Hort 201, The Art of Horticulture
Exercises to enhance observation and drawing skills

Each semester, there are students that request assistance regarding form, perspective, composition, and other elements of drawing. We don’t address this explicitly in Hort 201. Therefore, these exercises are designed to guide the student interested in furthering their drawing ability through a series of activities to train the eye, and hone skills.

Lesson 1. Observation of the Plant World
Before beginning to capture the form and beauty of botanical forms on paper, we have to learn to observe plants with an artist’s eye. When walking through a garden, our senses are sometimes overwhelmed with scents and vivid colors, and we fail to pay attention to certain details that are essential to botanical illustration.

Take a close look at a leaf. To draw it, we need to understand its every detail, from the curves of its scalloped leaves (are they semi-circles or elliptical in shape?), to whether or not the leaf veins are symmetrical. How do the leaves group along the stem? With petals, you may have noticed the color as the most important detail, but when we draw, it’s more important to study the number of petals and their arrangement around the flower head. How do they overlap and what is the size proportion of the smallest to the largest or of each petal to the leaves and thickness of the stem?

Exercise 1:
Walk through the woods, your favorite garden, the park or a tree-lined street. Focus your attention on the shapes, sizes, patterns, textures and groupings of the plant life. Notice how the light falls on objects unevenly, leaving some details in darkness, and others fully illuminated. Notice the shapes produced by the shadows on overlapping leaves.

Find a single plant, or a part of that plant that is especially interesting to you. Take out your sketchbook and spend at least 20 minutes observing and drawing it carefully. Be wary that we often have symbolic shapes and representations of certain objects lingering from when we were young artists (think of a child’s portrayal of a flower). Be careful to observe the true plant and not let these symbols find their way onto your sketchbook. Note your frustrations and your accomplishments, as you will be asked to write about them in the reflective journals. You will also learn to overcome many of them in the lessons that are to follow.

Sign and date your drawing.

Exercise 2:
This exercise will be done sitting at your desk or some other comfortable place that you have established for drawing. You will need a plant subject for this exercise, preferably something complex, such as an intricate flower, a veined leaf, a piece of warped driftwood or a potted plant. You will draw this complex object in a mode of complete concentration on your subject. We’ll accomplish this by removing your drawing from your view as you create it.
Place the plant object that you have chosen as your subject on a stool next to your drawing surface, but not upon it. Turn your chair so that you are completely facing the object and your sketchbook and drawing hand are completely out of your peripheral vision. Now allow your eyes to move slowly along the surface of your subject, only a few centimeters at a time. As your eyes move, so should your pencil (out of sight!!) drawing the line in coordination with your eye movement.

If the edge of the object moves slightly upward, so should the direction of your line. Allow yourself to become completely immersed in the subject matter and forget what your drawing looks like. Continue this until you’ve included every visible detail of the subject in your rendering. Make sure this lasts at least 30 minutes.

Once every aspect has been drawn, turn to face your drawing. It probably looks a series of lines or scribbles. Maybe it resembles the subject, but it doesn’t have to. Your goal is to abandon thoughts of how the object should look in a drawing and focus on how the object actually looks from life.

Feel free to try this again and again; it will sharpen your observational skills and you may even feel a sense of meditation as you become engrossed in the shapes of your subject.

Sign and date your drawing or drawings.
Lesson 2: Learning to use line in Illustration

Lines are used in illustration as the most direct way to delineate space. Lines can stand alone without color or value to describe the shape and details of botanical objects. They can be used to experiment with the placement of objects on a page before a drawing begins and are often the skeletons behind beautiful and complex paintings. So, before we can accomplish the more complex components of illustration, we must first become comfortable with the line.

The key to a beautiful contour (or line-only) drawing is an understanding that there are an infinite number of possibilities when drawing a line or when putting two lines together. A line can express strength with boldness or grace with delicacy. They can be short and stiff, graceful and flowing, curvy, spiky, dashed or angular.

When observing lines in nature, think of which qualities each line possesses and how you might translate that to a page. Here are some general rules about drawing lines.

- Greater pressure on the pencil will result in a bolder line; less in a lighter line.
- A bold line tends to pop from the page, suggesting a hard edge or an area close to the viewer.
- A light line suggests an area that an area is receding into the background, is highly illuminated, or is relatively delicate.
- The boldness or lightness of each line suggests your mood as well as the delicacy (or lack thereof) of your object.
- Varied lines will make a composition more interesting and suggest depth and a wealth of textures.

Once you have understood the power or gentleness that line can lend to a drawing, you are on your way to expressing plants and gardens through illustration.

The warm-ups that correspond to this lesson will help you to practice drawing lines and experience the wealth of effects that something as simple as a line can create.

For these exercises, you will need the following supplies:
- Pencils. These can be a few with varying hardness, but should contain a graphite HB pencil. One pencil is fine as long as it is HB.
- Paper. The surface should be smooth so that lines can be erased easily and so that the texture does not interfere with drawing a straight, smooth line. The paper should not be as smooth as copy paper, however, since this will not hold the graphite powder left by your pencil.
- Eraser. You will want to gum rubber and harder plastic eraser on hand for these exercises.
- Sharpener. This can be a hand-held sharpener or a craft knife. Your pencil point should never be allowed to become dull.
- Pen with nib. These are known as crow quill pens and the nib is the flexible metal piece at the tip.
- India ink or some other kind of waterproof ink. Your choice of sepia (brown) or black.
Warm Up 1: Getting comfortable with Pencil Lines

Take your pencil (or pencils) and make some preliminary strokes to get acquainted with the pencil. Make sure that your grip is firm with some flexibility. I find that I can create better lines when I hold the pencil farther from the tip than I would hold it for writing (1/3 of the way from the tip), but do what makes you comfortable.

Your strokes should come from the shoulder or elbow with little to no movement from the fingers or wrist. This will help you to make lines that have smooth rather than jerky movements. It will also come in handy when you’re drawing a long line. If you feel like you’re losing control by moving in this way, try moving from the wrist.

Try to note what you like and don’t like about this process so that you can use that information in later drawings.

(A.) Vary the darkness of your line by changing the pressure of the pencil on the page. See how light you can make a visible line and practice making the darkest line allowable without scratching through the page. Try to capture as many tones in between as possible.

(B.) Vary the angles of your lines. Make lines that are strictly horizontal and lines that are strictly vertical. Try different angles. Pull the pencil toward you and then away from you. Again, note what makes you feel the most comfortable and confident.

(C.) Vary the tautness of your lines. Try wispy lines by pulling the pencil off of the page after you begin your line. Try rolling the pencil tip to see how this can give natural curvature. Draw scalloped lines and dotted lines, undulating lines and intersecting lines.

Draw lines whenever you can. Try anything you can think of, including textures, patterns or dashes. Also try to be more observant of the lines in your everyday world. Stems of plants can be stiff and straight or gently sloping. The edges of flower petals are probably more delicate lines—they may be curved in a circular or elliptical line and can be scalloped or smooth. Draw them. This is the kind of practice that will make you more confident in your technique. You will find yourself with better control of the medium (pencil) and will achieve a growing understanding of your subject matter.

Warm Up 2: Getting comfortable with lines in pen and ink

The crow quill pen should be held firmly by the plastic or wooden support with no wiggling. Hold the pen upright and dip into the India ink only up to the middle of the hole; any further will result in an ink blob when you touch paper. Using a piece of scrap paper, make several strokes to get acquainted with the pen and ink. Try making a mark directly after ink loading. You’ll probably get a blot of ink. This is why you should always mark your page only after and then making the first mark after ink-loading on a sheet of scrap paper.
Between ink loadings, you should wipe your quill clean on the rag or towel to prevent ink from building up on your pen. It is also suggested that if you’re right handed, you start inking with the top left corner of the page first to prevent you hand from smearing wet ink over the page and vice versa (if you’re left handed, begin from the top right corner). You should also have a piece of paper of the same kind you’re drawing on to prevent perspiration or oil from your skin from soaking into the page, thwarting ink absorption.

(A.) Again, try to vary the boldness of your line by changing the pressure of the quill on the page. The quill will tear the paper if you use too much force. Try to capture as many tones of line as possible. Try different angles and pulling the pen toward you and pushing it away. Find what makes you comfortable.

(B.) Try drawing a set of parallel lines with the pen. Try one set of curved, a set of linear, and a set of undulating. Try crossing your sets of lines and experimenting with as many patterns as you can come up with.

(C.) Experiment with using damp paper. Tear a sheet of paper from your sketch book and wipe a clean, damp sponge (it should be wrung out and not dripping) over its surface as it lays flat. Experiment with the same lines as in parts (A) and (B) and note the softer effect. This may be helpful for drawing more delicate things like thin leaves or petals.

Exercise 1: Discovering line in leaf drawing

For this exercise, you’ll need to go for a walk outside and collect as many leaves as you can. If it’s winter, try to collect leaves from your houseplants or visit the local craft store to build your collection. Leaves should be of different sizes and shapes, different edges (serrated, smooth, etc.), varying vein patterns, and several textures. I recommend that you spend at least a half hour on each of the exercises below.

(A.) For the first part of this exercise, you’ll be focusing on how lines make each of the leaves you’ve collected unique. Before you begin this first drawing, use your newly-honed observational skills to note the type of line that makes the leaf edge. Notice that a line called the midrib separates the two leaf sides and that veins separate the leaf even further. Notice the patterns these veins produce and the strength of the lines from bold to faint. Depict at least 3 leaves shown in whole view on your page in pencil using the line techniques from Warm-up 1.

You may find it’s easiest to lay them flat, apart from one another. First, sketch the general outline of the leaf on the page, carefully observing the leaf’s true nature as you go along. This line can be touched up or redone until you’re happy with it. Then, create the midrib, and from there, the venous network. Vary pressure, angle, and curvature. Try to indicate texture.

(B.) Try this again, only this time using pen and ink. Follow the same directions as in Part A.

Exercise 2: Creating a composition using line, only

I recommend that you spend at least a half hour on each of the assignments below.
(A.) For this exercise, you are welcome to use the same leaves as in Exercise A, but I encourage you to try different ones. Overlap the leaves on each other, again, no fewer than 3. Try different combinations of overlap and different angles of the leaves until you have created a composition that is pleasing to your eye.

Next, use your view finder to select the part or whole of your composition to fit your page. (It’s helpful to close one eye when looking through it to flatten the image and to move the view finder back and forth in front of your eye to crop the composition in a variety of ways). Once you find your favorite view, try to remember where different parts of the leaves fall in relation to the edges of the viewfinder so that when you sketch the leaves on your page, you can place them more easily. For example, take note that your bottom-most leaf hits the left vertical edge of the viewfinder 1/3 of the way up at the leaf’s midrib.

Sketch out the general shapes of your image using large, simple shapes. A ginkgo leaf, for example, could be sketched on the page as a fan shape before the actual edges are sketched. Using these large shapes is called ‘blocking out’ the composition and it will allow you to place each of the leaves in their proper locations on the page before you begin with any true lines.

When you begin placing the true lines of the leaves in the drawing, please remember to closely observe the plant, to vary tone and direction of line and to move your hand from the wrist, elbow or shoulder and never from the fingers.

(B.) Try this exercise again with a different composition of leaves, only using pen and ink as your medium. You can wet the page or work with a dry page. Either way, you will probably find it helpful to first sketch the lines and block in the composition in pencil first. Pencil lines will be erased after the ink has dried when you’ve completed the piece.

Sign and date all of your drawings from Exercise 1 and 2.
Lesson 3: Learning to Use Shape and Negative Space in Drawing

You may see from your simple line drawings in the last lesson that lines allow shapes to emerge from an illustration. A composition is the way that an artist chooses to place these shapes on a page. There are two main components that make up a composition.

**Shapes:** the objects in the illustration that represent physical areas of your subject

**Negative Space:** the spaces around the shapes which are empty but still very important to the piece

When we draw, we often concentrate so much on depicting our subject that we forget the importance of negative space. Because negative space interlocks with the shapes of an illustration like a puzzle piece, we can get just as much a sense of what an artist is trying to depict from looking at the negative space drawing alone as we can looking at a drawing of the shapes alone.

Before we begin the exercises for this lesson, a quick lesson on proportions will make your battle with space and shape easier. Proportion means the same thing to illustration as it does to any other aspect of your life. It is simply the relative height to width of any object (we will learn about adding a third dimension, depth, in later lessons). Seemingly simple, this is something that challenges many students.

A great way to measure the proportion of an object you’re drawing is to use your pencil. Try the following method:

- Hold your pencil out in front of you at eye level with your elbow locked.
- Close one eye and find some relatively small and simply-shaped object around you to for which you want to determine the proportions.
- Line your pencil eraser up with the top edge of the object and move your thumb along the pencil length until it is aligned with the bottom edge of the object. Remember where your thumb is located on the pencil. This measurement represents the relative height of the object you’re drawing.
- Again, with your elbow locked, the pencil level with your eye and one eye closed, hold the pencil so that the eraser touches the right edge of the object (or the left edge-whichever is more comfortable). Move your thumb along the length of the pencil until it is touching the opposite side of the object. The distance from the eraser to your thumb represents the relative width of your object. When you compare this to the length you measured, you have a good understanding of the proportions of this object.
- Lay out lightly in lines the relative proportions.

Using this technique, you can also determine how much of the total length of an object one component occupies, for example, what fraction of the total length of a flower is the stem. It may help to think in fractions as you set up proportions, for example, to determine that the stem is \( \frac{1}{2} \) the total length of the flower, the sepals \( \frac{1}{8} \), and the petals \( \frac{3}{8} \).
Another technique that’s helpful when drawing symmetrical objects is to draw a line down the center of your proportion sketch to further break the object down.

Learning how to depict proportion will allow you to draw an object that occupies any size piece of paper, and as long as the relative height to width relationship stays the same, size changes won’t make any difference in the reality of what you’re drawing.

Another important tool is learning to break what we see into component shapes before drawing them on the paper. Imagine drawing every leaf of a tree or every petal in a dandelion. You might never finish, and if you did, you’d be hesitant to ever begin another drawing. View the scene before you as a collage by getting rid details in your mind. Certain aspects overlap, intersect or stand a given distance from other aspects. Every component can be included within the boundaries of shapes; sometimes they are geometrical, most times abstract. These are the shapes we’ll use to ‘block in’ our drawing, only adding details after every one of these collage pieces or shapes has been included on the page.

Exercise #1: Upside-down Contour Drawings to Understand Shape and Space

The simplest exercise for learning to break a composition in shapes and negative spaces is the upside down contour drawing. The object of this exercise is to forget that the image you’re trying to depict (you need not know what the subject of the drawing you’re working from is). You will simply follow the lines that enclose shapes and create negative spaces.

Print the drawing provided for this exercise below. You will find it helpful to complete this exercise without ever turning the drawing right-side up and trying to determine what it represents. Tape it upside down in front of you and begin to copy the lines exactly as you see them.

Follow the path of lines and preserve intersections, shapes and negative space. Allow yourself to become lost in these components of the drawing by forgetting that this piece depicts anything. You should spend at least 30 minutes on this exercise.

When you’re finished, turn the drawing right-side up. Do you see an image? You can understand the point of this exercise by copying the drawing taped right-side up. Your copy will probably not match as well as your upside-down attempt since we tend to lose focus on shapes when our brains takes over in an attempt to depict this familiar image.

Exercise #2: Drawing Negative Space

For this exercise, you’ll need your own potted plant, preferably a leafy one in which the leaves are loosely packed; if you do not have one at home, you will easily find one in many public spaces.

You’ll also need your viewfinder, a sketchbook and a pencil.
First, sit in a supportive chair and find a comfortable position since moving during this exercise will change your sense of space and likely drive you crazy. Hold your viewfinder between you and the plant so that the outer edges of the plant are cut off by the edges of the viewfinder. This will give you fully-enclosed negative spaces to draw.

Try now to let your eye focus blur until you no longer see a plant in front of you, but are instead concentrating on the negative spaces between the leaves, stems or petals. This may take a bit of time since our brains are trained to neglect this information and pay attention only to the shapes of objects in front of us. Try to imagine that the shapes of the negative spaces are just as real or physical as the shapes of the leaves.

Now, move your eyes slowly along the edges of that negative space as your pencil moves correspondingly on the page. You are not drawing the leaves or stems in this exercise; instead, you are drawing the spaces between them and fitting these spaces together on your page exactly as they fit together in the houseplant. Remember how even the space around the plant was contained inside negative shapes by the edges of the viewfinder? These shapes should be the outer bounds of your drawing.

When you have included all of the negative shapes that exist in your houseplant, try coloring them in. Does an image of your plant pop out? It should. If not, keep practicing this exercise keeping in mind the method for understanding how to draw proportions from Lesson 3.

If you are having a difficult time using a houseplant for this exercise, try arranging the leaves you collected for the line drawing so that the tips of all of your leaves meet to create full enclosed negative spaces. Try to stare at the arrangement long enough until you see only the negative space and carefully draw this.

If you are still having trouble with this exercise, try copying only the negative shapes of the picture given as an example. The details of these spaces are just as important as the details of the object shown. Carefully depict them on your paper, filling them in if you choose.

This exercise may be frustrating. This is because you’re learning to see in a way that opposes how you’ve perceived things your whole life. The more you practice trying to see both the positive shapes and negative spaces that surround objects and the more you practice depicting objects this way, the better you’ll become at drawing.

Exercise #3: Collage

Create a collage using an old magazine, a book of colored paper, or a newspaper to create the botanical object or landscape before you.

- First, recognize the general shapes of each component of you composition, such as the heads of flowers might fill in circles (ex. Daisies) or ovals (ex. Tulips), leaves on a tree might fill in an abstract large globular shape, and your flower pot might be represented as a cylinder that is larger at the top then bottom. Remember the importance of negative
shapes as well and either preserve these in your collage or choose them as the shapes you’re applying to the page.

- Once you’ve recognized the shape and proportion of one of your components, cut it out of paper- ignore the details on the magazine page you’re using and remember that shape is more important here.

- Glue the shapes to the page preserving the spacing and overlap that exists in the scene you’re viewing. Negative space should be preserved.
Lesson 4: Depicting Perspective and Foreshortening in Illustration

By now, you may have asked yourself these questions:
• How do I convey a sense of distance in my drawings and why do my drawings appear ‘flat’?
• Why do the shapes of objects look distorted when I try to portray them as 3-D?
• How do I convey things like roundness on the flat plane of my paper?

All of these are excellent questions and difficulties that all art students undergo. The answers to all of these questions can be answered by something known as perspective drawing. Perspective drawing is a manmade convention that helps us translate reality into a 2-dimensional image.

There are two main areas of perspective drawing that you’ll practice:

• Linear Perspective: A way to represent 3-D images on a flat (2-D) plane by the convergence of parallel lines and the reduction in size of objects in direct proportion to their distance from the observer.
• Aerial Perspective: The reduction in both tone and value and the relative size of objects as they retreat into the scene or away from the picture plane.

A lesson and example of linear perspective drawing as taught to design and architecture students can be found in the supplementary activities section at the end of this lesson.

For now, we’ll avoid the more complex issues of perspective and take a practical approach to using perspective as it applies to botanical illustration.

Perspective is best conveyed linearly by the proper orientation of angles, and spatially by the shifting of simple shapes (a circle appears as an ellipse from certain angles) and by the overlapping and of the change in size appearance of your subject as it recedes or comes forward.

One way that this is conveyed is by foreshortening, which establishes an object’s perspective when the object is not directly facing the viewer. A foreshortened view will depict lines that recede or advance toward the viewer as shorter than our mind knows them to be.

Look at the cubical boxes below for example. From a head-on view, we know that all sides of the box are of equal length. When we turn it or look at it from above, some of the lines are drawn shorter since they appear shorter to us now (even if we know they’re not). The same happens, as you can see, with a coin viewed from the side rather than head-on.
Similarly, you can observe any number of shapes and how foreshortening affects them by drawing them on a piece of paper, lying it flat on a surface, and bringing your eye level to the surface of the table. As you move your point-of-view, you can see how the lines that make these shapes appear shortest when you’re at table-level and longest when you’re viewing the shapes from above.

Drawing Botanical Subjects Using Foreshortening Techniques

Leaves must be drawn with foreshortening techniques if they are facing toward or away from us, just as shapes must. In this case, we can use the midrib of leaf as our guide to the direction of the leaf, as it continues in one direction, regardless of how short its length appears due to foreshortening. Once you’ve carefully observed the shape of the leaf (as it exists with foreshortening), and preserved the negative space surrounding it in your drawing, sketch the midrib. If the leaf turns, the midrib and veins should be followed through the curves to preserve direction. Bente King does an excellent job of illustrating this in page 27 of the text.

Like the midrib of leaves, linear forms like stems and stalks can show us perspective, but foreshortening is not as important here, since the already-narrow width of these lines shows relatively less change. Lines are more important for showing us the direction of the object’s turn. Simple curves in this case will give a sense of movement and changing direction. Remember, regardless of how much they turn, a line is always continuous from base to tip.

To show aerial perspective in a drawing, remember two important and seemingly obvious (but frequently overlooked) rules:
• As objects recede toward the background of your drawing, they become faint. Tone and value should fade and lines should be less distinct. Detail should diminish as well.
• Overlapping will describe the position of one object as farther from the viewer as the object partially cut off by this. Students often concerned about cutting off part of one object by drawing another in front of it, but this will actually make your composition more interesting.
Lesson 5: The Importance of Light in Drawing

Light is essential to vision, which is fundamental to observation, which is fundamental to drawing. Since vision is merely our brains’ perception of light rays bouncing off of objects around us to create images, we could neither see nor draw without light.

Artists rely on light quality to describe what surrounds them in engaging and appealing ways. Think of all of the different qualities of light that affect the way you perceive things or have made an impact on your memory of an event -- the lighting at sunrise or sunset, the luminosity of a summer day or the subtle glow of freshly fallen snow. Lighting not only creates mood, it selectively describes texture, form and surfaces of objects. Perhaps the most important feature of light to the artist is its capacity to cast shadows.

Unlike line, the artist can use shadowing techniques to suggest features of their subjects in a more subtle and lifelike way. It can be used to depict textures that are impossible to show using line only, and dimensionality is almost impossible without it.

There are four main categories of shadow or light in a drawing.

- **Highlights**: These are the lightest lights in a picture and are depicted by allowing the white of the paper to come through in such brightly lit areas. Highlights are usually found only in areas where the light source hits the object directly.

- **Form (Crest) Shadows**: These are the shadows formed on the object. They are usually graded, meaning that they advance from the highlights to the darkest points on the object itself (usually the side of the object opposite the light source).

- **Reflected Light**: These are areas on the object that are usually adjacent to the darkest of the form shadows. These light areas are caused by a reflection of light from the surface on which the object rests. They are never as light as highlights.

- **Cast Shadows**: These are the shadows that the object casts on the surface that supports it and on surrounding objects. They are usually found at the base of the object and on the side opposite the light source. Cast shadows lie adjacent to the reflected light and are darker in value than form shadows, but should not be drawn so much darker that they dominate the drawing. They also have the ability to ground the object so it doesn’t appear to be floating, clarify the light source and add 3-D character by showing an object’s relationships to its surroundings (both its surface and surrounding objects).

Another term that we’ll be using throughout this lesson is **value**, defined as the degree of darkness or lightness of a shape or shadow.

**Light Sources**

Before you begin drawing, it’s important to determine where your light source is coming from. The direction, intensity and quality of illumination will have a major effect on your final drawing and if you can learn how to observe and illustrate these effects properly, incredible artwork can result. Light can be natural if you’re drawing outdoors or next to a window on a sunny day, or it can be artificial if you’re drawing by lamp. It is recommended that you never draw under conditions where fluorescent lighting is your only light source, since it illuminates so evenly that
resulting drawings are often dull and flat. Like the categories of shadow, there are also six major categories of light source.

- **Overhead Light**: This will produce highlights at the top of the object and rich shadows at the object’s base. This type of lighting doesn’t effectively demonstrate volume or texture as some other forms.
- **Direct Light**: This form of illumination form “head-on” tends to make the object look flat and unexciting because certain surface features disappear. This lighting is best for a linear drawing, since linear details of a surface will be most obvious, yet areas of shape do not have shadows and highlights to describe them.
- **Side (Oblique) Light**: This form of illumination is best for describing volumes, form and surfaces, yet it is the most often-used category, so it often visually portrays the object in a predictable and commonplace way. If you’re looking to catch attention, this may not be the best lighting to choose.
- **Low Side Light**: This is the kind of lighting we get in the morning or evening. It creates long shadows and an expressive illustration and has a tendency to emphasize surface characteristics.
- **Backlighting**: This is when the light source is directly behind the object (whereas in direct lighting, it’s directly in front of it). This is what we observe at sunrise or sunset and it can create a very dramatic illustration. At the same time, backlighting fails to illuminate many of the objects’ features, except those at the rim, so be aware that this is a poor choice of lighting for something like a scientific drawing.
- **Overcast Light**: This is the diffused light that we see on a foggy or cloudy day. It tends to wash out details and textures, leaving us with a much narrower range of values from darkest to lightest. It does, however, create a sensation of smoothness and gentility.

**How to Shade**

Shading a drawing involves the ability to see very subtle differences in value. This takes some training. Here a few simple steps you can take before picking up your pencil to recognize these subtleties. Keep reminding yourself of these steps as you proceed through the drawing, as these tools are key to creating a realistic and interesting drawing.

1.) The first step is to recognize the primary light source and its direction.

- **What is the intensity of the light?** This will instruct the range of values in your drawing. On a summer day at noon, the light is probably very bright, causing bright highlights on illuminated areas and deep shadows rich in value. The interesting shapes created by these commanding conditions will be a prominent part of your drawing. An overcast day, on the other hand will not produce such deep shadows and you’ll have to be careful to keep your range of values fairly narrow from lightest to darkest.

- **What is the direction of the primary light source?** As you have read, the direction from which the light source illuminates your object is important to both the placement of shadows and the shape of these shadows. For example, low side light will cast shadows on the side of the object that is facing away from the light source. Cast shadows will be elongated due to this position, although they will still have the same general shape of the
object that stands between the shadows and light. Low side lighting will also produce
form shadows and highlights that are very distinct in value.

2.) The second step is to recognize the general shapes of the shadowed and highlighted
areas.

- **Squint.** This may sound awkward, but it is the best tool you’ll find to recognize the
general areas of light and dark in your scene. I often look at the scene I’m drawing
through squinted eyes several times throughout the drawing to be sure that I’m accurately
portraying areas of light and dark. This will give you information about the shapes,
relative tone, and location of shadows and highlights. Think of shadows and highlights as
you did with negative space and be sure they’re truthfully represented in your illustration.

Now that you’ve learned how to see the aspects of light, you are ready to draw them.
There are many ways that you can shade a drawing. Please experiment with all of these at some
point in your practice exercises and assignments to see which methods suit you best.

**Hatching:** This is the creation of parallel lines in shaded areas that follow the shape and contours
of the object you’re drawing. The value of each line in a group of hatchings is important. The
group can contain lines of all the same value if the value of the shadow is constant or they can
progress from a deep value in a form shadow to a very light value near a highlighted area. The
shape of the lines is important as well as the value. For example, for a round object, the hatch
lines will follow a curved path, suggesting roundness within contours. It doesn’t matter which of
the contours your hatch lines follow, as long as you’re consistent. In addition to the path of hatch
lines, the proximity of the lines will affect the value of your shadow. Dark areas will have
heavier lines packed close together, while lighter areas will have fewer lines in an area with
wider spaces between the lines. Hatch lines can also be used to soften harsh contour lines when
we use them to repeat a contour and have them gradually progress from dark to light as we move
inward with line repetition.

**Crosshatching:** This is we draw lines that cross the original hatch lines to create a gradual
transition from dark to light. The crosses are made such that the angles of the hatch lines and the
crosshatch lines from diamonds. They should not cross at right angles, as we get a checkered
effect when this is done. The sizes of the diamonds depend on the number of lines we choose to
draw. Big diamonds created by fewer lines will represent lighter areas, while small diamonds
portray deep shadows.

**Graded Shadows:** These are areas in which the change in value is continuous, an effect created
by leaving no obvious pen or pencil marks (the lines in hatching and crosshatching are obvious).
Graded shadows give a much softer effect that hatch lines. In graphite pencil, you can fill in an
area with close lines and then blend those lines to get an area of continuous value. The blending
can be done either with your finger or with a tightly rolled piece of paper with a form tip. These
blending sticks can be purchased in the drawing section of your art store and are called **stomps**.
In pen and ink, on the other hand, graded shadows are created with an ink wash, which will be
explained later in this topic.
**Stippling:** This is a technique in which shadowed areas are created by groupings of small dots. The dots are produced by the touching of the pencil or pen point to a single spot on the page. The density of the dots will determine the perceived value of the shadowed area. For example, a greater number of closer dots will result in a darker shadow. This technique is especially effective in pen and ink.

Any of these techniques can be used to shade a drawing, but you’ll find that certain techniques fit certain values and textures better than others. You’ll make your own decisions about this after the warm-up exercise and a career of drawing.

Usually, one technique is used consistently throughout a drawing to maintain a sense of uniformity. Techniques can be combined, however, if you are trying to show a difference in texture or color between two parts of a drawing. For example, perhaps the hairy stem of a rose looks best when shaded with the stipple technique, but the soft petals look best using graded shadows. Feel free to experiment and stick with effects that you find pleasing.

**Shadow Edges and How Light Affects Contour Lines**

The edges of shadows can be harsh or very soft, gradually fading into an area of light. Edges really depend on the object you’re drawing and your light source, which means you’ll have to pay careful attention to these qualities.

Generally, smooth objects (apples, rose petals, etc.) will cast shadows that have softly-graded leading edges, while rough, angular objects (nut shells, pine cones, etc.) will have hard-edged shadows. Shadow shapes will generally follow the contours of the object casting the shadow, although shapes can be considerably shortened or elongated depending on the direction of the light source.

Contour lines are also somewhat dependent on the light characteristics of your scene. Often, in brightly illuminated highlights, a disappearance of a portion of the contour will enhance the appearance of the highlight. Likewise, dark contour lines in areas of shadow will enhance the sense of reality.

**General Steps**

- Begin by drawing shadows lighter than they actually appear. You can always darken them as you go along, but you want to be sure to reserve the darkest dark that your pencil can create for the darkest shadows and the white of the paper for the brightest highlights. Using an eraser can be difficult and you may not be able to remove marks completely, so try to darken the drawing as you progress.

- Start from the darkest shadows in the scene and work out toward the highlights. Drawing the darkest areas first creates a value on your page against which all other values can be compared and drawn accordingly.

- Keep your highlights clean and bright. You will probably have to keep a piece of paper under the heel of your hand to prevent the dragging of graphite into these unwanted areas.
Since the brightest highlights can only be as bright as the white of your page, remember to reserve blank space for these areas.

- **When you’re finished, use your pencil to reinforce the darkest shadows and your eraser to pick out the brightest highlights.** Having a wider range of values will make your drawing more dramatic, so a great last step is to widen this range one step further by lightening the lightest areas and darkening the darkest.

**Details Specific to Pen and Ink**

An introduction to drawing with pen and ink was given in Topic 2, but we will now add shading techniques to the simple strokes discussed back then.

The textbook provides a wonderful lesson in pen and ink drawing on page 57, which you may want to refer to after reading this lesson.

When we create a composition in pen and ink, we must first use a harder pencil (the author of the text suggests 2H) to lay out a detailed drawing of our subject. This is important since changes can be made to create our ideal composition in pencil but we have a very permanent layout as soon as we introduce ink. Anything softer than a 2H pencil will dissolve in the liquid ink and create a muddy feel to our piece. This is an unwanted effect, especially since pen and ink is noted for its crisp, clean quality. Also, remember the importance of a piece of paper between your hand and the drawing, since oils and perspiration from your skin will prevent the ink from taking to the page.

After you lay out key contours, you can begin to shade. Hatching and crosshatching are particularly effective techniques when shading in pen and ink, as they give a definite sense of shadowed areas and a wonderful conception of an object’s shape. We accomplish hatching and crosshatching with pen and ink exactly as they are with graphite pencil. Please remember to always make your first mark after ink-loading on a piece of scrap paper to prevent blotchy drawings.

Stippling will be much more beautiful in pen and ink than in graphite since the dots are much more clearly visible because this media gives you such excellent contrast. Again, it’s important to first mark scrap paper after ink-loading to be sure that dots are uniform in size.

Graded shadows are beautiful in pen and ink, but you cannot blend with your fingers or a stomp. Instead, you can use ink washes create this effect. Create these in the following way:

- Before drawing any contours, use clean, clear water to lay a wash within all the lines of your drawings to prepare the page for smooth gradations with different amounts of ink.

- After this dries, lay out essential contour lines, especially those that are in shaded areas. You may want to leave out the contour lines that touch highlighted areas for now; you can always come back to fill them in later.
• Squint at your composition and note areas of highlight. You’ll want to leave these areas bright white by not washing in them.

• Then, fill a small cup with an inch of clean, clear water. To this, add a drop of ink and stir with your brush. You can always add another drop of ink later if this wash isn’t dark enough for you.

• In an area of graded shadow, paint a thin line with the ink wash in the darkest part of the shadow. Create your next stroke as you move towards a lighter area dipping the brush in clean water once, touching it to a towel to remove excess water, and painting a new line overlapping your darker one before the first line dries.

• Once you’ve laid out the wash, you can always add another drop of ink to the wash and go over the darkest shadows, but be careful not to create edges between the strokes where the transition should be smooth.

Warm-Ups
The first warm up exercise will sharpen both your observational skills and your understanding of how much a simple change in lighting affects the appearance of your subject.

First, find a plant object that has a relatively smooth surface and edges. You might try a piece of fruit or vegetable (peaches, apples, peppers, etc.). Then find a lamp or bright flashlight to create the lighting for your scene. As you go through each of the light positions, ask yourself the following questions:
- What kind of mood does this light create?
- Where are the shadows and highlights located relative to the light source?
- What are the shapes of the shadows? Are they elongated, shortened or regular?
- How deep are the shadows in value and how broad is your range of values?
- What are the shadow’s edges like? Do they gradually fade or are they sharp?
- What kind of information do I get about the texture and surface of this object from this lighting?
- What technique would I choose that might best illustrate this type of shadow?

Sometimes it’s helpful to make quick “thumbnail” sketches, which are about 1 x 2”, of each position so that you can remember certain characteristics. If it helps, take notes about your observations, but try to draw them; this will be helpful as you begin to create a composition.

• Hold the flashlight or lamp directly in front of the object to fully illuminate its front. This is **direct lighting**. Note how this position fulfills the conditions above.
• Hold or place the light directly above the object. This is **overhead lighting**.
• Hold or place the light slightly above and to the side of the object. Now try the other side. Is one more interesting than the other? This is called **side (oblique) lighting**.
• Hold or place the light so that it illuminates the object from the side, but this time from the full side and not overhead. Again, try the other side. This is **low side lighting**.
• Hold or place the light directly behind the object so that it illuminates it fully from behind. This is **backlighting**.
• Put a shade over the lamp or close the blinds somewhat if you’re in a sunny room. What do you notice now? This is overcast lighting.

Now, repeat all of these positions of lighting, only with an object that is less smooth. You’ll want something with rough edges, several planes, or noticeable texture. Try something like a pine cone, a rough nutshell, a piece of tree bark, or a twisted branch. What kind of differences do you notice in the shadows produced? Ask yourself all of the questions above now with this object, paying careful attention to things that have changed.

Exercise 1: Working from a Mid-tone Drawing
This exercise will give an introduction to shading in graphite pencil with an approach that starts with a mid-tone paper. This will allow you to recognize the full range of values and familiarize you with the concept of lightening highlights with an eraser and darkening shadows with dark pencil marks.

• Gather a few pieces of plant material to set up a still life. You’ll need at least two objects near one another to give you experience drawing shadows cast on other objects rather than just surfaces. It is best to have a combination of objects with different textural surfaces and different shapes. This will give you the greatest range of practice in drawing all kinds of shadow edges and allow you to apply different shading techniques to depict dissimilar surfaces.

• Arrange your still life on a piece of white paper on your drawing surface. A wood grained or highly reflective metal surface can complicate shadows and may cause frustration as you’re learning to observe different shadow qualities.

• Find a lamp to set up near your still life and experiment with a light condition that feels most interesting to you. Try side (oblique) or low side lighting to enhance cast shadows.

• Use your viewfinder to choose a composition. Be sure that cast and form shadows as well as highlights are included in your composition so that you can experience drawing each of the four categories of shadow.

• Tone the whole paper or the bordered format you’ve chosen by rubbing the pencil lightly over the entire surface. It is helpful to have a sharp pencil with a long point for this. Use the side of the long point for rubbing. The goal is to obtain an even mid-tone (not too light or too dark) across the entire area you’ll be drawing on.

• Choose some object in the composition to serve as your “fundamental”. In other words, the object you choose will set the proportions of your drawing- not just the relative size of that object to the real scene, but the size template for other objects relative to it. This will help you with placement and the translation of your subject from 3-D reality to a 3-D composition.
- Draw the main edges of your fundamental, followed by the negative spaces, positive shapes and the other objects, as they relate to the fundamental and to the edges of the composition. When looking for main areas of light and dark, it is helpful to SQUINT at the scene before you map out value areas. I often stop and squint several times to recognize major areas of the same value, only then sketching them to their corresponding position on the page.

- As you go along, remove lines and work toward smaller and smaller detail. Darken slowly; you can always make the mark heavier later, but it’s difficult to make a dark mark disappear.

- Once you’re please with the composition, use your kneaded eraser to lighten the highlights and reflected light and you pencil to darken the form and cast shadows, remembering the lessons you’ve learned.

Beginning with a middle tone is helpful, especially for the beginner, since it allows you to start from the middle of the value range. Whether you have a small or wide value range, your middle tone will usually be the same.

**Exercise #2: Creating a Shaded Illustration Using Pen and Ink**

Pen and ink is a wonderful medium for drawings with crisp lines and fine detail. Because of its line quality and bright contrast, it is excellent to use when illustrating complex botanical pieces.

For this exercise, you will create a pen and ink composition of some intricate botanical object and the shadows it can create when lit in an interesting manner. Here are some ideas for subject matter: a pine cone or group of pine cones, a chunk of tree bark, a knotted branch or piece of driftwood, or a delicate flower. Use what you’ve learned about line quality and aspects of light and shade to include as much detail as you’d like, paying careful attention to compositional aspects of the drawing.
Lesson 6: The Importance of Composition

Now that you’ve learned some of the basic components of botanical illustration, you are ready to put it all together to create art. While you may have picked up or honed the necessary skills to draw plant subjects, skill is different from “art.”

A piece of artwork is something in which every component works in synergy with one another to evoke a feeling on the part of the observer. In terms you’re now familiar with, a piece of art will have not only interesting subjects, but well-thought placement, lighting, proportion and viewpoint choice, and a value range that is interesting and appropriate.

Having said all of this, there are no rules that one can follow to create art. It takes expression, creativity and originality on the part of the artist. But, there are some things you can look out for when creating artwork.

Six Visual or Artistic Elements
Many artists and art critics have defined six elements that make up all artwork that must be considered before finalizing a work of art:

- **Color** (not covered in these exercises)
- **Line** (Unit 2)
- **Shape and Space** (Unit 3)
- **Value and Tone** (Unit 5)
- **Texture.**
- **Volume and Form** (Unit 4)

Throughout these lessons, you’ve had the chance to learn the meaning of these elements and some of their uses in botanical illustration, while having the opportunity to experiment with them for yourself.

Now that you’ve learned about them, you know something of the qualities of each that you like best and where you like to use them. Now is our opportunity to put them all together and think about how we can use them creatively and holistically in a piece of artwork. This is what we can think of as design.

Some Design Principles
Design has to do with working out the elements in such a way that they create something meaningful. Before we can critically examine an illustration’s ability to display creative design, it is helpful to review design concepts.

- **Emphasis.** This is the piece of a work that we choose as our center of interest: the piece that exerts dominance over other parts of the drawing and influences how we perceive the work as a whole. You can feel free to choose any one or a number of things to emphasize, depending on the effect you would like to give, or you can choose to emphasize nothing at all to make all of the components equally influential.
• **Harmony.** This is the design principle that deals with combining objects in an illustration to create a pleasing effect. Sometimes, harmony is given by combining two objects with radically different textures, sizes and colors, and sometimes by using objects with similar features. Harmony is achieved through experimentation of such combinations and you’ll find that you have an innate sense of what works together and what does not as you begin to keep harmony in mind.

• **Unity.** This concept entails having no one thing detract or distract from the whole. A piece of object should flow together and not have awkward juxtapositions or one section that is obviously the artist’s “pet” while other sections seems to have been disregarded. Unity, however, doesn’t mean have several of the same things to prevent disunity; it needs variation to stay interesting.

• **Opposition.** This does not mean the opposite of unity as we might think. Instead, it deals with the concept of variation that we said is essential to keeping unity interesting. It allows contrast to pleasantly enter our illustrations. For example, if we are drawing a bunch of picked flowers, it is the contrast between some stems standing straight while others curve, it is the contrast between opened and closed buds, and it is the opposition of smooth petals and rough foliage.

The concepts of visual balance and tension are also critical to our thinking of an illustration as a composition.

**Balance** is our contemplation of visual ‘weight’ as we view different parts of the page. By visual weight, it isn’t literally how heavy the objects we’re drawing are, but their dominance on the page. To understand the dominance of an element of our drawing, we consider the size it is drawn, the level of detail with which it’s treated, its particular value relative to the value range of the whole piece, and its overall impact on our eye.

A good illustration will be balanced on the top and bottom of the page as well as on the left and right sides. For every object of importance on one side, there should be something equally important or a few things whose sum is equally important on the other side. Sometimes, something as simple as a dark cast shadow at the bottom of a page can balance the intricately-drawn object that casts it on the top of the page.

For a piece to be well-balanced is not to say it need be symmetrically drawn. In design terms, **symmetry in a drawing is called “formal balance”**. We’ll find with botanical illustration that, as we learn to observe, natural subject material is rarely ever symmetrical from left to right. While a tree has branches on both sides, they will be on different levels and of different shapes and weights. Yet, we know that if one side of the tree had branches which were all much heavier than those on the other side, the tree would tip. The sum of the ‘visual weight’ on both sides must come out to near equal.

**Asymmetrical balance or “informal balance”** as a design principle: using this concept will usually present as a more visually interesting composition, especially with plant materials since it may appear more natural. Objects on both sides should be similar in visual weight, but not mirror
images of one another. This, you’ll find, will create a sense of relaxation and movement in your compositions.

A third type of balance that, like asymmetrical balance, appears often in nature is **radial balance**. To understand this, it is best to think of a daisy. The petals and disk flowers (small yellow flowers that make up the yellow center) are arranged around a center such that the flower is the same at any point an equal distance away from that center. It is important to remember, though, that while something like a daisy may have radial symmetry, its minor defects and asymmetries are what make it interesting and beautiful to view.

**Tension** in visual design terms means a deviation away from perfect balance. Tension can either enhance or detract from a beautiful drawing.

One component of tension that will help to make a drawing more attractive is the placement of emphasized objects *away* from the center of the page. Although it may leave you with perfect balance on your page, an observer will often find it dull and overly simplistic in appearance. Too much tension, however, can make something appear overly distorted or confuse the observer enough to have him or her lose interest that way.

One method that has been used since Renaissance painting to enhance a sense of “good” tension is the rule of the Golden Mean. The Golden Mean says that the center of interest is most appealing when placed 1/3 of the way from the top or bottom of the page and 1/3 of the way from the side.

Another way of maintaining tension in a composition is to use **variation**. This doesn’t always mean using a variety of different objects, but rather a repetition of the same or similar objects with changes in size, shape, perspective and lighting. This allows us to achieve unity while avoiding a composition that resembles wallpaper.

Just as we give attention to the art and design components of a composition, there are ways of producing visual effects on paper that can match the way we see and feel about a real object we’re viewing.

The first visual effect that can be conveyed with illustration is **motion**.

- This can be done with the **orientation** of lines and shapes. A diagonal line is much more likely to suggest motion than is a purely horizontal or vertical line. Perhaps this is because we know that diagonal objects without support will fall in the real world.

- Another way to express motion is by blending lines. This can be done whether we shade or define an object. A blurred line gives us a sense that an object is in motion.

- A third way to convey motion is to avoid straight lines. A curve or zigzag will suggest movement to us, while a straight line tends to keep our eyes stationary.
• Also, certain characters of our subject can convey movement. A lifted leaf or folded petals suggest a breeze, for example. This is another area where observation is very important to fully depict your subject.

The second visual effect that can be created is **depth**. For the best lessons in assigning depth to your subjects, please review Unit 4 on perspective (both linear and aerial) and Unit 5 on shading (which suggests volume and form as well as depth).

Students and experienced artists alike struggle with the concept of composition. It is very difficult to understand and it can take even the most famous artists an entire career to master. But this doesn’t mean that you should ignore composition entirely, particularly since it can make or break a well-executed illustration as a piece of artwork.

One way that artists deal with choosing a good composition is by trying a number of compositions. They may use a viewfinder or their naked eye to imagine a variety of possibilities, including or rejecting certain objects, changing proportions and arrangements, experimenting with light conditions, or toying with different value scales. Then, they create what is known as “thumbnail” sketches, where a small and simplistic version of the composition is sketched in roughly 1 x 2” proportion. Several of these are sketched and placed on the page where the artist can then compare them to decide which he or she will use to create their illustration.

**Warm Up**

Look through advertisements, paintings, or drawings that you’ve done before this unit. Spend at least five minutes on each of the examples you’re viewing to pick out how they artist or designer has employed the elements discussed in this lesson. Find and critically reflect upon:

• the 6 elements of art
• the 4 design principles
• the concepts of balance and tension
• the visual effects of motion and depth

Might you have noticed these before you took the time to critically reflect and were aware of these components? How does this work as a composition? Would you have used them the same way?

**Exercise**

Choice and creation of a composition is just as important, if not more important, than the skills you’ve practiced so far. Find a place to draw where you have many suitable compositions available to work from. This can mean several objects in a still life that can be rearranged and re-lit, or it can mean an outdoor scene with plenty of different comfortable spots where you can see and draw your subject.

• Set up a still life with a variety of plants or go to a garden where you can find an assortment of compositions to be drawn.
• Next, sketch out at least 5 small 1 x 2” rectangles on the same page to use for thumbnails.
• Play with the arrangement or lighting of your objects, or if you’re outside, walk around your subject to get as many possible vantage points as you can, sketching each one as you go along. Each thumbnail should take you no longer than 1 minute to 1 ½ minutes.
• Once you’ve drawn thumbnails until you tire, sit down for a careful comparison. You can either assess the drawings as gestalt images (meaning how the entire thumbnail impacts you immediately and as a whole), or you can make a list of components you like in a drawing as you’re viewing. What makes your subject interesting, effective, dynamic, original or is just a creative composition? Which do you like best and why? Try to be aware of the elements that appeal to you.
• Choose the thumbnail you like best and make an illustration of it. Please remember that you are the creator; even if you liked most things about the thumbnail drawing you chose but dislike one aspect, change it. It might help to draw another thumbnail with your new idea before executing it, though.
• Submit your sheet of thumbnails and your final drawing. The process is just as important as the final product.