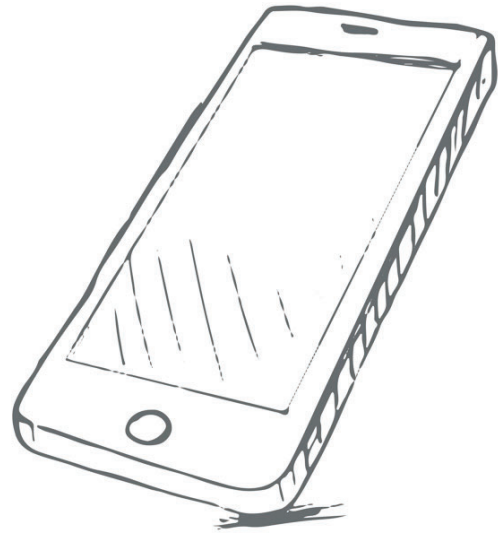


Freehand Sketching

FREEHAND SKETCHING is a valuable and necessary design and drafting skill. It allows you to quickly express an idea and/or a concept and communicate it to others. Freehand sketching takes time and practice to fully develop. A well-constructed freehand sketch allows you to quickly capture ideas and showcase those ideas clearly by visually communicating relationships, proportions, and key design elements. This image of a mobile phone is an example of freehand sketching.



Objective:



Summarize and practice freehand sketching techniques.

Key Terms:



drawing

ellipse

freehand sketching

mechanical drafting

pencil

mechanical pencil

method

parallel lines

perpendicular lines

perspective

technique

tracing paper

vellum

Drawing Without Drafting Tools

Drawing is a form of visual art in which a person uses various sketching instruments (e.g., compass, computer) to precisely mark paper or another two-dimensional medium. Sketching is a form of drawing, usually preliminary drawings made prior to producing a final work of art or a final technical document. During sketching, the artist, drafter, or designer typically “works out” composition, balance between values, and proportion before a final drawing is produced.

FREEHAND SKETCHING PROCEDURES

Freehand sketching is drawing without the aid of drafting equipment. A freehand sketch is the initial transfer of an idea from an engineer’s abstract thought into a 2D and/or 3D



FURTHER EXPLORATION...

ONLINE CONNECTION: Basic Sketching Processes

Freehand sketching is a process that one learns: it is different than writing or using a compass or using a CAD program. You need to practice the correct hand and arm movements to create straight and curved lines. To learn some of these basic drawing principles, watch the video tutorial, “Sketching Tutorial 1—Basic Sketching Techniques,” at <https://www.youtube.com/watch?v=SiToLklthes>.

working drawing that incorporates technical drawing symbols and characters. The main goal of a freehand sketch is to illustrate the proportions of an object in relation to its overall shape and size while expressing the general concept.

Procedures

Freehand sketching is a series of straightforward tasks:

- ◆ TASK 1: Create a representation of an object or an idea quickly and in a manner that displays and represents the important relationships and elements of the object.
- ◆ TASK 2: Sketch lines that are “close enough” to explain the object in the drawing (e.g., exact parallel or square lines is not mandatory during sketching).
 - **Parallel lines** are two lines that are always the same distance apart and never touch.
 - **Perpendicular lines** are lines that are squared at an angle of 90° to a given line, plane, or surface.
- ◆ TASK 3: Make multiple iterations (versions) of the sketch with each version more exact than the last. For beginners, a freehand sketch may require several iterations as ideas are developed and refined: it may be drawn over and over to achieve the correct proportions. Sketches can be produced multiple times until the drawing has its desired result or communicates the object clearly. For multiple iterations, the use of tracing paper is a convenient tool.
 - **Tracing paper** is a thin, transparent sheet used to copy an existing image, drawing, sketch, or design by placing the transparent sheet on top of an existing image and drawing over that image’s lines, adding new lines, or deleting lines to improve the sketch.
- ◆ **Vellum** is a high-quality tracing paper similar to parchment. Today, vellum is made from cotton and wood pulp and is often used to trace designs. Originally, vellum was made from calf’s skin.
- ◆ TASK 4: Select a drawing type or form. Drawing types or forms vary based on the object being drawn and the message or concept the drawing is attempting to convey. Once the object and its message are determined, the drafter or designer selects the best view or angle to display the sketch. Sketching/drawing types typically include:
 - Multiviews or perspective drawings
 - 3D sketches (such as perspectives)
 - Plans, elevations, or sections of the object

Materials and Media

Freehand sketch documents are typically produced with simple materials and media: pencil, paper, and an eraser. More advanced freehand sketches use drafting or mechanical pencils and pens. For example: pencils, erasers, and paper.

PENCILS AND ERASERS: Any type of pencil can be used, and for experienced sketchers any type of pen may be used. However, a medium or lightweight pencil is useful for sketching, as its lines can be easily erased. Many drafters and designers use mechanical pencils for sketching. A **mechanical pencil** is a graphite drawing tool with replaceable and mechanically extendable lead. A **mechanical drafting pencil** works in the same fashion as a mechanical pencil, however it is able to hold much larger leads than a typical mechanical pencil. A high quality soft eraser leaves few particles and few graphite smears.

PAPER: Freehand sketching can be done on any type of paper media. The only caution is that the paper selected is appropriate for the pen or pencil type used. For example:

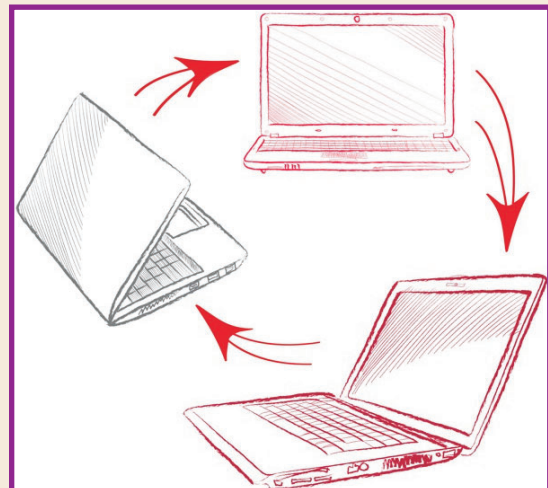
- ◆ Standard bond paper, tracing paper, or vellum papers are common. These papers allow pencil marks to be fully erased. [NOTE: Drafters and designers will select from a range of drafting mediums as they become more experienced.]
- ◆ Graph or grid paper is a common choice for beginning sketchers as the grids assist with relative proportions: the evenly spaced grids are used as a scale or size reference. [NOTE: Because the grid lines are printed with blue ink, those lines do not copy on a standard photocopier (e.g., a completed sketch can be photocopied and the blue lines will not “show up”).]



FURTHER EXPLORATION...

ONLINE CONNECTION: Freehand Sketching Objects

Freehand sketching takes time and practice. There are different techniques and methods people use to sketch in proportion and in scale. It can be useful to watch someone skilled in freehand sketching to see how quickly objects can be drawn in perspective. Watch Anton Ruckman's video, “How to Draw Product Design Sketches,” at <https://www.youtube.com/watch?v=D3Y26ww5izA>.



The main goal of freehand sketching for drafting and design tasks and projects is to convey the main design features, elements, and proportions of the subject matter.

FREEHAND SKETCHING TECHNIQUES

A **technique** is the process of carrying out a particular task, especially the execution or performance of an artistic work or a scientific procedure. The main goal of freehand sketching for drafting and design tasks and projects is to convey the main design features, elements, and proportions of the subject matter. As such, drafters and designers need to incorporate artistic techniques into their sketches as well as technical drawing skills including: perspective for 3D imaging, ratio and proportion, and being aware of scale. **Perspective** is an image as perceived by the eye. In many design offices it is important to be able to create quick freehand sketches of an idea especially when working and discussing that idea with others: colleagues, supervisors, and clients. Freehand sketching requires practice to develop accurate drawings that are in proportion. Specific freehand sketching techniques include the following expectations:

- ◆ The ability to create accurate straight, curved, and parallel lines.
- ◆ A degree of freedom (imperfections) as compared to a hard line or mechanical drawing. Over time, a drafter or designer develops a personal drawing style and method. A **method** is a procedure or process for accomplishing or approaching a task or project. A method usually includes some systematic or established processes or procedures.

Straight Lines

Producing straight lines in a freehand sketch can be difficult especially as a person typically moves their wrist to draw. However, moving the wrist tends to create arched lines rather than straight lines. Tips to drawing straight lines include:

- ◆ Tip #1: Move the whole arm and hand in a straight direction focusing on a straight path from the elbow or shoulder.

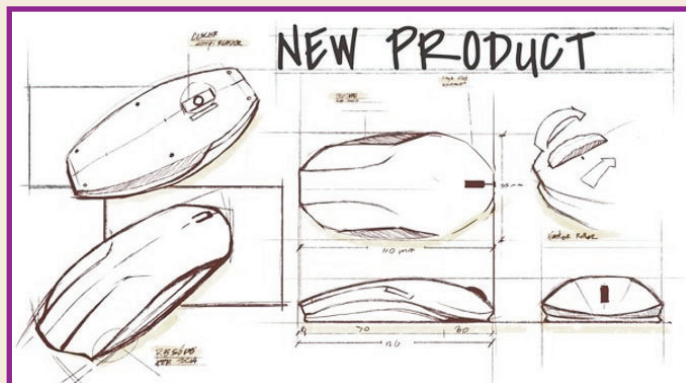


FURTHER EXPLORATION...

ONLINE CONNECTION:

How to Draw Freehand Lines and Circles

As a beginning sketcher, basic techniques are important. Understanding how to draw lines and circles is key to freehand sketching. To learn more, watch “The Drawing Tutorial—Freehand Lines & Circles,” at <https://www.youtube.com/watch?v=8Ty4KCPZiCw>.



Learning to draw with your shoulder and arm, rather than fingers and hands, takes practice. These new product sketches also include notes and freehand lettering.

- ◆ Tip #2: Move in a single motion from the line's begin-point to its end-point to create a continuous straight line.
- ◆ Tip #3: Create long lines in several segments. [NOTE: This technique is helpful to beginning freehand sketchers.]
- ◆ Tip #4: Use a reference. A reference may include the edge of the paper or points created along a path for the straight line (e.g., by noting the begin- and end-points). Guide the drawing hand along the path with another finger trailing along the paper edge or points.

Parallel Lines

Producing parallel lines in a freehand sketch can be difficult especially as a person typically moves or twists their wrist to draw which results in curved lines. Tips to drawing parallel lines include:

- ◆ Tip #1: Create points, as guides, at the begin- and end-points of a line before the line is sketched.
- ◆ Tip #2: Use parts of the pencil as a quick ruler. Points can be notated at each end so that the parallel distance is equal for two lines. With practice, visually noting the location of these points allows parallel lines to be sketched.

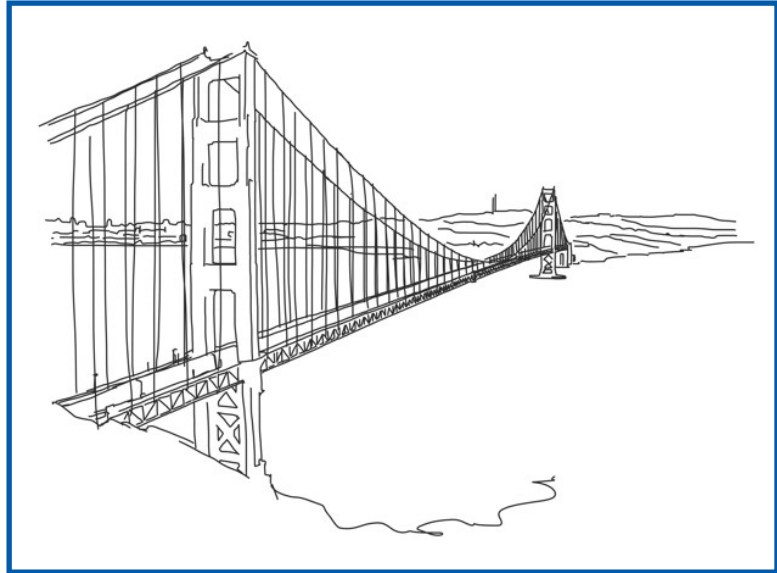


FIGURE 1. The main goal of a freehand sketch is to illustrate the proportions of an object in relation to its overall shape and size while expressing the general concept. This freehand drawing of the Golden Gate Bridge illustrates the bridge's proportions and shows its overall shape and size.

Circles, Arcs, and Ellipses

An **ellipse** is a geometric shape that results from viewing a circular shape in perspective, or from a different vantage point: an ellipse is an oval. Tips to drawing circles, arcs, and ellipses include:

- ◆ Tip #1: Use the box method. To use the box method to freehand sketch a circle, lightly sketch a box around the diameter of the circle. The four sides are the tangent-edges of the circle and each centerline of the four sides is noted as a point. Then, four arcs are equally drawn from each centerline on the box sides: from the top to the right side, from the right side to the bottom, from the bottom to the left side, and finally, from the left side to the top.

◆ Tip #2: Use a type of box method that creates a center point and center lines that run horizontal and vertical at equal distances. Lines are then sketched perpendicular to each other and at equal lengths from the center point. Once the four points are noted, equal arcs can be sketched from one point to the next (similar to the box method) resulting in a full circle.

◆ Tip #3: Use the “hand-as-compass” method. The natural joints of the hand or elbow can be used as a guide for drawing larger circles. Joints are used as pivot points, just like a compass. An arm can be used as a compass to draw a curved line by turning or

rotating the arm while keeping the elbow joint in one position while drawing. Then, the location in which the pencil is held can be adjusted to create a specific length. [NOTE: A circle viewed in perspective is an ellipse: it is a distortion of an object that is circular in shape. An ellipse may be sketched in the same manner as a circle by noting which dimension looks longer or shorter: the height or the length. Then, lightly sketching in the center point and the perpendicular lines that run horizontal or vertical and drawing in the appropriate arcs creates the ellipse.]

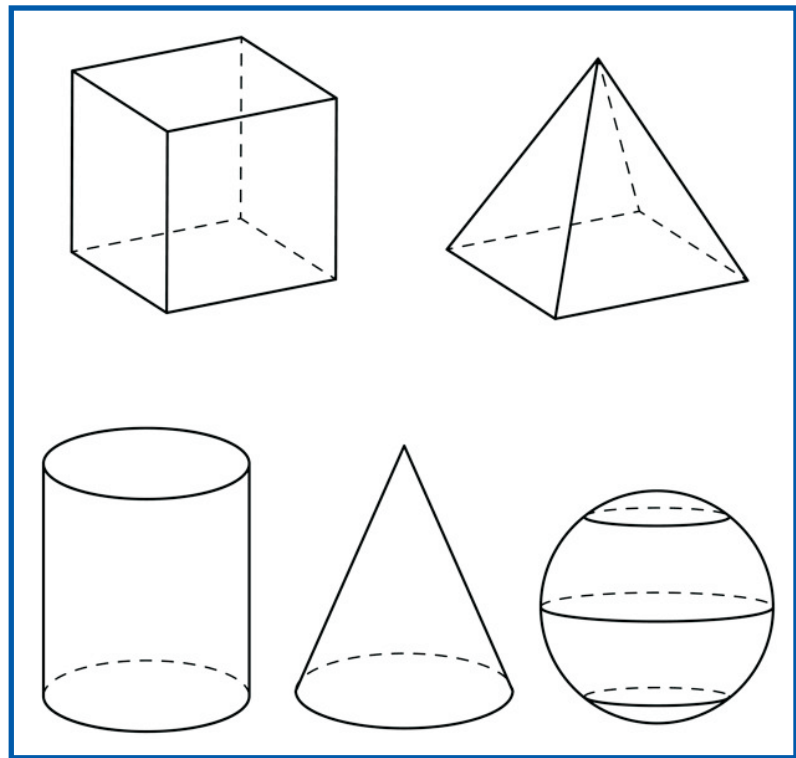


FIGURE 2. An ellipse is a geometric shape that results from viewing a circular shape in perspective, or from a different vantage point: an ellipse is an oval. How many ellipses are viewed from this perspective?



FURTHER EXPLORATION...

ONLINE CONNECTION: Freehand Sketching Complex Objects

All the basic freehand sketching techniques can be used in combination to create advanced sketches of designed objects and spaces. The more you practice and develop your skills the quicker you will be able to communicate your ideas to others. To watch a sketch of a complex object, watch the “Freehand Sketching—Porsche-Ball-Point-In Perspective” video at <https://www.youtube.com/watch?v=dd0kZmS4WYI>.

Paper

Take advantage of translucent paper when learning to freehand sketch. Quick edits can be made to a sketch by placing a translucent sheet on top of the original sketch, and then tracing a new sketch to more exact dimensions and ratios. Using tracing paper is an excellent way to practice freehand sketching skills.

Summary:



Freehand sketching is drawing without the aid of drafting equipment. In a technical sketch you are quickly creating a representation of the object in a manner that displays and represents the important relationships, elements, and proportions of the object. For someone learning to sketch, a technical sketch may require several iterations (versions) to produce a drawing with the correct proportions.

Any type of pencil or pen can be used and any type of paper. However, tracing paper and grid or graph paper is recommended for beginners as well as the use of mechanical pencils or mechanical drafting pencils.

In most design offices, the ability to produce a quick sketch of an idea is helpful when communicating that idea to others. Creating accurate straight, curved, and parallel lines takes practice. Good technique requires you to move your whole arm and shoulder to create those lines.

Checking Your Knowledge:



1. Describe freehand sketching.
2. What technique is used to create freehand parallel lines?
3. Why do drafters and designers use tracing paper for their freehand sketching tasks?
4. What is the “hand as compass” method?
5. Describe the “box method.”

Expanding Your Knowledge:



There are many useful links and online tutorials that demonstrate how to use freehand sketching techniques. Visit some of the Web Links listed here and take the necessary time to practice your techniques. Practice is the best way to expand your freehand sketching skills.

Web Links:



Freehand Sketching Exercises

<http://www.cs.unca.edu/~bruce/Fall15/171/FreehandSketchingExercise1.pdf>

Freehand Sketching—Perspective

<https://www.youtube.com/watch?v=KA9pBVDSvjE>

How to Draw Ellipses and Cylinders

https://www.youtube.com/watch?v=6Cf_pUJSQeM

How to Draw a Circle and an Ellipse

https://www.youtube.com/watch?v=eMGn-N4_jBo

Quick Tips for Drawing Freehand Ellipses

<https://www.youtube.com/watch?v=NIzvnDp-tD4>