

# DRAW BETTER

Learn to Draw with Confidence

Dominique Audette

# Draw Better

by Dominique Audette



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# ABOUT THIS BOOK

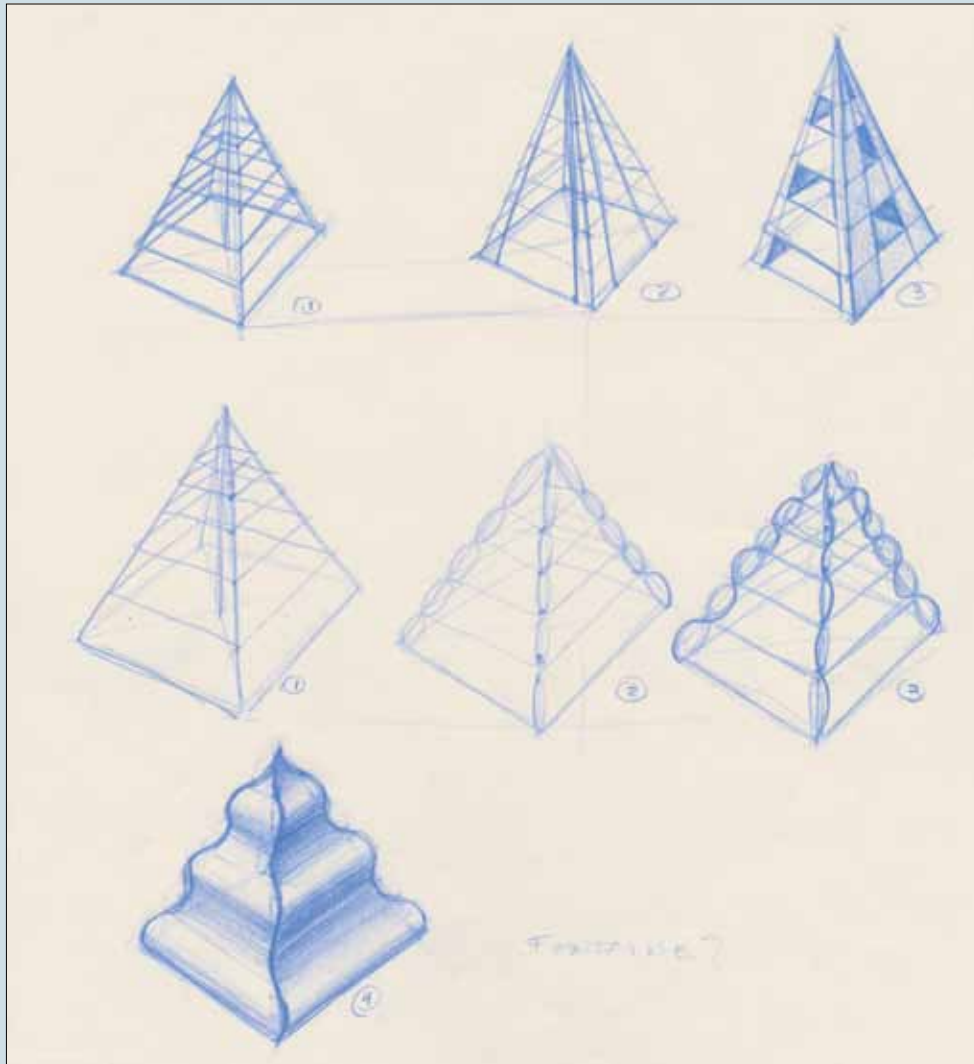
## INTRODUCTION

The goal of this book is to allow anyone to improve their skills in drawing. Beginners will learn the basic concepts of drawing and then be able to apply these ideas to simple projects. Intermediate draftspeople will find new challenges and insights. Throughout the book, everyday objects are used to demonstrate specific techniques. Part One presents basic concepts of drawing, while Part Two suggests some drawing projects based on these concepts. Every project is presented with step-by-step drawings that visually explain the construction of the object. Understanding that the people who use this book are visual learners, images are the primary component here, with text kept to a minimum.

## CONCEPTS

**Draw Better** systematically presents fundamental concepts, starting with the idea that even complicated shapes can be reduced to basic geometric forms such as spheres, boxes, and cones. A description of orthographic projection teaches how to visualize an object in space. This standard technique allows us to imagine an object from all angles, and quickly provides a summary of the information that will be used to make a finished drawing. From there we move on to perspective, a trick that allows us to make a two-dimensional image mimic a three-dimensional reality. The final concept is the addition of shading to enhance contrast and increase the sense of volume within a drawing.

# CONCEPTS



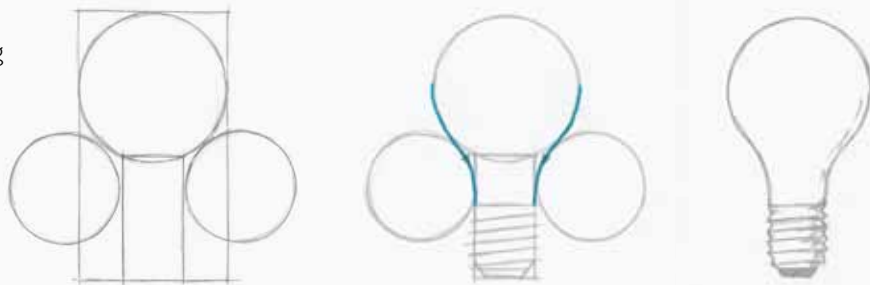
# GEOMETRIC SOLIDS: BASICS

## Basics:

Any object can be reduced to a geometric shape, as illustrated with these common objects.

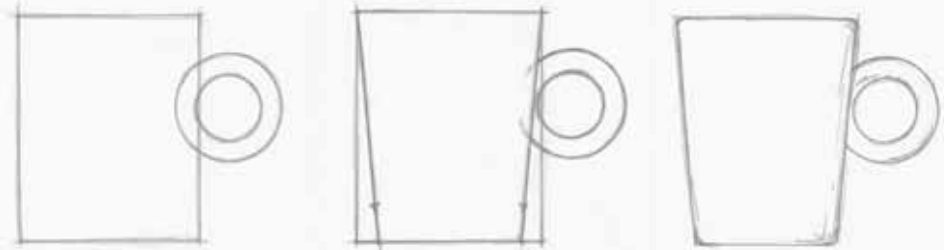
### Light bulb

- Layout circles and rectangles.
- Draw two curves by following the circles.
- Add the screw as shown, using diagonals in the small rectangle.



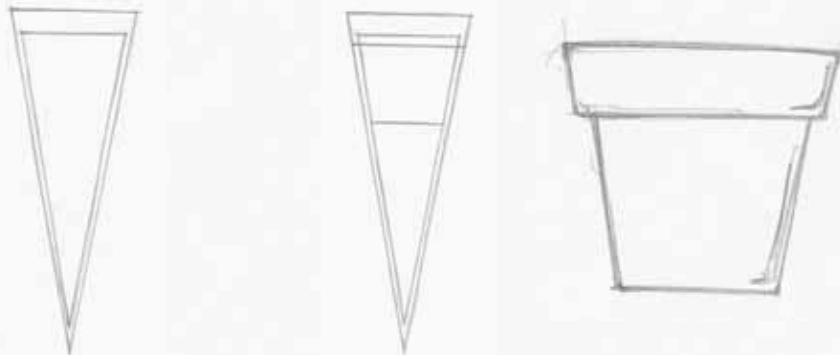
### Cup

- Draw a rectangle and two concentric circles as shown.
- Taper the base of the cup.
- Round the corners and erase a part of the larger circle.



### Earthenware pot

- Draw two long triangles, one inside the other.
- Cut the triangle as shown to create the lip of the pot.
- Erase most of the triangles to leave the shape of the pot.



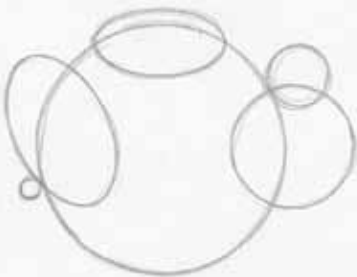
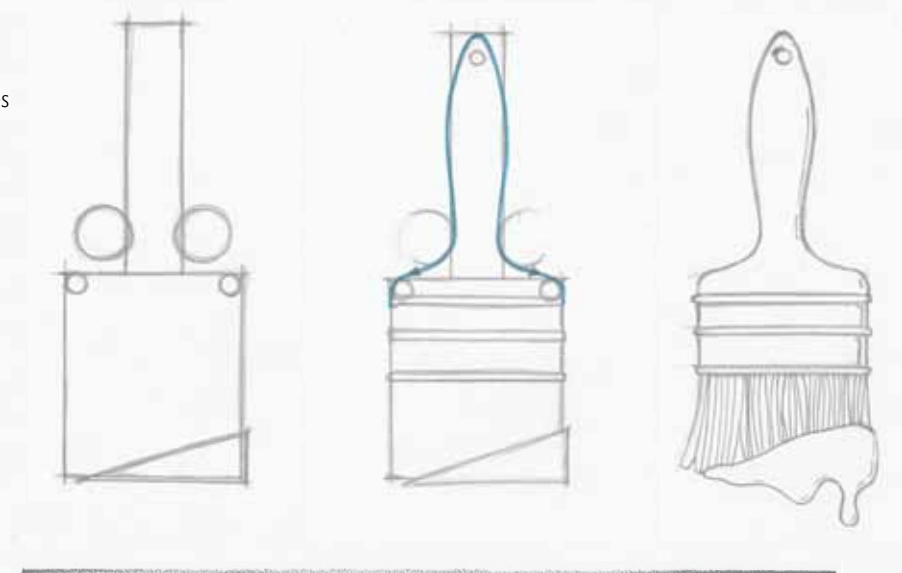
# GEOMETRIC SOLIDS: ADVANCED

## Advanced:

The concept is the same for more complex forms, which might require more shapes to construct.

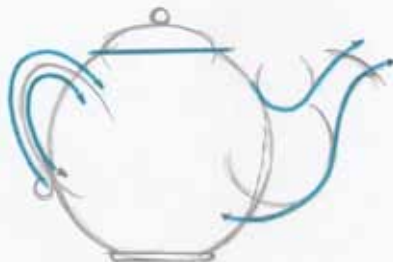
### Brush

- Draw two rectangles, two circles and a triangle, as shown.
- Draw the shape of the handle and use the circles to connect the handle to the brush. Horizontal lines represent details in the ferrule (the metal part of the brush).
- Draw vertical lines to represent the bristles and stretch the triangle with random curves to indicate fluid paint.



### Teapot

Draw a primary circle with smaller circles and ovals around it. These will be used to determine the location and shape of the handle and spout.



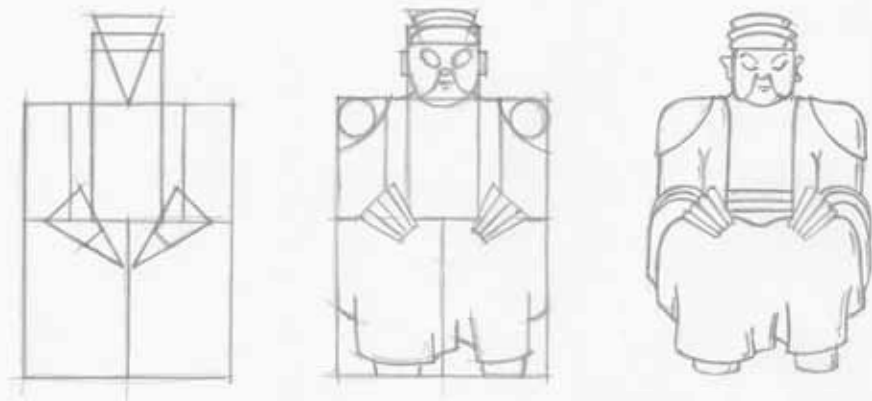
Use the small geometric forms to inform the shapes and transitions between parts, as shown in blue.



Connect the spout to the body of the teapot and add details..

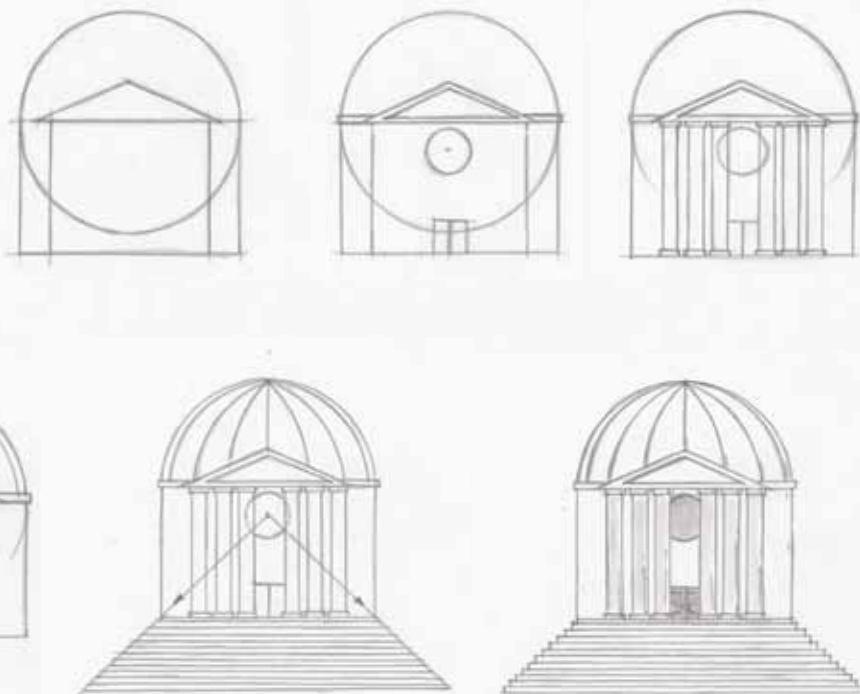
### Traditional Chinese Figurine

- Draw rectangles and triangles to start the form.
- Add other geometric shapes and curves to locate details such as the hat, face, shoulders, hands and robe.
- Complete the drawing by adding details and indications of shading.



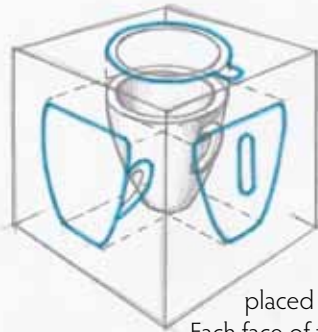
### Classical Building

- Draw geometric solids as shown—a circle, a triangle and rectangles.
- Draw additional lines along the roof and add a small circle and rectangles to indicate a door.
- Draw vertical lines for the columns and curves on the dome.
- Use the center of the small circle and the corners of the large square to define the outlines of a staircase.
- Complete the drawing with shading.

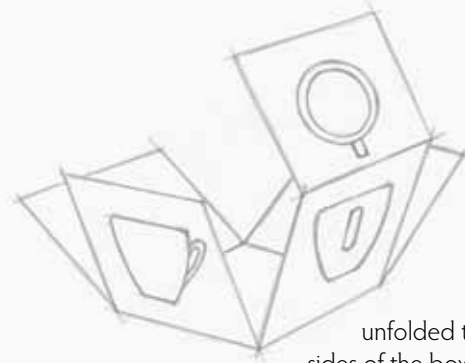


# ORTHOGRAPHIC PROJECTION

Orthographic projection refers to a single drawing that shows several views of an object—typically the top, front, and side views. In addition to providing detailed information about the object, it also helps us understand where to place lights and shadows.



Imagine an object placed inside a transparent box. Each face of the object is parallel to the surfaces of the box and visible through it. Now imagine the outlines of the object drawn on the faces of the box, each face showing what is directly in front of it.



The box can be unfolded to show all the sides of the box at the same time—a two-dimensional view showing many views of the object.



This approach is called the **Orthographic Projection**. The word orthographic comes from the Greek *orthos*, meaning straight and *graphia*, meaning writing.

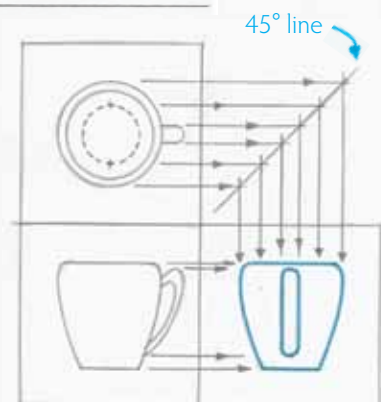


**Front view:** Draw the outlines of the cup.

**Top view:** Project all dimensions up from the front view, using dashed lines to depict hidden features. The lines used for projection are called **projectors**.

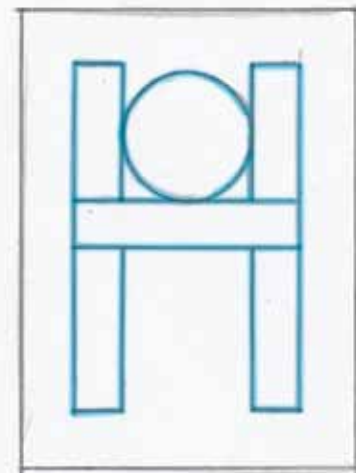
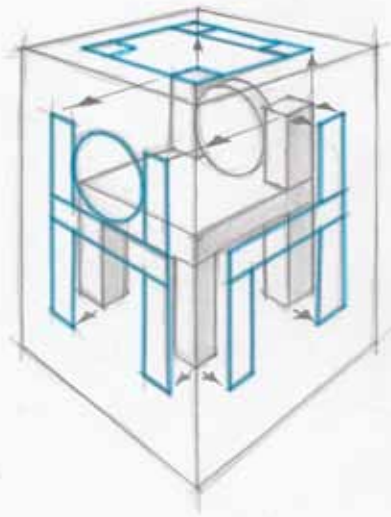


**Side view:** Project all dimensions horizontally from the front view. From the top view, project information horizontally, then redirect the projectors vertically using the 45° line. These projectors intersect those from the front view to define the outline of the cup. Usually, three views are enough to depict an object.

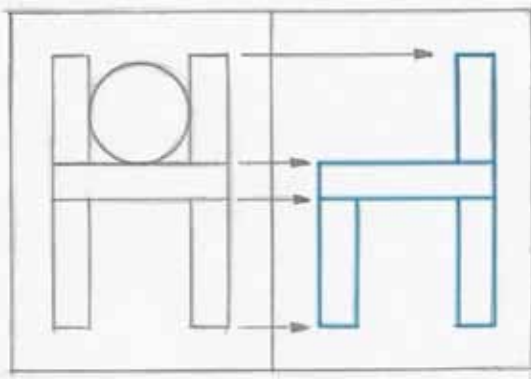


## Chair

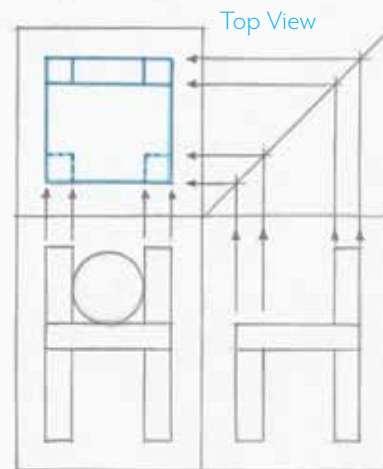
- Imagine a chair inside a glass box, then imagine tracing the shapes of the chair onto each glass panel, shown here in blue.
- **Front view:** Draw the outlines of the chair, front legs, thickness of the seat and the back.
- **Side view:** Draw projectors from the front view, including the thickness of the seat.
- **Top view:** Project all dimensions up from the front and side views.



Front View



Side View



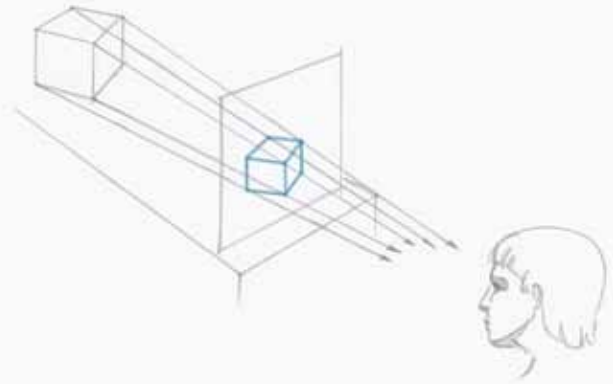
Top View

As shown, the side view dimensions need to be "bent" at 90° on the segment at 45° to complete the top view.

# PERSPECTIVE: INTRODUCTION

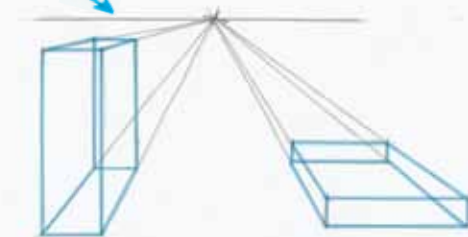
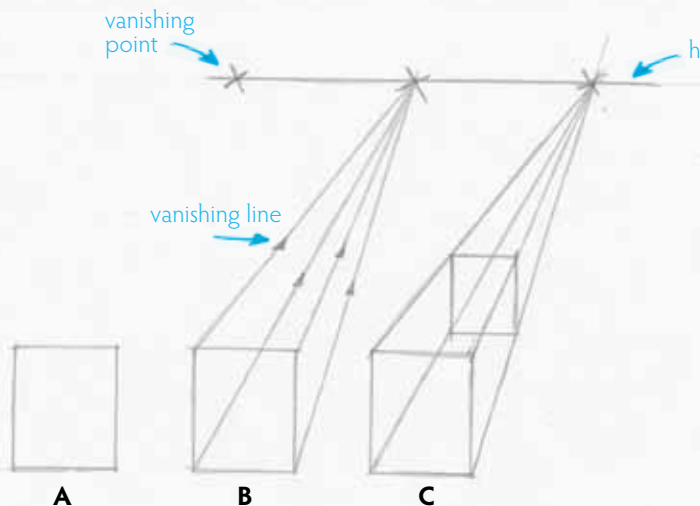
## Basics

Perspective is a drawing technique that allows a three-dimensional object to be reproduced on paper as the observer sees it in space with a life-like appearance. To say it another way, the top, front, and side views (orthographic projection), can all be seen in the same image. The concepts underlying perspective provide an understanding of the mechanisms that make it work. We will begin with a series of exercises that illustrate these concepts, creating drawings of **surfaces** (i.e., flat planes) and **volumes** (e.g., boxes) that will then be sliced and divided as needed to make other shapes.



## One Vanishing Point

Perspective drawing that uses just one vanishing point is good for a simple object and gives the appearance of distance.



Boxes of any size can be made this way, depending of the size of the first rectangle and the distance to the second rectangle.



The vanishing point can be in the middle of the page. When the boxes are above the vanishing point, it appears that the observer is below the box.

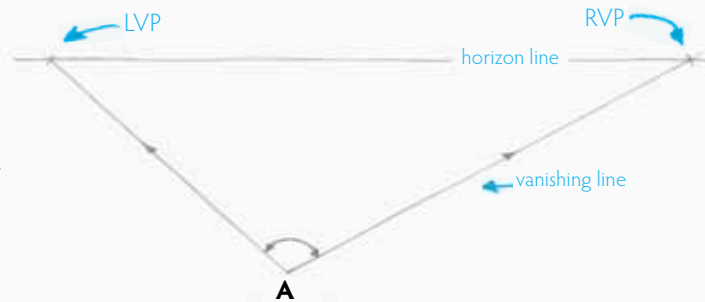
- Start with a rectangle (A).
- Draw a **horizon line** at the top of the page to represent the eye level of the observer. Place a **vanishing point** on this line. For now, the location of this point can be random.
- Draw **vanishing lines** from each corner to the vanishing point (B).
- Draw a second square, further along, touching each of the vanishing lines (C).

# PERSPECTIVE BASICS

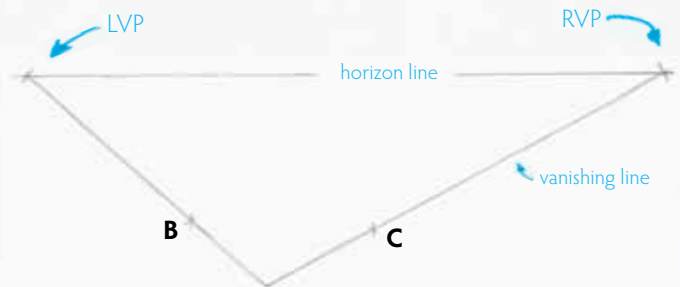
## Basics: Quadrilateral

The most basic form drawn in perspective is a rectangle as seen from a front edge.

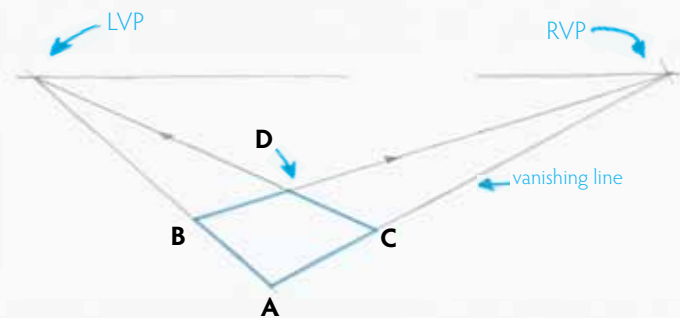
- Draw the horizon line at the top of the page and place the vanishing points at the ends of it. The left vanishing point will be called **LVP** and the right one **RVP**.
- Place the point **A** below the horizon line. This point represents the bottom corner of the quadrilateral.
- From this point, run a vanishing line toward **LVP** and another toward **RVP**. To depict the object realistically, angle **A** of the corner formed by the first two vanishing lines should be greater than  $90^\circ$ .

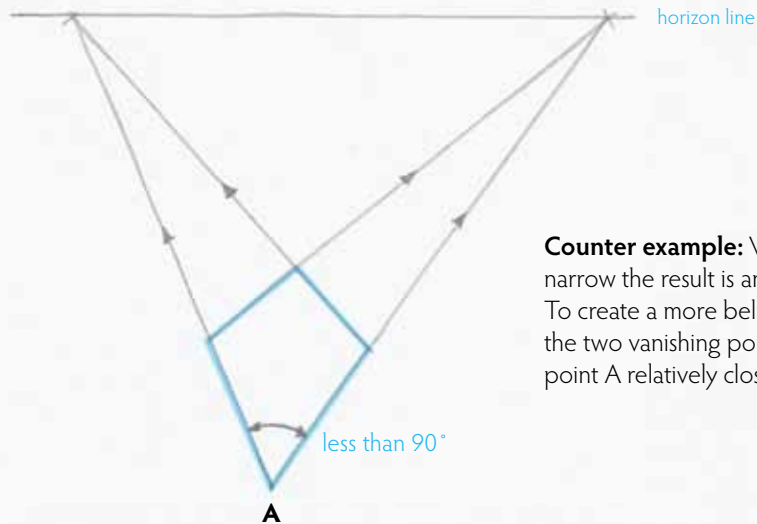


- Make two marks on the angled lines, shown here as **B** and **C**. The dimensions are arbitrary. These will become the outside corners of the resulting rectangle (technically called a quadrilateral).



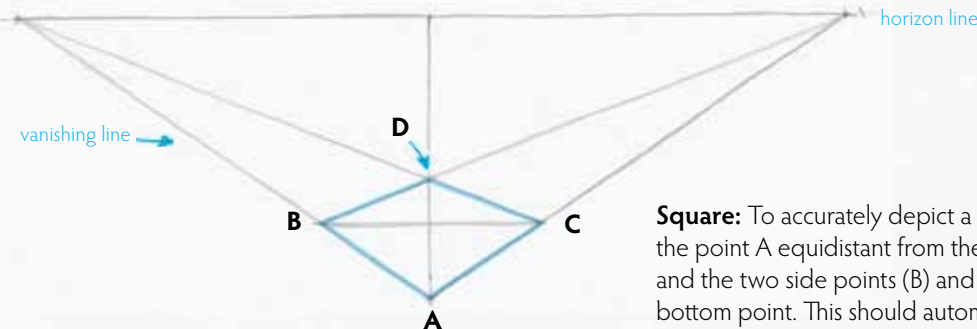
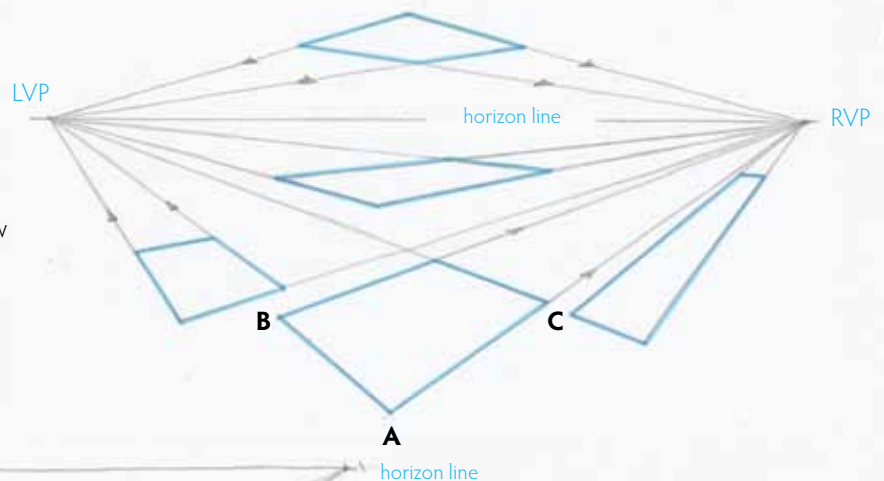
- Using a ruler, draw two vanishing lines that cross from the right side to the left point and vice versa. They meet at the point **D** to complete the surface **ABCD**.
- Highlight these lines (or erase the vanishing lines, which are no longer needed) and the result is a square or rectangular plane shown in perspective.





**Counter example:** When the angle A is too narrow the result is an unrealistic distorted look. To create a more believable perspective, place the two vanishing points far apart and keep point A relatively close to the horizon line.

**Point of View:** To create different shapes, change the location of the two side points (B & C). To change the angle of viewing, place the bottom point of any quadrilateral closer or further from the horizon line. To change the view as if seen from below, place the quadrilateral above the horizon line.



**Square:** To accurately depict a perfect square, locate the point A equidistant from the two vanishing points and the two side points (B) and (C) equidistant from the bottom point. This should automatically place the upper crossing point (D) directly above the bottom point.

# PERSPECTIVE: QUADRILATERALS

Perspective drawings, by definition, play games with measurement. Parts that in reality are of equal length are drawn as unequal, which is what makes them appear to exist in space. To make measurements within this invented space, we use diagonals.

## Finding Centerlines



Start with a quadrilateral, then draw the diagonals corner to corner. Draw a line that connects the intersection of the diagonals with the right vanishing point.



The figure can also be divided in the other direction, creating four equal parts.

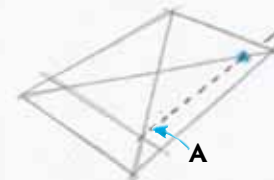


Each part can also be divided. There is no limit to the number of subdivisions.

## Dividing Symmetrically



Choose any point on the quadrilateral and draw a line from there to the left vanishing point.



At the intersection of the vanishing line with a diagonal (A), draw another line toward the right vanishing point.



From the intersection with the diagonal, draw a line toward the left vanishing point. The two interior lines are now equidistant from the center.

## Quadrilaterals within Quadrilaterals



Choose a location for the first corner of the smaller quadrilateral and run two vanishing lines until they meet the diagonals...



...and redirect these vanishing lines until they meet the diagonals.



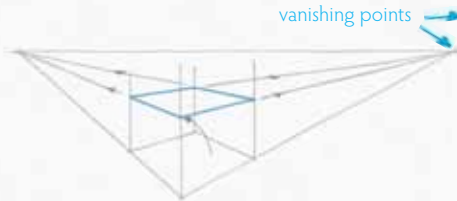
Using this technique, any number of smaller quadrilaterals can be created within the original.

# PERSPECTIVE: BOXES

## From Planes to Boxes

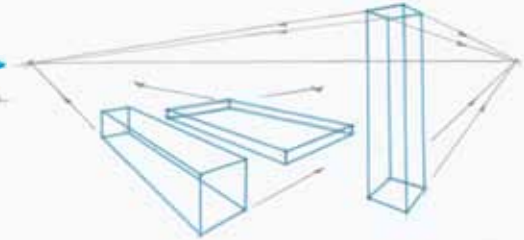


To draw a volume from a surface, start with a quadrilateral, then draw verticals from each corner.



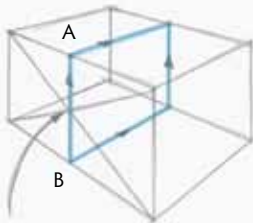
Determine the height of the box by marking a point on the front edge (arrow). Draw lines from this point to the left and right vanishing points to establish the top of the box.

vanishing points

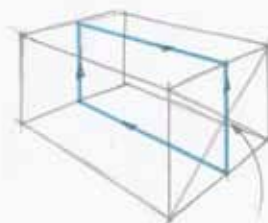


Boxes can be created in other shapes and dimensions by changing the proportions of the quadrilateral and the length of the verticals.

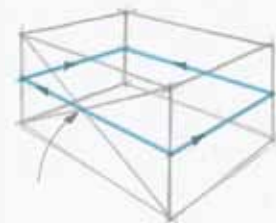
## Bisecting Boxes



Draw diagonals on the left side of a box to determine the center point. Using this point, draw a vertical line (AB), and from the top and bottom of this line, connect to the vanishing points.

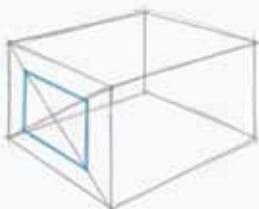


Draw diagonals on the right side of the box and proceed the same way, using the left vanishing point.

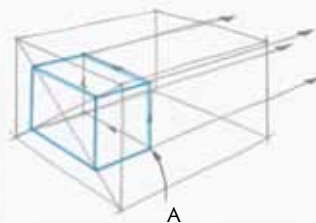


Using the diagonals of the previous exercise, draw lines to both vanishing points.

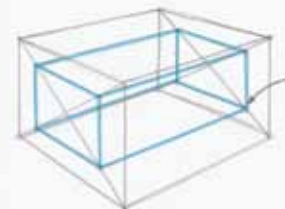
## Internal Boxes



To draw a box within a box, create diagonals as above, draw two vertical lines, and from the top and bottom of those, draw lines to the left vanishing point.



Draw lines from each corner to the right vanishing point. Determine the depth of the interior box with a vertical (A), then draw a line to the left vanishing point.

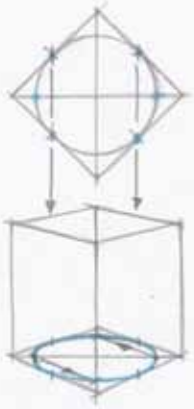


To make the interior box slice all the way through the larger box, draw diagonals on the opposite face. Draw a vertical from the place where the vanishing line meets the diagonal (arrow).

# PERSPECTIVE: CYLINDERS & CONES

Boxes are important because they provide a structure for other forms.

## Cylinders & Cones



A square box seen from the top would contain a circle that touches the midpoint of each of the four sides.



Draw diagonals on the top and bottom of the box then connect the points with smooth curves.

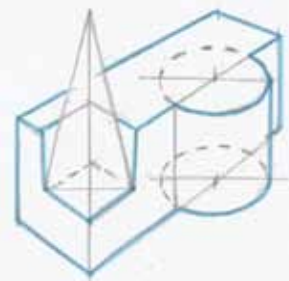
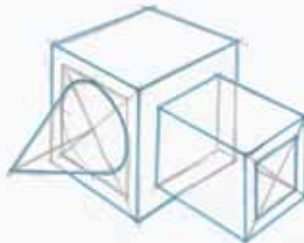


Draw vertical lines to connect the outer points of the two ellipses to form a cylinder.



To make a cone, create an ellipse on the base of a box, then connect the outer points to the intersection of the top diagonals.

## Complex Forms



In each of these forms, the preliminary drawing in the upper corner shows how familiar geometric forms were used to construct complex forms.

# LIGHT & SHADOW: INTRODUCTION

Adding light and shadow to the outline of an object helps to give it volume. This makes the drawing more lifelike and therefore more effective. Light and shadow go hand in hand—each one exists through its contrast with the other.



Light and shadow are so important in a drawing that they can almost depict an object even without outlines. In this example for instance, the shadow is sufficient to recognize the object.



In the same way, light alone can often describe an object. Light is rendered here with white pencil on colored paper.



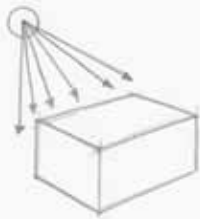
When both light and shadow are represented the object comes to life. This effect is so powerful that outlines are not absolutely necessary for simple objects.

## Tip:

When we start including shadows, it is helpful to use pencils of different hardness. Draw the outlines with a hard graphite pencil (e.g. 4H) and depict the shadows with a softer graphite such as HB or 2B. Because the 4H graphite is hard, it will not blend when the stump is used to spread the softer graphite in a gradation. This means that the outlines will stay in place.

# LIGHT & SHADOW BASICS

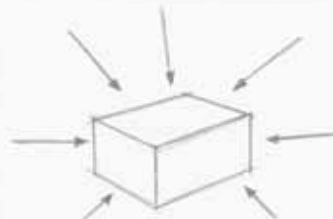
The source and quality of light affects objects and should be considered in every drawing.



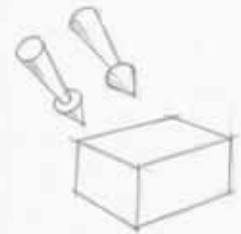
An **artificial light** source, a light bulb for instance, projects divergent rays toward an object.



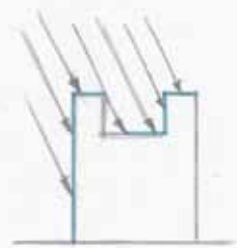
**Natural light** of the sun is projected in parallel rays toward an object. This natural source will be used in this book. It is easier to pinpoint areas of light and shadow on objects with natural rather than with artificial light.



Drawings require that we choose a **direction** from which the light is coming. In general, it is accepted practice to place the light source above and to the left of the object, but the rays can come from any direction, as shown here.



The **placement of the light source** must create sufficient contrast to emphasize the object. Placing the source behind the object usually creates the best environment for this light/dark dynamic to occur.



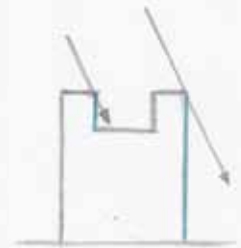
**Light zones** are surfaces that are struck directly by the light rays. The rays strike the object at precise locations to create these zones. Elsewhere, the rays miss the object, leaving shadow.



The **highlight** is the precise location of a light zone where the light strikes the object directly, that is, at a  $90^\circ$  angle to the surface. This is the most brightly lit area of an object.



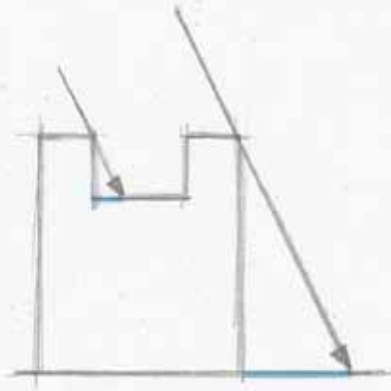
**Reflected light** is light that bounces back from neighboring surfaces onto the shadow side of the object.



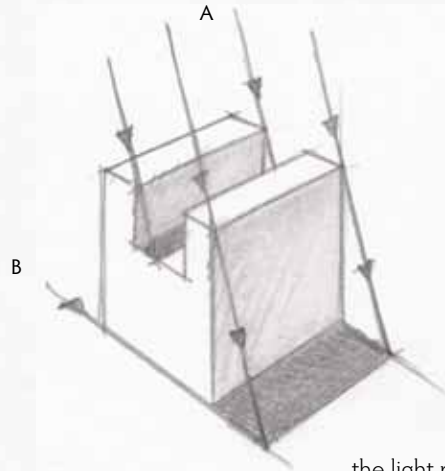
**Form shadow** occurs on the surfaces away from the light source, that is, in areas the light rays cannot reach. More on page 25.

# CAST SHADOW BASICS

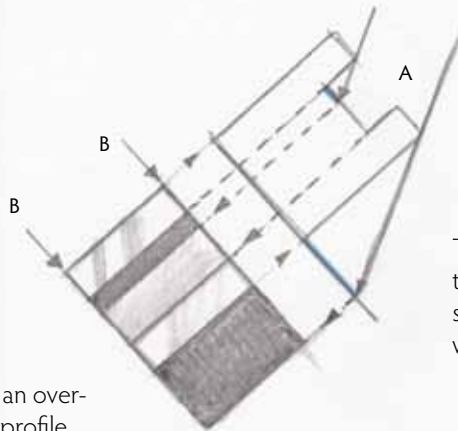
The formal definition of a cast shadow is “the shaded area produced when a raised non-transparent object blocks the light from striking the surface on which it lies or an adjacent surface.” Or simply, ***When you block light, you create shadow.*** In drawing, shadows help us communicate the size and solidness of objects.



A sketch of the profile helps to envision where the cast shadows will fall.



In a three-quarter view, the light rays (A) and their traces (B) are integrated into one single view. The cast shadow is darker than the form shadow.

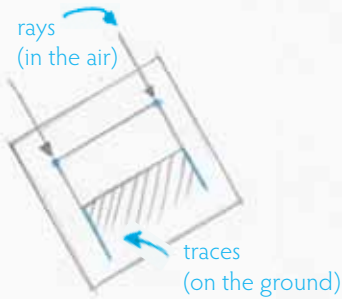


The top view has an overhead view with a profile.

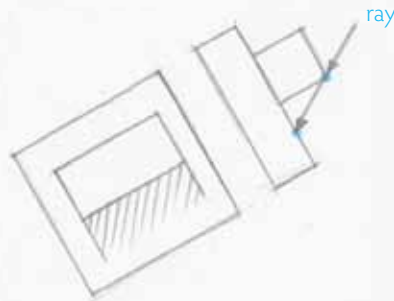
The cast shadow in the top view is depicted the same way as a form shadow on complex shapes, using the rays (A) and their traces (B) with two separate drawings.

# CAST SHADOW: TOP VIEW

The cast shadow is shown on the top view using the same procedure as the Form Shadow on a Complex Shape, page 26.



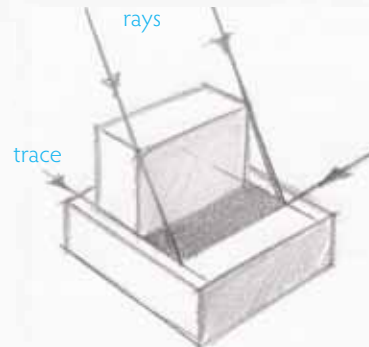
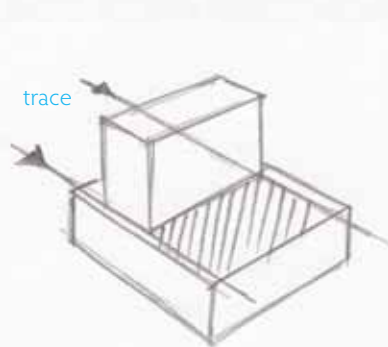
On the top view, draw traces on each side of the box to locate the edges of the cast shadow.



An overhead view with a profile provides placement details.

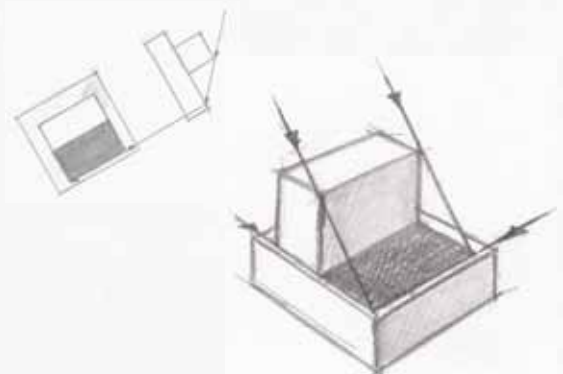
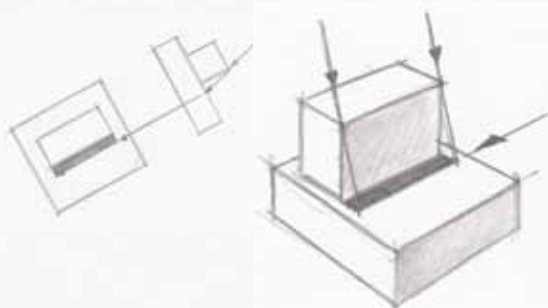


Use the ray from the drawing at the right to determine the length of the cast shadow.



These two sketches show the same information conveyed above, this time in three-quarter view.

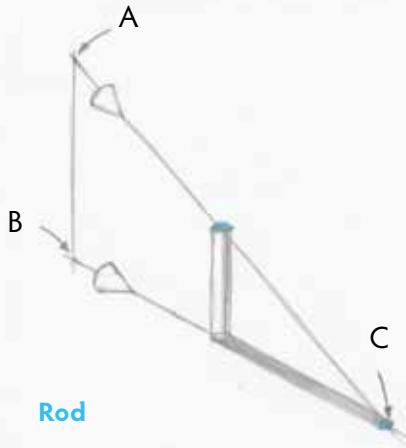
The height of the light source above the object determines the length of the shadow.



We know that the shadows we cast at midday are shorter than those we cast in the morning and evening.

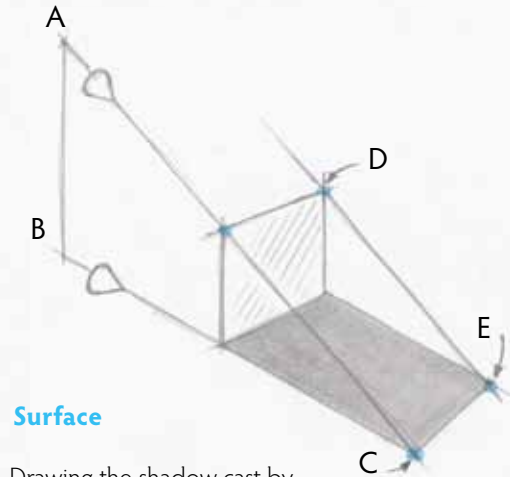
# CAST SHADOW: PERSPECTIVE & VOLUME

A cast shadow is influenced by the height and direction of the light source. The light rays and their traces on the ground are integrated into one single view.



## Rod

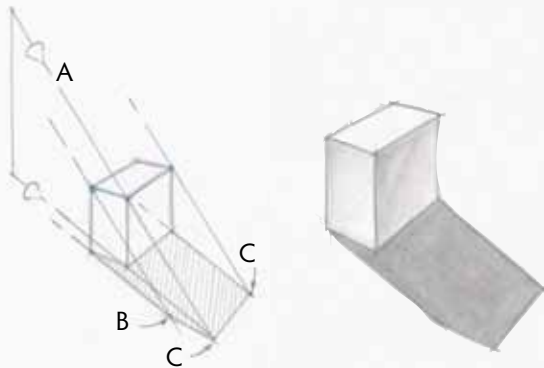
Place the light source (A) at the upper left, and project a ray through the upper point of the rod. The ray determines the length of the cast shadow. Place the foot of the source (B) by dropping a vertical from the light source on the ground, and project a trace through the lower point of the rod. The foot of the light source determines the direction of the cast shadow. The meeting point (C) of the ray and its trace determine the far end of the cast shadow.



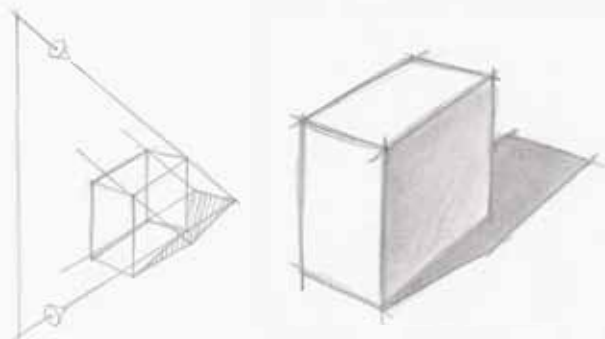
## Surface

Drawing the shadow cast by a surface is similar to the rod example. Place the light source at A as before and project a line through the top edge of the surface. Drop a line from A and project a line from there through the lower corner of the surface to find point (C). Draw a line that is parallel to the first one (AC), this one going through D. They will meet at the point (E) to determine the shape and length of the cast shadow.

## Volume



In this example, the light source is not at a right angle to the box so the shadow is cast toward the viewer. Start as before to locate the main shadow, then project a line from A to the top corners of the volume to locate points B and C. Darken the cast shadow zone and give it very sharp edges. Note that the form shadow on the volume is lighter and smoother than the cast shadow.



Here the light source is somewhat near the viewer, off to the left. Notice how this increases the dramatic impact. The process is the same as before: darken the cast shadow and give it sharp edges. Again, the form shadow is lighter and smoother than the cast shadow.

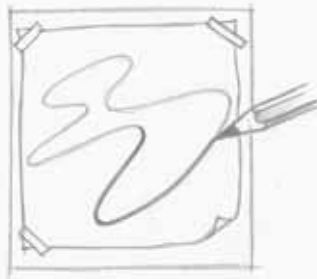
# CAST SHADOW: TOP VIEW

## Shortcut to Make a Cast Shadow for a Complex Shape

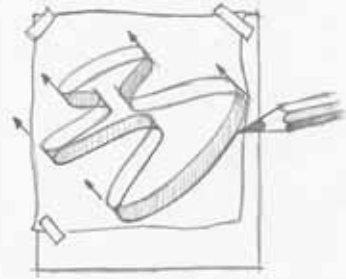
The shape of a cast shadow always mirrors the form that generates it—even a form with a complex and irregular shape. Here is a simple way to draw the cast shadow of a complex shape.



1. Draw a complex curve on a piece of paper.



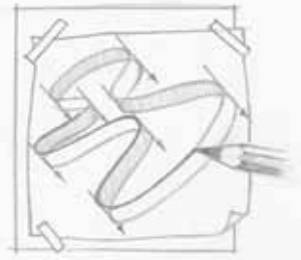
2. Reproduce the drawing on tracing paper.



3. Slide the tracing paper sheet **toward** the light source and copy the complex curves.



The area between the original figure and the repositioned one corresponds to the shadow zone. The result shows the object as raised up and casting a shadow.

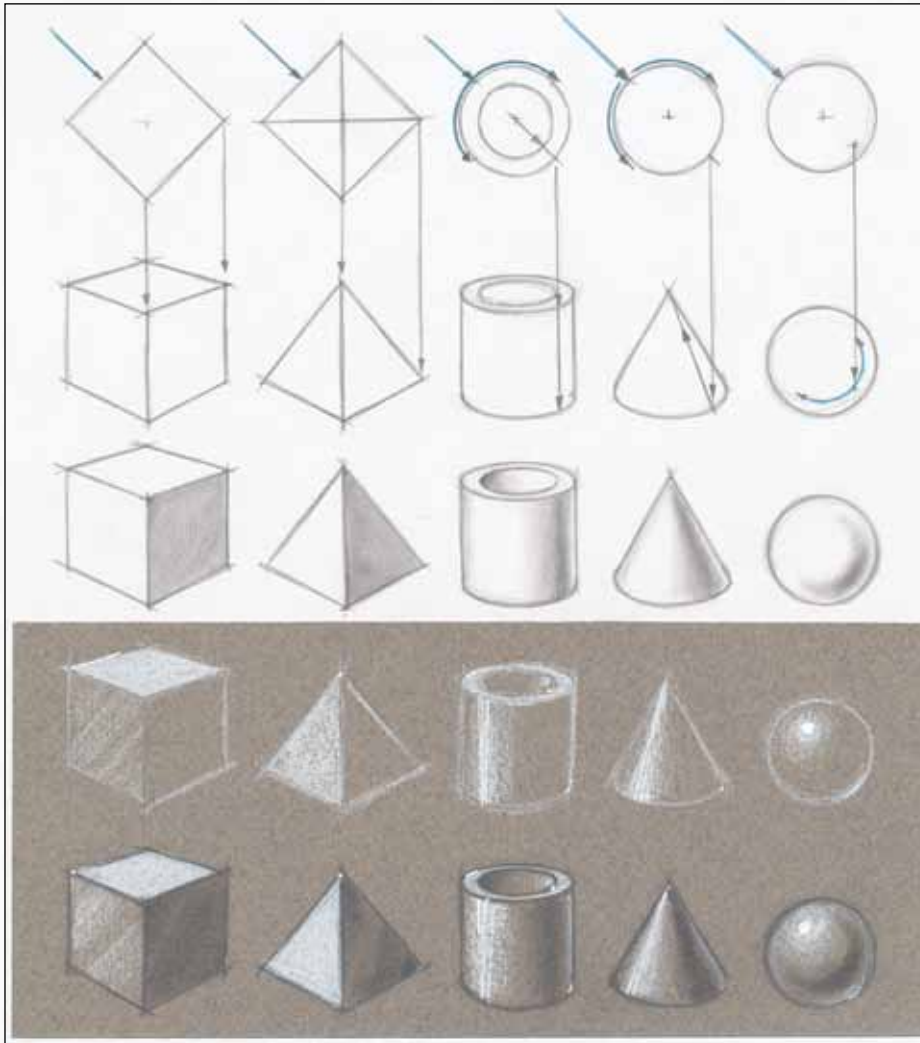


Sliding the sheet of tracing paper **away** from the light source...



...will develop a cast shadow in a recessed shape.

# FORM SHADOW: INTRODUCTION



To help visualize where the form shadow occurs on an object, sketch a top view of the object (top row). Indicate the direction of light with an arrow, (as shown in blue). On flat planes (seen in the box and pyramid), the light falls evenly on the surface facing the light. On curved forms such as a cylinder, cone and sphere, the light gradually fades to shadows, again indicated by the shorthand of arrows. These sketches provide maps that help determine where the shadows will fall.

For flat surfaces, use a uniform gray to indicate shadows. To create the gradation as light falls across a curved surface, use a cardboard stump to spread the graphite dust of the pencil lines. Note that on rounded surfaces, the shadow doesn't touch the edges of the shape because those areas are illuminated by light reflecting off the surrounding surfaces.

As shown here, the light falling on the tops of these objects is more intense because we are following the convention that the light comes from above and to the left of the object. For example, the top of the cube is lighter than its side.

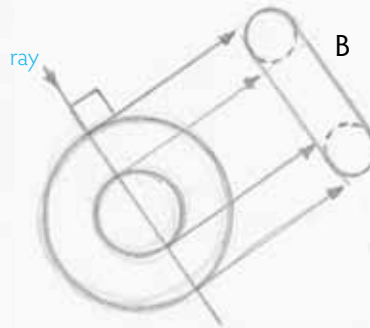
# FORM SHADOW: COMPLEX SHAPE

## Adding a Form Shadow to a Complex Shape

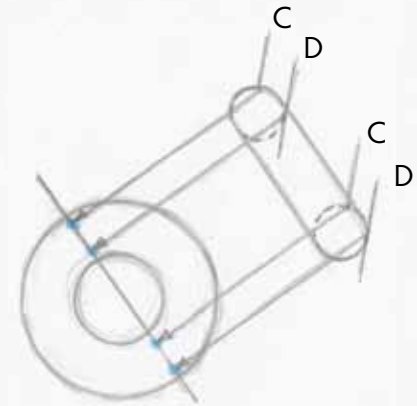
This example shows a process that clarifies the shape and cross section of an object, registers the angle of illumination, and then follows through with shading and highlights. This process will be used frequently throughout the rest of this book, so it will be helpful to study it here.



Sometimes the top view is insufficient to pinpoint the shadow zones, such as in a volumetric object like this donut. In these cases, a side view should be used. On the top view, project a light ray through the center to the far edge. The ray (A) identifies the location of the shadow zone, but not its extent.

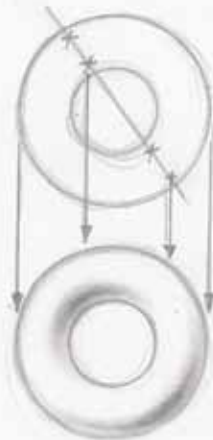


Project a side view (B) by creating lines perpendicular to the light ray. The effect is like cutting the donut in half then getting down to eye level to see where the light hits.



Mark where the light will hit the object. At the areas marked C, the rays strike the curves. The areas marked D indicate where the light no longer touches the object, i.e., the shadow zone. Carry this information down the arrows to indicate where shadows will fall on the object.

This shows the original top view and below it, a new drawing that uses the shadow placement information gained in the preceding sketches. Shading is done with a soft pencil and a stump.



When working on colored paper, highlights are added. In this case, it is a circle of white, moved toward the light source.