Ultimate SIMPLE'ISH PAPER GUIDE

H History

Papermaking Time Line

The first writing surface was made in ancient Egypt from a plant called Papyrus, the royal plant of Egypt.

The core of the papyrus plant was cut into tissue-thin strips, then laid across each other and pressed together under pressure. This turned the strips into a thin, smooth and durable laminated material that wasn't quite paper.

Paper and papyrus are not the same, but often get confused because the word paper is derived from the Egyptian word for Papyrus, "Pa-prro".

The true history of paper beings in China, where there was no access to the Papyrus plant. The Chinese began using woven textiles as their writing surfaces, and a pen & ink calligraphy style of writing. Books and scrolls were made from woven cloth by hand, and the woven cloth left a lot of scrap after being trimmed for books and scrolls.

In 105AD, Ts'ai Lun developed the idea of beating the discarded cloth into fibers, suspending them in water, and matting them into sheets (creating the basic process for making paper).

News of the paper making process did not spread fast. It took over 1,000 year before the process reached Europe.

The Turn to Modern Paper Making

It wasn't until 1789 that Nicolas Louis Robert of France created the concept for the first paper-making machine. The French Revolution put Nicolas' plans of developing the machine on hold, so he sent his idea and design to his brother-in-law in England. It was here in 1803 that the first successful paper-making machine was developed. Henry and Sealy Fourdrinier were financial backers and enthusiastic supporters of the project, giving way to the name of the machine, the Fourdrinier. This machine became the standard design for paper-making machines, which remain virtually the same today.

P Process

Papermaking Process

The basic principles involved in making and forming paper have not changed since Ts'ai Lun invented the process nearly 2000 years ago. Wood or cotton fibers are beaten until they break down into small particles, and the fibers are diluted with water to make pulp and placed in a reservoir.

Pulp Reservoir

Pulp is then metered out in a continuous stream onto a moving wire screen. The moving wire is mechanically shaken side to side to distribute the pulp evenly across the screen and drain water. Suction boxes underneath the screen also help drain excess water.

Pulp on Wire

The pulp is then transferred to a woven felt blanket and carries paper through a press roll which removes even more water. By varying the woven texture and the location of felts, the finished texture of the paper can be varied. Watercolor paper, for example, uses a very heavily textured felt, while the felts for drawing and sketch papers have very little texture. At this point, the fibers have interlocked and the paper has dried enough to be passed through steam-heated cylinders.

Sizing Bath

Next, the paper is run through a "sizing" bath to enhance the working properties of the sheet. Without sizing, the paper would act like a blotter. The sizing seals the fibers individually or as a structure to provoke water holdout. The amount of sizing is adjusted based on the grade of the paper. For example, drawing papers have more sizing for water hold out, where watercolor papers require a different approach to allow absorbency while still maintaining an internal barrier.

Calendaring

After the sizing bath, the paper is re-dried. At this point, it will go through different finishing processes depending on the type of paper. A calendaring stack, which is a large stack of rolls that the paper runs though, determines the final smoothness of the sheet. The degree of calendaring can be adjusted to change the smoothness of a sheet.

Plate

If an ultra-smooth sheet is desired, paper is layered sheets of metal which gets passed back and forth between pressure rollers in a process known as plating.

Texture & Type

Paper Textures & Types
There are many types of paper to choose from and some have multiple uses, such as Mixed Media. Paper is also one of the most common artist surfaces.

Sketch Paper is intended for practicing, experimenting, and quick studies. Often lighter weight and is typically less expensive, giving you lots of sheets to practice with in your pad.

Drawing Paper is intended for finished artwork. With drawing papers typically being heavier, the artist is able to work on the sheet longer and refine work. The paper can usually stand up to more erasing and more fine detail work. Typically, bit more expensive than Sketch paper and will usually contain fewer sheets in a pad.

Mixed Media Paper is thicker and made to handle various types of media, including wet media. Combines the characteristics of watercolor paper with the finish of a drawing sheet. The unique combination creates the ideal surface for watercolor, gouache, acrylic, graphite, pen and ink, colored pencil, marker, and collage.

Bristol & Its Various Surfaces
Bristol generally describes a drawing paper that is pasted to form multi-ply sheets. Bristol sheets provide a stiff, strong surface to work on without the need for mounting. The term Bristol derives from the early days of European papermaking when mills would send their finest papers to Bristol, England to be pasted together. Bristol papers generally have two types of surfaces: smooth and vellum.

Smooth - also known as hot press, has a very satiny, hard finish. This surface is especially good for pen and ink, marker, mechanical layout and airbrush.

Vellum - can be called regular, medium or kid finish, this surface has a tooth or roughness, making it excellent for use with dry media including pencil, colored pencil, charcoal, pastel and oil pastel.

Semi-Smooth - perfect in-between surface that isn't as smooth as smooth, and not as rough as vellum. The Slightly textured surface is suited for pen and ink tools, pencil, specialty pens and markers.

Plate - a unique, uniformly smooth finish is created on the surface of the sheet through a special process. Sheets of paper are interleaved with highly polished metal plates to make a stack/"book". The "book" is then pressed repeatedly under pressure between steel rollers, imparting the smoothness of the metal plates to the paper's surface. This surface is ideal for pen and ink, marker, mechanical layouts and air-brushing.

Watercolor Paper & Its Various Surfaces
Watercolor paper is usually made by one of three processes: handmade, mold-made or machine-made. Can be made with cotton, wood pulp or mixture of the two. The higher and best performing watercolor has a higher content of cotton.

Cold Press is the most versatile and popular texture, suitable for beginners and experienced painters alike, because it's semi-rough surface is suitable for both detailed work and smooth washes.

Hot Press which has a smooth, hard surface. Some artists like hot-pressed paper for detailed work, but others find it too slippery, making it difficult to control the paint.

Rough Press is less comply used by artists. It has pronounced rough tooth texture.

Special Use Papers, etc....
Tracing - low opacity, allowing light to pass through. It is named as such for its ability for an image to be traced onto it.

Newsprint - low-cost, non-archival paper consisting mainly of wood pulp.

Colored Pencil - paper with a bit of tooth or surface texture.

Marker & Layout - perfect for quick sketches with pencil, pen, or felt markers. Won't bleed, fade, or wrinkle. Markers can't bleed through.

Pastel - textured (sometimes sanded) paper that comes in a wide range of colors and tones.

Charcoal - laid pattern, ribbed texture, for precise shading with charcoal and pastels. Its raised texture is also suitable for pen, pencil, or art crayon.

Toned Paper - providing the middle value that would otherwise need to be rendered by the artist. A wider range of values from light to dark can be used, and the middle tone makes it easier for the artist to deliberately place shadows and highlights.

Illustration Boards differ in that they are sheets of drawing paper mounted to both sides of a heavyweight board to provide the stiffest surface yet.

Plastic- smooth, bright white, 100% waterproof synthetic paper.

Stone/Mineral - 80% calcium carbonate bonded with a small amount of plastic. Water-resistant with a smooth finish, it still has enough tooth and absorption for all mediums. It will not buckle when used with the wettest mediums.

Weight

Paper Weight: What does it mean?
Paper weight can be confusing. There are two ways that paper weight is measured and stated. The US measures paper weight in pounds, whereas it is standard to measure in grams per square meter outside of the US.

Paper weight in the US is stated in #/1bs. and is determined by weighing 500 sheets (a ream) in the basis size of a particular paper. The part that can get confusing when weighing paper in pounds is that not all paper types have the same basis size.

On the other hand, weighing paper in grams per square meter does give you a clean, apples-to-apples comparison. Measuring paper weight in grams per square meter (commonly referred to as gsm or g/m2) is literally taking the weight in grams of 1 square meter of paper.

A papers weight does not necessarily reflect quality. It is *usually* a reflection of intended use. Watercolor papers are heavier weight because of their need to hold a lot of water, versus drawing & sketch papers which are intended for dry media.

Q Quality

Does Quality Matter?
Their are two main grades of paper, artist/professional and student grades. Artist grade typically is archival, made with better materials and has quality control.

Student papers tend to be more affordable in price since they are made with less expensive materials, thus may not perform as well as higher quality papers, may be come yellow or brittle over time.

A Archive

Archivability
Although there are no universal standards in regards to what makes a paper archival, there are some generally accepted properties. In addition to being acid free, the paper should contain no groundwood or unbleached pulp, meet strict limits on metallic content and be free from optical brighteners which artificially make the sheet whiter.

If you are looking for the ultimate in permanence, it is recommend to use acid free surfaces made with 100% cotton.

Acid-free papers are made using alkaline paper making technology. This means the pH of the pulp that is used to form the paper is above 7 (neutral). The paper is also buffered with an alkaline reserve, such as calcium carbonate, to neutralize acid compounds absorbed from the atmosphere or formed through natural aging.

Environmental Factors
In addition to your choice in paper, don't forget environmental factors. They can be just as important in ensuring the longevity of your work.

Light, heat and humidity all have an effect on paper.

- Sunlight and ultraviolet light can cause fading and brittleness.
- Too low a humidity can cause paper brittleness, and too high a humidity increases the chance of mold.
- The lower the storage temperature of paper, the longer it lasts.
- The life of paper is doubled with every decrease of 10°F.
- Cycling (temperature/humidity fluctuations) weakens and breaks down paper fibers by causing fibers to expand and contract.

Permanence and Longevity Artwork
Some important factors to remember concerning the permanence and longevity of paper and artwork inlcude:

Acid - As mentioned, acid is the main factor that affects permanence, so if you're concerned about longevity remember the most durable and long lasting papers are acid free.

Other Art Materials - Paper permanence refers not only to the acidic level of the finished sheet of paper, but also to factors that affect the paper after it is made, like what comes in contact with the sheet (paints, oils, fixatives, etc). Make sure you are using safe materials if you're concerned about longevity.

Light - Sunlight fades all color. Ultraviolet and fluorescent light accelerates fading. Light energy is converted into heat and a minute amount is absorbed by paper, causing fibers to become brittle. Be sure to protect your artwork from the sun and hang it where it won't be directly exposed to sunlight. UV Varnishes can also help work last longer.

Temperature - Typically a lower storage temperature of paper makes it last longer (although extreme cold can cause brittleness). The life of paper is doubled with every decrease of 10˚ F. Too hot of a temperature can cause mold. In general, the average room temperature range is safe, and it's best to keep artwork in a place where there won't be a 20˚F fluctuation within a 24 hour time period. For example, a garage may not be the best place to hang artwork if it gets down to 50˚F at night and up to 90˚F during the day.

Humidity - Too low a humidity increases paper brittleness. Too high a humidity increases the chance of mold. Cycling (temperature/humidity fluctuations) weakens and breaks down paper fibers by causing fibers to expand and contract due to the water contained within them. On average 5% of water remains in a finished sheet of paper after the paper making process is complete, so think of paper as being alive... it can be affected by changes in the environment.

Storage - The main consideration is not to let anything acidic touch your paper. Acid free interleafing can be used to store artwork. Acid free tissue paper is a cost effective option. Glassine paper can also be used, or museum barrier paper. They all prevent acid from touching your paper. Do not use a stiff cardboard container to crate your portfolio as the acid in the cardboard can enter your paper. We'd recommend making a container out of either an acid free illustration board or acid free mat board.

G Grain

Grain Direction

Paper is made up of individual fibers from materials such as wood or cotton fiber. In the papermaking process on a Fourdrinier paper machine (the most common type), the fibers align themselves in the direction of the vibrating wire mesh upon which the paper is formed. This is called the machine direction or grain direction.

The grain direction of the paper is important when binding books, because paper is scored and folded. For bookbinding, you should always fold with the grain direction parallel to the fold and the spine of your binding. Folding parallel to the grain is easier and the paper is less likely to "crack," create a rough fold and result in a bulky binding edge. It also helps book's pages to turn easier, stay open and lay flatter.

A paper is called "grain long" if the grain is parallel to the paper's long side. If you are uncertain of the grain direction, there are techniques you can use to determine the direction in papers. If the grain direction is strong enough, you can identify the direction by "feel." **Take the sheet of paper in your hands and gently curl/bow the paper towards the middle, first in one direction and then in the other direction. The direction that bends more easily, with less resistance, is the grain direction.**

S Seal

Varnishes and Fixatives

Varnishes and fixatives are two different things.

A spray **fixative** is used to "fix" the drawing material (usually graphite, charcoal, or pastel) so that it does not smear as easily.

A **varnish** is used to change the sheen of the artwork and protect it from absorbing pollutants from the environment. It often is available in a variety of finishes including gloss, satin and matte.

There is also a difference between varnishing a painting on canvas vs varnishing paper. If the drawing materials are dry (i.e. graphic, pastel), the drawing will smudge when the varnish is applied with a brush, which is why a spray should be used.

When spray varnishing paper, the varnish will absorb into the fibers of the paper and into the various drawing materials. You may need several light coats, varying the direction of art when spraying. The spray varnish on paper is not removable, as it sinks into the paper fibers and possibly drawing materials.

Make a test with a "scrap" using the same art materials/paper being used and want to varnish. This will give you a good indication of finished results and help you determine whether or not the drawing should be sprayed.

R Rolled

How Do I Flatten Rolled Paper?

Technique 1 - Unroll the entire roll and re-roll it in the opposite direction it was previously rolled. Let it sit for at least 20 minutes before unrolling it again.

Technique 2 - Cut the paper to the correct size that is needed and roll it in the opposite direction it was previously rolled in. Let it sit for at least 20 minutes before unrolling it again.

Technique 3 - Cut the paper to the size that is needed, leaving a half inch to an inch extra on all sides, and tape along the edges so the paper lies completely flat. Complete artwork while edges are taped.

Technique 4 - Another technique involves placing the rolled paper in a plastic container which sits in a larger plastic container that is ¼ filled with water. To complete this technique, the following materials will be needed:

Plastic container large enough to fit the rolled paper
Plastic container with lid large enough to fit the plastic container that is holding the rolled paper
Water
Tissue Paper
Plastic wrap
Heavy board or thick, heavy book

Instructions

- Place the rolled paper into the smaller, clean plastic container.
- Place a piece of plastic wrap over the top of the small container.
- Fill the larger container ¼ of the way with clean water.
- Set the smaller container with the rolled paper in the larger container with the water. It is okay if the smaller container floats, but do not let any water get into the smaller container or touch the paper.
- Put the lid on the large container and seal it.
- Let the paper sit in the container overnight.
- Open the large container and lift the plastic wrap off the smaller container.
- If the paper feels soft and pliable from the humidity, remove the smaller container from the water and leave the plastic wrap off. Let the paper sit in the smaller container without the plastic wrap for about 10 minutes to let the air hit it.
- Place a sheet of clean tissue paper on a flat table. Unroll the rolled paper and place on top of the tissue paper.
- Carefully lay a heavy board or a thick, heavy book down on the unrolled paper.
- Let the paper sit under the weight for 24 hours. If the ends still start to curl after the weight is removed, let the paper sit under the weight for another day.

Technique 5 - For Watercolor Rolls, Mixed Media Rolls, or any other types of paper that is designed to handle wet media, the following technique can be used:

- Cut the paper to the size that is needed
- Lightly mist the paper with clean water using a spray bottle (do not soak the paper - only a light mist is needed)
- Place the misted paper between 2 sheets of parchment or tissue paper
- Carefully place a board or heavy book over the paper and let sit for 24 hours

Information Sources; Strathmoreartist.com, Artistsnetwork.com, Arches-Papers.com
Created for The Painty Rag (Yuga Art) & BeauxArts Fine Art Materials - Your Local Discount Art Materials Store.