

Odisha State Open University



Commonwealth of Learning

# 2D ANIMATION

*Layout & Designing*



Diploma in  
Multimedia and Animation (DMA)

DMA-03  
BLOCK-2



# 2D Animation

Block – II: Layout & designing



ଓଡ଼ିଶା ରାଜ୍ୟ ମୁକ୍ତ ବିଶ୍ୱବିଦ୍ୟାଳୟ, ସମ୍ବଲପୁର  
ODISHA STATE OPEN UNIVERSITY, SAMBALPUR

## 2D Animation

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## Course Overview

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### Welcome to Layout & Designing

This block focuses on layout and designing. Before setting your hands into the practical aspects, a lesson on the theoretical study of sketching is important. There are some common elements of a successful 2D design. Exploration of 2D elements and understanding of images, screens, pixels and resolution will help you change the world of 2D animation.

### Basic of Sketching

This course is intended for people who want to make a career in drawing and sketching. It helps you learn the techniques of using pencil in an organised way. Still life is the best subject in workmanship for learning and educating the aptitudes of drawing and painting. It shows you what is the look for items and see those like a craftsman - with a discerning attention to their framework, shape, extents, tone, shading, surface, frame and organization.

### Work in Different Media

This course will assist the people who want to create a perfect 2D movie. Different types of artworks and drawing media will help you create a fantastic 2D output. The three forms of art such as painting, drawing and mixed media are the distinct method to describe your creativity.



### Exploration of 2D elements

This course will prove beneficial for people intending to do 2D animation. Elements like Line, shape, form, space, color and texture are most important to design 2D. Furthermore, accumulations of different outline principles, balance, perspective, movement, design, rhythm and harmony are the elements that will help you change the field of 2D Animation.

## Pixel & Resolution

This course is intended for people who want to become a graphic designer. It includes a major portion of designing apart from two distinct categories: vector-based and bitmap images. To make the best design, the designer has to understand both the drawbacks and benefits of types of images, screen, pixels and resolution.

This video will provide a brief overview of this course

Topic	YouTube link	QR Code
Video 1 – 2D sketching & storyboarding for animation	<a href="https://youtu.be/AQpiyOWCQ4Y">https://youtu.be/AQpiyOWCQ4Y</a>	
Video 2 – Image & graphics Preparation	<a href="https://youtu.be/exL8HwjDNFc">https://youtu.be/exL8HwjDNFc</a>	

## Course outcomes



### Outcomes

Upon completion of preproduction you will be able to:

- Describe various types of pencil.
- Describe various types of pencil
- Examine various techniques of holding a pencil
- Describe different type of drawing media
- Explain the major theories influencing art
- Describe various design elements
- Division of elements
- Know the resolution
- Describe facts about vector and bitmap



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## Timeframe



How long?

This course will be completed within “4” classes.

This course is of “1” credit.

8 hours of study time is required for this unit.

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## Study skills



This is a combination of theory and practical.

Hence, you should have access to a personal computer or personal laptop for better understanding of this unit.

Each and every option is explained step by step in the course material.

Apart from this course material, the learner needs to adopt the tendency of learning from multiple sources i.e.;

Internet tutorials

Video tutorials on YouTube

Collaboration with people working in the industry etc.

Only classroom study will not make you a professional. You have to be active to grab the opportunity of learning wherever you get a chance.

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## Need help?



Help

In case you need any help, you can browse the internet sites such as youtube.com for video tutorials about the subject.



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## Assignments



### Assignments

There will be some assignments at the end of each unit.

These assignments are mostly practical based and should be submitted in CDs or DVDs. Theoretical assignments are to be submitted written on A4-size sheets.

All assignments will be submitted to respective study centres of the Odisha State Open University or as directed by the co-ordinator.

All assignments should be unit wise on separate CD/DVDs clearly mentioning course title and unit on the top. Theoretical assignment will be neatly filed or spiral bind with cover mentioning necessary information of course, student detail on top.

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## Assessments



### Assessments

There will be “1” assessment for each unit.

All practical assessments will be submitted to the OSOU.

Assessment will take place once at the end of each unit.

Learner will be allowed to complete the assessment within stipulated time frame given by the university.

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## Video Resources



### Reading

This study material comes with additional online resources in the form of videos. As videos puts in human element to e-learning at the same time demonstrating the concepts visually also improves the overall learning experience.

You can download any QR code reader from Google Play to view the videos embedded in the course or type the URL on a web browser.



















## Getting around this course material

### Margin icons

While working through this course material, you will notice the frequent use of margin icons. These icons serve to “signpost” a particular piece of text, a new task or change in activity; they have been included to help you find your way around this course material.

A complete icon set is shown below. We suggest that you familiarize yourself with the icons and their meaning before starting your study.

 <b>Activity</b>	 <b>Assessment</b>	 <b>Assignment</b>	 <b>Case study</b>
 <b>Discussion</b>	 <b>Group activity</b>	 <b>Help</b>	 <b>Note it!</b>
 <b>Outcomes</b>	 <b>Reading</b>	 <b>Reflection</b>	 <b>Study skills</b>
 <b>Summary</b>	 <b>Terminology</b>	 <b>Time</b>	 <b>Tip</b>



# Unit-1

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## Basic of Sketching

### Introduction

Drawings are methods for articulation of our perceptions, contemplations and emotions. Over the wide field of workmanship and outline, specialists and planners will utilize drawing as a particular tool for visual correspondence. In the meantime, it may also be utilized for a wide range of attracting strategies to express, create and showcase thoughts and work with the watcher for innumerable reasons. It is difficult to make a drawing unless the craftsman has a reasonable comprehension of what type of thought or scenario is to be presented and what visual dialect will be utilized in giving shape and expressing the flow of the drawing. This is frequently overlooked or misjudged by most educators of drawing.

In this unit, you will learn about basics of sketching, still life drawing and composition of basic elements.

### Outcomes



#### Outcomes

#### Upon completion of this unit you will be able to:

- Describe various types of pencil
- Examine various techniques of holding a pencil
- Explain the meaning of sketching
- Practice still life drawing
- Assess the components of composition



## Terminology



### Terminology

- Pencil:** A bar of graphite encased in a delicate wood for drawing and writing.
- Balance:** Balance is the feeling that the depiction "feels right" and not heavier on one side.
- Pattern:** A customary reiteration of lines, shapes, hues, or qualities in a composition.

## The Pencil

A pencil is a bar of graphite encased in a delicate wood, for example, cedar which is around six or seven inches in length and uncovered toward one side. Unrefined types of graphite pencils were first utilized as ahead of schedule as the 17th century. Prior to this, poles of lead or silver (known as silver point) were utilized as executables for making drawings. The cutting edge type of lead or graphite pencil with its wooden encasement initially came into utilization about the start of the 19th century.

The pencil essentially works by pushing or pulling the lead end over the surface filaments of the paper, which gets grated getting separated into little drops. Weight on the pencil pushes the pieces of lead into the filaments of the paper to leave a stamp.

Graphite, a type of carbon, otherwise called mineral dark, is the real constituent of the cutting edge pencil. The delicate quality or hardness of a pencil fluctuates relying upon the measure of earth blended with the carbon. Practically, no earth contains the mildest assortments of pencil. Craftsmen and creators will have to utilize the scope of pencils, for shifting their decisions as indicated by the impact based on their attempts to accomplish.

As the graphite is worn away through utilization, it has to be uncovered. This is finished by the activity of honing the pencil utilizing a sharpener. Honing and uncovering the graphite ought to be viewed as an imperative demonstration, since how it is done changes the kind of stamp you make with it. There are numerous methods for honing. A specific point creates a specific outcome.



The craftsman should test to find what is conceivable and how to make each kind of pencil meet his specific needs at any given point of time.

The pencil can be utilized for an assortment of purposes and, as with any material which is utilized, you should be completely aware of its possibilities and its impediments --diverse pencils and sorts are intended for specific employments. In the resulting section, some of these practices will be uncovered with specific pertinence to the suitable pencil or graphite material.

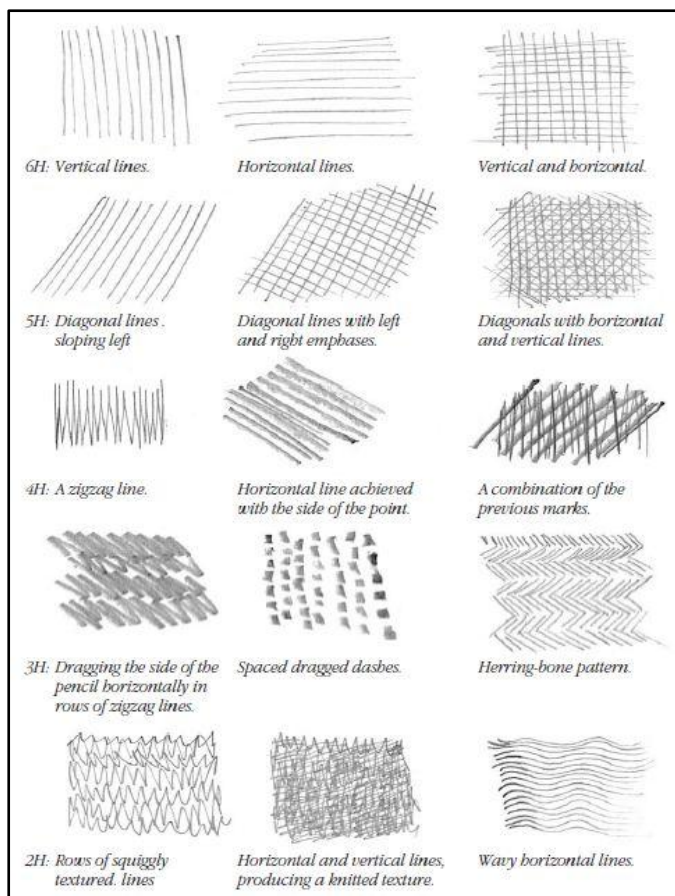
The imprints that appear over the accompanying couple of pages give some thought of the extensive variety of checks making conceivable. When you are taking a look at them, see each of the pencils thoroughly as to what marks you can make. Aside from being extremely animating and finding methods for opening your brain to new potential outcomes with your drawing, you will discover how it expands your "vibe" for the pencil itself. As specialists, what we feel through the materials we utilize affects what we deliver. And understanding the nature of those materials is indispensable for a decent result.

## Types of Pencil

There are many types of pencils like hard pencil, soft pencil, peel-back pencil, clutch pencil, standard thick dark pencil, triangular craftsman's pencil, graphite pencil or stick and aqua drawing pencil. But as a basic, we will discuss only about hard pencil and soft pencil.

### Hard pencil

Hard pencil marks have almost no variety in the scope of stamp making. They just for the most part shift through a direct movement. Tone is normally produced using a development of crosshatch impacts. Hard pencils are meant by the letter H. Similarly as with delicate pencils, they arrive in a range, involving HB, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H and 9H (the hardest).



**Title-** Hard pencil marks

**Attribution-** Peter Stanyer

**Source-** The complete book of drawing techniques

These pencils are essentially for use by originators, planners and individuals who create exact specialized diagrammatic drawings for which a fine, precise line is fundamental (for example, viewpoint or other projection drawings). Despite the fact that the imprints made with hard pencil demonstrate almost no variety, it can be utilized as a part of an expressive medium. Likewise, with delicate pencil, tone can be constructed utilizing across-incubating framework, despite significantly better and more formal outcome.

Hard pencils are generally proper for drawings requiring exactness. As we have paid attention to already, such drawings are typically done by engineers, mechanical fashioners, visual originators and modellers. The last drawings which are created must be proportional and exact with the goal of an individual, for example skilled workers can choose in the directions to develop and improve the instigated drawing or make the exact proposed drawing. These drawings arrive in diverse point of views or parallel



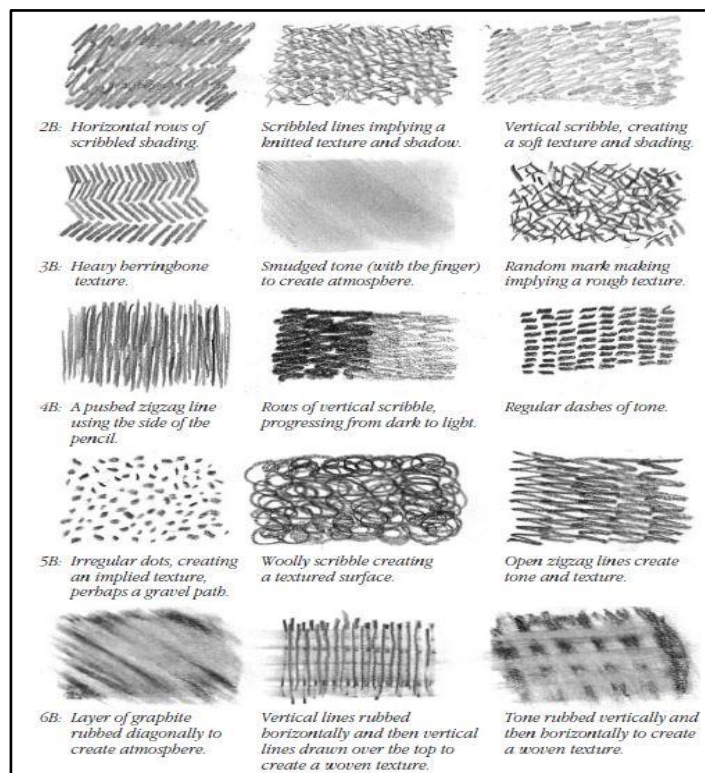
projection frameworks, extending from level of orthographic arrangement or rise drawings to 3D point of view delineations.

### Soft pencil

The soft pencil has more flexibility for making tone and surfaces than the hard pencil. Soft pencils are meant by the letter B. The HB pencil is a blend of hard and soft and is the essential pencil between the two extremes. The scope of soft pencils accessible comprises of HB, B, 2B, 3B, 4B, 5B, 6B, 7B, 8B and 9B (the softest).

These pencils are intended for the fine craftsman to express specific thoughts. For instance the working of tone, the making of surface, cross-bring forth or even simply basic line. Range of pencils having softest end can be utilized to create pieces of tone. A graphite stick is by far the most suitable for this kind of work and for creating bigger ranges of tone.

Mainly the soft pencil is reasonable for refined work requiring extraordinary exactness - basically for the safeguard of the hard pencil depends on the fine grip of the pencil.



**Title-** Soft pencil marks

**Attribution-** Peter Stanyer

**Source-** The complete book of drawing techniques

## Pencil holding techniques

### Holding Pencils

There are numerous approaches to hold the pencil yet the watchword to recall while drawing is "unwind." Avoid holding the pencil as though you were composing, in light of the fact that, for the written work, the pencil has to be grasped fairly firm and tight. The hold required for portraying is relatively loose and simpler. Hold the pencil roughly, a few crawls from the tip of the lead. The holding position ought to include the thumb and the initial two fingers just, with the pencil lying easily within the tip of the third finger. Utilize the second finger and the thumb to settle the pencil and to keep it from slipping out.

The connection between the second finger and the thumb as a rule directs the sort of lines and portraying style. At the point when the tips of the two are moderately near one another, for mooring of the pencil the whole hand by and large creases internal; and in this manner the portability and reach of the pencil for development is restricted by how far the fingers can extend. This position is called **Position A** and is very similar to the written work grasp. It is exceptionally helpful in portraying short strokes and points of interest and it also gives the craftsman more control of the instrument managing to be less inclined towards committing errors



*Control the pencil with three fingers.*



The grip should be relaxed but firm. Control the movement with the same three fingers.



WRITING POSITION

- tight grip
- no flexibility
- hold very close to lead



SKETCHING POSITIONS

- looser grip
- flexible
- hold farther up the shaft

**Position A**





### Position B

**Title-** Pencil holding techniques

**Attribution-** Thomas c. wang

**Source-** Pencil Sketching (2<sup>nd</sup> Edition)

**Link-**

**Position B** is the point at which the tips of the second finger and thumb are far separated. The second and third fingers are normally straight as opposed to being twisted internally thereby expanding the portability and reach of the pencil. By clearing here and there with the broadened second and third fingers, the strokes can be achieved up to six to seven inches. This is a perfect position for shading in light of the fact that, the hold is free and the fingers are substantially less demanding to move. This position additionally enables the craftsman to hold the pencil sideways and boosts the adequacy of the whole pencil tip. General terms are one aftereffect of this hold. Basically broadening the fingers of the whole hand having the palm down helps coasting the pencil over the page. The edge of the pencil must be changed in accordance with the individual craftsman's hand and level of adaptability. One ought to have the capacity to change from Position A to Position B in a nonstop development decisively or stoppage.



### Position C

**Title-** Pencil holding techniques

**Attribution-** Thomas c. wang

**Source-** Pencil Sketching (2<sup>nd</sup> Edition)

The third (Position C) includes holding the pencil as though holding a putty blade or little hand apparatus. The pencil is held between the thumb and the second finger. This dispenses with any type of finger or hand development and along with hand development these lines are essentially suited for long and general terms. The whole lower arm is utilized, giving the craftsman most extreme reach. Contingent upon the extent of paper accessible and the scope of the craftsman's arm, pencil strokes can reach more than three feet. This position can likewise be utilized to make etch strokes. Simply hold the pencil and strike it here and there utilizing short and sudden strokes.

**Pressure**

Applying pressure (drive) to the pencil is the thing that gives beauty and enthusiasm to a line. Without pressure, the strokes and lines are plain and exhausting. A straight forward line attracting pen and ink can be very excellent but if there is a consistency in the lines, they can draw out the lucidity and softness of the portray. A hard lead can give a line that is moderately reliable when contrasted than a softer lead. Considering this, the magnificence of pencil portraying lies in the craftsman's capacity to apply pressure to the pencil keeping in mind the end goal to change the nature of the lines. The striking, lifting and turning, the incidental bumping and bending, and the sudden change of the edge of the lead all add to a huge number of impacts which are one of a kind to pencil portraying. What's more? It is this uniqueness that makes pencil exceptional.

A pencil ought to and should be dealt like as an expansion of the craftsman's hand arm and fingers. The creators of drawing not only include the movement of a hand holding a pencil but also manage the whole tactile transfer from eyes to cerebrum to that of hand. We watch and inspect with our eyes; streamline with our cerebrum and eyes; dissuade our mind about what ought to be kept; record with our hand; assess with our eyes again to check whether the picture takes a look at all like the one we saw before; roll out moment improvements and reexamine everything again in an unending cycle. This is the outlining procedure more or less. Similarly, as drawing is without doubt a mental procedure that is



extremely individual and cozy, so is the demonstration of applying pressure to the pencil is based on individual and personal experience. There is no logical standard for how much constrain one ought to apply on a specific lead. It is fundamentally an experimentation procedure which you gain from your trials and errors. You do it more than once to accomplish a predictable example and you attempt to keep it that way, however nobody can show you how to do it.

## Sketching

A definitive objective of sketching is to graphically decipher the picture effectively. In spite of the fact that the way of elucidation and introduction is an individual issue (and each craftsman has his or her methods for communicating it), the ultimate result of a draw is regularly represented by some pleasing benchmarks. The portrayal must have some level of authenticity and the subject of elucidation must be fairly conspicuous. For instance, on the oversimplified level, a portrayed tree should resemble a tree and not a man. On the more propelled level, an old tree ought not to resemble a youthful sapling. The storage compartment and the bark ought to some way or another uncover its age. If a house with a stone exterior is ought to be drawn, then the unobtrusive contrasts in the joints and mortar can be uncovered and highlighted.

## Observation

With a specific end goal to effectively translate the picture that we are endeavouring to portray, we should invest energy watching it painstakingly. Cautious perception is a critical initial phase really taking shape of a decent outline. Perception must be sharp. Rehashed perception and recording are required to comprehend the subject. Once in a while estimations are taken just to ensure that the best possible relationship is accurately depicted. Scene sketching (and especially the sketching of trees) gives one of the best vehicles to exhibit the significance of perception and recording. Estimations and recordings have an astonishing advantage for originators in light of the fact that these right and appropriately proportioned pictures can turn into the visual information bank from which they can later infer motivation and thoughts for future work.



Steps to sketch:

- **See**
- **Identify**
- **Isolate**
- **Simplify**
- **Translate into sketching**

## Still life drawing

Still life is the best subject in workmanship for learning and educating the aptitudes of drawing and painting. It shows you what is the look for items and see those like a craftsman -- with a discerning attention to their framework, shape, extents, tone, shading, surface, frame and organization.

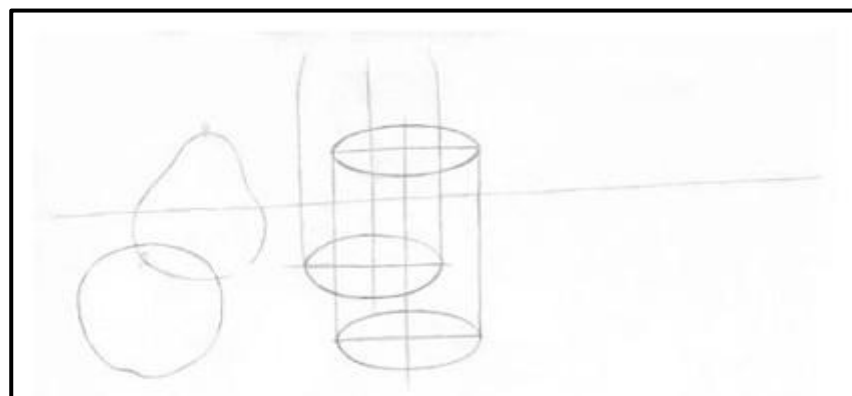
Well ordered, still life lesson will show you the attracting strategies used to create the still life, which was finished with a 2B pencil on cartridge paper.

- Steps 1 to 4: It exhibits how to draw the shapes and extents of the still life objects utilizing line.
- Steps 5 to 8: It represents how to render the three dimensional type of the still life utilizing tone.

For this still life lesson you will require:

- **2B pencil**
- **Eraser**
- **A3 sheet**

Step 1: Beginning the still life drawing



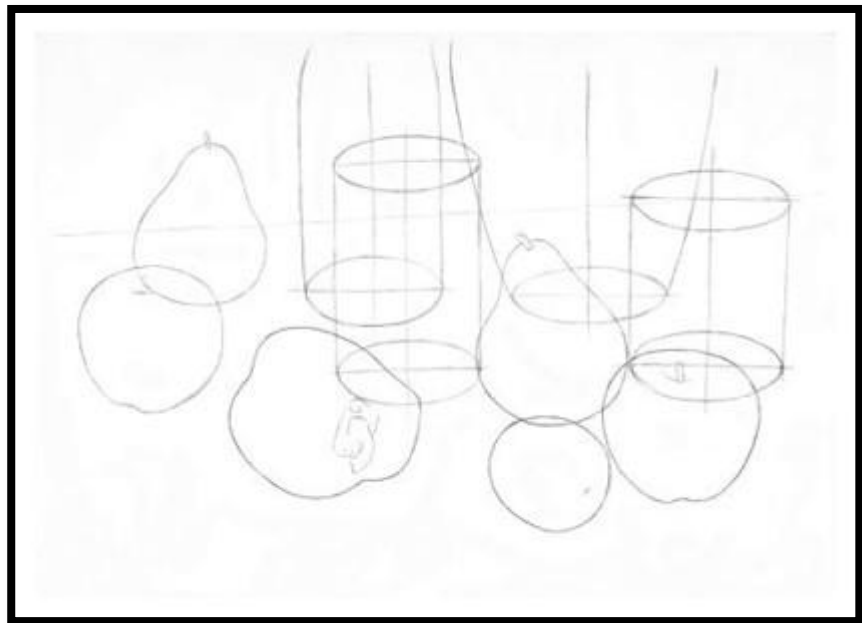
**Title-** Beginning the Still Life Drawing

**Link-**[http://www.artfactory.com/still-life/still\\_life\\_pencil.html](http://www.artfactory.com/still-life/still_life_pencil.html)

In any still life, you should begin to draw the items, as though they are straightforward wire outline frames with noticeable lines of development. This procedure causes you to be completely mindful of the state of every individual frame and its position in connection to alternate structures. It is critical to outline the items softly as this commits it simpler to change any errors and delete any lines of development.

NOTE: This transparent drawing strategy utilizes vertical and even lines of development to help you to attract persuading circles and to adjust the symmetry of round and hollow structures.

**Step 2:** Making a fascinating synthesis

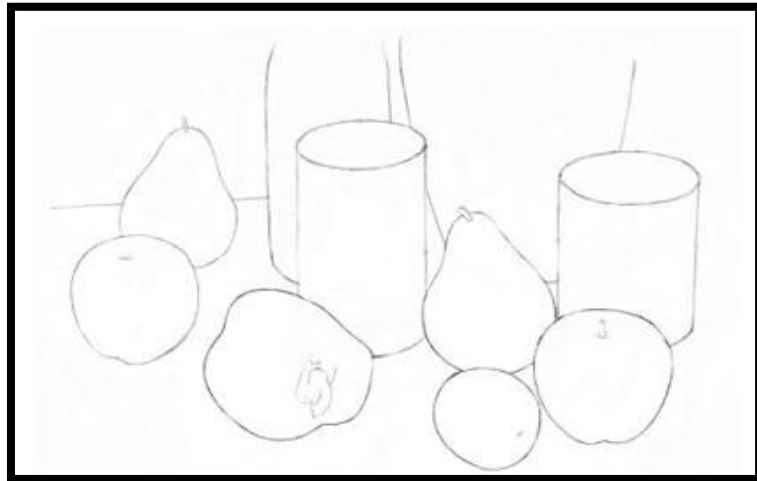


**Title-** Making a fascinating synthesis

**Link-**[http://www.artfactory.com/still-life/still\\_life\\_pencil.html](http://www.artfactory.com/still-life/still_life_pencil.html)

While forming a still life, attempt to present the qualities that make a fascinating plan. You should know about the conceptual structure of your course of action: its rhythms and complexities of line, shape, tone, shading, example, surface and frame.

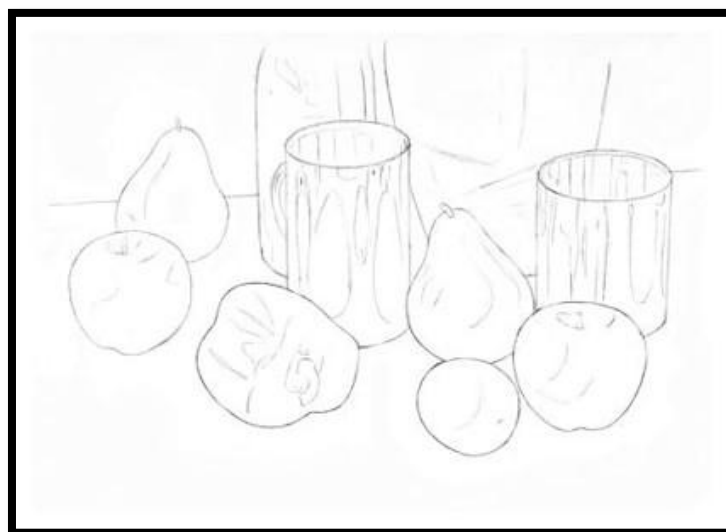
NOTE: A straightforward wire outline way to deal with sketching the still life encourages you to sort out the organization of the gathering. It makes it less demanding to see the shape, position and extents of each object in connection to its neighbours.

**Step 3: Eradicating the lines of development**

**Title-** Eradicating the line of development

**Link-**[http://www.artfactory.com/still-life/still\\_life\\_pencil.html](http://www.artfactory.com/still-life/still_life_pencil.html)

When you are content with the shape, extent and structure of the still life, you can delete the lines of straightforward development. This will abandon you with a precise noticeable layout of each shape and the certainty that everything of the articles is situated accurately. You are currently prepared to take a shot at the points of interest of each protest.

**Step 4: Including the points of interest in line**

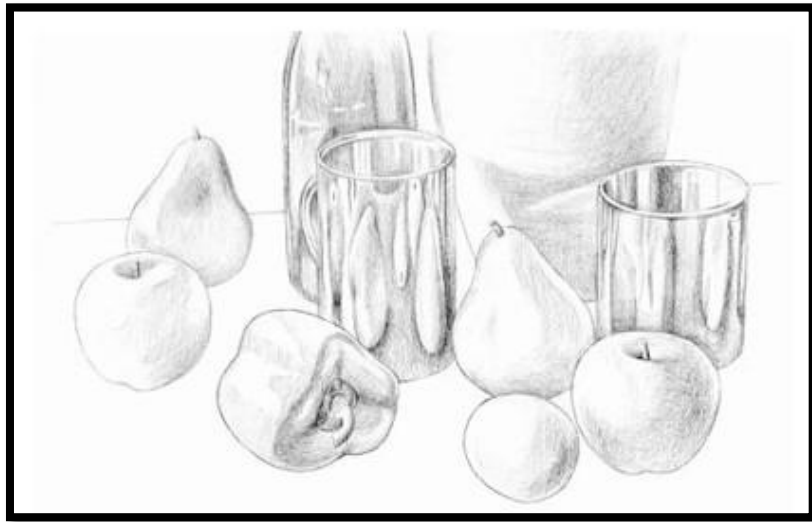
**Title-** Including the points of interest in line

**Link-**[http://www.artfactory.com/still-life/still\\_life\\_pencil.html](http://www.artfactory.com/still-life/still_life_pencil.html)

Presently softly portray in the states of any shadows or reflections onto each question.

NOTE: The more care you assume control over the precision of these imprints, the less demanding you will locate the following phase of the drawing - the Application of Tone.

**Step 5: Shading Method: 1**

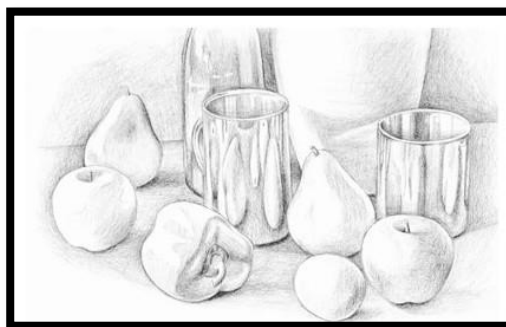


**Title-** Shading method step-1

**Link-**[http://www.artfactory.com/still-life/still\\_life\\_pencil.html](http://www.artfactory.com/still-life/still_life_pencil.html)

The tone of our still life is developed in four phases sketched out in steps 5-8. In this progression, some essential tones are softly connected to each protest help develop its three dimensional shape.

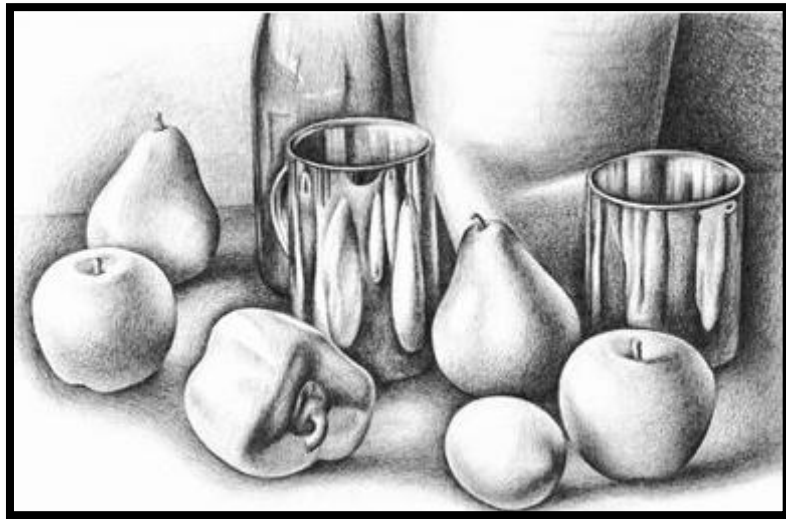
**Step 6: Shading Method:**



**Title-** Shading method step-2

**Link-**[http://www.artfactory.com/still-life/still\\_life\\_pencil.html](http://www.artfactory.com/still-life/still_life_pencil.html)



**Step 8: Shading Method: 4**

**Title-** Shading method step-3

**Link-**[http://www.artfactory.com/still-life/still\\_life\\_pencil.html](http://www.artfactory.com/still-life/still_life_pencil.html)

At last, you concentrate again on the spaces between the articles, developing their tones and expanding their complexity.

NOTE: You should be cautious in adjusting the tonal estimations of the articles and the spaces between them to guarantee that you make a bound together picture.

The finished still life should chip away at two levels: as a practical portrayal of the gathering of items and as a dynamic creation of visual components, orchestrating and differentiating the utilization of line, shape and tone.

## Composition

The demonstration of perception is the most critical part in sketching. A decent draw starts with watchful perception and innovative seeing. Inventive seeing needs to go with figuring out how to disengage things. Earnest Watson said in his book *The Art of Pencil Sketching* that “in pencil drawing, one always avoids any leaning toward photographic simulation.” How genuine that is. Sketching is tied in with catching the quintessence of the genuine article. An outline speaks to another dialect particularly like



shorthand that records the genuine article with shortened images of lines and surfaces. Imaginative seeing is tied in with finding the conspicuous element, exhibiting it, and disposing of the rest. It is tied in with catching the skeletal structure and the soul that rises above it. Clearly, the genuine article can be scattered wreckage; however, a decent draw comprehends what to dispose of.

Arrangement is a piece of the whole inventive seeing procedure. It includes visual determination, visual positioning and visual core interest. Maybe we know what to dispose of; however what do we do with the things that we keep? How would we rank them in the request that we need to accentuate them in an outline? For instance, should the attention be on the entryway or the windows? How would we disengage the purpose of intrigue and utilize differentiation to highlight the significance? How would we adjust tone and esteem and how would we outline the draw keeping in mind the end goal to outwardly lead the watchers into the photo? By tending to these inquiries effectively, a great structure has the uncommon capacity to join the craftsman and watcher both outwardly and inwardly.

Piece is the term used to depict the course of action of the visual components in an artistic creation or other fine art. It is the manner by which the Elements of Art and Design - line, shape, shading, esteem, surface, frame, and space -- are sorted out or formed by the Principles of Art and Design - adjust, differentiate, accentuation, development, design, mood, solidarity/assortment - and different Elements of Composition, to give the canvas structure and pass on the aim of the craftsman.

Arrangement is not the same as the topic of a work of art. Each depiction, whether theoretical or illustrative, paying little mind to topic, has an organization. Great organization is basic to the achievement of an artistic creation. Done effectively, great organization attracts the watcher and afterward moves the watcher's eye over the entire painting with the goal that everything is taken in and at last, settling on the primary subject of the depiction



## Element of Composition:

The Elements of Composition in craftsmanship are utilized to orchestrate or arrange the visual parts in a way that is satisfying to the craftsman and one's expectations, the watcher. They enable to provide structure for the format of the artistic creation and the way the subject is introduced. They can likewise energize or lead the watcher's eye to meander around the entire painting, taking in everything and eventually returning to lie on the point of convergence.

Components of composition are by and large thought to be:

- **Unity:** Does every one of the parts of the composition feel as though they have a place together, or accomplishes something feel stuck on, fumblingly strange?
- **Balance:** Balance is the feeling that the depiction "feels right" and not heavier on one side. Having a symmetrical course of action includes a feeling of quiet, though an awry game plan makes a more powerful feeling. An artistic creation that is not adjusted makes a feeling of unease.
- **Movement:** There are numerous approaches to give a feeling of development in a work of art, for example, the plan of items, the position of figures, the stream of a waterway. You can utilize driving lines (a photography term appropriate to painting) to coordinate the watcher's eye into and around the canvas. Driving lines can be real lines, for example, the lines of a fence or railroad, or they can be suggested lines, for example, a column of trees or bend of stones or circles.
- **Rhythm:** Similarly music does, a bit of craftsmanship can have a musicality or fundamental beat that leads your eye to see the fine art at a specific pace. Search for the substantial basic shapes (squares, triangles, and so forth) and rehashed shading.
- **Focus (or Emphasis):** The viewer's eye at last needs to lay on the "most vital" thing or point of convergence in the artwork, generally the eye feels lost, meandering around in space.
- **Contrast:** Paintings with high differentiation -- solid contrasts amongst light and dim, for instance -- have an unexpected vibe in comparison to artistic creations with insignificant complexity in



light and dim. Notwithstanding light and dim, complexity can be contrasts fit as a fiddle, shading, estimate, surface, kind of line, and so forth.

- **Pattern:** A customary reiteration of lines, shapes, hues or qualities in a composition.

- **Proportion:** How things fit together and identify with each other regarding size and scale; regardless of whether enormous or little, adjacent or inaccessible



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## Summary



### Summary

In this unit, we described the basics of sketching and elements of composition. You got general information of sketching. You will know how to utilize pencil, you must have realized what materials are best used for and you will know how to approach your sketching. More importantly, in any case, you will have an unmistakable understanding that sketching is about how to impart your perceptions, your imaginations, and your thoughts in the light of nature and our general surroundings.

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## Assignments



### Assignments

1. List the different types of pencils
2. Describe hard pencil
3. Describe soft pencil
4. Write the ways of holding pencil for sketching
5. What is sketching and what are the steps
6. Describe still life drawing with step by step techniques
7. Explain what composition is
8. List the elements of composition
9. Describe the elements of composition

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## Resources



### Reading

- <https://en.wikipedia.org/>
- <https://www.google.co.in/>
- <https://www.rmit.edu.au/>



## Unit 2

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### Work in Different Media

#### Introduction

Any work structure can be a good thing; but in regards to art, innovation is the key to finding out how far you can take a painting and how sincerely you're prepared to express your visualization. A few artists want to take in any particular sole medium, and essentially they want to use individual preferences for that picked medium. And of course, there are those of us who are curious to see how different mediums will work together; you can build up a totally unique style of art while using variety methods of different drawing media.

In this unit, you will learn about different kinds of artworks listed. The unit will give a diagram with a few illustrations that may help make you think about how our function in encaustic can be integrated into the more extensive universe of art. You will learn that each of the three fields that is focussed on painting, drawing and mixed media/collage has a distinct method for describing what the work is made of - a material vocabulary all its own..

#### Outcomes



##### Outcomes

##### Upon completion of this unit you will be able to:

- Describe different type of drawing media
- Explain the major theories influencing art
- Assess how to use materials
- Formal elements and safe working practices
- Differentiate between various water colour techniques.

#### Terminology



### Terminology

<b>Canvas:</b>	The fabric that is extended on a wooden casing in which oil paintings and acrylic paintings are finished.
<b>Crafts:</b>	Art frames used for creating attractive art pieces that are both excellent and helpful. Crafts include weaving, texture outline, pottery, and gems making.
<b>Crayons:</b>	Pigments held together with wax and formed into sticks.
<b>Fresco:</b>	A procedure of painting on a layer of wet mortar. The mortar ingests the shades and the painting turns out to be a piece of the divider.
<b>Mosaic:</b>	Small pieces of tile which is creatively placed together to make a design on a wall or floor.
<b>Palette:</b>	A wood, metal, or plastic surface used by an artist to blend paint.
<b>Solvent:</b>	A fluid material that is utilized to thin the binder in paint.

## A Brief History of Designing

### Exploring Different Art

Art has implied different things to different individuals at distinctive circumstances through our mankind's history. In the content Art Fundamentals, the authors\* discuss the term "art" we utilize it today is likely to be gotten from the renaissance words arti and arte. "Arti was the designation for the craft guilds of the 14th, 15th and 16th centuries to which the artists were closely tied by the traditions of their calling. The word for craftsmanship is art, implied knowledge of the materials utilized by the artist as well as the surface on which they would execute their work. Art or craftsmanship also implied the skilful handling of those materials



in the sense of producing images more or less like those of nature, but certainly not in the sense of imitating the exact appearance of nature.”

This unit investigates conventional and non-customary medium related with Two Dimensional artworks including:

1. Drawing
2. Painting
3. Collage

Two-dimensional media are gathered into general classifications. We should take a look at each gathering to comprehend their specific qualities and how craftsmen utilize them.

## Drawing

Drawing is the expertise to utilize lines and shapes to make a pleasing piece which shows profundity, differentiation, light and shadow and gives the impression of measurement, using different degrees of detail. Drawing is the least complex and most proficient approach to impart visual thoughts, and for a considerable length of time. Charcoal, chalk, graphite and paper are sufficient apparatuses to dispatch the most profound pictures in workmanship. Leonardo da Vinci's *The Virgin and Child with Saint Anne and Saint John the Baptist* wraps every one of the four figures together, what is basically a more distant family picture. Da Vinci attracts the figures an astoundingly sensible style, one that accentuates individual characters and encompasses the figures in a grand, unfinished landscape. He invigorates the scene with the Christ kid pulling himself forward, trying to discharge himself from Mary's grip to get more like a young John the Baptist on the right, him self's identity turning toward the Christ tyke with a look of inquisitive interest in his younger cousin.

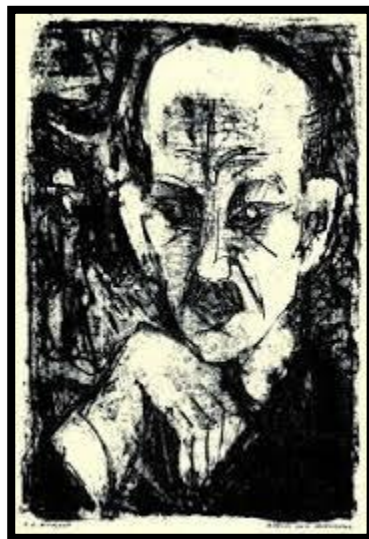
The customary part of drawing was to make outlines for bigger arrangements to be shown as paintings, mold or even design. In view of its relative immediacy, this capacity for drawing continues today. A preliminary draw by contemporary modeller Frank Gehry catches the mindboggling natural types of the buildings he outlines.

## Types of Drawing Media

### 1. Dry Media

Dry Media includes charcoal, graphite, chalks and pastels. Each of these mediums gives the craftsman an extensive variety of stamp making abilities and impacts, from thin lines to expansive ranges of shading and tone. The craftsman can control a drawing to accomplish wanted impacts in numerous ways, including exerting different weights on the medium against the drawing's surface, or by eradication, blotting or rubbing.

This procedure of drawing can instantly exchange the feeling of character to a picture. From vivacious to inconspicuous, these qualities are clear in the most straightforward works: the immediate and unalloyed soul of the craftsman's thought. You can see this in the self-pictures of two German craftsmen; Kathe Kollwitz and Ernst Ludwig Kirchner. Injured during the main world war, his *Self-Portrait under the Influence of Morphine* from around 1916 presents us with a nightmarish vision of him wrapped in the mist of sedative medications. His empty eyes and the realistic brokenness of his imprints verify the energy of his drawing.



**Title-** Portraits

**Attribution-** *Sandrine Pelissier*

**Source-** pinterest.com

**Link-**[https://www.moma.org/s/ge/collection\\_ge/artist/artist\\_id-3115\\_role-1\\_sov\\_page-71.html](https://www.moma.org/s/ge/collection_ge/artist/artist_id-3115_role-1_sov_page-71.html)



## Ernst Ludwig Kirchner, Self Portrait under the Influence of Morphine

### 2. Graphite

Graphite is the most widely recognized drawing medium. Graphite usually comes in the type of pencils, powder or packed sticks and is the thing that a large portion of us basically allude to as "pencil". Each one makes a scope of qualities depending on the hardness or softness inherent in the material. Hard graphite tones territory from light to dark dim, while softer graphite enables a range from light dim to almost dark. In this manner a great deal of graphite drawings are basically called pencil drawings, despite the fact that calling them graphite drawings would be more exact.

Graphite drawing procedures are for all intents and purposes interminable. At any rate that you apply graphite to a surface will deliver some kind of results. French stone carver Gaston Lachaise's *Standing Nude with Drapery* is a pencil drawing that fixes the vitality and feeling of development of the figure to the paper in only a couple of strokes. And Steven Talasnik's contemporary huge scale drawings in graphite, with their swirling, natural structures and design structures are demonstration of the energy of pencil (and eraser) on paper.

### 3. Charcoal

Charcoal is scorched natural material. Typically the material is wood. There are a couple of sorts of charcoal utilized by craftsmen to make a drawing. These sorts of charcoal include "vine" and "packed". Vine charcoal is more often used that does not comprise of consumed willow wood. Vine charcoal is effectively spread on a surface and is anything but difficult to eradicate. As an outcome it is for the most part makes a lighter stamp when you draw than packed charcoal and it is effectively smirches. Compacted charcoal is held together by a gum binder and is darker than vine charcoal. Thus, it is harder to eradicate, harder to smirch, yet makes a darker stamp. Compacted charcoal may come as a round stick, a square stick, or in a pencil. (Vine charcoal is quite often a round stick.) But it's harder to control once they are connected to paper.



## 4. Pastels

Significantly more prominent color refinement is conceivable with pastel colored pencils, produced using powdered shades blended with a base measure of non-oily cover. At the point when the colors are connected to paper, they perpetually look new and bright, in spite of the fact that they should be safeguarded from scattering by been kept under glass. Pastel colors can be connected in straight method straightforwardly with the pastels, or to a region of the paper specifically with the fingers. Pastels originated in the north of Italy amid the 16th century, and were utilized by Jacopo Bassano (1515-92) and Federico Barocci (1526-1612). Pastel drawings were known to the Accademia degli Incamminati no later than the 17th century, in spite of the fact that as a work of art it didn't achieve its apogee until the eighteenth century, eminently in France (with Jean Marc Nattier, Maurice Quentin de La Tour, Jean-Baptiste Perronneau and Jean Chardin) and in Venice (with Rosalba Carriera)



**Title-**Pastels

**Source-** pixabay.com

**Link-**<https://www.pexels.com/photo/art-artistic-bright-close-up-268435/>

## Wet media

**Ink:** Wet drawing media generally eludes to ink, however, truly includes any substance that can be put into arrangement and connected to a drawing's surface. Since wet media is controlled much like paint – through thinning and the utilization of a brush – it obscures the line amongst drawing and painting. Ink can be connected with a stick for linear impacts and by brush to cover huge zones with tone. It can likewise be weakened with water to make estimations of dim.

**Felt tip** pens are viewed as a type of wet media. The ink is immersed into felt strips inside the pen at that point discharged



onto the paper or other help through the tip. The ink rapidly dries, leaving a lasting imprint. The hued marker drawings of DonnabelleCasis have a flowing, natural character to them. The conceptual nature of the topic infers body parts and viscera.

Different fluids can be added to drawing media to improve impacts – or make new ones. Craftsman Jim Dine has sprinkled soda onto charcoal drawings to make the surface rise with bubbling. The outcome is a visual surface dissimilar to anything he could make with charcoal alone, in spite of the fact that his work is known for its solid control. Dine's drawings often utilize both dry and fluid media. His topic includes creatures, plants, figures and apparatuses, ordinarily packed together in thick, darkly sentimental pictures.

Conventional Chinese painting utilizes water-based inks and colors. Truth be told, it is one of the most seasoned continuous imaginative conventions on the planet. Painted on backings of paper or silk, the topic includes landscapes, creatures, figures and calligraphy, a fine art that utilizes letters and script in liquid, expressive motions.

## Painting

Painting is the act of applying paint, shade, shading or other medium to a strong surface (bolster base). The medium is normally connected to the base with a brush, however different actualizes, for example, blades, wipes, and enhances with Photoshop, can be utilized.

Painting is a method of inventive articulation, and the structures are various. Drawing, signal (as in gestural painting), piece, portrayal (as in story craftsmanship), or reflection (as in dynamic workmanship), among other stylish modes, may serve to show the expressive and theoretical intention of the professional. Paintings can be naturalistic and illustrative (as in a still life or landscape painting), photographic, conceptual, story, symbolist (as in Symbolist craftsmanship), emotive (as in Expressionism), or political in nature (as in Activism).



Painting mediums are to massively flexible, in light of the fact that they can be connected to a wide range of surfaces (called bolsters) including paper, wood, canvas, mortar, earth, veneer and cement. Since paint is normally connected in a fluid or semi-fluid state it can douse into permeable help material, which can, after some time, debilitate and damage it. To keep the help material, it is typically first secured on a solid land with a blend of binder and chalk, when dries makes a non-permeable layer between the help material and the painted surface. There are six noteworthy painting mediums, each with particular individual qualities:

- 1. Encaustic**
- 2. Tempera**
- 3. Fresco**
- 4. Oil**
- 5. Acrylic**
- 6. Watercolour**

All of them use three basic ingredients:

- 1. Pigment**
- 2. Binder**
- 3. Solvent**

Pigments are granular solids incorporated into the paint to contribute shading. The binder, generally alluded to as the vehicle, is the genuine film-forming segment of paint. The binder holds the shade in arrangement until it's prepared to be scattered onto the surface. The dissolvable controls the stream and utilization of the paint. It's mixed into the paint, usually with a brush, to weaken it to the best possible consistency, or thickness, before it's connected to the surface. Once the dissolvable has vanished from the surface the remaining paint is settled there. Solvents go from water to oil-based items like linseed oil and mineral spirits.

How about we look a gander at each of the six main painting mediums:



## 1. Encaustic

Encaustic is a wax based paint (made out of beeswax, resin and color), which is kept liquid on a warmed palette. It is connected to a retentive surface and then warmed so as to meld the paint. "Encaustic" originates from the Greek word enkaiein, meaning to consume in, referring to the way toward fusing the paint. Though they originate from a similar root word, "encaustic" ought not to be mistaken for "acidic," which alludes to a destructive synthetic response. There is no such risk with encaustic.

## 2. Tempera

Tempera, otherwise called egg tempera, is a changeless, quick drying painting medium consisting of hued pigments mixed with a water-solvent binder medium (typically a glutinous material, for example, egg yolk or some other size). Tempera additionally alludes to the paintings done in this medium. Tempera paintings are durable and customarily connected in progressive thin layers, called coats, painstakingly developed using systems of cross brought forth lines.

## 3. Fresco

Fresco painting is utilized only on mortar dividers and ceilings. The medium of fresco has been utilized for thousands of years, yet is most connected with its utilization in Christian pictures during the Renaissance time frame in Europe.

There are two types of fresco: Buon or "wet", and secco, meaning "dry".

Buon fresco method comprises of painting in color mixed with water on a thin layer of wet, crisp lime mortar or mortar. The color is connected to and consumed by the wet mortar; following various hours, the mortar dries and responds with the air: it is this substance response that fixes the shade particles in the mortar. As a result of the compound cosmetics of the mortar, a binder is not required. Buon fresco is steadier on the grounds, that the shade turns out to be a piece of the divider itself.

**Buon Fresco** alludes to the hues and subtle elements are safeguarded in the dried mortar divider.



**Secco fresco** alludes to painting a picture on the surface of a dry mortar divider. This medium requires a binder since the shade is not mixed into the wet mortar. Egg tempera is the most widely recognized binder utilized for this reason. It was basic to utilize secco fresco over buon fresco paintings with a specific end goal to repair damage or roll out improvements to the original. Then the colours and details are preserved in the dried plaster wall.

## 4.Oil

Oil paint is the most flexible of all the painting mediums. It utilizes color mixed with a binder of linseed oil. Linseed oil can likewise be utilized as the mixing fluid, alongside mineral spirits or turpentine. Oil painting was thought to have created in Europe during the 15th century, however, late research on wall paintings found in Afghanistan hollows show oil based paints were utilized there as right on time as the 7th century.

A portion of the characteristics of oil paint includes an extensive variety of color decisions, its capacity to be thinned down and connected in practically straightforward coatings and in addition utilized straight from the tube (without the utilization of a vehicle), developed in thick layers called impasto (you can see this in many works by Vincent van Gogh). One disadvantage to the utilization of impasto is that after some time the body of the paint can part, leaving systems of breaks along the thickest parts of the painting. Since oil paint dries slower than different mediums, it can be mixed on the help surface with careful detail. This expanded working time additionally takes into account alterations and changes to be made without having to rub off segments of dried paint.

## 5.Acrylic Paint

Acrylic paint was created in the 1950s and turned into another option to oils. Shade is suspended in an acrylic polymer emulsion binder and utilizations water as the mixing fluid. The acrylic polymer has attributes like elastic or plastic. Acrylic paints offer the body, shading reverberation and toughness of oils without the expense, wreckage and danger issues of using overwhelming solvents to blend them. One noteworthy contrast is the generally quick drying time of acrylics. They are water dissolvable, yet once



dry wind up noticeably impenetrable to water or different solvents. Additionally, acrylic paints cling to a wide range of surfaces and are to a great degree solid. Acrylic impastos will not split or yellow after some time.

## 6. Watercolour

Watercolour is the touchiest of the painting mediums. It responds to the lightest touch of the craftsman and can turn into an overworked mess in a minute. There are two kinds of watercolour media: straightforward and obscure. Straightforward watercolour works in a switch relationship to the next painting mediums. It is generally connected to a paper bolster, and depends on the whiteness of the paper to reflect light back through the connected shading (see underneath), while hazy paints (including murky watercolours) reflect light off the skin of the paint itself. Watercolour comprises of shade and a binder of gum Arabic, a water-solvent compound produced using the sap of the acacia tree. It breaks up effectively in water.

The conventional and most basic help-material to which the paint is connected for watercolour paintings is paper. Different backings include papyrus, bark papers, plastics, vellum, or calfskin, texture, wood, and canvas. Watercolour paper is often made completely or somewhat with cotton, which gives a decent surface and minimizes contortion when wet. Watercolours are generally translucent, and seem luminous, in light of the fact that the pigments are set down in an unadulterated shape with couple of fillers obscuring the shade hues. Watercolours can likewise be made hazy by adding Chinese white.

In East Asia, watercolour painting with inks is alluded to as brush painting or parchment painting. In Chinese, Korean, and Japanese painting it has been the dominant medium, often in monochrome dark or tans. India, Ethiopia and different nations have long watercolour painting conventions also. Finger-painting with watercolour paints originated in mainland China.



## Water Colour Techniques

Watercolour painting has the notoriety of being very demanding; it is more exact to state that watercolour methods are remarkable to water colour. Not at all like oil or acrylic painting, where the paints basically stay where they are put and dry pretty much in the frame they are connected, water is a dynamic and complex accomplice in the water colour painting process, changing both the sponginess and state of the paper when it is wet and the outlines and appearance of the paint as it dries. The trouble in water colour painting is totally in learning how to envision and use the conduct of water, instead of attempting to control or dominate it.

### Washes and Glazes

In water colours, a wash is the use of weakened paint in a manner that masks or destroys individual brush strokes to deliver a bound together region of shading. For example, this may be a light blue wash for the sky.

A coating is the use of one paint shading over a past paint layer, with the new paint layer at a weakening adequate to enable the main shading to show through. Coatings are utilized to blend at least two hues, to alter a shading (darken it or change its tone or chroma), or to deliver to a great degree homogenous, smooth shading surface or a controlled yet sensitive shading move (light to dark, or one tint to another). The last strategy requires the principal layer to be an exceptionally weakened consistency of paint; this paint layer disintegrates the surface sizing of the paper and slackens the cellulose tufts in the mash. Painters who utilize this method may apply 100 coatings or more to make a single painting. This technique is as of now exceptionally mainstream for painting high difference, intricate subjects, and specifically brilliant blooms in precious stone vases splendidly illuminated by coordinate daylight. The glazing technique likewise works extraordinarily well in water colour picture, allowing the craftsman to delineate the complex tissue tones successfully.

### Wet in wet

Wet in wet includes any utilization of paint or water to a region of the painting that is as of now wet with either paint or water. As a



rule, wet in wet is a standout amongst the most distinctive elements of watercolour painting and the method that delivers a striking painterly impact. The fundamental thought is to wet the whole sheet of paper, laid level, until the point when the surface no longer wicks up water yet gives it a chance to sit at first glance, at that point to dive in with an expansive brush immersed with paint. This is typically done to define the extensive zones of the painting with unpredictably defined shading, which is then honed and refined with more controlled painting as the paper dries.

### **Dry brush**

Dry brush is the watercolour painting system for accuracy and control, especially exemplified in numerous herbal paintings and in the dry brush watercolours of Andrew Wyeth. Crude (undiluted) paint is gotten with a pre-moistened, little brush and then connected to the paper with little hatching or crisscrossing brushstrokes. The brush tip must be wetted however not cheated with paint, and the paint must be sufficiently liquid to exchange to the paper with slight weight and without dissolving the paint layer underneath. The objective is to develop or blend the paint hues with short exact touches that mix to stay away from the presence of pointillism. The aggregate impact is objective, textural, and profoundly controlled, with the most grounded conceivable esteem differentiates in the medium. Often it is difficult to distinguish a decent drybrush watercolour from a shading photo or oil painting, and numerous drybrush watercolours are varnished or lacquered after they are finished to upgrade this likeness.

### **Diluting and Mixing**

Tube paints are regularly utilized with a level palette that gives compartmentalized paint wells (for holding separate paint hues) and an extensive mixing zone for mixing or diluting paints; skillet paints are exhibited in enamelled metal paint boxes that give shallow mixing zones in the folding spread or in a crease out faceted plate. With tube paints, the abundance paint remaining in the palette paint wells ought to be use or wash out just in case if the paint moves toward other well dirtying another paint; generally the paints ought to be permitted to dry out quickly and totally, as this keeps shape from forming. Regardless of the regular



misguided judgment, there is no visual contrast between the goopy paint bundled in tubes and the dried paints in skillet. Tube paints left to dry in paint wells are utilized as a part of the very same path as skillet paints—the painter essentially dribbles or showers water over the paint a couple of minutes before starting work. The main remarkable contrast is that some tube paints, for example, viridian or cerulean blue, create a coarse, uneven paint blend when left to dry and then rewetted.

## Minimal Palettes

Palette is likewise the term for a particular choice of paints. A natural decision is the "primary" palette consisting of a fuchsia (generally yet inaccurately distinguished as "red"), yellow and cyan (customarily "blue") paint, each representing subtractive primary shading. This palette can blend every conceivable tint, however the purple, orange, and green blends are distinctively rather dull or dark, and most shading blends require utilization of each of the three paints. The primary palette is in this manner helpful to exhibit that smallness additionally influences accommodation (the trouble involved in mixing any normal shading) and shading immersion (by and large, the paint blend range or aggregate number of exceptional hues it is conceivable to blend with a palette). Leonardo, in his note pads, referred to red, yellow, green and blue (alongside white and dark) as the "painter's primaries". However, he might not have had a particular palette in mind; but rather replacing the cyan paint with a dark blue paint, (for example, ultramarine blue), and adding a green paint, incredibly enhances the immersion of both purple and green blends in a smaller four-paint determination, and enables a dark impartial or dark to be mixed specifically, using just red and green.

In the 19th century six paint "split primary" palette was introduced and is still upheld today as an answer for the mixing restrictions of the three paint "primary" palette. It depends on the three conventional subtractive primary hues (red, yellow, and blue), each in a "warm" and "cool" adaptation.

## Collage

A collage is any work of art that is created by gluing or otherwise attaching objects to a base. The base can be canvas, wood, stone, paper or anything the artist wants to use. In collage the medium attached to the base is usually paper or fabric.



## History of Collage

Collage turned out to be all the more completely created during the coming of innovation, when Cubist pioneers Pablo Picasso and Georges Braque explored different avenues regarding combining parts of different materials to make a radical new synthesis. These craftsmen mixed high culture (present day workmanship) with components of everyday life (bits of materials, daily papers, magazines, colour paper, and so forth.). Dada craftsmen introduced the use of existing photos in their compositions, which often remarked on the province of German culture in the disorder of World War I. The craft of arrangement continued to fill in as inspiration in the 1950s and 1960s, when array and Pop craftsmen utilized discovered questions and pictures from mass created commercials in their works. While numerous craftsmen today continue with original strategies for arrangement, many introduce more updated computerized mediums to rejuvenate the customary craftsmanship.

## Mixed Media Techniques for Collage

Rice paper and gel medium present an excellent opportunity to preserve many different objects while creating a beautiful piece of art. Leaves, flowers, feathers, pieces of paper and bits of fabric can all be used in this simple technique. When the gel medium dries, the rice paper becomes transparent and encases the items you used to create the collage.

Consider thinking outside the box on the selection of a base for your collage. Stone or ceramic tiles that are commonly used in kitchens or bathrooms can make interesting bases. The “wrong” side of a travertine tile makes a lovely natural base for alcohol inks, acrylic paints, glass powders and other interesting bits. Try using stamps that you already have or make your own. Small found objects can be glued on to add interest or tell a story.

Collage is an excellent technique for people that love to scrapbook as well. You can add pieces of paper such as concert or movie tickets. Pieces of fabric from special dresses, such as a wedding dress or prom dress could be added to a collage that is part of a scrapbook project. This is a good way to transform memories to art and make them last for generations to come.



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## Unit Summary



In this unit you have learned the different types of drawing media and its use in 2D animation. Besides that you have learnt the exploration of different medium and materials for producing a 2D art. You learn extra strategies and aptitudes to utilize them to express your own innovative thoughts.

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## Assessment



Assessment

1. Describe formal elements of art.
2. Classify different types of art.
3. Explain the term media in art.
4. Define pigment in art.
5. List the characteristics of abstract art.
6. Explain the meaning of texture in art.
7. Define creative arts.
8. State what is acrylic?
9. How is a Pegasus drawn?
10. Write the way to erase crayon from paper.
11. Define washes.
12. Describe perspective in painting.
13. State what is ink?
14. Describe "Fresco".
15. What is collage?

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## Resources

<https://www.google.co.in/>

<https://www.rmit.edu.au/>

<https://www.wikipedia.org/>



## Unit 3

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### Exploration of 2D elements

#### Introduction

All of us visit several websites in a day. Some websites grab our sights all the more effectively, while others don't. Why? Once in a while we need to comment our feeling about preferences or abhorrence of web sites, and it is anything but difficult to state just "I like this thing, or I don't care for that thin " But in the event that we are asked to answer the inquiry for what good reason, it is extremely troublesome for us to discover the fundamental driver.

Which factors do impact on somebody to have a specific disposition towards a web page? There is a probability of many reasons associated with it, yet I think the "plan" of the webpage is extremely basic one of them.

This unit portrays the components and standards of plan and eloquent the sub-variables of outline. Color, values, structures and shapes, space lines and surfaces are known as the components of outline. These components are known as the basics for all gems. Without these components, craftsmanship couldn't be made. These components exist in our general surroundings in nature and in the situations we make for ourselves.

In this unit, you will learn the relationship between elements and principles.

#### Outcomes



#### Outcomes

##### Upon completion of this unit you will be able to:

- Describe various design elements
- Division of elements
- Elaborate, design elements
- Define a line
- Differentiate between 'outline randomness' and different forms of randomness
- Discuss various grid systems



## Terminology



### Terminology

<b>Line:</b>	A line is a shape with width and length.
<b>Scale:</b>	Scale is a huge piece of outline.
<b>Color:</b>	It explains the particular state of mind.
<b>Texture:</b>	Texture alludes to the surface quality.

The plan components and standards portrayed here can be an investigating outline for webpage plan. It illuminates us where to start, what to test and how to examine. For instance, the creator who knows the outline components and standards can break down the page in terms of lines, colors, developments, adjustments, amicability, etc., while others simply imagine whether it is suitable for them or not. This data can likewise give a communicating instrument to the web planner. An author can express his/her idea utilizing dialect. A webpage originator likewise communicates their idea or a specific aim with components of outline and does it viably alongside the plan standards. When a planner needs to state something through the webpage, he should utilize the components (line, color, and so forth) as a specialized device. So it is essential to know such sort of implications of the outline components and standards.

*Note: Although color stands out amongst the most vital outline components, I barred the detail depiction of it, since color-related subject has just grabbed creator's interests and numerous architects, I think, definitely they know about it in particular.*

## Design Elements

The components will be segments or parts which can be disconnected and characterized in any visual outline or masterpiece. They are the structure of the work and can convey a wide assortment of messages. The points of interest might be differently selected by scientists, however, I included "line", "scale", "color", "repetition", "negative space", "symmetry", "transparency", "texture", "balance", "hierarchy", "contrast",



"framing", "grid", "randomness", "direction", "rules" and "movement" in this unit



**Title-**Line drawing

**Attribution-**

**Source-** prawnny

**Link-**<https://pixabay.com/en/vintage-sketch-doodle-line-drawing-1778234/>

A line is a shape with width and length, yet no profundity. Artists utilize lines to make edges and the outlines of articles. A line is made by the movement of the craftsman's pen.

The direction of a line can pass on disposition. Flat lines are quiet and tranquil, vertical lines proposes mostly the potential for movement, while corner to corner lines emphatically recommend movement, which gives a greater degree of sentiment essentialness to a photo.

Lines can be characterized as any linear imprints. In this way, when you consider it, lines make up pretty much everything. Indeed, even these words and letters you're pursuing comprises thousands of bended, calculated and straight lines.

Lines can channel certain thoughts as well. Straight ones can bring out request and tidiness, wavy lines can make movement and crisscrossed lines can infer pressure or fervour.

A strategy to improve photography to a considerable measure is by the utilization of 'driving lines' which does exactly what they guarantee i.e. they lead the eye. Finding and underscoring solid driving lines in your piece can enable you to coordinate the eye through the whole piece or to certain central focuses.

Let's take a look at a case of driving lines in web outline. This webpage has a cool askew grid with extremely solid driving lines that brings down the page from area to segment in a quick



crisscross shape. A solid utilization of line is an incredible approach to stylise your representations.

Lines are adaptable, basic and viable realistic components that you surely ought not to underestimate! Let's explore different avenues regarding them and find out what cool things they can add to your plan.

## 2. Scale

Scale is a huge piece of outline, once in a while actually. In an extremely fundamental definition, scale is the presence of mind measuring the individual components.

Scale can enable us to comprehend plans and pictures. Consider if you somehow happened to attract a mouse alongside an elephant, you'd likely draw the mouse substantially littler than the elephant, which would help watchers easily comprehend your drawing.

Along these lines, scale encourages us to comprehend different things. In any case, scale doesn't generally need to be found on authenticity. You can estimate your components drastically expansive or little to make staggering impacts and to flag which parts of your outline are more vital and which are less.

While this scale is not in fact in light of authenticity as individuals' countenances for the most part are of similar size. All things considered (Ryan Gosling is not a mammoth as far as anyone is concerned) are the sensational scaling all over. The confront causes watchers to get a fast handle on each character's level of significance in the film.

This scaling of components to flag significance is frequently called "Progressive System", which we'll discuss later. For the interim, let's take a look at a case that utilizes scale to connote significance.

## 3. Color

Color is vital factor. It explains particular states of mind, channels feelings and as well as each shade has certain particular



undertones related to it. To put it simply, color can represent the deciding moment your outline.

Color consists of three properties. The first is tone, which is the name of the colors. The essential tones are yellow, red and blue. Auxiliary colors are made by blending two primaries. Middle colors are the blends of an essential and adjoining auxiliary color.

The second property of color is esteem, which alludes to the softness or murkiness of shade. The third property of color is power, which alludes to the virtue of the shade (likewise called "chroma").

Color isn't a rule essentially restricted to marking components. However, color ventures into everything, even photos. Channels and picture adjustors have given us the boundless capacity to change our photo's coloring and tones.

It is safe to say that if you are planning a smooth and advanced publication, then why not a sharp, noir-propelled monochromatic channel run over your picture, similar to Canvas "Road" channel. On the other hand, if you're going for an offbeat look, then consider dropping the contrast of your picture a little to quiet your picture's colors a bit, making it milder and more quiet.

## 4. Contrast

Contrast is regularly the magical key fixing to make your plans 'pop', which is a (sometimes disappointing) demand from many outline clients.

In an exceptionally basic definition, contrast is the level of difference between two elements of your outline.

Some common forms of contrast are dull versus light, thick versus thin, vast versus small, etc.

Contrast greatly affects meaningfulness and neatness also, it's a major motivation behind why you see books and many different publications imprinting in black content on a white background. Imagine that they printed utilizing light dim on a white background. The contrast would be low and the sort of hard to peruse. In this way, in case you're utilizing sort, make beyond any doubt you bump up that contrast.



Contrast isn't only a stylistic element or a decipherability enhancer; it can likewise act to attract the eye to certain elements of your plan. This technique is utilized as a considerable measure in website plan.

## 5. Texture

Texture alludes to the surface quality, both simulated and actual pattern of craftsmanship. Techniques used as a part of painting serves to indicate texture, i.e. the dry brush technique produces a harsh simulated quality and substantial application of pigment with brush or other implementation that produces an unpleasant actual quality.

Clean, sharp and smooth graphic plans can be superb, however sometimes; roughing it up a little with some texture can be far superior. Texture can include tactility, profundity, and can add some entirely fascinating effects to your outline.

Be that as it may, as with many things, make sure to use this technique in moderation, as a lot of texture can quickly overwhelm your plan. Remember: there's a barely recognizable difference between shabby-chic and out and out old shabby.

The more textures connected, the harder sort and different elements are created without a stroke effect around each letter.

Of course, in case you're going for the muddier look stylistically, at that point layering textures might look good for you. However, if you're searching for an approach to incorporate texture in a less imposing manner, follow the example below



**Title-**texture

**Attribution-**

**Source-**monicore

**Link-**<https://pixabay.com/en/vintage-sketch-doodle-line-drawing-1778234/>



How about we observe an example that utilizes texture in a way that enhances the piece. Notice that the utilization of the unpleasant texture isn't distracting, rather giving it a more handcrafted, authentically-vintage feel.

## 6. Repetition



**Title-**repetition

**Source-**kaatjem

**Link-**<https://pixabay.com/en/row-of-trees-repetition-sunrise-2168579/>

Imagine about any big brand name such as Pepsi, Adidas, Audi, Motorola and Apple, this is certain that you would all be able to think about their logo, their manner of speaking and their general color plans utilized. Why are these things so significant without a moment's notice? That is correct, you got it – repetition.

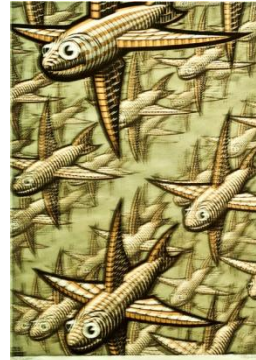
Repetition is a critical component with regards to marking outline, both as far as keeping your marking predictable and as far as entwining your things.

## 7. Negative Space

To put it gruffly, negative space is the 'space inbetween', the range between or around different elements that form its own particular shape.

Take example of broadly respected ruler and counterfeiter of negative space craftsman M.C. Escher, whose work I'm certain you

have seen and would have been sometimes astounded. Escher did a number of decorations that focussed on one shape driving into the following, by means of negative and positive space.



**Title-**Negative space

**Attribution-**Maurits Cornelis Escher

**Source-**

**Link-** <https://www.flickr.com/photos/pedrosimoes7/38798263524>

Perceive how the space in the middle of the black kangaroos is utilized to display the state of white kangaroos. This is negative space at work – considering everything around and in the middle of your physical outline and manipulating that space to form something new.

Negative space when utilized strategically can help create really staggering and clever plans. Observe these simple animal icons to render clear depictions of each animal.

## 8. Symmetry



**Title-**Symmetry

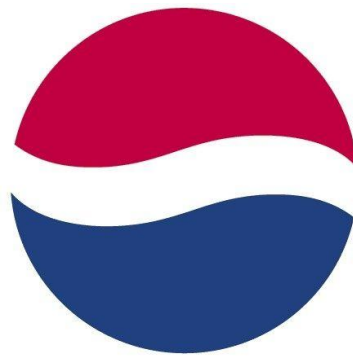
**Source-**bogitw

**Link-** <https://pixabay.com/en/architecture-stairs-steel-abstract-1313678/>



As species, human creatures are scientifically ended up being attracted to symmetry. We find symmetrical faces, examples and outlines, by and large more attractive, effective and lovely.

Symmetry is utilized as a considerable measure in logos so as to create a harmonious and balanced plan. Some examples of extensive brands with symmetrical logos are Target, McDonald's, channel, Starbucks, etc.



Screenshot



Screenshot



Of course, symmetry is not generally a possibility for each plan and nor should it be. There's an almost negligible difference between an outline looking balanced and symmetrical in appearance as though one side was copied, flipped or stuck to one side. So as opposed to attempting to achieve perfect symmetry, rather attempts are made to introduce inconspicuous elements of symmetry into your outline.

Symmetry isn't generally as evident, either sometimes it is inconspicuous or sometimes you may not even notice it. A prime example of imperceptible symmetry can be found in article plans and more specific message boxes. Open up any magazine you came across, the chances are more in an extended article where you'll notice that the body copy that has been part up into columns of content and they are frequently symmetrically measured to keep things readable, flawless and additionally outwardly engaging.

By utilizing a touch of symmetry in your format, you can create a feeling of balance and request. In this way, next time you're planning a publication outline or a plan with a considerable measure of sort, focus on how much (or how little) symmetry you're utilizing. On the off chance that your outline doesn't look very right, have a run at toying with your symmetry, regardless of whether this be increasing it or decreasing it.

## 9. Transparency

Likewise occasionally known as 'opacity', transparency alludes to how 'transparent' an element is. The lower your opacity, the lighter and less noticeable your element is, and the higher it is, the more strongly noticeable the element is.

Transparency is additionally an incredible technique for producing a feeling of movement in static images. For example, check out this blurb, layers different images with various levels of transparency to create an immersing effect and feeling of movement.

Transparency isn't quite recently limited to advanced graphics either. Check out how this welcome card for the New York Museum of Glass has apropos which has been imprinted onto



straightforward glass, giving the plan a special and drawing in effect. Consider on what mediums your outlines will be imprinted on, what will be the opacity and what completion they will have while designing or showcasing your creativity.

## 10. Balance

Balance is a really important thing in most of life and it's equivalently important in the realm of outline.

One approach to master balance is to think about each of your elements as having a "weight" behind it. From content boxes to images, to that of blocks of color, consider each of their sizes, shapes and what "weight" they have in connection to different elements on the page.

A decent technique is to imagine if your outline were to be printed out as a 3D model. Would it stand, or would it tip to the other side?

One kind of balance is 'asymmetrical balance', which is less about mirroring left and right/top and bottom and more about conveying, measuring and adjusting elements so their "weights" are in occasion.

## 11. Hierarchy

Hierarchy in configuration is a great deal like that in culture, as both are based on fundamentally the same thought. At the highest point of a hierarchical scale, we have the most important things, the lords. These elements are to be "dressed" the most indulgently and command the most consideration.

In the following level of hierarchy, we have the noblemen i.e. the elements that are important. However they don't command much consideration as the lords. These are things like subheadings, pull cites and extra information. Make beyond any doubt to keep these eye-catching and noticeable, however not at anyplace close as noticeable as your headings.



What's more? On the last rung of the hierarchical scale are the labourers, the humble elements of your plan that are given minimal amount of visual spirit, as a rule things like body copy, less important information, joins, etc.

Observe this blurb. You can without much of a stretch bring up the title, the subheading/date, and down the bottom, the smallest sort of extra information that isn't as crucial to the communication.

Of course, hierarchy isn't recently limited to sort. Images likewise have hierarchy. The bigger, more colorful or more central elements of your image will have a higher hierarchy than those smaller, blunter and less point by point elements.

## 12. Framing

Much the same as you do with your photos and pieces of workmanship, framing your plans correctly is an important aspect. We as a rule consider framing in terms of photography – what you include and what you don't. Be that as it may, framing is similarly as important in plan.

Physical frames such as box outlines or graphic elements can enhance or attract regard for specific elements of your plan.

For example, we should check out this menu plan that chooses to frame one of the specials and the business mission statement to attract consideration regarding these two elements that the eye may have generally disregarded. Such a simple method for highlighting certain elements of your outline can have a major impact.

# PALEO COOKBOOK



## Why You Should Get a Paleo Cookbook & How to Find The Best One For You

A paleo cookbook is a fantastic source of ideas for making totally paleo meals that are also perfectly suited to your needs and tastes. There are many paleo cookbooks out there. You can even find a free paleo cookbook if you're looking to save money.

### PALEO DIET BOOK

- High protein snacks
- Energy boosting snacks
- Smoothies and shakes
- Snacks for before and after your workout
- Metabolism boosting snacks
- Snacks for satisfying your sweet tooth

Get a Paleo Diet Cookbook



### PALEO DIET COOKBOOK

Snacks are actually one of the most risky areas for anyone on any diet. When we get those between-meal cravings, that's when we're most likely to cheat on our diet and grab a quick candy bar or bagel or other non-paleo snack.



### Paleo Recipes For People Who Love to Eat

Just choose the one that's targeted to your specific needs and interests and let your creative spirit out in the kitchen!



PALEO COOKBOOK

[www.paleoauthority.com](http://www.paleoauthority.com)

Title-Framing

Attribution-Paleocookbook

Link-[https://commons.wikimedia.org/wiki/File:Paleo\\_diet\\_book.jpg](https://commons.wikimedia.org/wiki/File:Paleo_diet_book.jpg)

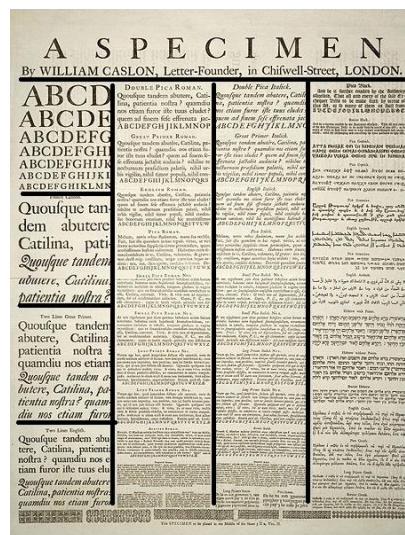
Frames don't need to be graphic either. In case you're working with photographic elements, consider utilizing them to frame your plans. Check out how this notice uses random objects to create a frame for the superimposed sort. Along these lines, you attract consideration regarding the piece by the frame and direct the eye to the truly important bits.

## 13. Grid

Think about an outline grid like the establishment to a house – it's a crucial initial phase in taking into consideration for you to construct a functional and wonderful final product. It signs to the developer/planner where certain elements ought to be placed, what ought to line up with what and it also gives a general outline for construction.

Grids are important, normally imperceptible elements to pretty much any outline. They are comprised of a certain number of lines and columns that you can adjust your elements against. Grids can keep your content all together, perfect and neat and great looking.

Here are some examples of various grid systems.



**Title-Grid**

**Attribution-** William Caslon

**Link-**[https://commons.wikimedia.org/wiki/File:A\\_Specimen\\_by\\_William\\_Caslon.jpg](https://commons.wikimedia.org/wiki/File:A_Specimen_by_William_Caslon.jpg)

This example demonstrates a four-column grid at work. Note how some elements are contained to one column, while others stretch



more than two, sometimes three columns. But the outline all in all seems perfect, clean and very much adjusted.

For more adaptability, consider including some more columns, similar to this example beneath.

In any case, this example has a clear and identifiable grid system to which each element has been adjusted, making for a striking, perfect and attractive outline.

Grids are adaptable, versatile and endlessly helpful. So consider utilizing one for your next outline and see what it can accomplish for you.

## 14. Randomness

As of not long ago we've been preaching about alignment and request. Be that as it may, shouldn't something be said about the more organic, unpleasant and random outlines? Randomness has an extensive impact on outline. However, it is a specific sort of randomness that we should call 'plan randomness'.

The difference between 'outline randomness' and different forms of randomness is the reason and execution. With outline, your main objective ought to be communication – what does this piece need to state to consumers? Is it saying it plainly? How might I make the communication more grounded?

This piece layers the hand-sort and positions. It is in an exceptionally random manner that some individuals would state obstruction to the intelligibility. But the idea behind this is to speak to a scrambled and distorted psyche.

In this lies the difference amongst "randomness" and 'plan randomness'. If this outline were connected to a blurb for a children's movie about cheerful talking animals, it would seem random and wouldn't communicate the best thing by any stretch of the imagination. However, in this case, the random outline communicates the movie's themes perfectly.

Likewise, observe this plan by Laura Berglund that uses a level of randomness to create an organic-looking, collage-like effect. While this piece seems as though it was slapped down onto a page and in a flash looked beautifully harsh and ruffled. Have somewhat a

glance at it and note what number of outline conventions it actually uses.



**Title-**Collage

**Attribution-**

**Source-**

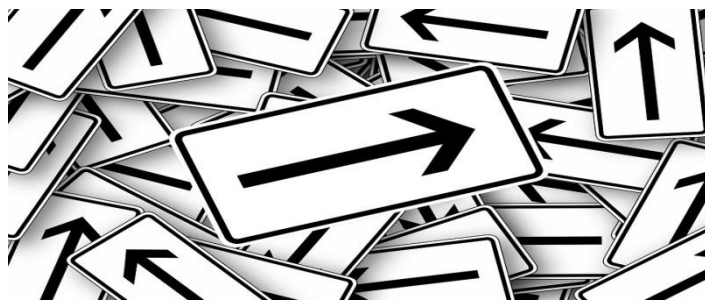
**Link-**<https://pxhere.com/en/photo/992512>

Take a look at how each element has actually been strategically situated. Driving lines have been implemented to manage the eye around the piece and there has been a selective balance between color level, texture and photography.

This plan seems random; however, if you dissect its elements, you'll notice that certain parts of the outline have been adjusted. The design enables the eye to stream across the page and there are even some indications of a grid at work.

The fact of the matter being – things don't need to be flawless and efficient to be classed as plan. Speaking to "randomness" and playing with a couple of vanguard outlines can be effective and super fun.

## 15. Direction



**Title-**Direction

**Source-** Pixabay

**Link-** <https://pixabay.com/en/direction-road-sign-note-arrow-95475/>



An important aspect of many plans is the means by which the eye moves over the page and the direction it takes – this is likewise sometimes alluded to as 'stream'. How does your eye move across the page? Do your peruses know exactly where to look next? Is the direction that their eye takes is logical?

Studies have dissected the exact idea of our eye movement propensities and the examples our eyes trace over, when seeing specific things.

By and large, the general thought is that the eye normally goes from the upper-left corner to the bottom-right corner, in a "clearing" motion. This hypothesis is best clarified top to bottom. Instead of planning 100% by these examples, however, attempt to adjust your outline's' stream and direction on a case-by-case premise. Simply remember that the eye inclines toward the upper left of a page and winds its way down from there.

## 16. Rules

This without question begins a lot of verbal showdown and to parcel any room of makers – half announcing that there are no tenets in layout, the other testing that there are numerous. Additionally, in fact, they're both right.

Similarly as with any ability, there are things you need to learn and this comes with general rules. Things like: make your sort neat beyond any doubt, figure out how to kern, don't utilize pixelated images, etc. These are the establishments of plan, the things that assist you to make a basic outline.

In any case, once you've learnt these rules, it's certainly time to break them.

Thus, while the clarity is a little compromised, the communication certainly is definitely not.

Following the rules and breaking them, each have their own places in the realm of outline. Bring everything with a grain of salt and learn as much as you can so that you can break and twist the rules in the correct way and make a memorable sprinkle.



## 17. Movement

Have you at any point heard or seen somebody describe an artistic creation or piece of craftsmanship as having "a considerable measure of movement to it"? You might have first been bewildered by that clarification – all things considered, how does a static painting move? In any case, movement is a major piece of the visual expressions, including graphic plan.

Prior we discussed the direction and stream of your plan, these factors have a major influence in the movement of your outline. On the off chance that your last piece has a decent spill out of through and through, left to right, corner A to corner B, etc., your piece will "move" smoothly.

Yet, shouldn't something be said about the cases where you need to give an element an exact feeling of movement? Maybe you paint the town that you need to appear in motion, or a car that you need to depict zooming down a roadway.

Movement can likewise be captured through motion lines. These are common in comics representations, when a character is fleeing or moving quickly. Along these lines, channel your internal comic book artist and make the most of motion lines.



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## Unit Summary



### Summary

Elements of configuration described here are point, line, shape, form, space, color, and texture. Furthermore, I accumulated information about different outline principles, similar to the balance, extent, perspective, emphasis, movement, design, repetition, rhythm, assortment, harmony, and solidarity. These elements and principles can be the basic information and analytical frame work for an architect. I attached the examples of the elements and principles in supplement. I hope the perusers would find it useful.

Configuration is a complicated business loaded with principles, tricks, and techniques, some of which you can gain from others and some you need to learn by yourself.

Take each "govern" you read about with a grain of salt and apply it where it feels proper and relinquish the rules at whatever point you feel they aren't. Configuration is a constantly developing and changing field and each circumstance is distinctive -- one of a kind and exciting.

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## Assessment



### Assessment

1. Elements are divided into categories
2. Describe the various design elements
3. Elaborate how line helps us in design elements
4. The difference between 'outline randomness' and different forms of randomness
5. What can keep your content all together, perfect, neat and looking great
6. Discuss the various grid systems



## Resources



### Reading

- <http://mexicounexplained.com>
- <https://google.com>
- <http://minyos.its.rmit.edu.au>
- <http://wikipedia.com>
- <https://encrypted-tbn3.gstatic.com>
- <http://3.bp.blogspot.com>
- <https://cdn0.iconfinder.com>
- <https://thumbs.dreamstime.com>
- <https://cdn.shopify.com>
- <https://cms-assets.tutsplus.com>
- <http://www.woot-design.co.uk>
- <http://www.magazinedesigning.com>
- <https://www.smashingmagazine.com>
- <https://i.ytimg.com>
- <http://montrealblackfilm.com>
- <http://thecontextofthings.com>
- <http://www.rockdesign.com>
- <https://market.envato.com>
- <http://subdimensionstudios.com>



# Unit 4

## Pixel & Resolution

### Introduction

In this unit, you will be introduced to pixel and resolution with vector-based and bitmapped graphics. In order to understand each graphic format, you will also have to know the benefits and the drawbacks of both types of images on a multimedia screen, calculation of Pixels and its color and intensity depth.

### Outcomes



Outcomes

**Upon completion of this unit you will be able to:**

- Know the resolution
- Describe facts about vector and bitmap
- Elaborate the depth of pixel color and intensity
- Choose the right format
- Convert bitmap to vector

### Terminology



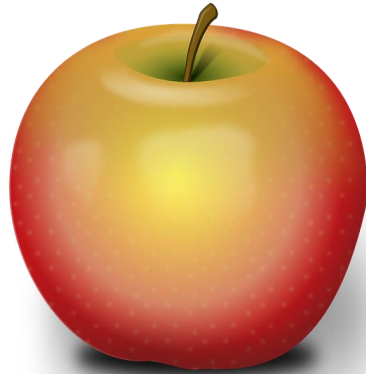
Terminology

<b>Pixels :</b>	Picture elements in digital images.
<b>Image Resolution:</b>	Number of pixels in a digital image.
<b>Digital Image:</b>	Which resolution always yields better quality, generally Higher Resolution is chose.
<b>Bitmap:</b>	A representation for the graphic /image data in the same manner as they are stored in video memory
<b>Bits/Pixel:</b>	It contributes to the quality of the image



## Introduction

Digital images are basically divided into two distinct categories. They are either bitmap files or vector graphics. You need a good understanding of the advantages and disadvantages of both types of data. In this unit you learn the differences.



**Title-**Photorealistic vector art

**Source-**[OpenClipart](#)

**Link-**<https://pixabay.com/en/apple-red-fruit-nature-food-146453/>

## Pixels and Resolution

The image that is displayed on the screen is composed of thousands (or millions) of small dots which are called pixels. The word "Pixel" is a contraction of the phrase "Picture Element". A pixel represents the smallest piece of the screen that can be controlled individually. Each one can be set to a different color and intensity (brightness). The number of pixels that can be displayed on the screen is referred to as the resolution of the image. This is normally displayed as a pair of numbers, such as 640x480. The first is the number of pixels that can be displayed horizontally on the screen and the second represents how many can be displayed vertically. The higher the resolution, the more pixels that would be displayed and, therefore, more content can be shown on the monitor at once. However, pixels are smaller at high resolution and detail can be hard to make out on smaller screens. Resolutions generally fall into predefined standard sets, only a few different resolutions are used by most PCs.



The aspect ratio of the image is the ratio of the number of X pixels to the number of Y pixels. The standard aspect ratio for PCs is 4:3, but some resolutions use a ratio of 5:4. Monitors are calibrated to this standard so that you can draw a circle and have it appear to be a circle and not an ellipse. Displaying an image that uses an aspect ratio of 5:4 will cause the image to appear somewhat distorted. The only mainstream resolution that currently uses 5:4 is the high-resolution 1280x1024. There is some confusion regarding the use of the term "resolution", since it can technically mean different things. First, the resolution of the image you see is a function of what the video card outputs and what the monitor is capable of displaying. To see a high resolution image such as 1280x1024 requires both a video card capable of producing an image this large and a monitor capable of displaying it. Secondly, since each pixel is displayed on the monitor as a set of three individual dots (red, green and blue), some people use the term "resolution" to refer to the resolution of the monitor. The term "Pixel Addressability" is referred to the number of discrete elements that the video card produces. In practical terms, most people use resolution to refer to the video image as it is done in this unit. The table below lists the most common resolutions used on PCs and the number of pixels each uses:

Resolution	Number of Pixels	Aspect Ratio
320x200	64,000	8:5
640x480	307,200	4:3
800x600	480,000	4:3
1024x768	786,432	4:3
1280x1024	1,310,720	5:4
1600x1200	1,920,000	4:3



## Resolution

The resolution can be defined in many ways such as pixel resolution, spatial resolution, temporal resolution, spectral resolution. We are going to discuss pixel resolution.

You have probably seen that in your own computer settings, there are different monitor resolutions such as 800 x 600, 640 x 480 e.t.c. in the options for selecting pixel resolution. The term resolution refers to the total number of count of pixels in an digital image. For example, if an image has M rows and N columns, then its resolution can be defined as M X N.

If we define resolution as the total number of pixels, then pixel resolution can be defined with set of two numbers. The first number is the width of the picture or the pixels across columns and the second number is height of the picture or the pixels across its width. We can say that the higher is the pixel resolution, higher will be the quality of the image.

We can define pixel resolution of an image as 4500 X 5500.

## Megapixels

We can calculate mega pixels of a camera using pixel resolution.

Column pixels (width ) X row pixels ( height ) / 1 Million.

The size of an image can be defined by its pixel resolution.

Size = pixel resolution X bpp ( bits per pixel ).

### Calculating the mega pixels of the camera

Lets say we have an image of dimension: 2500 X 3192.

Its pixel resolution = 2500 \* 3192 = 7982350 bytes.

Dividing it by 1 million = 7.9 = 8 mega pixel (approximately).

## Aspect ratio

Another important concept with the pixel resolution is aspect ratio. Aspect ratio is the ratio between width of an image and the height of an image. It is commonly explained as two numbers separated by a colon (8:9). This ratio differs in different images, and in different screens. The common aspect ratios are:1.33:1,



1.37:1, 1.43:1, 1.50:1, 1.56:1, 1.66:1, 1.75:1, 1.78:1, 1.85:1, 2.00:1, e.t.c .

### Advantage

Aspect ratio maintains a balance between the appearance of an image on the screen, means it maintains a ratio between horizontal and vertical pixels. It does not let the image to get distorted when aspect ratio is increased.

### Pixel Color, Intensity, Depth of Color and the Color Palette

Each pixel of the screen image is displayed on a monitor using a combination of three different color signals: red, green and blue. This is similar (but by no means identical) to how images are displayed on a television set. Each pixel's appearance is controlled by the intensity of these three beams of light. When all are set to the highest level, the resultant color is white; when all are set to zero the pixel color is black, etc.

The amount of information that is stored about a pixel, determines its color depth, which controls how precisely the pixel's color can be specified. This is also sometimes called the Bit Depth, because the precision of color depth is specified in bits. The more bits that are used per pixel, the finer the color detail of the image. However, increased color depths also require significantly more memory for storage of the image, and also more data for the video card to process, which reduces the possible maximum refresh rate.

This table shows the color depths used in PCs:

Color Depth	Number of Displayed Colors	Bytes of Storage Per Pixel	Common Name for Color Depth
4-Bit	16	0.5	Standard VGA
8-Bit	256	1.0	256-Color Mode
16-Bit	65,536	2.0	High Color
24-Bit	16,777,216	3.0	True Color

## True Color

True color is named as such because three bytes of information are used, one for each color such as red, blue and green signals that make up each pixel. A byte has 256 different values, which



means each color can have 256 different intensities, allowing over 16 million different color possibilities. This allows for a very realistic representation of the color in images, with no compromises necessary and no restrictions on the number of colors an image can contain. In fact, 16 million colors is more than the human eye can discern. True color is a necessity for those doing high-quality photo editing, graphical design, etc.

High color uses two bytes of information to store the intensity values for the three colors. This is done by breaking the 16 bits into 5 bits for blue, 5 bits for red and 6 bits for green. This means 32 different intensities for blue, 32 for red and 64 for green. The reduced color precision results in a slight loss of visible image quality, but it is actually very slight -- as many people cannot see the difference between the true color and high color images, unless they are looking for them decisively. For this reason, high color are often used instead of true color- as it requires 33% (or 50% in some cases) less video memory and it is also faster for the same reason.

In 256-color mode the PC has only 8 bits to use; this would mean something like 2 bits for blue and 3 for each of green and red. Choosing between only 4 or 8 different values for each color would result in rather hideously blocky color, so a different approach is taken instead i.e. the use of a palette. A palette is created containing 256 different colors. Each one is defined using the standard 3-byte color definition that is used in true color: 256 possible intensities for each of red, blue and green. Then each pixel is allowed to choose one from the 256 colors in the palette, which can be considered as sort of "Color Numbers". So the full range of color can be used in each image, but each image can only use 256 of the available 16 million different colors. When each pixel is displayed, the video card looks up the real red, green and blue values in the palette based on the "color number" the pixel has assigned.

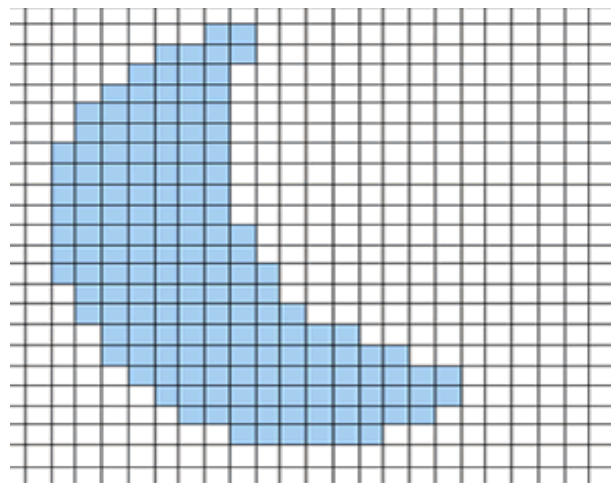
The palette is an excellent compromise: it allows only 8 bits to be used to specify each color in an image, but allows the creator of the image to decide what the 256 colors in the image should be. Since virtually no images contain an even distribution of colors, this allows for more precision in an image by using more colors



than would be possible by assigning each pixel a 2-bit value for blue and 3-bit values each for green and red. For example, an image of the sky with clouds (like the Windows 95 standard background) would have many different shades of blue, white and gray and virtually no reds, greens, yellows would be chosen.

256-color is the standard for much of computing, mainly because the higher-precision color modes require more resources (especially video memory) and aren't supported by many PCs. Despite the ability to "hand pick" the 256 colors, this mode produces noticeably worse image quality than high color; most people can tell the difference between high color and 256-color mode.

## Raster(Bitmap)



Screenshot

A raster image is defined by pixels. In raster images, the more pixels an image contains, the higher will be its resolution. For example, in a raster image a square is drawn as a grid of pixels (dots) and each of those pixels will have a specific color value. The amount of detail that can be seen in a picture depends on the resolution of the image i.e. how many times per inch these squares or pixels occur. 300 times per inch is what is needed for good quality production of a commercial printing press and 72 pixels per inch is required for monitor display. A line is made up of a row of pixels with each pixel having a color value and you work with this line by working with the group of pixels that makes up the line, not as a single object as you would find in a vector file. Programs such as Photoshop, PaintShop, and PhotoPaint all work



with pixels (raster images). Raster images are the best choices for creating subtle gradations of shades and color, such as in a photograph.

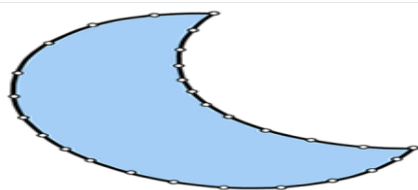
A raster image is resolution-dependent because it contains a fixed number of pixels that are used to create the image. Since there is a fixed and limited number of pixels, a raster image will lose quality if enlarged beyond that number of pixels as the computer will have to 'make up' the missing information. This is usually the cause of the image becoming "fuzzy" or "steppy".

The other disadvantage with bitmaps is when an image is enlarged, the individual coloured squares become visible and the illusion of a smooth image is lost to the viewer. This 'pixelation' makes the image look coarse.

### Raster (Bitmap)

- Pixel-based
- Raster programs best for editing photos and creating continuous tone images with soft color blends
- Do not scale up optimally: Image must be created/scanned at the desired usage size or larger
- Large dimensions and detailed images equal large file size
- It is more difficult to print raster images using a limited amount of spot colors
- Some processes cannot use raster formats
- Depending on the complexity of the image, conversion to vector may be time consuming
- Raster images are the most common image format, including: jpg, gif, png, tiff, bmp, psd, eps and pdfs originating from raster programs
- Common raster programs: photo editing / paint programs such as Photoshop & Paint Shop, GIMP (free)

### Vector (Lines/Calculated Points)



Screenshot



A vector image is defined by objects which are made of lines and curves that are defined mathematically in the computer. Vectors can have various attributes such as line thickness, length and color. For example, in a vector image, a square is drawn as four lines connected at the corners. Those lines can be set to different thickness and colors. The square can be empty or filled. A line is one object with attributes, and you work with this line as a single object, not as a group of pixels as you would in a raster image. All programs such as PowerPoint, Illustrator and Freehand work with vectors. Vector graphics are resolution-independent because the vector objects are drawn mathematically in the computer. They can be made larger or smaller without any loss of quality to the image. Vectors can be printed at any size, on any output device, at any resolution, without losing detail and without altering the resolution of the image. Vector images are the best choice of typefaces, charts and graphs, drawings and other graphics that must have sharp lines when scaled to various sizes.

Vector graphics, however, cannot reproduce 'continuous tone' photographic images like bitmaps.

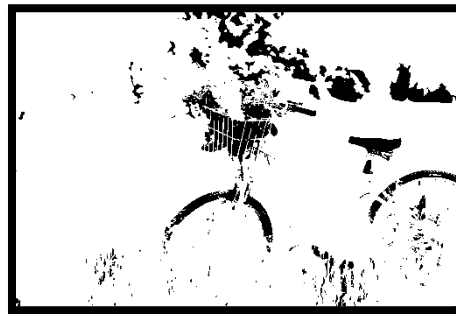
## Vector

- Mathematical calculations that form shapes
- Vector programs best for creating logos, drawings and illustrations, technical drawings. For images that will be applied to physical products
- Can be scaled to any size without losing quality
- Resolution-independent: Can be printed at any size/resolution
- A large dimension vector graphic maintains a small file size
- Number of colors can be easily increased or reduced to adjust printing budget
- Vector art can be used for many processes and easily rasterized to be used for all processes
- Can be easily converted to raster
- It is not the best format for continuous tone images with blends of color or to edit photographs
- Common vector programs: drawing programs such as Illustrator, CorelDraw, Inkscape (free)

## Types of bitmap images

Bitmap images can contain any number of colors, but there are four main categories:

1. **Line-art:** These are images that only contain two colors, usually black and white. Sometimes these images are referred to as bitmaps because a computer has to use only 1 bit (on=black, off=white) to define each pixel.



**Title-**Line art

**Source-** pixabay.com

**Link-**<https://pixabay.com/en/bicycle-meadow-flowers-grass-bike-788733/>

2. **Grayscale images:** These contain various shades of gray as well as pure black and white. Typically 256 shades of gray (8-bit) are used even though the human visual system needs only 100 tints to perceive an image as life-like.



**Title-** Grey scale images

**Source-** pixabay.com

**Link-**<https://pixabay.com/en/bicycle-meadow-flowers-grass-bike-788733/>



3. **Multitones:** Such images contain shades of two or more colors. The most popular multitone images are duotones, which usually consist of black and a second spot color (often a Pantone color). The example below contains black and Pantone Warm Red.



**Title-** Multitone images

**Source-** pixabay.com

**Link-**<https://pixabay.com/en/bicycle-meadow-flowers-grass-bike-788733/>

4. **Full-color images:** The color information can be described using a number of color spaces: RGB, CMYK or Lab for instance.



**Title-** Full Color images

**Source-** pixabay.com

**Link-**<https://pixabay.com/en/bicycle-meadow-flowers-grass-bike-788733/>

## Characteristics of bitmap data

Bitmap data can take up a lot of room. A CMYK A4-size picture that is optimized for medium quality printing (150 lpi) takes up 40 MB. Compression can reduce the size of the file.



The image with the enlargement showed one of the main disadvantages of bitmap images. Once they are enlarged too much, they look unnatural and blocky. Reducing their sizes also has an impact on image quality as images lose a bit of sharpness.

Bitmaps are fairly simple to output, as long as your RIP or printer has sufficient memory.

### **File formats for Bitmap data**

Bitmap data can be saved in a wide variety of file formats. Among these are:

**BMP:** An outdated and limited file format that is not suitable for use in prepress.

**EPS:** A flexible file format that can contain both bitmap and vector data. It is gradually being replaced by PDF.

**GIF:** It is mainly used for internet graphics

**JPEG:** Rather the JFIF file format, which is mainly used for internet graphics

**PDF:** A versatile file format that can contain just about any type of data, including complete pages, it is not yet widely used to exchange just images.

**PICT:** A file format that can contains both bitmap and vector data, but that is mainly used on Macintosh computers and is not very suitable for prepress.

**PSD:** The native file format of Adobe Photoshop (which can also contain vector data such as clipping paths).

**TIFF:** A popular and versatile bitmap file format

### **Applications for Bitmap format data**

- Microsoft Paint
- Adobe Photoshop
- Corel Photo-Paint
- Corel Paint Shop Pro
- GIMP

All scanned images and digital camera images are bitmaps.



Converting between bitmap formats is generally as simple as opening the image to be converted and using your software's "Save As" command to save it in any other bitmap format supported by your software.

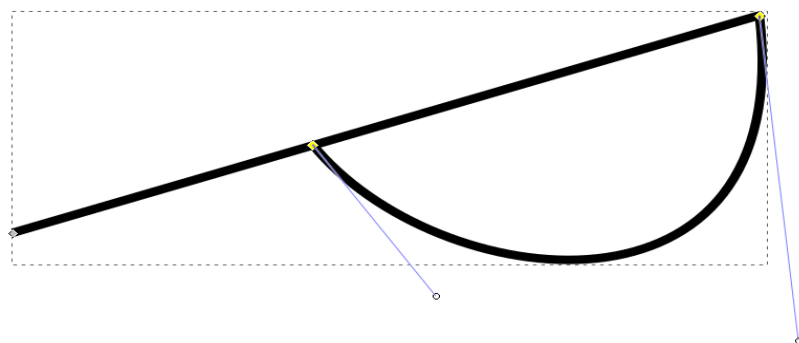
Bitmap images, in general, do not inherently support transparency. A couple of specific formats - namely GIF and PNG - support transparency. In addition, most image editing programs support transparency, but only when the image is saved in the software program's native format. A common misconception is the transparent areas in an image will remain transparent when an image is saved to another format or copied and pasted into another program. That just doesn't work, however, as there are techniques for hiding or blocking out areas in a bitmap that you intend to use in other software.

#### Key Points About Bitmap Images:

- Pixels in a grid
- Resolution dependent
- Resizing to a larger size reduces quality
- Easily converted
- Restricted to rectangle
- Minimal support for transparency

### Vector graphics

Vector graphics are images that are completely described using mathematical definitions. The image below shows the principle. To the left, you see the image itself and to the right, you see the actual lines that make up the drawing.



Screenshot

Example of a vector based image, drawn using bézier curves.



Each individual line is made up of either a vast collection of points with lines interconnecting all of them or just a few control points that are connected using so called Bézier Curves. It is this latter method that generates the best results and is used by most drawing programs.

### **Characteristics of vector drawings**

Vector drawings are usually pretty small files because they only contain data about the Bézier curves that form the drawing. The EPS file format that is often used to store vector drawings includes a bitmap preview image along the Bézier data. The file size of this preview image is usually larger than the actual Bézier data themselves.

Vector drawings can usually be scaled without any loss in quality. This makes them ideal for company logos, maps or other objects that have to be resized frequently. Please note that not all vector drawings can be scaled as much as you like:

- Drawings containing trapping information can only be scaled up to 20 percent larger or smaller.
- Thin lines may disappear if a vector drawing is reduced too much.
- Small errors in a drawing may become visible as soon as it is enlarged too much.

It is fairly easy to create a vector-based drawing that is very difficult to output. Especially the use of tiles (small objects that are repeated dozens or hundreds of times) and Corel Draw lens effects can lead to very complex files.

### **Applications for vector data**

There are hundreds of applications on the market that can be used to create or modify vector data.

- Adobe Illustrator
- CorelDRAW
- Xara Xtreme
- Serif DrawPlus
- Inkscape



## File formats for Vector data

Bitmap data can be saved in a wide variety of file formats. Oddly enough the most relevant formats for the printing industry are also capable of storing bitmap information:

**EPS:** The most popular file format to exchange vector drawings even though PDF is quickly gaining ground.

**PDF:** A versatile file format that can contain just about any type of data including complete pages.

**PSD:** The native file format of Adobe Photoshop.

**AI:** The native file format of Adobe Illustrator

**AI:** The native file format of Adobe Illustrator.

**Note :** By the way, PDF and EPS are technically compound file formats, meaning that they can handle both vector and bitmap artwork. However, for simplicity, they're more commonly known and categorized as vector file formats.

## How to convert bitmap data to vector data and back

### Visual Comparisons of Vector vs. Bitmap

300 dpi is generally considered the minimum resolution for printing bitmap work, like photos or complex artwork. There can be a marked difference between the way bitmaps and vectors are printed.

Below are some close-up images from a chapter on file types in 'The Print Handbook'. The book was printed using a Heidelberg Speedmaster XL75 litho printer. Each image's actual width is roughly 15 mm (just over half an inch).

#### **JPEG OR JPG(300 dpi/Quality: High):**

Developed by the Joint photographic expert's group, jpg became an imaging standard in 1992, which is roughly about three years before the web gained broad acceptance.

Jpg images support up to 24-bits of color in the RGB color space. Though typically used for photos and scanned images, jpg is what is called a lossy imaging format. By that, it means every time an image undergoes jpg compression, color data is lost. The amount



of compression is determined at the time of creation through the use of a quality slider or value. The default value is traditionally 80% or high quality, which kicks out a rather nice result. The issues appear when you take that same image and recompress it. Suddenly colors disappear and white dots or halos appear around object. This means the color information has been wiped out in those areas and can't be recovered. It is replaced by what is called a "Specular Color". Due to the relatively small file size, jpg has become a de facto imaging standard on the web or for any graphics displayed on a screen.

## **GIF**

The grand daddy of web imaging formats, the Graphics Interchange Format, has been around since 1987 and was created by compuserve partly to provide 256 colors in the hexadecimal color space to otherwise black and white images.

The other objective behind its development was the image created which had to be small enough to be transferred over the slow dial-up modems that were common at the time. One case where the use of a GIF over a jpg image makes sense is a single-color logo or illustration being shown on a screen. Even though the low quality GIF fell out of grace with the rise of faster bandwidth, its animated GIF counterpart is undergoing a bit of a nostalgic renaissance.

To learn more about the GIF, this article is a great overview of its history. A huge variety of some of the hilarious GIF and animated GIF files are available in the web for ready reference.

## **PNG**

More commonly called "Ping" images, the Portable Network Graphic format actually rose to prominence thanks to competing GIF copyright claims between Compuserve and Unisys. The reason was due to the fact it was a non-patented alternative to GIF. Like its jpg counterpart, png images use the 24-bit RGB color space. What has spurred its popularity on the web and in mobile, is the fact PNG images can also support an 8-bit Alpha channel (RGBA) which means this is the only imaging format- other than GIF- which permits transparency.



## TIF

The Tagged Image File Format (TIF or TIFF) is the preferred imaging format for the print industry. The reason is this is the only format that fully supports the CMYK color space and can support very high resolutions of 300 dpi/ppi or more. At those resolutions the file size of a tiff image, compared to its jpg or png cousins, is relatively massive. Interestingly, this format is under the control of Adobe which explains why Photoshop is the software of choice when it comes to working with TIFF images.



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## Unit summary



### Summary

In this unit, you've learned how image files can be divided into two distinct categories: vector-based and bitmap images. These two are different in the way that how to be processed by computers by calculating the pixels and Pixel Color and Intensity Depth in order to decide, which format will help you with your multimedia or web project. You need to have a good understanding of both kinds of images and know their advantages and disadvantages.

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## Assignment



### Assignment

1. What is a pixel made of?
2. What does "dpi" stand for, and what is its relationship to a digital file?
3. Describe mega-pixel
4. How the image is "pixelated"?
5. Differentiate between raster and vector graphics
6. What is a Bezier curve?
7. Describe the difference between screen resolution, print resolution and image resolution.
8. Elaborate the difference between a halftone (or bitmap) image and a greyscale image
9. Write down the advantages and disadvantages of the JPEG and Tiff file formats
10. Explain the relevance of the term 72dpi
11. What is "ppi", and how is it different from "dpi"?
12. If an image is three inches by four inches at a resolution of 200ppi, how many pixels does it contain?

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## Resources



### Reading

- <https://google.com>
- <http://wikipedia.com>
- <https://www.prepressure.com>