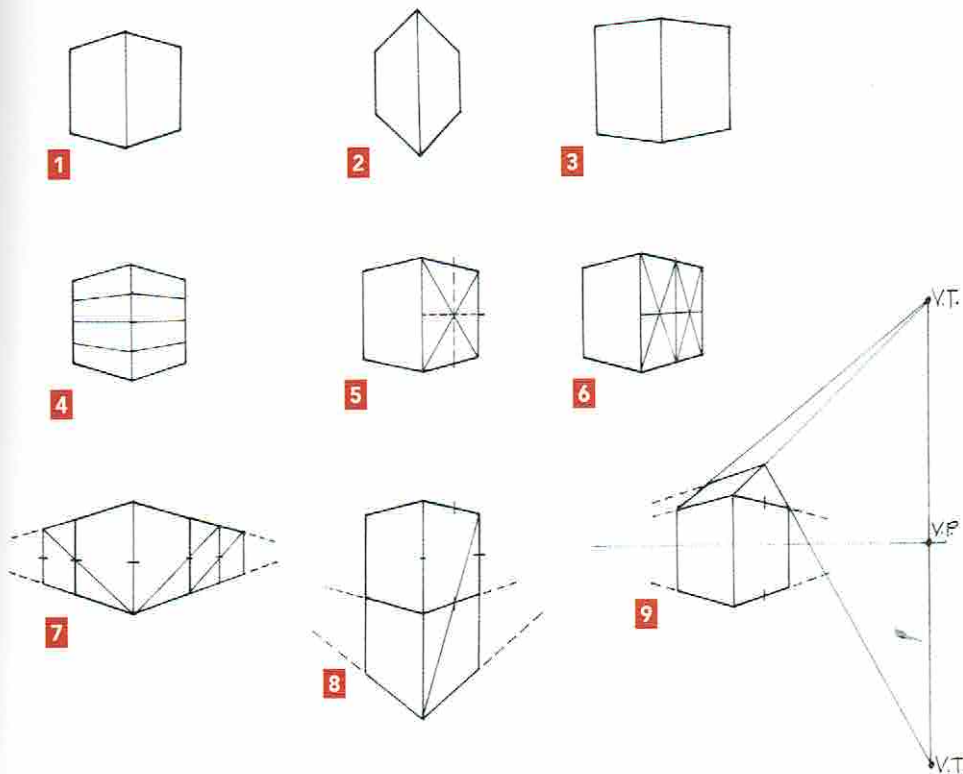
Circles and curves are drawn as *ellipses* in perspective. An understanding of ellipses and how they are drawn can help create natural-looking perspective drawings. Figures 3-11 and 3-12 illustrate important concepts related to drawing ellipses.

Use of Enclosing Boxes

The ability to draw a square-looking box accurately is an effective tool in freehand perspective drawing. Students can develop this skill by filling pages with boxes drawn to look square in two-point perspective. Once this skill has been developed, the box is

FIGURE 3-10

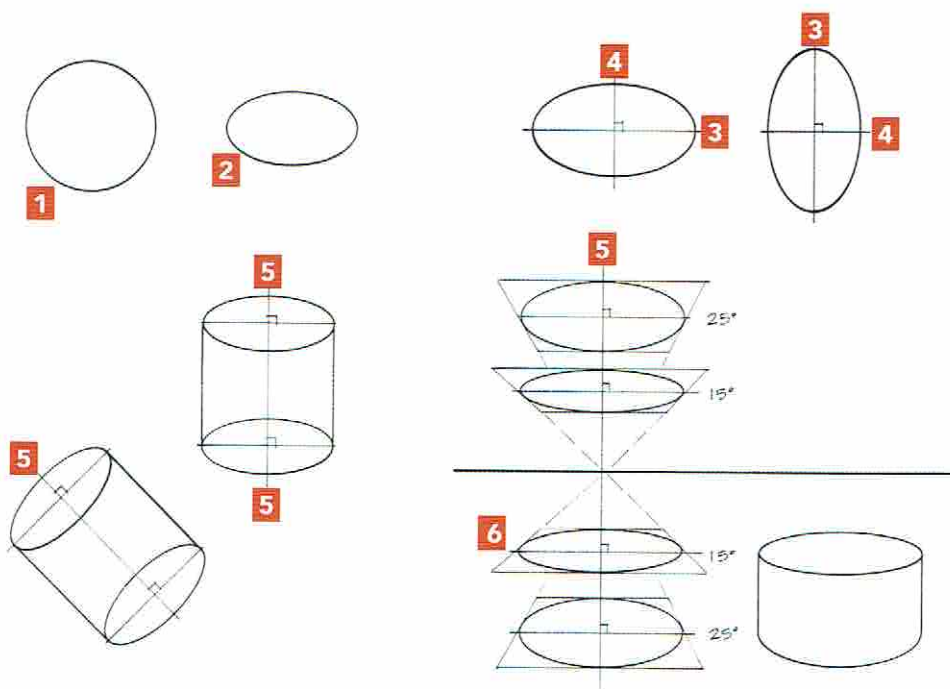
Quick reference: Tips for sketching in two-point perspective.



1. Practice drawing boxes that look square, like this box.
2. Boxes can look distorted when the front corner equals less than 90 degrees. This means the vanishing points are too close together.
3. Boxes can look distorted when the front corner equals greater than 140 degrees. This means the vanishing points are too far apart.
4. The front corner can be divided equally to serve as a measuring line. This line can be scaled and then used to measure portions of the object that recede toward the vanishing points. Vertical measuring lines allow you to measure of a drawing's vertical elements; in principle, this line is the only element of a drawing that can be accurately scaled.
5. Bisecting diagonals divide a square drawn in perspective. The intersection of diagonals drawn from corner to corner in a square locates the midpoint of that square. Diagonal subdivision is an important technique and is useful perspective drawing.
6. Diagonals also divide rectangles (shown within square box here).
7. Boxes can be extended using diagonals. Locate the midpoint of a single box or cube, and draw a diagonal from the bottom corner of the cube through the midpoint of the cube's far side. Then extend the diagonal from the midpoint to the top perspective line (the one that recedes to the vanishing point). Where the diagonal meets the perspective line of the original cube, draw a new vertical, creating a second square that is visually equal in perspective.
8. Diagonals can also extend a box vertically.
9. Slanting parallel lines converge at a common point. Francis Ching dubbed this point a vanishing trace, or VT, and it is directly below or above the vanishing point.

FIGURE 3-11

Quick reference:
Drawing ellipses.



1. Circle.
2. Ellipse. In perspective drawings, circles are drawn as ellipses.
3. The major axis is an imaginary line found at the widest part of an ellipse.
4. The minor axis is an imaginary line found at the narrow diameter and is always at 90 degrees to the major axis. An ellipse's major axis is longer than its minor axis.
5. The centerline of a cylinder is drawn as an extension of the minor axis. The major and minor axes always appear at right angles (90 degrees) to each other, regardless of the position of the object.
6. When found on a horizontal plane such as a floor, the major axis is horizontal. The view of the ellipse varies according to the location of eye level (horizon line).
Elliptical templates are used to approximate the various views more easily.

used as an enclosing form, like a packing crate, then portions of the box are subtracted or added to reveal the object within.

When sketching larger items such as furniture one must keep in mind the relationship of the object to the horizon line. Because humans typically view furnishings and larger items from a standing position, a drawing of such items is best done with the horizon line estimated at around 5 feet above the floor (or 5 feet above the surface that the items is sitting on). Therefore, in constructing these drawings it is best to create the horizon line with a scale figure shown (the figure's eye level should align with the horizon line as shown in Figure 3-13). The scale figure serves as a scale device for the elements in the composition.

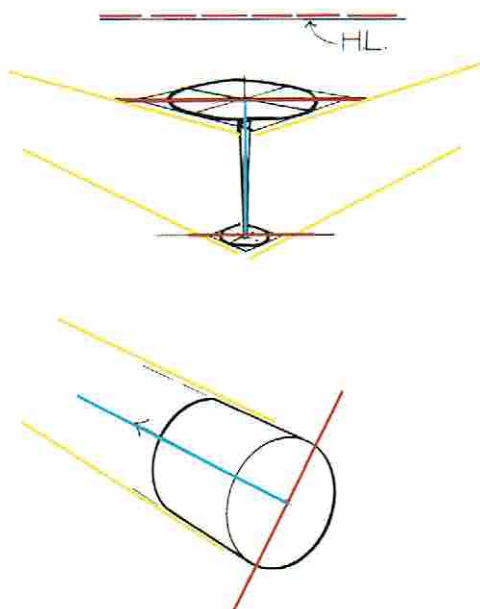


FIGURE 3-12

Additional information about drawing ellipses.

- Items that are parallel to the floor or ground, such as a table base or top, must have a major axis (in red) that is parallel to the horizon line (dashed red line). The central leg of this table is formed by a centerline that extends from the top minor axis to the lower minor axis.
- Cylindrical items not parallel to the floor have a minor axis (blue line) that extends through the center of the major axis and back to the object's vanishing points. Perspective lines to vanishing points are drawn in yellow.
- Templates can be used to create accurate ellipses and curvilinear forms. The choice of template is based on the locations of the major axis, the minor axis, and the centerline of the form.

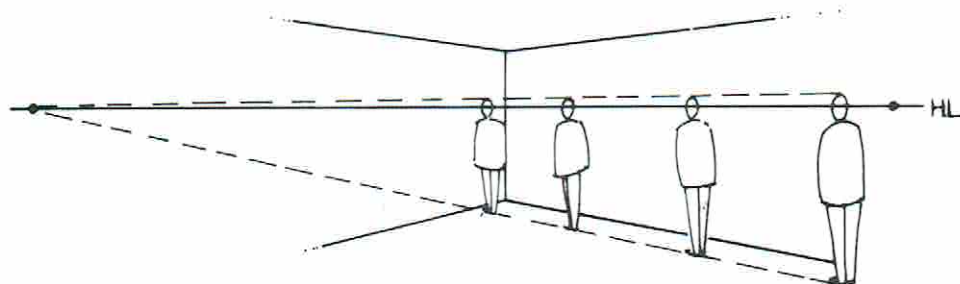
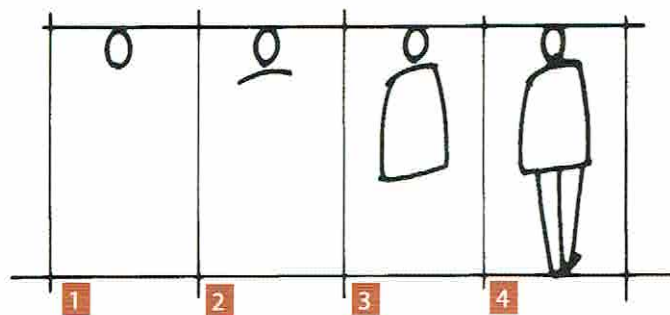


FIGURE 3-13

Quick reference: Using a scale figures. Scale figures can be used to establish proportions and relationship to the horizon line (H.L.). Generally it is best to place the adult figure's head directly on the horizon line and establish this height as roughly 5' to 5'-6". With these rough dimensions one can establish items such as chair seat, and back height for rough estimation.

FIGURE 3-14

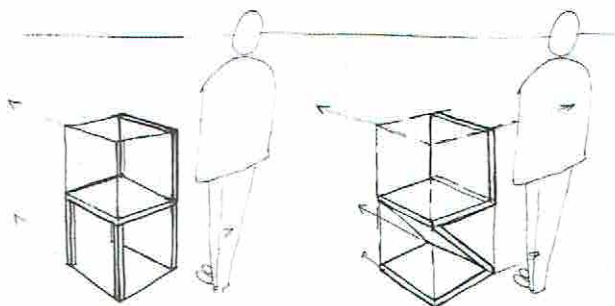
Quick reference: Step-by-step drawing of scale figures. A figure shown walking away from the viewer is easiest to draw.



1. Draw a small oval head (on or near the horizon line).
2. Draw curved shoulders slightly below the head.
3. Draw a torso extending downward from the shoulders.
4. Draw legs below the torso. The legs can be uneven, and shoe-shapes can extend from them.

FIGURE 3-15

Quick reference: Two-point sketching using estimated boxes. Note: These are actual rough sketches with no straight edges or rulers used (roughly 3–5 minutes per sketch or less).



- Sketch a box or series of boxes that approximate the total dimensions of the object.
- Make sure the vanishing points are generously spaced.
- Make sure the horizon line is appropriately located (in this case the chair seat and back should be below the horizon line); use a scale figure if necessary to help establish heights as shown here.
- In these examples there are two stacked boxes, one representing the seat height and one representing the back of seat, and they are proportioned accurately given the scale figure. The boxes are used to rough out the locations of seat and back and, as shown, the boxes can be used to generate varying designs in roughly the same scale.

It is very helpful to develop a quick method of sketching human figures. Steps for drawing these figures are shown in Figure 3-14. With a quick human scale figures sketched in proper relationship to the horizon line, estimation boxes can be developed in a way that creates a scale relationship that is fairly accurate.

Starting with a simple box, placed correctly place on the horizon line in relationship to viewers eye level and using diagonal division or simple estimation, allows for sketching items in boxes that are not exactly square but may be elongated in a number of directions. Figures 3-15 and 3-16 depict drawings in which an enclosing box is employed to construct and estimate items.

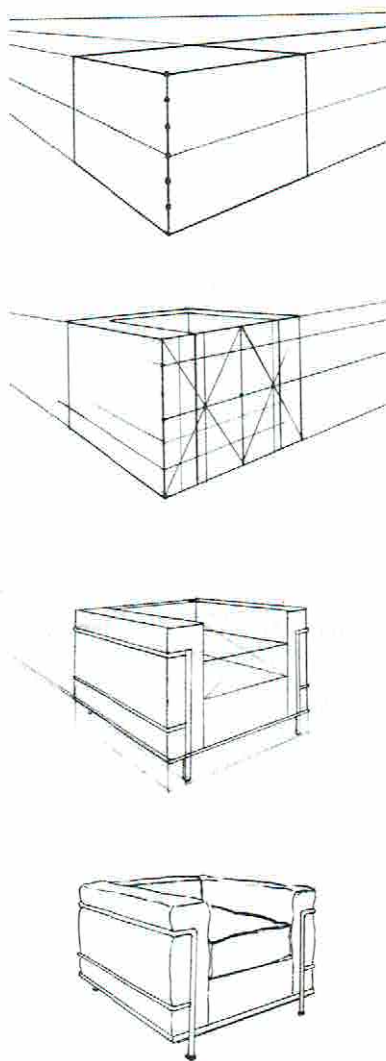


FIGURE 3-16

In this step-by-step example, an enclosing box is used to draw a Grand Confort chair. The front corner of the box is marked in equal increments and serves as a measuring line. Diagonal division and the measuring line were used to rough out proportions with a final version created using tracing paper. DRAWING BY LEANNE LARSON

The ability to visually assess freehand perspective drawings that have been constructed from simple boxes lets us understand and see form and spatial relationships. Employing the principles of perspective mentioned thus far allows for better drawing and for the use of perspective drawing as a design tool.

The quick sketching covered to this point can be used for ideation and development of design details. To this point only drawings of single items have been presented in order to clearly present information. Additional information about drawing entire rooms and spaces can be found in the following chapter, which builds on the issues discussed to this point.

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