

**THE COOPER UNION**

**PAINTING STUDIO HANDBOOK**



**David S. Derish, MFA**

# THE PAINTING STUDIO HANDBOOK

## Introduction/Table of Contents

While it may not be possible to *teach* someone how to become an artist, there are certain technical aspects to art that should be learned by the practicing artist. This involves the development of a comprehensive approach to dealing with the materials used in creating art: their proper selection, their safe and economical utilization, and ultimately their disposal in an environmentally sound and responsible way.

And since art is ultimately about the artist, there are important concerns that need to be addressed about the physical and mental health of the artist—ranging from a familiarity with the ergonomics involved in the physical act of making paintings to the avoidance of stress and substance abuse that may detract from the creative process and pose serious risks to both wellbeing and productivity.

Topics to be covered in the handbook will include:

### 1. **Supports and Surfaces**

- a. Rigid vs. Flexible Supports
- b. Building Stretchers
- c. Stretching Canvases
- d. Preparing Surfaces (Grounds)

### 2. **The Materials of Painting**

- a. Pigments
- b. Paints

### 3. **The Tools of Painting**

- a. Brushes
- b. Palettes

### 4. **Developing a Sustainable Art Practice: Health and Safety in the Studio**

- a. Lighting
- b. Dealing with Toxic Materials
  1. Handling Toxic Materials
  2. Ventilation
  3. Disposal of Toxic Materials
- c. The Physicality of Making Art: Ergonomics
  1. Repetitive Stress Injuries
  2. Posture: Neck and Back Strain
- d. Mental Health and Overall Wellbeing: General Comments

# Getting Started

## 1. SUPPORT AND SURFACES

Painting is the act of moving paint over the surface of a support. The first step in the painting process is the selection and preparation of the support and surface on which to paint.

### A. Rigid vs. Flexible Supports

There are two basic kinds of supports for painting: **1) rigid supports**, such as wood and aluminum panels; and **2) flexible supports**, which include paper and a variety of different fabrics, usually stretched over a frame, with the most common being canvas.

***Rigid Supports.*** Artists have been painting on rigid panels since ancient times, long before the creation of any known painting on fabric. When prepared properly, rigid supports such as wood or metal panels are generally more durable than stretched fabric, and also support a wider range of media.

***Flexible Supports.*** Today most painting supports are flexible, with stretched canvas—commonly made from either cotton duck or linen—being most popular. The key factor in selecting canvas is the **weight** of the canvas, which is measured in grams. The weight of the canvas determines the **weave** (and texture) of the painting surface.

Linen fibers are generally stronger and more durable than cotton. Linen also comes in a wider range of weaves, from fine grade linen to the more textured coarse grade linen. Cotton duck is commonly available in either 12 oz or 15 oz weight. Both are acceptable for painting (10 oz weight, also often available, is not recommended), and considerably more economical than linen, which is not a practical choice for the typical art student based on its higher cost.

Aside from cost and durability, one additional factor in deciding between rigid and flexible support materials is the type of paint that will be used, since different paints work better with specific support materials.

Finally the maintenance and storage of art is a concern in the selection of support materials, since flexible supports lend themselves to being removed from stretchers and rolled up to conserve space in the studio and to facilitate transport.

### Comparison of Supports:

	<b>RIGID SUPPORTS</b>	<b>FLEXIBLE SUPPORTS: CANVAS</b>	<b>FLEXIBLE SUPPORTS: LINEN</b>
Durability	Excellent	Fair	Good
Strength	Excellent	Fair	Good
Cost	Varies	Inexpensive	Expensive
Range of Media Supported	Varies	Varies	Varies
Paint/Pigment Choices	Good range	Good range	Good range
Ease of Storage/Maintenance	Poor	Very good	Good

If a flexible support is chosen, the next step is how to prepare it. There are three aspects to preparing supports: 1) Building stretchers; 2) Stretching canvas; and 3) Preparing the surface (GROUNDS).

#### **B. Building Stretchers**

Building your own stretchers bars can be an economical alternative to buying stretchers from the art supply store—especially when working on larger canvasses—and also gives you more control over the specific character of your stretchers.

#### **Equipment Needed:**

<b>Table saw</b>	<b>2 x 4 wood strips</b>
<b>Chop saw</b>	<b>Measuring tape</b>
<b>Mitre saw</b>	<b>Pencil</b>
<b>Brad Gun or Power Drill</b>	<b>Goggles</b>

Here are the steps for building your own stretchers for painting. For the student, this should only be done under the supervision of a shop tech, and only after you have been trained in the proper use of the equipment involved.

**TIP: When working in the shop,  
ALWAYS SAFETY FIRST:**

- *Shop tech supervision*
- *Never work alone*
- *Safety goggles for eye protection*
- *Don't use equipment you are not familiar with*
- *Always keep hands and cutting blades in clear view and out of each other's path*

Let's say you want to build a frame measuring 40" x 50".  
First step: Always work safely. Before doing anything, **make sure you are wearing safety goggles to protect your eyes.**

1. On your 2 x 4, measure the length for one of the dimensions and mark with a pencil. If there is enough wood left on the 2 x 4 for the length of the other dimension, mark that as well. If there is not, you will need to repeat the process on another 2 x 4.
2. On the **chop saw**, cut the 2 x 4s to the lengths that you have measured. You will now have two strips of wood measuring the lengths of your stretchers (one 40" and one 50").
3. On the **table saw**, with the blade set to the appropriate height, and at an angle of 45 degrees (recommended), run the 2 x 4s lengthwise down the blade, bisecting the 2 x 4 and creating a pair of stretchers. You will now have one pair of 40" stretchers, and one pair of 50" stretchers. When cutting 2 x 4s on the table saw make sure to keep your hands clear of the blade, using a push stick to push the end of the wood strip through the blade.

Now you will need to cut the ends of the stretchers so that they can be joined together to make the four corners the frame that will be assembled from them.

4. On the **mitre saw** cut each of the corners at 45 degrees, making sure that the corners are cut so that they can be joined at 90 degree angles.

**TIP: For frames larger than 40" x 50" consider adding reinforcements--either corner braces or cross braces to prevent warping.**

Now it is time to assemble the frame, which can be done one of two ways: either with a brad gun and brads, or with a power drill and screws.

### **C. Stretching Canvases**

Before stretching your canvas it is crucial that you make sure your frame is square. This can be done in one of two ways; you can use a right angle tool to measure the corners, making sure they are all 90 degrees. Alternatively, you can measure the frame diagonally, making sure that both diagonals are the same length. If the frame is not square you can use a mallet to adjust the corners until it is.

1. First you must cut the fabric you will be stretching to size. Set the fabric on a clean, level surface. Now place your frame on top of the fabric. Cut the fabric so that there is **at least 2" – 3"** extra all around, and cut the fabric (for example, if you are stretching a canvas that is 40" x 50," your fabric should be at least 44" x 54" so that there is enough extra fabric to wrap around the frame.
2. Now it is time to start stretching. For this step you will need a **staple gun** and staples. A **canvas pliers** can also be useful for creating tension when stretching, though not necessary.

The most important thing in stretching a canvas is creating tension that is distributed uniformly along the surface, ensuring a sufficiently taut surface for painting. Here is the best way to accomplish this:

- Using either your hands or with a canvas pliers, pull the fabric over the frame at the midpoint of one side and staple in place.
- Now repeat the process in either corner on the opposite side. (The reason for doing it this way is to use the diagonals to create maximum tension by pulling the canvas on each axis.)
- Do this same thing on each remaining side, starting with the midpoint, and then moving to the corners on the opposite side of the frame.
- Next add staples, approximately 2" apart, along the perimeter of the whole frame until the canvas is taut.
- The last step is to staple the corners. This must be done properly, or corners can unfold and tension will be lost, resulting in wrinkles, etc. This involves making several folds, so that when the final flap is in place, the corner can be stapled without any extra slack or extraneous material.

#### **D. Preparing Surfaces (Grounds)**

Before the artist can paint on a support the surface must be **primed**. Priming a surface consists of preparing a **ground** that is acceptable for painting. This ground serves three purposes:

- It protects the underlying support from damage (by ingredients in oil paint).
- It provides a surface that accepts paint and allows for adhesion.
- It provides a reflective white background that enhances the colors in transparent and semi-transparent painting techniques.

Different techniques and different painting media require different kinds of grounds. The main factor to consider when preparing a ground for painting is whether the medium is **oil-based** or **water-based**. When painting with oil-based media additional preparation is required in order to protect the painting surface from the effects of oil and other solvents.

### **Priming a surface for painting with oil**

Priming supports for oil painting consists of two steps: **glue sizing** and **application of the ground**.

**Glue sizing** protects the painting surface from the damaging effects of the oils in the priming or paint layers.

There are two standard priming techniques for oil painting surfaces: one for producing an **absorbent** ground (a ground that absorbs oil) and the other for producing a **non-absorbent** ground. The kind of ground the artist chooses to paint on is important because it will influence not only painting technique but also the formal possibilities of the process as well.

### **Traditional size and gesso ground** **(ABSORBENT)**

This traditional preparation consists of a layer of **glue size** and a layer of **gesso** (chalk gesso): white powder (chalk) mixed with glue size. The traditional gesso used in this preparation is not to be confused with **acrylic gesso**, a common commercial primer. Acrylic gesso is also an acceptable, though not ideal, primer for oil painting.

- **Glue size** (rabbit-skin or hide glue) is made by mixing dry glue - in the form of powder or crystals - with water, and heating in a double boiler. A solution with too great a proportion of glue can result in tension or cracking to the ground, while a solution with too small a proportion of glue can produce a weak, soft film which is not ideal for carrying oil paint.
- **Gesso** is the traditional Plaster of Paris and glue size ground used over wood panels for oil (or tempera) painting. The gesso layer provides the background color and texture of the painting surface.

There is no one “right” way to prime a surface with gesso, but most artists apply **between three and seven layers**. Painting surfaces for acrylic only require one or two, if any. The **thicker** the gesso layer the **more absorbent** the ground. The gesso layer should be a **smooth, even surface** of brilliant whiteness.

**Traditional oil ground**  
**(NON-ABSORBENT)**

The priming process for oil painting with traditional oil ground is essentially the same for flexible supports as for rigid supports, except for one thing: **glue size should not need to be as strong for flexible as for rigid supports**, as a too-strong glue size on a flexible support can result in excessive tension and cracking.

Unlike a gesso ground, which will always absorb some of the oil in the painting process, a traditional oil ground allows the painter to continually return the painting ground to its original condition by “oiling out” the painting layer with linseed oil, making it preferable to an absorbent ground for painting techniques that involve using the inherent luminosity of thinly-layered or transparent colors.

**Priming a surface for painting with acrylic and other water-based paint media**

The main difference in surface preparation—for both rigid and flexible supports—with acrylic vs. oil painting is that with acrylic painting **no glue size is required**.

*TIP: When priming a canvas for painting with acrylic, to maximize tension of the canvas and create a durable painting surface, wet the canvas with room-temperature water, then brush coat acrylic gesso primer into the wet canvas so that it is absorbed into the fibers of the canvas. Then allow this first layer of primer to dry overnight before adding another one or two layers of undiluted acrylic primer*

The recommended primer for acrylic painting is **acrylic gesso primer**, a mixture of the acrylic polymer emulsion used as a vehicle for acrylic paints and titanium dioxide for whiteness.

If you are painting opaquely with acrylics, primer is not actually necessary at all—e.g. when you want to use the color of raw canvas as part of your painting process. If you do use primer for painting with acrylics **one or two coats is enough** to create a uniform white ground for painting.

The acrylic primer can be applied with either a gesso brush or some kind of scraping device, such as a squeegee, for a uniformly smooth, primed ground.



## II. THE MATERIALS OF PAINTING: PIGMENTS AND PAINT

After the preparation of the painting support and surface, the pigments that you paint with are the most important element of the painting process that must be considered.

**Pigments** are solids made up of particles that are suspended (or “dispersed”) in a binding medium (“vehicle”) that enables them to be manipulated and distributed over the surface of a support.

Pigments in themselves are the same in different media, but the **binder** is different for oil-based paints (linseed oil) vs. acrylic paints (acrylic polymer emulsion), as well as other water-based media (gouache, watercolor).

### Understanding Pigments

When selecting pigments it is important to know what you are getting – something that is often not clear from the name on the tube. Before getting into a discussion of the various different kinds of pigments that are available and their properties, we should first consider the two most important characteristics of any pigment: **opacity** and **light-fastness**.

**Opacity** refers to **how much light a pigment refracts**, which determines whether a pigment’s hue is solid (opaque), semi-transparent, or (fully) transparent.

**Light-fastness** refers to the **permanence** of a hue, which is determined by a pigment’s resistance to change from the effects of exposure to light.

Information about the opacity and light-fastness of the pigment(s) in a tube of paint can often be found on the label on the tube. Also on the label is the **pigment code, which** identifies the pigment(s) contained.



The pigment code often includes the name of the pigment, in addition to the numerical code, which is determined as follows:

“**P**” for pigment, followed by the first letter of the hue group (“**R**” for Red), and then a number which identifies the particular pigment (“**209**”. This is standardized and *always the same*, even if another manufacturer uses a different name for the same pigment).

### **Kinds of Pigment: Inorganic vs. organic**

Pigments can be divided into two main classes: **organic pigments** (pigments derived from complex compounds of carbon) and **inorganic pigments** (pigments derived from sources other than carbon).

**Inorganic pigments** come in three varieties: **earth, mineral, and synthetic—descriptions** that refer to the sources from which they are derived. All of the opaque pigments that can be found in a traditional painting palette are inorganic pigments, usually derived from natural sources such as metals (Cadmium, Manganese, etc.) or minerals (Ultramarine).

**Organic pigments** are either derived from natural sources or are synthetic. **Synthetic organics** include such pigments as the **Phthalocyanines** (blues and greens), **Quinacridones** (reds and violets), and **Azos** (yellows and oranges), among many others. Synthetic organic pigments are **extremely strong pigments**, are comparatively cheap to produce (and **cheaper to buy**), and have **excellent permanence**. Most modern synthetic organic pigments are **brighter, stronger**, and more **flexible** than traditional pigments, making them ideal for mixing an array of spectral colors at relatively low cost.

## Colors and Color Mixing

The specific pigments you include in your palette determine the range of colors and tones you can render in your paintings. In order to develop an acceptable palette for your work you must understand both the **structure of color** and the **principles of color interaction** that determine how pigments react when mixed with each other.

Our perception of color in a painting is determined by the action of light on the pigments that contain the colors we see or by how they absorb or reflect rays of light. The effects that occur when pigments are intermixed are explained by the theory of **subtractive color mixing**, which states that color added to a mixture diminishes (“subtracts”) the amount of light that is reflected (transmitted) to the viewer in the resulting mixture. This is why the more pigments that are added when mixing color the darker and less pure the color will become.

It is for this reason that pure pigments (mixed with an appropriate amount of white) are ideal for capturing a sense of light in a painting and why, in order to prevent an unwanted lowering of the tone and purity of pigments when mixing it is preferable to start with lighter colors, adding touches of the darker color, not the other way around.

Another thing to consider when mixing pigments is how the **opacity** of the colors being mixed affects the resulting mixture. For example, mixing two opaque colors together results in another opaque color, and mixing two transparent colors together creates another transparent color, but mixing a transparent color with an opaque color will result in an opaque color.

*TIP: In order to prevent an unwanted lowering of the tone and purity of pigments, when mixing it is preferable to start with lighter colors, adding touches of darker color, not the other way around.*

### Oil vs. Acrylic (and Other Water-Based Media)

Paints can either be **water-based** (watercolor, acrylic, gouache), **solvent-based** (alkyd, lacquer), or **oil-based** (oil paint). Before getting into the materials and handling for different kinds of paint it is useful to consider the properties of different painting media, and how they compare to one another with regard to various painting techniques (their “pros” and “cons”).

- **Oil colors** have a **depth** and **richness of color** that is unique, and oil colors can be worked while wet on the surface (“wet into wet”) for far longer than other painting media.

On the other hand, because of the **toxic** nature of many of the chemicals involved in the oil painting process (oil, solvent, etc.) more preparation of the painting surface—as well as general safety

precautions—are required than for water-based media.

Also, in order to prevent cracking and other problems associated with the integrity of a painting surface, working in oil requires following the “**fat over lean**” rule, which demands that thicker, more oily paint be layered over thinner paint.

- In addition to the fact that **acrylic** and other water-based media don’t require the use of toxic materials as do oils, the greatest advantage of acrylic paints is their **versatility**, accommodating a range of paint application techniques from thin, transparent washes, to thick, opaque (impasto) surface effects.

Acrylics are also simpler to work with than oils (no “fat over lean”, surface preparation, etc.) and in general have greater **permanence**—i. e. modern acrylic emulsions are sturdy and flexible, and are not subject to the chemical changes over time associated with oil colors.

Gouache and watercolor are two other water-based media that are ideal for transparent and semi-transparent painting on paper and other rigid supports, and can be used to achieve visual effects that are unique to their respective media.

### **Painting with Oils**

Oil paints are made from pigments in an oil binder, which is most commonly linseed oil. There are a number of substances that can be used in the painting process to facilitate the handling of oil paints. The most relevant of these substances fall into two categories: **oils** and **resins**.

- The most important oil in the painting process is **mineral spirits (preferably odorless mineral spirits, “OMS”)**, which are used primarily as a solvent for **diluting** oil paint, decreasing viscosity to produce a consistency that is easier to manipulate on the painting surface, making it ideal for working in thin layers, especially in the early stages of an oil painting. **Gamsol** is recommended (available for sale at a discount from the Painting Office on request).

Painting with oils doesn’t require the use of materials beyond quality pigments and mineral spirits, so long as the “fat over lean” rule is observed, but there are a number of other mediums that can be incorporated into the process to expand the possibilities of the medium.

- **Linseed oil**, a drying oil that is already contained in oil paints as the binder that gives them their consistency, can also be used (by itself, or in combination with other substances) as a painting medium that is added to paints to increase their flow.

- **Stand oil**, or “stand linseed oil,” is a thicker, polymerized linseed oil that can be thinned with mineral spirits to make a standard painting medium. Adding stand oil gives oil colors an excellent flow that cannot be achieved with regular linseed oil, and stand oil also slows the drying time of oil paint, making it ideal for use in wet-into-wet painting techniques.
- **Resins** are hard, glassy, non-crystalline solids that can be used in painting mediums and in the preparation of **varnishes**. Resins can either be natural or synthetic. **Damar** is the most useful of the natural resins for making a varnish (Damar Varnish), which accelerates the drying time of oil paint when included in oil painting mediums.

When used in the preparation of a varnish resins such as damar give a **luster** and **depth** to the appearance of a painting through their highly refractive transparency. They are also useful for glazing.

There are a number of synthetic resins, such as **alkyd resins**, which are as good—if not better—than natural resins in the preparation of oil painting mediums, and have similar characteristics.

### Painting with Acrylics

Acrylic is arguably the most versatile of the water-based paint media. Acrylic paints consist of pigment suspended in an **acrylic polymer emulsion** binder, which is water-soluble when wet, and provides a flexible, waterproof, non-yellowing film when dry.

Most of the pigments available in oil colors—or acceptable substitutes—are also currently available in acrylic. However, acrylic manufacturers tend to favor more **modern, synthetic** pigments, while excluding some more traditional, natural ones, making acrylic ideal for a more contemporary palette, heavy on Phthalos and Quinacridones, etc.

Acrylic paints can be used effectively with only water to manipulate the consistency of the paint, but there are a number of mediums available for working with acrylics that can produce different effects, many of them similar to the effects characteristic of oils. Most of these mediums are versions of the acrylic polymer emulsion that is used as a binder in acrylic paints. The three main acrylic painting mediums are **gloss medium, matt medium, and gel medium**.

- **Gloss medium** is the same as the binder in acrylic paints, and can be added to “extend” the paint.
- **Matt medium** (gloss medium + matting agent) is thicker than gloss medium and good for transparent glazes that retain the mattness of acrylic color.

- **Gel medium** is gloss medium that has been thickened, and allows acrylic colors to be extended or rendered more transparent without loss of structure.

*...Other acrylic painting mediums:*

- **Flow improver** is a wetting agent that helps thin acrylic colors for use in glazes without reducing color strength, making it preferable to water for thinning acrylics.
- **Retarder** can be used to slow the drying time of acrylic paint, and is useful for blending.

### III. THE TOOLS OF PAINTING

#### A. Brushes

There are two main types of brushes: **soft-hair brushes** and **bristle brushes**, and both types can be made from either natural hair (traditional) or synthetic fibers.

The type of brush you use for painting should be determined by several factors, including the viscosity of paint, the support you are painting on, and the style in which you are painting (loose vs. precise handling, etc.).

- **Soft-hair brushes** are meant for working with **thin washes** of paint, making them ideal for watercolor painting. They can also be used for oils and acrylics, and are especially good for precision work and work on a smaller scale.
- **Bristle brushes** are good for moving thick, viscous paint in oil or acrylic around on a support. They can hold large amounts of thick paint, making them ideal for **impasto** brushwork and work on a larger scale.

Soft brushes and bristle brushes both come in two different shapes: **round** and **flat**. There are also **filbert** brushes, which are in-between flat and round in shape, and provide some of the best features of either type of brush.

**Synthetic brushes** offer an economical alternative to natural-hair brushes, but come with certain disadvantages as well. They are **very difficult to clean** completely and tend to disintegrate over time, lacking the longevity of properly maintained natural-hair brushes.

**\*\*\*A note about cleaning brushes\*\*\***

**Brushes used with acrylic**, which is a quick-drying medium, require continuous washing, and thorough washing with water (but **never hot water**) at the end of each painting session. **Brushes should not be left in water for extended periods of time**, as this can result in damage to the brush fibers.

**Brushes used with oil**, a slow-drying medium, should be cleaned after each painting session, as leaving dirty brushes soaking in mineral spirits can result in deterioration over time. Oily brushes should first be wiped with a rag to remove excess paint, then rinsed in mineral spirits, and finally washed out with water and a de-greasing agent—such as Murphy’s oil soap or dishwashing soap—until all oil and solvent is rinsed out of the brushes.

- **Airbrushes** allow paint to be atomized and distributed in a fine spray. Airbrushes consist of a **spray gun** and a **compressor**, which works with a can of compressed air. Airbrushes are useful for applying **uniform tones** and **gradations** over large canvases and also for controlled detail work in small areas.

Because the chemicals in paint can be toxic, and are especially hazardous in particle form due to risk of inhalation, a **respirator should always be used** when working with an airbrush, and airbrush work **MUST** be done in a properly-ventilated area—preferably a spray-booth—in order to prevent exposure to ambient particulates.

An airbrush system should be cleaned after every use by spraying a cleaning agent through the system until it is clean.

**B. Palettes**

A number of different surfaces can be used as palettes, so long as they are not absorbent, and provide a base that is adequate for moving and mixing paint.

It is best to work on a palette of a **neutral tone**, and a palette that matches the tone of the ground on which you are painting is ideal—i.e. a white palette for a painting on a surface that is prepared with white primer. This will give you a better sense of how the colors you are mixing will look in your painting.

Paint can also be mixed in **plates** and **saucers**, which can be preferable to a palette if your painting process requires large amounts of pre-mixed paints at the ready. Mixing containers should be covered with a plastic film such as saran wrap to prevent drying or

*TIP: Used, solvent-soaked painting rags must ALWAYS be disposed of in designated sealed containers in order to protect against the potential for combustion of fabrics soaked in flammable chemicals.*

hardening from oxidation caused by exposure to air, allowing you to save paint over the course of multiple working sessions and prevent waste and lower cost.

**Palette knives** are useful for moving and mixing paint on your palette, as well as scraping away excess or undesired paint from both a palette and a painting surface. A palette knife can also be used for applying paint in dabs or flat, smooth patches of color.

Perhaps the most important accessory material for the painter—especially the oil painter—is an ample supply of **clean cotton painting rags**, or some kind of absorbent tissues, to clean excess paint from brushes, which prevents muddy paintings resulting from the use of dirty brushes.

**Rags** dipped in linseed (or stand) oil are also useful for “cleaning” the surface of a painting during or after a painting session (especially on a surface primed with oil ground), which can help keep the painting film on the surface “fresh” and facilitate the flow of fresh paint layers.

#### **IV. DEVELOPING A SUSTAINABLE ART PRACTICE: HEALTH AND SAFETY INSIDE AND OUTSIDE THE STUDIO**

##### **A. Lighting**

Perhaps the most important consideration in setting up a space for making art is lighting. Our perception of color is determined entirely by the effects of light on objects, and—in the case of paintings—the pigments on the surface of the painting.

There are two main types of lighting: **natural light** (daylight) and **artificial light**. Many painters prefer the clarity of natural light, which allows them to perceive colors in their natural state. However, this is often not an option in a studio setting, where artificial lighting is required. In this case, **fluorescent light** is often an acceptable choice. There are even fluorescent lights that simulate the effect of natural light, called “artificial daylight.”

The color temperature of an artificial light source—a fluorescent tube for example—is measured in degrees Kelvin (K), which represents the relative warmth or coolness of the light. The temperature of your lights should be **neither excessively warm nor excessively cool**, and preferably somewhere in the intermediate range (approx. 4000k).

A good way to gauge the relative character and temperature of lighting is, if possible, to photograph work against a studio wall of a neutral white and then review the photographs in order to observe the color of the wall in them. If the wall looks too warm or too cool, this would indicate that the temperature of the lighting might need to be adjusted.



In addition to having an appropriate color temperature, lighting should always be **even and consistent** across the surface on which you are working. Another thing to consider, if possible, is the lighting conditions under which the work will ultimately be exhibited, thus allowing the artist to maintain consistent lighting and ensure that the work will be seen in the way in which it was intended.

## **B. Dealing with Toxic Materials**

Painting sometimes involves working with materials that contain toxic chemicals. There are certain measures that can be taken, and substitutions that can be made, in order to minimize your exposure to toxic chemicals and mitigate some of their effects.

### **1. Handling Toxic Materials**

As we've discussed before, when handling toxic materials it is necessary to consider various protective measures. These include the use of personal protective equipment—such as latex or nitrile gloves, dust mask and particulate respirators, and, in some cases, protective eyewear, such as goggles.

Additionally, to prevent more general contamination with harmful chemicals, it is recommended that you have clothing strictly for the studio, avoid eating and drinking in your work space, and wash your hands thoroughly or shower after working with toxic chemicals.

Protective gloves or a barrier cream are necessary when handling any paints and solvents, which contain toxic chemicals that can be absorbed by the skin. When working with aerosol sprays and powdered pigments or other dry media it is especially important to prevent inhalation through the use of a dust mask, but preferably a particulate respirator with a filtration system.

Even if the materials you are working with are not actually toxic, they can be irritating to your skin. Use of a lubricating emollient cream or lotion can prevent excessive drying of your skin and irritative eczema. Aquaphor is an excellent choice for this.

### **2. Ventilation**

It is not only necessary to protect yourself from exposure to toxic materials while you are working in the studio; you also need to protect your work environment, bearing in mind that the chemicals you work with, if not properly vented, will remain in the environment, continuing to pose a health risk. This is where ventilation comes in.

Fortunately, Cooper Union provides ventilation systems in most classrooms and studios. It is your responsibility however to know how to take full advantage of this

resource. When you are painting, and dealing with solvents and other oils, working in an open, ventilated space, such as a studio room, is adequate.

However, if you are working with aerosol sprays or dry pigments and other powders, this must be done in a high-vent room, which is specifically designed to prevent the release of chemicals into your air space.

### 3. Disposing of Toxic Materials

When you are done working with toxic materials, it is crucial that you contain and dispose of them properly. This means keeping all of your solvents and other liquids in appropriate containers that are labelled, covered, and stored in flammables cabinets.

Any dry media, such as pigments and other powders, should be stored in closed containers.

Lastly, all potentially harmful substances should be disposed of in the designated receptacles provided throughout the studios and classrooms. These should NEVER be poured down sinks or toilets, from where they could enter and contaminate the air and water supply.

#### C. The Physicality of Painting

While painting is primarily a creative pursuit, physicality is nonetheless involved. Just as brushes and pencils are tools for the artist, the body is the vehicle for using these tools; it must be functioning properly to employ them effectively.

*TIP: If a container of solvent is covered and left overnight the contents will separate into clean solvent and sediment. The clean solvent can be poured off and reused, and the paint sediment can be disposed of appropriately. This is a great way to prevent waste and save money on art materials.*

When considering ergonomics, there are two important potential occupational hazards for the painter: 1) repetitive stress injuries; and 2) neck and back strain.

- i. **Repetitive stress injuries (RSI)** result from the gradual buildup of damage to muscles, tendons, and nerves from prolonged repetitive motions. Overuse or improper use is the usual cause. For the artist there are two important common types of RSI to consider: carpal tunnel syndrome and rotator cuff injuries.

**(a) Carpal tunnel syndrome.** Carpal tunnel syndrome affects the wrist—specifically the median nerve in the wrist, which becomes swollen and inflamed as a result of prolonged repetitive movements, leading to pain in the wrist and numbness, tingling, and

occasionally weakness in the affected hand. Unrecognized and untreated it can seriously handicap the painter, with surgery required in more advanced cases. In its milder forms and when diagnosed early, there are a number of preventive/remedial measures that can be applied to limit its impact and prevent permanent joint/nerve damage.

First and foremost is recognizing that the entity carpal tunnel syndrome exists and represents a real threat to the artist and that modifying work habits can minimize the impact of those necessary repetitive movements involved in painting or drawing.

Wrist positioning is crucial, as is an awareness of such positioning. Frequent rest breaks while working are useful, as are wrist stretching exercises. Appendix 1. illustrates suggested exercises for carpal tunnel syndrome.

Adding tape or foam to cushion the grip sites for pencils or brushes can sometimes prove helpful. Occasionally wearing splints or bands can decrease wrist pain and strain, but these should only be used at the recommendation of health care professionals. If pain becomes severe and disabling—and if persistent tingling and numbness in the affected hand suggest that nerve damage has occurred or may be developing—and conservative remedies prove insufficient, consultation with an orthopedic surgeon is recommended for consideration of a course of physical therapy and/or corrective surgery.

Appendix 1. illustrates sample exercises for carpal tunnel syndrome.

**(b) Rotator cuff injuries.** There are four muscles and tendons in the shoulder which stabilize it and aid in its movement. These muscles and tendons can be injured acutely or damaged more insidiously as a result of repetitive stress. Symptoms of rotator cuff injuries include pain (usually the result of one or more tears and the accompanying inflammation) and limitation of the normal range of movement in the affected arm and shoulder. For the artist, it can seriously impede the painting process, particularly when working on larger canvases.

While symptoms can suggest RCIs, consultation with a health care professional and diagnostic studies (X-rays and MRIs) are required to confirm the diagnosis before instituting therapy. This therapy will depend upon the extent of the injury and the amount of associated joint inflammation. Initial measures include rest, local application of heat and/or cold, anti-inflammatory agents (e.g. Ibuprofen), steroid injection, and supervised physical therapy. Should these conservative measures fail, corrective surgery may be required.

Awareness of posture, working at arm's level, avoiding excessive stretching or over-rotation of the shoulder, changing position, and frequent rest breaks with shoulder stretches and strengthening exercises can minimize the chance of acute or chronic rotator cuff injuries.

Appendix 2. illustrates suggested exercises for rotator cuff strains or injuries.

## ***ii. Positional Injuries: Neck and Back Strain***

Positional injuries or strains can result from maintaining rigid posturing over prolonged periods of time, especially when accompanied by unusual or “unnatural” angles or directions, without adequate rest breaks. The neck and the back are most commonly affected. In the majority of cases simple strain is the problem, but occasionally there can be more serious anatomical damage to discs in the neck or back—including herniated discs—that can result in permanent musculoskeletal or neurological problems.

Prevention is the key here with the development of good studio (workplace) habits. Never work at awkward heights or angles. Survey your work space and position work surfaces in such a way as to minimize body strain.

If drawing at a desk, do not work hunched over, constantly bending your neck. Make sure your chair has adequate support for your upper and lower back. Try to adjust the height of your chair so that your feet can rest comfortably on the floor with the height of your knees either at or slightly lower than your hips.

If working on an easel or off the wall, try to maintain your work at eye level. Avoid hyperextending the neck backwards to reach the upper canvas or flexing the neck downwards to reach the lower canvas. Always try to adjust your work surface to accommodate your body—not the reverse.

Most important, take rest breaks. Making art is hard work. The creative process takes its toll on the body as well as the mind. If you can’t get away from your work and jog around the block or go to the gym, at least walk around the studio, do a few jumping jacks, bend over and touch your toes, or stretch your arms and neck.

And when you’re not in the studio, remember that exercise—even modest exercise like brisk walking for half an hour a few times a week—is good for your mind and your body, as well as for your art.

## **D. Mental Health and Overall Wellbeing: General Considerations**

While recommendations for a healthy life style with a well-balanced diet, adequate rest, exercise, and planned recreation would seem to hold for any occupation or pursuit, it may be especially important for the young artist, since the creative process takes such a high toll on energy and concentration.

Similarly intelligent time management and social interaction to balance the relative isolationism of the artistic process are important to maximize efficiency, productivity, and work-based satisfaction.

Mental health and substance abuse issues are of special concern to the artist.

## Mental Health/ Substance Abuse

It was the Greek philosopher Aristotle who proposed the concept of the “tortured artist,” suggesting that no great mind ever existed without a touch of madness. This has led to an unfortunate association between creativity and mental illness. While there are any number of famous artists whose lives—and art—have been influenced by depression, bipolar disorder, schizophrenia, and drug or alcohol abuse (among them such artistic giants as Francisco de Goya, Vincent van Gogh, Paul Gauguin, Edvard Munch, Jackson Pollock, Jean Michel Basquait, and Agnes Martin), the simple fact is that while artists as a group *may* be more susceptible to mental illness than the general population, mental illness is not a prerequisite for creating art (to the contrary, it can become a barrier) and mental illness when it does occur in the artist can be addressed effectively in much the same way as in the non-artist to promote creativity, productivity, and work satisfaction.

Compare the lives and careers of Munch and Martin. He considered his “suffering as part of myself and my art” and tortured himself with hallucinations, phobias, and suicidal thoughts throughout his later life. She, on the other hand, after having to virtually stop painting as a result of schizophrenia and multiple psychotic breaks requiring hospitalization and electroshock therapy in her younger years, experienced a resurgence of her artistic drive after relocating to the peace and quiet of the New Mexico desert, adopting Buddhism, and embarking on a program of medical- and psycho-therapy, going on to live contentedly to a ripe old age and produce some of the most successful work of her long distinguished career.

Aside from mental illness, substance abuse—drug and alcohol—is increasingly being recognized as a disease. There is a definite link between the two, and fortunately both can be treated.

While the image of the tortured artist may seem romantic at first glance, it is not the kind of romance that you want to live with—or try to work with.

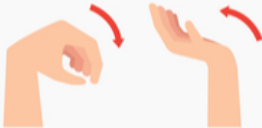
Creativity is a challenge—sustaining that creativity even more so. The isolation that is an inherent part of the creative process—and the artist’s life—can take its toll. That is why it is so important for the young artist to have a life outside of the studio and to be aware that they are not alone. There are support networks to help you to get out the kinks and get back on track if the need arises. While you might have to work alone, you don’t have to be alone, or try on your own to address anxiety, depression, mania, or any temptation for substance abuse as it may arise in the course of your work.

The art school is an ideal place to work, to learn, and to experiment for the young artist. There is a definite advantage to being a part of an artistic community to share ideas and foster camaraderie. And in the event that problems arise, there is an important support network among faculty and administrative personnel—either on a one-to-one informal basis or with more formal structured professional resources and referrals. It is there for you. Make sure to take advantage of it if the need arises.


Please visit the Cooper Union Counseling Services webpage for specific information on free or low-cost mental health counseling available to students.

# APPENDIX 1.

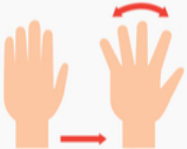
..... CARPAL TUNNEL SYNDROME EXERCISES .....



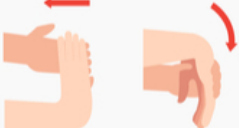
Active range of motion




Active range of motion




Finger exercise



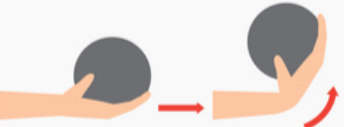
Wrist stretch



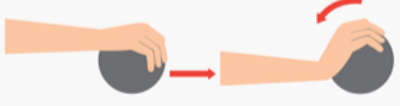
Tendon glides



Grip strengthening



Wrist flexion exercise



Wrist extension exercise

ErgonomicTren

The image displays eight illustrations of exercises for Carpal Tunnel Syndrome. Each illustration shows a hand or forearm in a specific position with red arrows indicating the direction of movement. The exercises are arranged in three rows. The first row contains three exercises: 'Active range of motion' (wrist flexion and extension), 'Active range of motion' (wrist ulnar and radial deviation), and 'Finger exercise' (finger flexion and extension). The second row contains three exercises: 'Wrist stretch' (wrist flexion and extension with thumb tucked), 'Tendon glides' (wrist flexion and extension with fingers curled), and 'Grip strengthening' (hand squeezing a blue ball). The third row contains two exercises: 'Wrist flexion exercise' (wrist flexion with a dark ball) and 'Wrist extension exercise' (wrist extension with a dark ball). The logo 'ErgonomicTren' is located at the bottom right of the exercise grid.

## APPENDIX 2.

### Sample Exercises for Rotator Cuff Injuries

