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VISUAL PHENOMENA: What Do I Know? What Do I Care To Know About It? How Am I Using It?

This pre-class questionnaire may help to answer these questions and pave the way, or at least fill some potholes of ignorance or neglect.

1. In reviewing your own work, which of the following phenomena do you use? Circle those used.

2. Of those phenomena circled, which is the most used?

3. For what reason are some not used?

4. Which phenomena need some fine tuning?

5. Why do you believe these phenomena to be important in your work?

6. Using periodicals, scans and/or photos, find examples of each phenomena in nature and in art.

7. We know you know the answers to the following, but play along with us, for it’s simply a tune-up.
   A. Name four means available to the artist in creating the illusion of depth.
   B. Of the four, which is the most reliable? Why?
   C. What has a film, veil or light to do with aesthetics?
   D. What is local color?
   E. What determines the color of the shaded side of any 3D object?
   F. What do films and shadows have in common?
   G. When observing the surface of still water or glass, where is it most like a mirror?
   H. Looking at the reflection of a mast on a water surface, in what direction does it fall?

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Visual Phenomenon Personal Inventory

In order to tailor this course to your personal needs, take a few minutes to review the following list of visual phenomena to determine your class focus.

Artists who consider themselves visual communicators, might consider it important to not only know visual phenomena, but to also utilize this knowledge where and when it’s appropriate.

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Visual Phenomena: From Reality To Painted Illusions

These watercolor exercises are designed to promote the understanding of some basic visual phenomena and the painting strategies needed to recreate the phenomena in watercolor.

Exercise #1. Create the illusion of a colored film/s lying on top of an array of colors of varying hue and value.

Exercise #2: Create the illusion of a veil/s lying on top of an array of colors of varying hue and value.

Exercise #3: Create the illusion of volume color or atmosphere as it effects the same color at varying distances from the viewer. Paint one in an atmosphere of colored liquid (infinite films) and one in an atmosphere of infinite veils, e.g. smoke, mist, fog, etc.

Exercise #4: Create the illusion of a white spotlight on an array of colors.

Exercise #4: Create the illusion of a colored light on an array of clashing colors.

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LOSE AN EDGE

HIDE AN IMAGE

CREATE OPTICAL ILLUSIONS

MAKE IMAGINATION BELIEVABLE
Visual Phenomena Photo Reference

Objectives: To apply the lessons learned by finding examples and recording them. To create a personal picture file of visual phenomena observations. To share observations and discoveries with others.

Suggested Procedures:
1. Identify sources, e.g. natural or man-made environment, objects, and art work.
2. Photo document in any of several ways, e.g. slides, photographic prints and digital images printed or stored on a CD.
3. Sort images by phenomenon. No limit on the numbers of pictures per category.
4. Mount the images. Digital mounting would be within a program that accepts both graphics and text e.g. "Word", "Photoshop" or "Illustrator". Slides could be placed in transparent pages or copied into a digital format.
5. Add text explanations and notes, e.g. artist's sketch pad documentation. Class notes could be included.
6. Design a portfolio. This could be a digital or printed album-like collection. The portfolio should accommodate changes and additions. Examples should be accessible for quick referencing.
Surface
Some Questions & Answers

1. Is the plexiglas or water transparent, reflective or both?
   Ans. Both. We can see the checker board which is under it, but we can also see the flowers and sky reflection. You might wish to think of it as shown in this diagram.

2. Why is the plexiglas more transparent in the foreground?
   Ans. As with a skipping stone on water, our angle of vision is steeper in the foreground, and like the stone, it fails to skip along the surface.

3. How can the visual phenomenon be recreated?
   Ans. First, observe the following: 1. Compare the three black ellipses in the top diagram. Observe how they appear outside and inside the plexiglas. Note the value contrasts are greatest in the foreground and disappear in the background. Follow the same painting strategies used when painting veils. Begin with a graduated wash over entire painting. Foreground color will generally be darkest.

4. Why would an artist tackle such a complex problem as painting forms in or on water and shiny surfaces?
   Ans. Every artist has his own reason for choosing a subject. For some, the challenge is reason enough. For others it may be the magical transformation of paper and paint into believable illusions.

5. What aesthetic purpose does a reflective surface play?
   Ans. The aesthetic reasons promise a reward which should not be overlooked. As in all forms of art, repeating themes or ideas in a variety of ways links all parts to a whole. Reflections serve as a vehicle for linking what is happening visually above or below that surface. A red sky is reflected in the ocean; uniting the two under a common color.

6. Where in our visual world will we find evidence of similar surfaces, that is surfaces which can be both reflective and transparent or varied in their degree of reflectiveness?

7. Where in art history do we find an emphasis on surfaces?

8. What are your personal concerns and interests in surfaces?

EXERCISE: Paint a simple watercolor composition which incorporates these visual phenomena.
Imagine life without the sense of touch. Numbness is no substitute for feeling, whether that feeling induces pleasure or pain. Imagine art forms void of tactile elements. We need not imagine, for some artists choose to ignore tactile elements either by choice, oversight or out of ignorance.

Vermeer has surely not ignored tactile elements seen in detail here. Our eyes can feel satins, shiny metal, human skin, dog's fur and more as Vermeer renders each with flawless virtuosity. But these varied surfaces are only illusions, for in fact, we have only oil paint on canvas.

PAINTING VISUAL ILLUSIONS OF SURFACES

1. How do we perceive different surfaces, such as satins or table cloth? Ans. Much as we perceive value or color. We all know color wheels and value scales, so let’s think of surface in a similar format. If number 1 on a surface scale is FLAT or DULL and number 10 is a mirror, we could determine where satins might fall on that scale. It is more shiny than the table cloth, but less shiny than a the candelabra or a mirror. HOW WOULD YOU RANK OTHER SURFACES IN THE VERMEER?

2. What tells us that the surface is shiny? Ans. How a surface absorbs or reflects light determines the degree to which it is seen as dull or shiny. The higher the value contrast, the greater its reflective qualities. Also, see how the satin dress reflects the floor color; more so as folds are closer to the floor.

3. Observe (with extreme care) these four photos and identify the visual clues which describes each surface. Develop your discovery approach through a line of questions. Example: Why do the checker squares appear black in #3, but black or blue in the other pictures? Where do I see a cast shadow? ETC.

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VISUAL PHENOMENA: The visual phenomena which bombard our senses are generally received without much thought as to why we see an image as round, light, colored, back lighted, glossy, or translucent. On the other hand, artists, seeking to recreate this phenomena, must first see the phenomena, understand why we see it as we do, and then find the means to communicate this information visually through any number of mediums.

The next series of exercises deal with the visual phenomenon of transparency. How do we perceive the degree of transparency found in a given image or space? What strategies must we develop in order to recreate this phenomenon in our medium?

Our answers will be initially based upon objective observation of the phenomenon. This requires seeing shape, value, and color before we recognize that these visual elements add up to a particular subject matter such as glass, water, etc. Compare the blue and yellow-green chips in the "True Film" example in Fig.1. Which appears to be a transparent film? Why?

**Exercise 1A. The Illusion Of A False Transparent Film.** Using 3 related pieces of color-aid paper, create the illusion of a colored transparent film, casually placed over both an opaque colored paper and a background.

- Step 1. Select two colors. Find a third color which is a mixture of the first two. Check with your fellow students and teacher.
- Step 2. Create a format which presents an visual illusion of transparency (See examples of false and real transparent films)
- Step 3. Cut out shapes and glue with rubber cement to backing.
- Step 4. Critique with critique group.
- Step 5. Class Critique.
- Helpful Hint: Recognize that the illusion of transparency requires consistency. If a colored film is transparent on one surface, it will be equally transparent on all surfaces. In the examples of "Real and False Films", which rectangles are transparent? How do you know? What’s the difference between the two films?

**Exercise 2. Creating the illusion of a White Veil.** Using the same format and steps as Exercise 1, create the illusion of a piece of tracing paper super-imposed over at least two other colors. Refer to Fig. 2.

**Exercise 3. The Illusion Of Liquid Immersion.** Imagine what four white index cards would appear to be if immersed at varying depths in a colored liquid. Recreate this phenomenon in Color-aid paper or watercolors, using a format similar to that of Fig. 3.

**Exercise 4. The Illusion Of A White Atmosphere.** Using the same format as Exercise 3, create the illusion of four shapes of the same color, placed in varying depths of a white atmosphere or haze. Refer to Fig. 4.
Creating The Illusion Of A Film: Some things to consider

Convincing the viewer that he is viewing transparency when in fact he is looking at opaque paper, requires the following:

1. The hue and value relationships must be correct.
2. The format must avoid ambiguity.

Which background color would you choose to make the blue chip appear as a transparent Film, but the yellow as opaque? Which would make the yellow appear transparent?

Find the film in each of these examples.

Which color chip would complete the illusion of this green film on pink?

Of the six color swatches, which could be a film? Why? Which film appears the most transparent? Which color is the child in this format? Where can you find halations here? In which pair is the halation most vivid?

Which is an example of a false film? Why? Which produces the greater halation? Why?
Creating The Illusion: Steps to consider when making...

An illusion of a film.

Step 1. Select three related colors from the color pack. (Father, mother and child)
Step 2. Select a background which is either white or colored card stock large enough to accommodate the design.
Step 3. Design the format. Use a index card template or one of choice as your model. Place it on a piece of paper and trace around it. Place the card on the first outline at a casual angle and trace it. Identify each shape created with a letter.
Step 4. Using the designed format, cut out each shape.
Step 5. Place the cut out shape on its matching color,
Step 6. Assemble all the pieces and glue to background.

---

**IMPORTANT!**

Don’t overlook the background color and value when choosing your color chips! Why?

Well, if a film has transparency, then it will be transparent over any color it covers.

Here are the same colors placed on a green background. Note that red is now a mixture of red and green or brown. Yellow and orange are unaffected by the green because they’re to be viewed as opaque. Red must be the film, since it has been modified by the green ground.

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Examine the illustration to the right and take note of the illumination of form and color on a lime. Try to answer as many of the following questions as you can on your own.

1. Where is the light source? __________________________
   How do you know? __________________________

2. What is the color of the light? __________________________

3. Inventory all of the different surfaces found in this illustration according to their degree of opacity or transparency, dullness or shininess
   a. Background __________________________
   b. Cutting board under the fruit. __________________________
   c. Outer skin of the fruit. __________________________
   d. Inner pulp of the fruit. __________________________
   e. The white pulp partitions and inner skin __________________________

4. Where is the lime darkest? ______________ Why? __________________________

5. Where is the lime lightest? ______________ Why? __________________________

6. Where is the color of the inner fruit most saturated (high chroma or intensity)? __________________________
   Why? __________________________

7. What is the local color of the outer skin? ______

8. Approximately what percent of the local color of the lime skin is evident on the foreground slice? ___

9. What percent of this same skin would be considered a shade? ______ A tint? __________

10. Where is there evidence of translucency? __________________________

11. Comparing the fruit slice in the foreground with a similar slice behind it, which appears to be more translucent or like a stained-glass window? ______ Why? __________________________

12. Does any part of the outer skin appear to be translucent? ______ If so, where? __________________________

13. Why is the shadow cast by the back slice lighter nearer the fruit? __________________________

There must be three elements present in order for us to sense a translucent surface. First, we must know the source of light (Reflecting highlight). Second, we must see the shaded area and cast shadow. Thirdly, that surface which is translucent appears more full in chroma.
Light & Shadow
Do I Know Light?

The purpose of this exercise is to identify what we know, don't know, or have forgotten about the phenomenon of light. See how well you can do with the following problems.

1. Compare Figures A and B to determine which is the more accurate example of how a set of grays is effected by a cast shadow. How did you arrive at your answer?

2. Identify any flaw or flaws you find in Figure C. Use the space to the right of the figure to illustrate your point.

3. Identify any flaw or flaws you find in Figure D.

4. Why are we unable to duplicate the natural world of light and shadow in a painting?

5. What does a shadow and a transparent film have in common?

6. If you were painting a portrait at twilight, why would you not want to paint any white highlights in the picture?

7. Draw a simple representation of what a white spotlight would appear to be when focused on a white piece of paper. Use the space below for the drawing.

8. What is the relationship of light to aesthetics?

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Lights & Shadows: Creating The Illusion

We know that films and veils transpose hues and values. A yellow hue viewed through a blue film, for example, will appear green. This green will be darker than both the yellow color and the blue film. This same yellow viewed through a white veil will appear as a tint of the yellow hue. This whiter yellow will be lighter than the original yellow. And, should either the film or veil fall over two or more colors, all of the modified colors will be transposed equally in both value and hue (with minor deviations).

In what way is the illusion of light and shade similar to that of films and veils? In what way do they differ? (See answers below.)

Exercise #1: Create the illusion of a white light on a set of different colors.
1. View a set of randomly selected colors under a condition of a white light. Refer to Example #4.
2. Create a visual illusion of this phenomenon with Color-aid paper. This illusion can be heightened by placing an actual cutout piece of cardboard on the illusion. An alternative format might be similar to that seen in Example #5.
Procedure: Pick out three papers for each color. The first will be the local color. The second will be that color under a white light. The third will be that color in shade. Do not use the local color in the final design.

Exercise #2: Create the illusion of a colored light on a set of different colors.
1. As with the previous exercise with white light, view the same set of colors, or a new selection under a common colored light. The color of the light is optional.
2. Create a visual illusion in a format of your choosing. See Example #3.
Procedure: Same as Exercise #1.

Some Helpful Hints: If you are creating an illusion similar to that in Example #4, first cut out the actual image that is creating the shadow. Place that image on a set of colored papers and shine a white light from an angle which throws a shadow across all four hues. Place a piece of tracing paper over the colors and trace the both the shape of the actual cast shadow and the shape of the colors it covers. Use this drawing as your template for cutting your paper shapes.

Answers: Light and shadows are similar to films and veils in the following ways:
1. When any color is illuminated by a light, it will always appear lighter or tinted (veils do the same.)
2. Lights and veils differ in that light modifies both the colors under light as well as those not in light, or in shade. In other words, we perceive light on color only when it is accompanied with its shade. When a shadow falls over any color, it will always appear darker and shaded (shadows act as a gray film.) Veils effect only those colors they cover.

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**LIGHT IS ADDITIVE**

Light may be white or colored. **Light is additive.** When two or more colored lights are mixed, a lighter mixture results. White light results from combining all three primary colors of light at high intensity. Light primaries are the secondary colors of pigment. A rainbow is white light refracted by rain drops.

**PIGMENT IS SUBTRACTIVE**

Mixing the primary pigments in equal amounts produces black. **Pigment is considered subtractive.** For as more pigments are mixed together (excluding white), darker hues result. Black is the presence of all colors in pigment.

**CREATING THE ILLUSION OF LIGHT AND SHADE**

In order to create the illusion of light falling across different colors and values, artists must recognize how light modifies color. When we say that an apple is red, we refer to its local color of redness.

This local color red exists only in our minds, for this red will change with every change in lighting. The red we perceive in candlelight, varies considerably from the same red seen under florescent light, daylight, etc. The reason we perceive it as the same red is that all of the surrounding colors change as well. We refer to such recognition as **color constancy.**

**COLOR PERCEPTION**

We perceive color in objects because those objects have a pigment which absorbs some light rays and reflects those we see. A yellow ball, for example, is perceived as yellow because its pigmentation reflects that color. Darker colors will absorb more light, because they have more pigmentation with which to absorb light.

**LIGHT PRIMARIES**

| RED ORANGE | GREEN | BLUE/VIOLET |

**PIGMENT PRIMARIES**

| CYAN | MAGENTA | YELLOW |

Refer to the illustration below which shows what happens when a white light illuminates a portion of a color. Unlike a white veil which tints only the color it covers, a white light will produce a shade or gray film over those portions of the color which are not in the light. Generally, the lighted surface will move from a shade to more chroma where illumination increases. If the white light is bright enough, it could even tint the color it illuminates.

**LOCAL COLOR** (These colors exist only in the mind. We only see them as they are modified by light and shade.)

1. The local color under a brilliant white light may produce a tinted hue.

2. 50% BLACK SHADING: The percentage is arbitrary. It depends on light intensity.

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In white light, shadows are transparent black or the complement of white. In colored light, shadows work the same way, that is they will be the complementary color of the light source. These shadows, as with black shadows are similar to transparent films placed over colors. Any color will be modified equally when this transparent film is overlayed.

The examples below continue the studies begun on the previous page, but colored light has replaced white light. Where white light separates and emphasizes the differences among the hues, colored light unites dissimilar hues under common colors. In these examples, the separate colors all take on an amber hue in the light. They are similarly united in the shadows by a common hue. The artist need not be concerned about what color to paint the shadows, for they are all modified equally by a single transparent film of color.

**Complement of Light Source:**
This color plus varying percentages of black will produce the shadow color.

**Shadow Color:**
Shadows are transparent films. Colored lights produce shadows which are generally a mixture of their complement plus black. The percentage of black is based on light intensity.

**Ambient Light:** Ambient light is any illumination which is not a direct light. The most common ambient light is that produced by the blue sky. We live in a dome of ambient light or sky. Realizing its influence on colors which are not in direct light, and adding a percentage of that hue to the shadow color, will create an even richer and technically more accurate cast shadow.

**Observe the Following:**
1. Compare how each color is modified by the color and intensity of the direct light. Note, for example, how the yellow green becomes duller in amber light. Orange, on the other hand, becomes more intense.
2. What happens to neutral gray as it is placed in colored light?
3. Did the dark, cool green brighten or dull under amber light?
4. Note which shades are dulled and which are intensified. Why?
5. Note that there is no white in the two examples in colored light. Why?
1. **Its Function**

   *We see form, values and color because of*

   a. It illuminates form and surfaces.

   b. It defines form and surfaces.

   c. It modifies form and surfaces.

2. **Its Properties:** Light is additive. The more light you mix, the brighter or whiter the illumination. In Light, the Primary colors are the secondary colors of pigment. They are: Red-orange, green and blue-violet. As with pigments, secondary colors in light are produced by mixing two primaries. For example, red-orange and green produce yellow. Blue-violet mixed with red produces magenta. Blue is the mixture of blue-violet and green.

   Pigment, on the other hand is subtractive. The more colors you mix, the darker or blacker the mixture. The Primary colors of pigment are yellow, cyan and magenta.

3. **Its Variables:**

   A. Intensity: The brighter the light, the greater the contrasts between highlights and shadows.

   B. Source: The direction from which the light comes, determines the shapes of an object’s lights and shadows. Primary light sources can also produce secondary, or reflected lights, depending on the environment in which an illuminated form exists. Light rays radiate from the source in an infinite number of straight lines. The brightest point on an illuminated form is where a ray of light strikes it at a 90 degree angle. Reflective and ambient light modifies the value and color of shaded surfaces and cast shadows. A principle source of ambient light is the sky.

   C. Color: Most natural light is white, or a mixture of all colors. Atmosphere will change this white light to warmer hues as the sun moves closer to the horizon. Early morning or evening light will vary from reds to yellows of varying color saturation. Since the color of shadows are the complementary color of the light, an orange light, for example, will generate a blue shadow. At high noon, such cool shadows can also be attributed to ambient or reflected light generated by a bright blue sky.

---

**Hue Mixing in Light And In Pigment**

- **Light Primaries:**
  - Red-orange + Green = Yellow
  - Green + Blue-Violet = Cyan
  - Blue-Violet + Red-orange = Magenta

- **Pigment Primaries:**
  - Red-orange + Green = Red-orange
  - Green + Blue-Violet = Pigment Primaries OR Light Secondaries
  - Blue-Violet + Red-orange = Pigment Primaries OR Light Secondaries

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Some Ideas On Creating The Illusion Of Light & Shade

Cast shadow in white light = A transparent black film.

Color pack sorting by hue and chroma.

Transposing colors to shades.

Observe with a prepared mind.

Cast shadow plus ambient light.

Five colors on common black

ASSIGNMENT: Create an illusion of different colors in white light and shade.

Step#1: Sort pack by hue, shades, tints and tones.

Step#2: Using black as the common parent, find the child of black and each of the other hues.

Step#3: Arrange colors with their respective shade and compare value steps.

Step #4: Design format.

Step #5: Cut and paste up design using formats suggested on hand-out "Lights & Shadows".

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Plotting Shadows

STEP 1: Establish the following arbitrary items.
   Label each point according to the above diagram.

**Plotting A 2 Dimensional Shadow.**

STEP 2: Draw a line from the Light source thru Top of post; another from Ground thru Bottom of post.
Where the two lines meet is X. Line BX is the length of the shadow.

**Plotting A 3 Dimensional Shadow**

Translating a 2D plot into a 3D plot requires an additional plot. If a form exists on a 3 dimensional plane, unlike the 2D one above, both the form and the light source must be set in a 3D space. Visualizing it in a box might make the concept clearer.

**Note:** In the 3D plot, the light has a base point. This was not required in the 2D plot, because the light was glued to a flat surface. Point B establishes that the light is not only to the left of the post, but behind it as well. All of the items have been arbitrarily placed.

Some Exercises: Using the preceding plots as examples, draw several more, changing the positions of the light.

Step 1. Following the same steps as those used in a 2D plot, draw a line from (L) through T until it passes somewhere below the box.

Step 2. Connect both (Bs) with a straight line and carry this line out to the right until it meets line (LT). Point X is the spot where these two lines meet. The line from the (B) or bottom of the pole to X is the length and direction of the shadow.

Note: In the illustration on the left, the shadow of a wall is plotted. If each end is viewed as a post, with a Top (T) and Bottom (B), the two X points are found. Simply join the X points and the shape of the cast shadow is revealed.

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LIGHT ON GEOMETRIC FORMS

Light reveals form. Light and shade unify a picture. Forms absorb and reflect light.

What this exercise lacks in creative expression, it more than makes up for in recognizing one of the primary elements in visual perception. To create the illusion of a white light playing on basic geometric forms, requires an understanding of how light works and a painting strategy with which to render the illusion. Since our mission here is not to learn drawing or composition, a computer rendering will be used as our model for a watercolor study. Hopefully, the basic lessons learned here will translate into more personal expression as they're applied to landscape, figure and even abstract paintings.

Exercise:
Utilize the two handouts to paint a watercolor by:
a. Using the fully rendered image as a source of visual information about how light modifies colors, changing both hue and value. This is only a guide, so choose your own colors for the objects.
b. Tracing the line drawing onto your watercolor paper. You may draw it freehand, but our time might be better spent developing a painting strategy and start painting!

Some Helpful Tips:
1. Identify the LOCAL COLOR of each form. This is the color we perceive as, for example, a red apple. It is a composite color which exists only in our mind, as we recognize that the tints, tones and shades of red are really the same red, but simply under different conditions of light and shadow. What is the local color of the ball shown in the guide? Where do you see the local color? Where do we see tints and shades?
2. White light slightly tints the local color.
3. White light creates gray to black shades and shadows.
4. Light reflects off surfaces of varying colors. This reflective light influences the color of the object, particularly in the shadowed areas.
5. Ambient light affects the hue of all objects, but particularly in the shaded areas. Ambient light is generally associated with the color which surrounds us all, that is the sky. Any indirect light source creates an ambient light. In the guide above, the ambient light is a cool blue/gray.
6. Plan your strategy to minimize overlapping edges. "Yes" was blue painted over yellow to create green. In "no" green was painted as a separate color. Result? Darkened edge. Why? Two colors overlap only at their common edges.

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1. Which of these rows of disks appear to be...

2. What basic principle of light does this illustrate?

3. Where is the light source in this illustration?

4. Describe what you see in this illustration?

5. Can you find any flaws in this drawing, and if so, where?

6. Why does this drawing fail to adequately describe the illusion of a white light on a piece of white paper?

7. What single addition would make this illusion believable?

8. If the light source is blue...
   a. what is the color of the lightest highlight?
   b. what is the color of any cast shadow?
   c. could we distinguish whether the apple is red or green? Why?

9. What colored light would you use if you wanted your colors to appear distinctly different? the same?

8. Describe how you would illustrate a red spotlight on a white and yellow piece of paper.
1. Which of these rows of disks appear to be...

2. What basic principle of light does this illustrate? 
   Because sunlight and overhead lighting predominates, we tend to read all forms as being top lighted. We read row 2 as convex because the circles are lighter on top; row 3 as concave for the opposite reason. Row 1 is ambiguous.

3. Where is the light source in this illustration? Our minds assume it is top lighted.

4. Describe what you see in this illustration? 
   We should see a light and a dark sphere, or an example of local value. That is, both are illuminated from the same light source, but the darker sphere absorbs more light and is perceived as darker.

5. Can you find any flaws in this drawing, and if so, where? 
   The identical spheres would cast identical shadows. The darker sphere in this picture casts not only a darker shadow, but it is also a broader ellipse and falls toward the light source. In order for the illusion to be convincing, the rule of consistency must be obeyed!

6. Why does this drawing fail to adequately describe the illusion of a white light on a piece of white paper? 
   Bad gestalt here, for unless we’re told to see light and shade, we only see a white circle on a gray ground.

7. What single addition would make this illusion believable? 
   Add two or more values to the equation to show how the light modifies all value:

8. Describe how you would illustrate a red spot—divergent hues—light on a white and yellow piece of paper.

9. If the light source is blue...
   a. what is the color of the lightest highlight?  The same blue.
   b. what is the color of any cast shadow?  The complement of blue
   c. could we distinguish whether the apple is red or green?  Yes. Why?  Color constancy.

10. What colored light would you use if you wanted your colors to appear distinctly different?  White, the same?  Black.
   Why?  White light contains all colors. It, therefore allows each hue to be distinctly different. Black light contains no color, so all hues appear to be the same, or black. A colored light will modify all colors, creating a more harmonious relationship among...
Lesson: See light, understand it, recognize its role in art and apply! (Where and when it's appropriate.)

Setup: Acquire the following: 1. an egg shell. 2. A small dark object. 3. A piece of foamcore. 4. A hot glue gun. 5. A lamp with an unfrosted bulb. (A Halogen light will work best.)

Step 1. Glue the forms to the foamcore.

Step 2. Observe the arrangement under varying conditions of white light, e.g. from different viewing angles, light intensity and lighting directions.

Step 3. Record your observations both verbally and with sketches. Ask questions if puzzled.

Step 4. Compare your notes with classmates and add any new observations or questions.

Step 5. Consolidate notes with lecture/demo and handout.

Render: Create an accurate black & white rendering of the subject under a single light source. (No ambient light!)

Critique: Review criteria with artwork.

Setup #2: Colored and Ambient Light Study.

Follow the same steps as above, but use a colored primary light source with ambient light.

2nd. Rendering: Create a full color rendering using colored pencils. Follow the following criteria:

1. Know, through observation and theory how colored light defines forms and surfaces.

2. Accurately render the subject matter according to both objective observation and theory.

3. Recognize that nothing can be lighter than the color and value of the light source. For example,
These two French Impressionists have much in common. Their pictures, however, display contrasting compositional choices. How would you describe their similarities and differences?

Lesson: To engage subject matter with a preconceived compositional plan. In this case, the plan should include viewing angle and lighting.

Assignment:

1. Find a subject to sketch which can be viewed from below as well as from above.

2. Do a sketch from each viewing angle.

3. Emphasize the lighting in these sketches.

4. Write out a description of your compositional plan. The description should include:

   a. The link between formal qualities and idea or feeling.
   b. Perspective devices incorporated.
   c. Lighting observations and considerations.
Painting Illuminated By Colored Light

Although we generally see our world illuminated by white light, early morning or early evening hours produce colored light. This colored light, unlike the light of day, unifies divergent hues into a harmonious and luminous whole.

Painting Lesson

Paint a watercolor composition which is illuminated by a colored light. It may be a still-life, landscape or non-objective painting which meets the following criteria:

1. Size: 1/4 sheet or larger.
2. Tri-hue glazing applications.
3. Painted from life or imagination.
4. Do not copy a photograph.
5. Be faithful to subject or design idea.

Suggested Steps

1. Observe a scene at sunrise or sunset. A theatrical setting may also be used. Such observation should be carried out on numerous occasions and under different conditions. Note: a. Value and color ranges. b. Match observation with painted color swatches. c. Locate the lightest and darkest values. Note that nothing is white.
2. Sketch out your composition.
3. Transfer the sketch to the final painting.
4. Paint the entire sheet the color of the light.
5. When dry, paint in the main forms according to their local color. Keep the shapes simple.
6. Mix up the shadow color. This color will be a mixture of the light source's complementary color, the ambient light and black. (Refer to "Colored light handout.)
7. Apply the shadow color to all areas which are in shadow. Should you wish to soften the edges of cast shadows, apply the color on a damp surface.
8. Paint in final details (Say more with less) by mixing the desired color on the palette.
9. Check the value range to see how closely it complies with the observed scene. Adjust colors and values as needed.

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Space
reference Point

You are here!
Where were you?
Where will you be?

How will you know when you get there?

*If you draw a line from the outer limits of this line to the circle, what is the alignment of the other three lines.*
There are two kinds of space, real and illusionistic. Most photos and traditional Western Art favored the latter, creating the illusion that the flat canvas or paper was actually a 3D environment.

Using the principles of Linear Perspective, discovered by Brunelleschi, and Italian of the 15th Century Early Renaissance, artists could, for the first time place the viewer in their picture, frozen in time and space. Their goal was to represent the visual world as it appears.

Appearance, however is not the only reality. Modern painters such as Picasso, a cubist, favored a reality which dealt with the significance of reality where our 3D world was seen not from a single point in space and time, but rather from multiple views which underscored only the significant elements of the subject.

For these artists, a painting which retained its flat appearance rather than an illusionistic space was more realistic. Collages provided additional ways by which real space replaced Renaissance illusions by apply actual layers of materials on their canvas to create a real third dimension.

Using either or both of these options as tools for visual communication, artists and designers can provide an endless array of spacial ideas. What artists and designers must recognize is when it's appropriate to use one, the other or both.

Flat Space: Elements to consider

1. Space division.
2. Balance.
3. Center of interest.
4. Figure/Gound Relationships.
5. Surfaces.
6. Unity and variety.

Three Dimensional Space: Same Elements as above plus...

1. Linear Perspective. 2. Aerial Perspective.
2. Light and shade.
Color & Value
Artists use the term "Local Color" when describing the "true" hue, or unmodified color of an apple, orange, sweater, etc. We know that this local color changes when seen under conditions of sunlight and shade.

In this photo, what is the local color of the leaves, flower or bee? Where on each object do you find this local color?

**Local Color exists only in our mind.**

What we see and what we perceive are quite different. In these examples, our eyes see multiple hues, shades and tints within a single leaf, yet, in our mind, we perceive a single hue or *local color* green. We refer to this as *color constancy*.

**Color Constancy** occurs when we perceive, for example, this circle as being the same orange hue, whether its under a gray film or not.

We do not perceive *color constancy* here because of the inconsistencies. This transparent gray film should modify the white ground and orange circle equally in hue and value. A gray film will not change orange to magenta.

"Local Value" refers to that value we perceive in a given object. For example, we can easily identify the darkest sphere above. The other spheres are the same value, but under different light intensities.

**Edouard Manet's painting** "Fifer" exemplifies one of the first works of art in which *local color* dominates. By minimizing highlights and shadows, Manet focuses our attention on the fact that what is red is red, white is white, etc. Even the boys flesh tones are reduced to a minimum of color or value variation. Without the traditional modeling of form, the viewer is reminded that the painting is first and foremost paint on a flat canvas. In other words, illusion plays second fiddle to fact. The fact is that this is paint on canvas, a concept that launched modern art and the notion of "art for art's sake".

**An Exercise:** Create a painting or drawing with the focus on *local color*. In other words, develop shapes from nature or the imagination which are distinctly different and varied in both *local color* and *local value*.

Incorporate one or more of the following visual phenomena: Light, Volume Color, Films, Veils, and Surfaces.
Squares "A" and "B" are the same color & value.

Proof? Test strip "C" is also the same color as "A" and "B". and it's not a gradation.
Vanishing boundary describes the visual phenomenon in which two colors of equal value and similar hue, are seen as a single color when viewed from a specified distance. This third color appears more luminous than either of the hues that produced it.

This phenomenon has little to do with the brightness or intensity of the colors. Examination of an Impressionist painting at close range reveals colors which are, in most cases, toned or grayed. Step back a few feet, however, and marvel at the luminosity created by vanishing boundaries.

The Lesson

1. Find two colors in the color pack which are similar in hue and equal in value.

2. Design or copy a simple shape as a template for a positive image.

3. Using this template, cut out its shape from both colors selected. It is important to place one color over the other and cut both simultaneously with a very sharp blade. Use glass or a similar surface as your cutting surface, for the cut must be clean and precise. It is most important to cut through both papers in a single cut. Tape all three pieces of paper together prior to cutting to avoid shifting surfaces.

4. Remove the cut shapes from their backgrounds and inlay them into one another’s background. There can be no overlapping or gaps in the inlay.

5. Allow no glue to show around the edges.

Result: A graphic example of a vanishing boundary. If executed correctly, the figure will disappear into its background, creating a luminous third color.
**HALATION:** What is it? How can it be created?

The two middle grays are the same in both “a” and “b”. Do they appear to be the same? If not, how do they differ? Why do they appear different?

Both “A” and ‘B” have the same three colors, but in what way has the different arrangements changed the appearance of the orange?

Stare at grays in each of these designs. How does the arrangement change the appearance of the grays? How does the arrangement change the appearance of the greens and purples? Why the difference?

Observe what happens to these colors and those of the image to the right as the two are joined as one composition.

What happens to the various forms which suggest mountain ridges? Why?

These two rows contain identical grays. How have the different arrangements changed their appearance?

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All of these circles are the same size and identical grays. If you doubt it, isolate them with white. Why does only the middle circle appear darker on the left and lighter on the right?

All of these ellipses are the same gray and size. Which appears to be the smallest? Which appears lightest? What might be causing this illusion?

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_e._ works best when a mixture of two parent colors is placed between the parents.

_f._ produces color luminosity.

_g._ cannot be found in nature.

_h._ is enhanced by eye fatigue.

_i._ requires a minimum of three colors to produce the phenomenon.

_j._ will not occur when black is the placed between white and gray.

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_k._ is greatest at the center of the color effected.

_l._ will result as many times as there are related colors placed in related order.

_m._ will not occur on a white swatch or black swatch.

_n._ will not occur within a primary color.

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One Answer: *Halation or a halo effect* is an optical illusion which produces a glow or airbrushed effect along the border of a neighboring color. Note how the middle gray in illus. #1A appears to darken as it approaches the light gray and lighten as it approaches the dark gray. No such halation occurs in illustration “B”. Why? Because the middle gray is not the offspring of the other two. A child should be a mixture of its parents. Similar halation are evident in illus. #2B and #3B.