

Unity University College
School of Architecture and Urban Planning
Arch. 201
Basic Design I

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(a) Objective

As the first of the eight semester courses in Design, its scope will be limited to introducing the student to the fundamental elements principles and language of design. The course heavily depends on creative exercises that are designed to assess and record each student's progress with regard to new things learned, and development of skill and imagination by challenging the student's creative dimension.

(b) Description

The course follows the following general format:

- Introduction to Abstraction and Modeling in design
- Introduction to the Course Approach and the Design Process
- Introduction to basic principles of Perceptual Organization of our Environment
- Abstract Theories of Form
- The Structure of Composition
- Proportion and Scale
- Texture and Pattern
- Principles of Light and the Mechanics of Vision
- Principles of Color

It starts by introducing the student to the principles that explain how we tend to mentally organize the world of objects we experience through the senses. The student then learns how we can use the fundamental principles of design as a means of organizing the perceptual world that is a collection of objects in reality.

The study of the fundamentals of design therefore will follow a model that decomposes objects in reality into basic elements that can be combined using certain rules that can bring about a pre-determined reaction from the audience at large.

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		Module Series One	
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		Understanding the Elements of Shape and Form	
		Operations on Forms	
		Principles of Composition	
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		Principles of Light and Mechanics of Vision	
		Understanding and Using Color	
		Module Series Three	
		Form and the Element of Space	
		A Summary of the Course	

References

Architecture: Form, Space and Order, Francis D.K. Ching

Design Fundamentals, Robert Gilliam Scott

Design through Discovery. Marjorie Elliot Belovin

Elements of the Arts of Architecture, William Muchenhein

Module One: Introduction to the Basics of Design

Section 1.01: Introduction:

Architecture is a work of art that employs the sciences to put up structures that draw emotional responses from users and observers. Outstanding works of architecture hence leave big impressions in the form of mental images in our.

It should come as no surprise then that the education of the architect aims to produce individuals that are well versed with the language of the arts. This course is hence designed to introduce the student to the principles and approaches of design from the perspective of the output, the actual process, the person undertaken the activity and the person(s) who will be experiencing the work.

We should therefore have a common understanding and a working knowledge of the following concepts.

Section 1.02: Object

Objects in reality possess three distinct qualities that we can recognize about them. They have an image, the element that we see; a name by which we can identify and recall it; and a description that elaborates the object based on a certain criteria such as its visual feature or function.

The object that we create is an abstract representation of an idea that is formed in the mind of the designer.

Section 1.03: The Design

The objective of a design is to create new objects for the mind to feast upon. The key word here is new, as design is understood to be an activity that produces an original work.

Our definition of design should highlight the major characteristic features that we need to understand. In our study, we define design by considering that it is a process, an activity undertaken to solve a particular problem and requires the designer to be creative and skillful.

Let us consider each of the three in detail

(a) Process

Any process is expected to have a definite beginning that sets it in motion and a definite end where the motion stops. A design activity is therefore triggered by some stimuli that starts a process.

(b) Problem Solving

The trigger that sets things in motion is usually the need to solve a problem. This in turn implies that the activity that we call design starts by identifying a problem to be solved and tries to use inputs from the human mind, the designer, to come up with possible solutions

(c) Creative Activity

There might be more than one possible solution to our problem. As designers, we are expected to explore possibilities and use our power of imagination to generate the best solution that is unique and original at the same time. To come up with such a solution, we have to be creative.

Section 1.04: The Designer

Each one of us can become designers. A designer is an individual that produces an original work of creation. For the student, it is important for you to understand what it takes to undertake a design activity. We therefore try to define the designer in the process as a person that is equipped with the following:

Knowledge:	Set of accumulated information
Imagination:	Power of visualizing various layers, sides, Dimension & Possibilities of information
Skill:	The ability to execute our ideas

Section 1.05: The Observer's Perspective

The ultimate goal of any design work is to stimulate the observer and get an emotional response. The success of our design hence largely depends on how we make an observer react to it. We have to understand the observer from this perspective.

As an observer, we use the mental power that we possess to assimilate information about the design that we are seeing. The world around us can only have some sort of meaning to us if we are able to organize the amount of sensory information that we pick up and store in the mind. This set of information becomes knowledge, a data bank of sets of objects that have been created by associating a name to an image and to our understanding of them to the extent that we can assign a description to what we see.

The design that was born of an Idea in the designer's mind is developed until it becomes an object in reality. The mental picture that we are creating becomes an object of reality that is there to transmit the content that helped create it.

Section 1.06: Understanding our Approach

Clearly, we can have two different processes that create two images of the same object. The first process is the process of design that has created an object in reality. The second process creates a mental image of the same object, an image that is formed in the human mind.

The course basic design is designed to help the student have a better understanding of both processes. The student will first learn about how the mind forms images from data collected by the sensory organs. Following the study of perception as a process, the student will learn a language specifically designed for studying and developing objects for the perceptual world.

Module Two: Understanding the Perceptual Process: An Architects Perspective

One of the things that we take for granted is the perceptual process. Apart from reacting to the world of experience that we call the perceptual world, we seldom ask questions like:

“Why do things look as they do to us? “



Module Objective:

At the end of this section, you should be able to:

Understand the process of perceptual organization of the world of experience

Have Sufficient Understanding of the Process of Perception to Distinguish the Perceptual Process from the Sensory Process

Understand the Basic component of object recognition

Understand and apply characteristics of Perception in Design

Lecture Synopsis:

A. Conceptual Definition of Terms

- a. Perception verses Sensation
- b. Perception as a Process

B. The World as Experienced through the Sensory Organs

- a. Understanding the Steps in the Organization of Visual Data
- b. Location and Type of Data to be Processed
- c. Understanding Associations in the Process
- d. Defining the Content of the Stored Image

C. Modeling the Interaction with Stimuli, and the Attention Process

- a. Defining Steps and Components of the Process
- b. Graphic Representation of the Process

D. The Characteristics of Perception

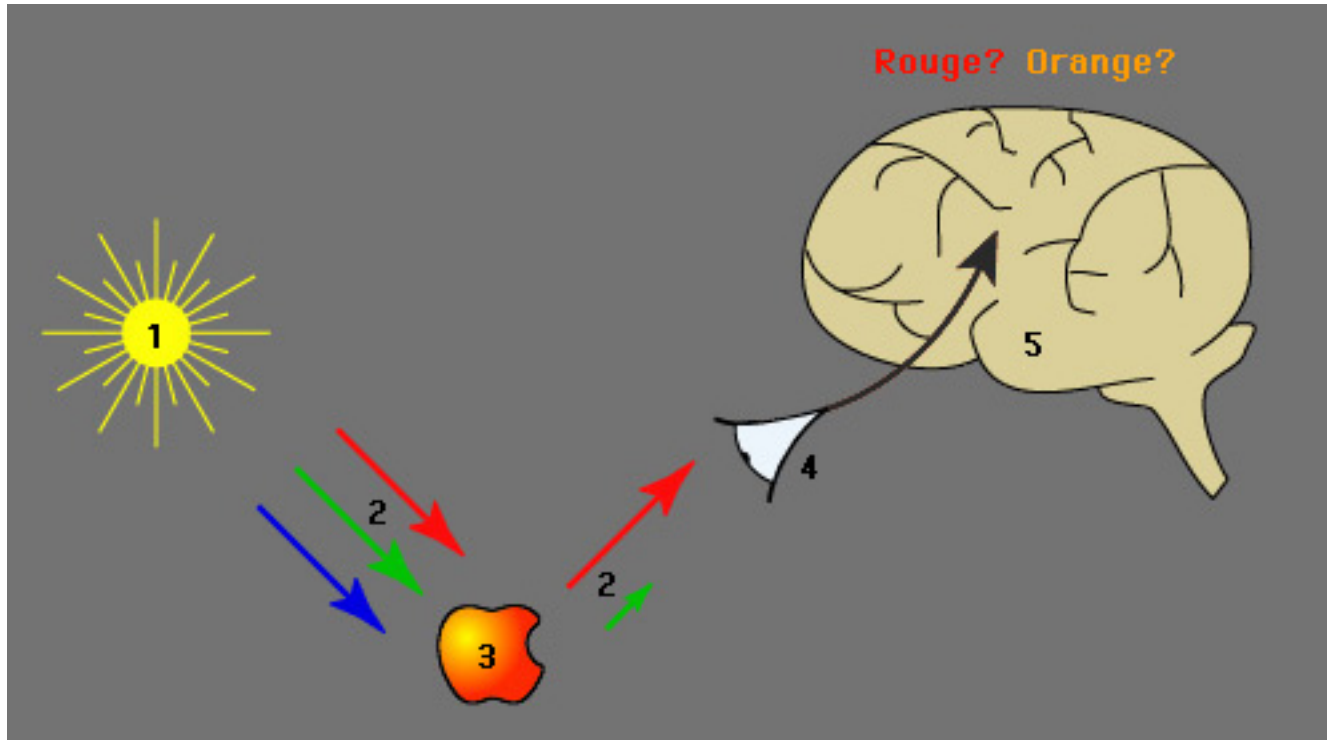
- a. Selectivity
- b. Organization
- c. Constancy of Experience in spite of varying inputs
- d. Dimension of Depth
- e. Movement
- f. Influence of Context within which Events or Objects are Perceived
- g. Importance of Relationships as Opposed to Absolute Difference
- h. Effects of learning and Motivation

E. Summary

Section 2.01: Conceptual Definition of Terms

Perception: Refers to the world of experience, the world as seen, heard, felt, smelt or tasted by a person. Man uses the power of perception to assimilate information about his world.

Perception is therefore the organization and interpretation of sensory experiences. The understanding of the process hence should start from defining both Sensory Experiences and the Organization of Sensory Data



Section 2.02: The World as Experienced through the Sensory Organs

(i) Understanding the Steps in the Organization of Visual Data

Data that enters our mind is organized in a two step process. There is the sensory part where we are interacting with stimuli through the sensory organs. Then, the information collected is assimilated in the mind, compared to existing sets of information and the resultant forms the outlines of what we understand about the stimulant. At this level, we are making an experience of the object of our attention and store our interpretation of the facts about that object.

Perception is the process of making sense of information resulting in not only distinguishing the object of attention, but understanding what the object is about in terms of its meaning based on past experience.

(ii) Location and Type of Data to be processed

In the entire process, the eye becomes a tool that supplies all visual information:

1. a difference in color implies two distinct objects (or different parts of the same object)
2. a difference in scale suggests one object is further from us than the other,
3. a difference in texture (one is more blurry) enforces this idea, and so on.

Once we have an understanding of the relationships between elements, we can piece together the whole story and understand what we are seeing.

We therefore concentrate on data that enables us to determine what we are looking at. These set of data are called features of objects. We therefore concentrate in part on features of objects to help us recognize the stimulant in the visual field. But this is not enough to recognize an object. We must have a previously defined object in our memory to compare to in order to determine the name and be able to describe the image that we have recognized.

(iii) Understanding Associations in the Process

Therefore, understanding the manner in which we group visual information must be combined with prior knowledge to be able to understand the object of attention fully. We therefore always refer to what we know to understand and define new experience. This process is an associative one, where we try to form an understanding of new experience by relating or looking at it with regards to prior information stored in our memory.

(iv) Defining the Content of the Stored Image

Objects in reality are always communicating a specific message to us. In addition to giving us clues about their visible components, they also tell us of the subject matter they were created to address. It is this relationship that exists between the object, as the communicator and us as observers that we need to understand in trying to define the object from different aspects.

Section 2.03: Modeling the Interaction with Stimuli, and the Attention Process

Understanding visual relationships and being able to use it to our advantage is an essential component of perception fueled by the drive to know what makes each object unique. In storing the image of an object in the visual field, we tend to pay attention to its visible properties to determine what the object signifies. It is this information, the content that helps us to organize information in a manner that can be recalled for immediate reference in determining similarities and differences between objects that we have been and will be encountering in the past and the future.

Section 2.04: Characteristics of Perception

- i) The process of perceptual organization of the world is not a visible process that one can observe or study. Yet owing to its significance in the education of the architect, it has to be understood so that it can be modeled in a graphic format. To be able to define the process, we are going to discuss instances where occurrences of perceptual activities are sensed by us. We are able to relate to these occurrences, making the study easier, and exciting.
- ii) We will be studying eight different instances, defined in Psychology as Characteristics of Perception.

I. SELECTIVITY

Selectivity refers to the concept of choosing from variety of possibilities. In the study of the process of perception, it defines one of the key activities that we recognize as taking place.

If we notice our daily interactions with the environment, at any given moment, there are several elements of our surrounding that can act as stimuli. If we consider these as objects that are fighting for our attention, the questions to be answered are:

1. How many objects can you focus on at a time?
2. Why is it that we only focus on one object at a time?
3. What factors influence my decision to shift from one object to another?

At any given moment, of the multiple stimuli that surround us the sensory organs select to focus on a few that we perceive clearly, other class of objects that become less clear while the rest form a hazy background.

We can state here that the perceptual world is divided with regards to the level of attention we give to the stimuli around us. Of the multiple sets of stimuli around us at a particular time “T”, we select one to be most important. Hence, attention divides our field of experience in to a Focus and Margin.

Example: While watching a soccer game, there are several things that we can choose from. Of these, we choose to concentrate n the one thing that we feel is important, the person with the ball

Shifting of Attention

Example: Taking the same example of the soccer player, the moment the person passes the ball, we will be looking at another person. The one that had the ball now is no more our focus of attention but has rather been marginalized.

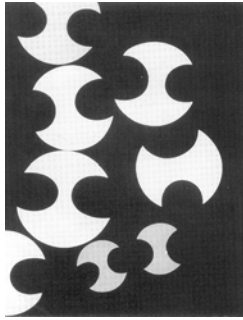
Attention shifts in a certain ordered manner. How we shift our attention is influenced by two sets of factors that are internal and external to us.

A. EXTERNAL FACTORS

These are sets of factors that are external to us. They are attributes of the perceptual stimuli that will trigger a certain response from us. Under this heading, what we will be discussing is what attributes of the stimuli will make us shift our attention to it, making it a focus at that time T. Four factors will be discussed hereunder:

Intensity & Size: When several stimuli are present, they always tend to fight for our attention. In such situations, the most intense one will get noticed over the others. In an area that is full of advertisements for example, the larger and brighter one will be noticed over the others.

Contrast: Human beings tend to adapt to stimuli around them. A sudden change from the stimuli that we have adapted to makes us focus on it. Contrast hence refers to a sudden change from the situation that was prevailing in a particular location, at a particular time. For example, in a dark room, the appearance of a sudden bright light results in an attention shift.



Repetition: Repetition of stimuli can be attention getting in two ways: If stimuli are repeated, for obvious reasons, there is a better chance of catching our attention than if it was only a single one. It increases our alertness to it

4. Movement: We are sensitive to objects that move within our field of vision over objects that are stationary.

(ii) B. INTERNAL FACTORS

Internal factors are those factors that determine our mind set at the time of interaction with the stimuli. These factors are internal to us and will be different from a person to a person. They are not attributes of the stimuli; rather they are internal attributes that will determine what of the attributes of the stimuli will be concentrated on at the time of the interaction. Two major factors are discussed hereunder:

1. Motives: Human motives are those factors that induce a person to act in a particular way. They are understood to be expressions of our interest or need. They are subjective in their nature and might differ from person to person. In a class room environment for example, we are attentive to lectures expecting to get a new perspective to a subject matter that is at hand. Hence, it is through a process of conscious choice that we decide to get to class on time and keep silent and attend a lecture. Our interest to know something that is new induces a reaction: attentiveness to class lecture.

2. Our mind-set or expectancy: This refers to us having advance knowledge of events that are going to happen or that we anticipate to take place. We are sometimes almost entirely convinced of the outcome of an event before we actually experience it. If we think that a certain building interior is going to be attractive and go to check it out, our attention will be focused on those elements that make the space more attractive. We see what we want to see as we are biased by expectations.

II ORGANIZATION IN PERCEPTION

In the study of perception, it is always necessary to understand what happens to the information that we receive through our senses. The data that exists in the world is received in an organized manner. It is usually processed as groups and patterns of stimuli that we call objects. Though details are important to the process, we in the end perceive not in terms of measurable qualities such as length or size but rather in terms of objects.

If organization is an activity that is undertaken by our mind in search of defining the data that we receive, we should understand the nature of the mental activity that we will refer to as organizing tendencies.

Organizing Tendencies in the Perceptual Process

Figure Ground The objects that fill our everyday perception are seen as standing out as separable from the ground background. As examples, consider the following:

Text on a page: the text on this page is only visible because we have the white ground on which the contrasting black words are visible. As the information that we transmit is through the text, we make it our focus and the white space, a ground. This is an activity, a choice that is deliberately made in the conscious mind.

Such relationship is basic to all object perception and organizes the information received by our sensory organs with the following perceptual characteristics:

Figure has some sort of shape while ground is formless
Ground extends behind the figure – figure in front, ground behind

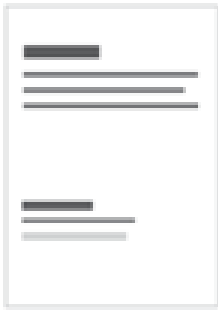


The image to the left is recognizable as a handprint because of the ground that is present. When we decide to see it as a figure, all the white spaces that are present in the figure are taken as part of the ground, not the figure. We are therefore grouping the figure into two, a figure and ground.

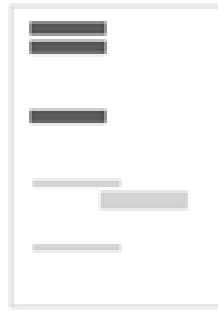
We as designers can create multiple figures that can be perceived as figure or ground.

(2) **Grouping:** When several stimuli are present, we try to identify perceptual relationships that will help us perceive them as groups of objects rather than single entities. Considering the content on this page, we group the text in terms of words, not single alphabets because we have been taught the structure of a language. In the case of grouping as a perceptual threat, our mind always establishes a certain prevalent relationship as a factor to assemble objects in the visual field in terms of groups.

Proximity



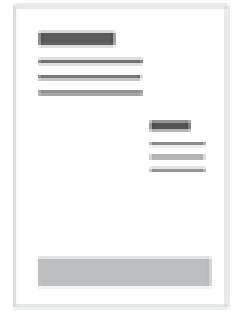
Similarity



Continuance



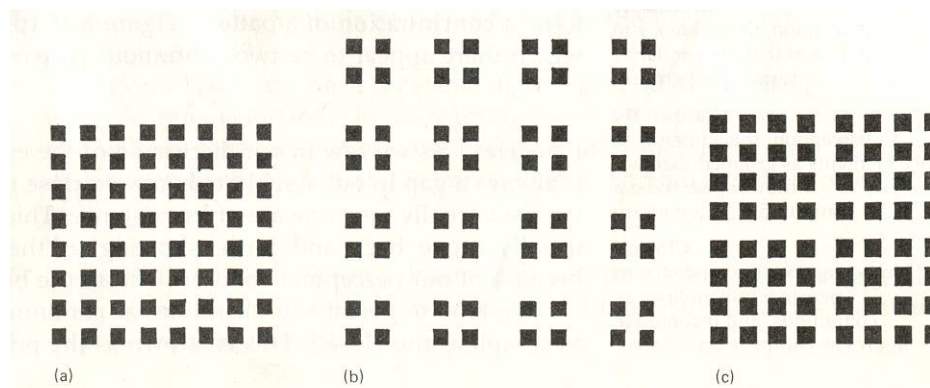
Closure



The apparent factors that establish relationships between objects that are grouped can be classified as:

Nearness or Proximity: We tend to compare distances between elements as a quality for deciding which objects belong together as compared to others.

Similarity: We tend to group similar elements together. The path of visual recognition follows similar features of objects such as shape, color, texture, pattern, etc to recognize meanings that are identified in the visual field.



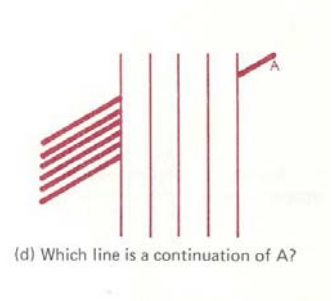
Symmetry or good figure: Tendency to group is tendency to form a balanced figure.

Continuance

of



Continuation: we perceive in attempt to understand complex patterns as groups objects. One characteristic is to group figures as continuations by physically trying to see extensions. Look at the figure to the right.



Contours: we are able to distinguish between figure and ground because we can perceive contours. Contours are formed when there is a market change in color, tone, brightness etc.

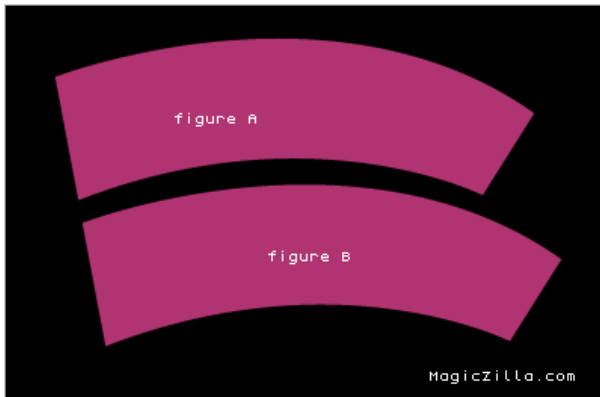


Closure: we tend to perceive whole objects rather than disjointed parts. We fill gaps so as to perceive whole objects.

In the example to the left, we see a triangle at the center because we make a visual line that connects all the corners that are cut from the black circles. We are therefore closing the triangle.

III. PERCEPTUAL CONSISTENCY

The world as we view it is consistent.



CONSTANCY OF SIZE: Object appears to be the same size irrespective of distances. We for example are able to recognize that a person that is standing is actually taller than us while we are sitting down. This is predominantly because we take our size as a reference in understanding our size relationships with other objects.

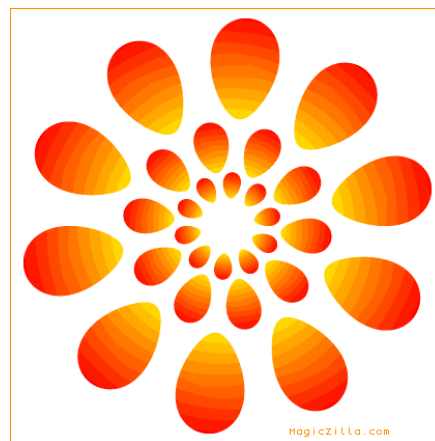
As an exercise, explain the figure to the left.

2) BRIGHTNESS CONSISTENCY: Visual objects also constant in their degree of whiteness, grayness or This is irrespective of the amount of illumination in the

The example to the left was designed to create inconsistency in the visual perception of brightness at

Explain the figure with respect to brightness consistency:

The white at the center appears to be brighter, but we can not be, as it is on the same white background.



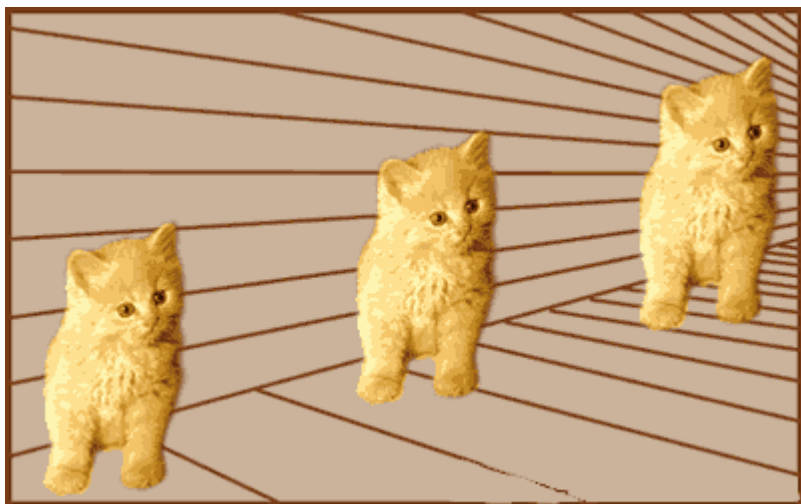
appear
blackness.
room.

the center.

know that it

The knowledge of what brightness consistency is enabled the designer of the example to get a pre-determined reaction from us, the observers.

3) PERCEPTUAL STABILITY: The visual characteristics that we define might be misleading to the eye. But when we finally make sense of things, we understand the apparent relationship that has distorted our perception of events. Hence, we tend to finally identify and explain the visual properties that distorted our vision.



IV. PERCEPTION OF DEPTH

Our mind receives and processes several clues that help establish a relationship between objects based on their distance from our position. This relationship is referred to as depth and is nothing but the relative distance between objects that are measured from the position of the observer.

Monocular Cues

Linear Perspective: Objects far away appear to be smaller than objects that are close. As the world is consistent, we recognize that they are smaller mainly because they are further away. We are therefore taking the effect of perspective as a clue to establish depth relationship between objects.

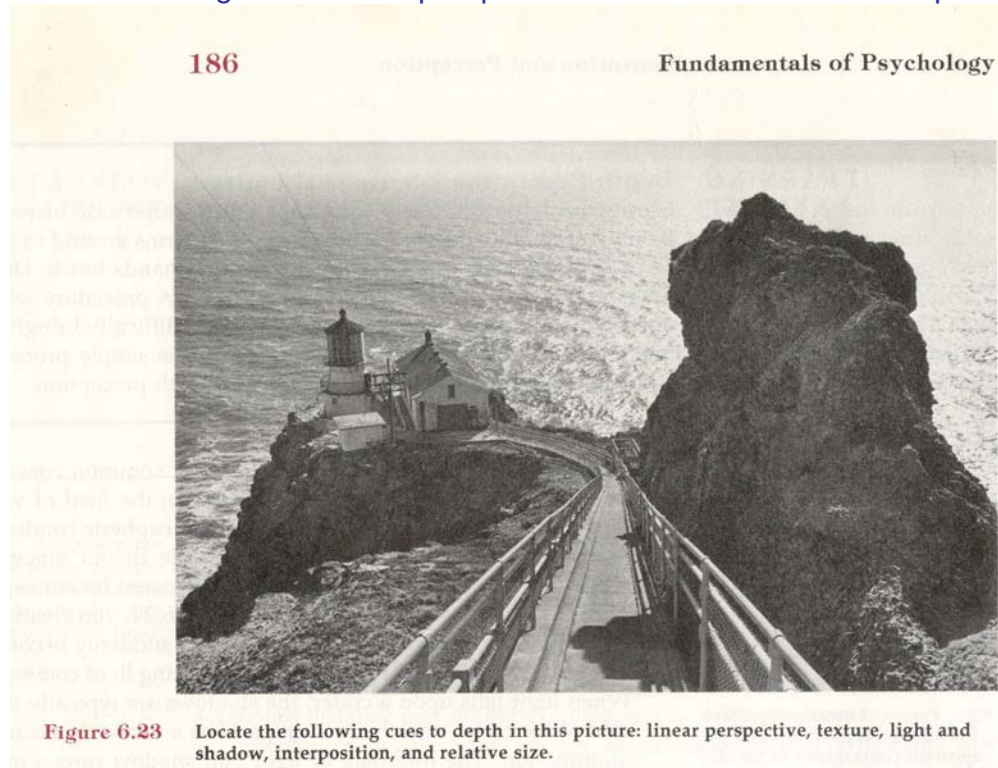
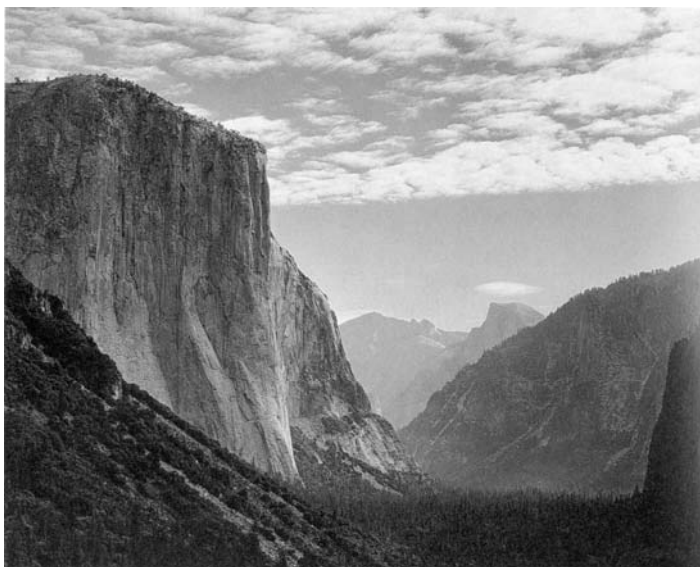


Figure 6.23 Locate the following cues to depth in this picture: linear perspective, texture, light and shadow, interposition, and relative size.

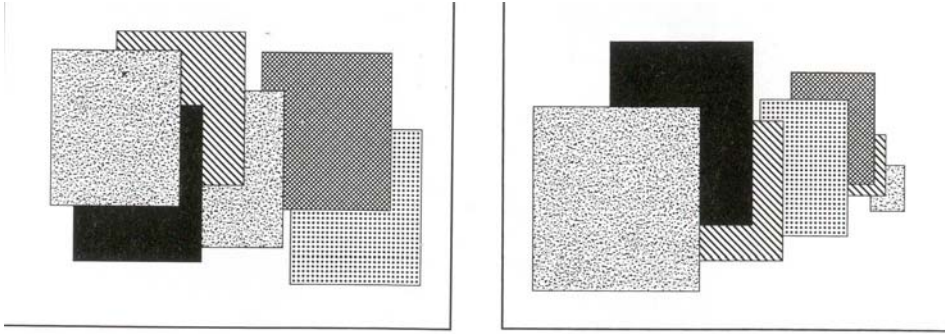


obstruct objects behind us.

Clearness: We are able to clearly see objects that are close to us than objects that are far away. The degree of clarity is hence taken as a clue that helps us understand the depth relationships between objects in the visual field.

Gradients of texture: Objects that are close will have coarser texture as more of their details will be seen. Texture is understood to be the roughness or coarseness of a surface. Gradient is defined as a change without abrupt transitions.

Interposition: Objects closer to us partially



Shadows: We assume that the source of light is always from up when we look at two dimensional studies.



Movement: Objects closer to you appear to move in opposite direction than objects further away.

(iii) BINOCULAR CUES

Depend on having two eyes:

I. RETINAL DISPARITY: The difference in the images of same object that falls on the retinas of the two eyes.

Eyes are separated by a few inches therefore the two images that are formed on the retinas are different: Two images are more dissimilar when object is close

A gradient of disparity is established: a change in the point of fixation from the horizon to close objects. This gradient provides us with information about depth.

II. CONFLICTING CUES

When the two cues give different impressions, we have conflicting cues and hence what our eye sees and what the mind understands becomes a source of confusion.

Looking at a photograph: Monocular cues – Give Impression of Depth - Binocular cues – Give Impression of Flat

V. PERCEPTION OF MOTION & EXPLAINING PERCEIVED PHENOMENON

Apparent Motion: - Perceived movement that is created without the actual presence of movement of the stimulus pattern.

Stroboscopic movement

Movie projection

Successive pictures are presented on screen

Auto kinetic Effect

Small stationary spot of light in a completely dark room will appear to move if a person fixates on it.

Induced Movement:

A stationary spot may get perceived as a moving object when the background or frame of reference moves.

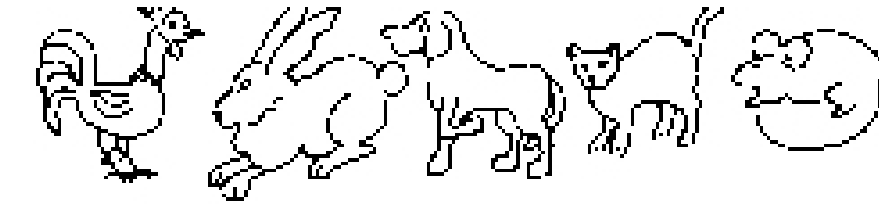
Example: Moon seen against moving Cloud

Movement in afterimages:

Perception of
Movement varies with speed
Size of object

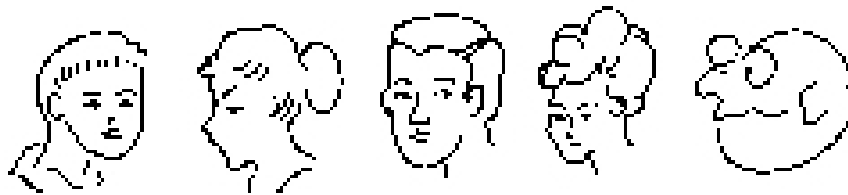
IV. INFLUENCE ON CONTEXT WITHIN WHICH EVENTS OR OBJECTS ARE PERCEIVED.

How we experience an object and how we react to the experience depends on the context in which we perceive the events.



In the example to that left, the last item in both rows of pictures in the same.

Contextually speaking, in the first row, it belongs to a group of animals, while in the latter it belongs to a group of humans.



Conversely, we perceive it as a mouse and as an old man, depending on the context.

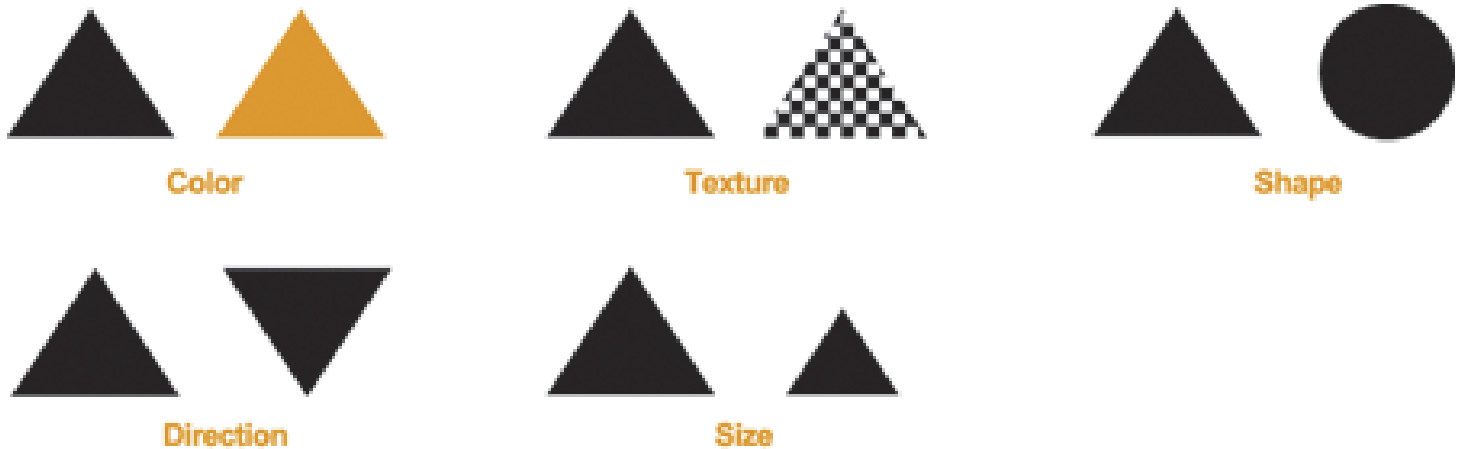
Simultaneous contrast

-Color cast influenced by other color.

Adaptation level

-Context background sets a standard against which objects are perceived

VII. IMPORTANCE OF RELATIONSHIPS AS OPPOSED TO ABSOLUTE DIFFERENCES



Transposition + Responding in terms of relationships

VIII. LEARNING AND MOTIVATION

Learning: - The world of perception is within limits, quite; plastic and modifiable.
: - Perception is in part a learned attainment

Association with already established

Influence of learning on the way sensory input is organized

Can learning affect the way our environment gets organized by ask to the extent to which the world actually looks, sounds or feeds differently

Perceptual Development

Motivation: - We perceive what we want to perceive due to factors that are internal to us.

Section 2.05: Summary

Everyone behaves in accordance to the way we perceive the world.

Perceived world is a construction and an achievement

Information comes in through the sensory channels and the perceptual processes act on it to form it into a world of experience.

Module Three: A New Approach: Understanding the Language of Design

Module Objective:

At the end of this section, you should be able to:

Understand the Rational behind the Language Construct that is going to be defined
Understand the Abstraction on which our definition depends on
Understand the Model of representation
Be able to define and distinguish between different elements of the Language Structure
Comprehend fully relevant concepts and terminologies

Lecture Synopsis:

- A. Introduction to the Module
- B. Understanding the Structure of the Language
 - a. Examples of Abstractions in Language Constructions
 - b. The Model
 - c. Understanding Associations in the Process
 - d. Defining the Content of the Stored Image
- C. The Elements of our Language
 - a. Conceptual Elements
 - b. Visual Elements
 - c. Relational Elements
 - d. Practical Elements
- D. Other Key Concepts
 - a. Framal Reference
 - b. Form and Structure
- E. Module Summary

Section 3.01: Introduction to the Module

We have defined the design process as a constructivist process that attempts to generate an idea for the solution of a problem that is defined depending on our level of understanding and approach. The output of our design both in reality is hence an assembly of decisions that are made during the thinking process.

In the study of the language of design, we first search for a simple way of rationally approaching the process of the construction of objects in the human mind. If we recognize that the human mind recognizes objects through a process that identifies components of the object that are assembled in the mind to give a meaning, it would be logical to depict this process and try to recreate it to ensure a progressive and organized thinking and doing process that will create an object with specific form and content.

This is done to be able to predetermine the reaction of the observer to the designed output. To do this, we try to develop our ability to create the design through an abstract language that has its base on the way people perceive objects.

This module concentrates on introducing you to the language construct we are going to use in an attempt to define the relationships between elements that make up the object to be studied and the relationship between the object & its surrounding.

As in any language, or the first activity we undertake is to list out the concepts our symbols should stand for. Then we learn the role of each symbol or element in the construction of our new language structure. Then we learn the rules for the combination of our elements and build it up through the study of principles of combinations, uses and other relevant components.

Section 3.02: Understanding the Structure of a Language

Any language is made up of components that are abstractions of larger elements in reality that we are trying to represent. Usually, these elements are the smallest possible representations corresponding to the simplest components of known elements in reality. These elements are then graphically represented through visual models that are determined as a consensus.

(a) Examples:

English Language: Is made up of 26 basic characters, the combination of which can represent any sound we make.

MUSIC: is made up of 7+5 notes the combination of which represents any sound we make.

NUMBER SYSTEM: is made up of 10 characters the combination of which make up any infinite no of symbols.

COMPUTING SCIENCE: is made up of 2 elements the combination of which gives us an infinite possibility

Each example gives basic elements of equal importance that when combined using a specific rule to get elements that are at a higher level.

The same principle of “Growth” applies to all examples. Each of the examples above are organized by using elements that are small, the combination of which produces larger elements that can still be combined to produce larger elements ...

This is in fact an abstract form of representing reality as we perceive it. In representing objects in reality, what happens is that details are removed from objects perceived and abstract elements are used to recognize and record information about the focus of our study. Objects are therefore represented using a general model.

(b) THE MODEL

It is nothing but a tool that enables us to simplify an object. If we can decompose an object, using this principle, we can build new objects that combining same elements.

The underline principle is the principle of growth each element grows to form the element next to it on the model.

Each element can be decomposed to the element that is before it or each element can grow to become the element that follows it.

In the previous chapter we have tried to study the perceptual process that helps us to characterize and experience the environment. In trying to study the language of design, it is important to note that:

Design: is an activity that attempts to modify this environment so that it becomes a better place to exist in.

Man has always attempted to shape the environment to his needs. Design produces abstract ideas that if implemented will serve as a solution that will address man's need. In the subsequent chapters, we try to understand the basic elements that are the building blocks of design.

What we will attempt to do is:

To observe things, terms of abstract elements

To remove details form objects perceived

Adopt a general model for describing and making objects

Design generates an abstract representation of an idea that can be practically constructed to the specifications of the designer. This makes the designer a creator of an idea, a concept that can be enriched and guided to become something greater than the original idea that started in the mind of an individual.

The designer's ability to come up with and execute ideas will heavily depend on knowledge and experience of components of the design process. As an approach to design education, we must recognize that design like any other discipline can be approached with a certain methodology.

Design methodology follows a language of its own. In an attempt to standardize our approach to design solution, we must start by understanding that design is a purposeful creation for our visual pleasure. It is not done as a fulfillment of personal desires of the creator; rather, it is placed before the audience to relay a predetermined message, an abstract representation of an idea.

The product of a designer will be put out in a visual medium of communication. That is why we study a language for visual communication of ideas. The mastery of this language helps us to build on our personal taste and sensitivity to the way we establish visual relationship.

Such mastery is not possible without an understanding of the elements of the language, and the important structures that will enable us to construct the basic components of our design in an organized manner. Our first task therefore will be to identify basic elements that will serve as building blocks that will help us create abstract images of our idea.

This part of the module hence defines and explains these elements and attempts to describe how they have been developed. The elements are divided into four parts with respect to our use of them in future design activities.

Section 3.03: The Elements of our Language

(a) Conceptual Elements

Conceptual elements are not visible. Their existence can be felt but they are not physically tangible elements that can be found in nature and hence actually do not exist in reality.

- (i) Point:** Perceived to be the smallest of the elements, it denotes a certain position in space. It is an abstraction of an idea that relates to the concept of having an element that is not measurable in any dimension.
- (ii) Line:** Is perceived as an element that has measurable qualities. It is perceived to be created through a process of evolution from a point. A point in motion in a single direction creates a line. If the point is in motion in a single direction, then we can measure the distance that point moved in that direction. Hence, a line is considered to have a single dimension.
- (iii) Plane:** The next level of elements is perceived to be generated through the movement of a line in a single direction for a limited distance. Hence, we come up with a new conceptual element that is dependent on the concept that argues that if a one dimensional object is moving in the direction other than its measurable one, it forms an element that is measurable in two dimensions.
- (iv) Volume / Solid:** The last of the conceptual elements is generated from a plane that we consider to be in motion in the direction other than its known two dimensions. Hence, it becomes an object that conceptually can be measured in three dimensions.

(b) Visual Elements:

These are representations of conceptual elements on a material medium. They are visible creations that stand for a concept, and can be seen on the medium that they have been put on. The moment that we have put a certain element on a drawing medium, it will be perceived as being composed of several characteristic features that helps us recognize it.

These features in turn can be used too create any object in the visual field and are hence recognized as visual elements of design.

- (i) Shape/Form:** It refers to the visual extent of the object that gives it an outer distinct appearance defined by its edges.
- (ii) Size:** is the smallness or largeness of an element. It is a measurable quality that can be expressed using a unit of our choice.
- (iii) Color:** Is created basically by the color of the material we used to create an element in the visual field.
- (iv) Texture:** Is the roughness or smoothness of a surface as perceived by our sense of sight.

(c) Relational Elements:

These are those that determine the placement and interrelationship of the elements that form our design. They can either be felt or perceived depending on their character but are always present if one tries to study the principles that are used in any design.

- (i) Position:** Refers to the relationship of the object to the frame in which it has been placed.
- (ii) Direction:** refers to how the object is related to the observer, objects near it or the frame that contains it.
- (iii) Orientation:** Refers how the object façade is related to the façade of the observer, objects near it, or another standard of reference
- (iv) Space:** Is the extent that has been occupied by the object.
- (v) Gravity:** form our personal understanding of the effect of gravity; we tend to psychologically attribute heaviness, lightness, stability or instability to objects that are in our field of vision.

(d) Practical Elements:

If one were to attempt to describe the content of any design, one would need a framework that can be used to describe what is behind every design work.

- (i) Representation:** it refers to the representation of an object that exists in reality.
- (ii) Meaning:** When we use an element to transmit a certain message, then it has an inborn meaning and falls to this category of elements
- (iii) Function:** When we have a use for our creation, then we can talk about function. Utilitarian things all have the practical element that we call function.

Section 3.04: Other Key Concepts

(a) Framal Reference

All the above elements exist in a boundary that defines the extent of our design. We shall call this the framal reference. It is said to be the boundary of the design as the relationship between all created elements and any left over space is perceived to be working together within the extent of the edges of the medium.

(b) Form and Structure

All visual elements constitute or add up to create what we call a FORM. Form in its design sense is that visual element with a definite shape, size, color and texture. It is the primary design element that we will be learning to manipulate.

With the study of form comes the study of the manner in which it is created or generated. This refers to structure, both as an approach and as a principle. Structure refers to the relationship that has been established between forms or between the form and the framal reference that it has been put in.

Module Four: Form as a Design Element

Module Objective:

At the end of this section, you should be able to:

Understand the Rational behind the Language Construct that is going to be defined
Understand the Abstraction on which our definition depends on
Understand the Model of representation
Be able to define and distinguish between different elements of the Language Structure
Comprehend fully relevant concepts and terminologies

Lecture Synopsis:

A. Conceptual Definitions

- a. Shape
- b. Form

B. Introduction to the Module

C. Form and the Conceptual Elements

- a. Form as a Point : **Vocabulary - Physical Characteristics - Expressive Characteristics - Spatial Characteristics – Representational Characteristics – Point and the other Forms**
- b. Form as a Line: **Vocabulary –Physical Characteristics - Types - Expressive Characteristics - Spatial Characteristics – Representational Characteristics – Line and the other Forms**
- c. Form as a Plane: **Vocabulary - Physical Characteristics - Types - Expressive Characteristics - Spatial Characteristics – Representational Characteristics – Plane and the other Forms**
- d. Form as a Volume: **Vocabulary – Physical Characteristics - Types - Expressive Characteristics - Spatial Characteristics – Representational Characteristics – Volume and the other Forms**

D. Interrelationship between Forms

- a. Detachment
- b. Touching
- c. Overlapping
- d. Penetration
- e. Union
- f. Subtraction
- g. Intersection
- h. Coinciding

E. Module Summary

Section 4.01: Conceptual Definitions

Shape: Is defined as the effect produced by the outlines or the edges of a figure. It is the visual field that the object occupies demarcated by the outer limits that distinguish it from its surroundings.

Form: Visible aspect of an object or figure. It could refer to parts or the whole of a figure that is describable in two or three dimensions. Form is also understood as being a characteristic feature of the conceptual element that we call a solid or a volume.

Section 4.02: Introduction to the Module

This section of the module defines one of the primary focuses of the course, the element of form. Architecture is an activity that utilizes form to define and enclose spaces that have specific functions. It is therefore important to be able to understand form to the level where we can comfortably start to use it to model our abstract ideas and notions.

It is further important to note that the ultimate target of a design work is to create a solution that will be visible in the three dimensional visual world. Hence, we can say that our primary target in the process of visual design is to create a form, a model of generated through the process of abstraction.

Form as an element of design is more than a shape that is seen; it is a shape with definite size, color and texture. It is therefore the equivalent of the summation of the components that we call visual element.

Since it is the summation of the visual elements that we call a form, our study must start with establishing:

- a. A language that has elements that will help us construct forms
- b. A general principle defining possible operations on forms
- c. Principles of purposeful organization of forms
- d. Principles and tendencies of grouping of forms
- e. Principles of establishing relationships and order between forms

Our concentration at this junction will be on defining and understanding what form as a design element is all about. As this section is the continuation of the previous module, we will start our study of forms by describing its evolution starting from the conceptual elements defined.

Section 4.03: Form and the Conceptual Elements

If the conceptual elements are those that are not visible, a visual representation of them gives us a form. Though they are commonly referred to as point, line ... they are in reality forms that have distinct visible characteristics that can be described and manipulated.

Form therefore is that element that is visible and has describable properties that make up the list of visual elements. We therefore study conceptual elements as forms and will exercise on their uses in the development of abstract ideas that can be used in the design process.

(a) Form as a Point

- (i) **Vocabulary:** A point is an element that marks a position in the visual space.
- (ii) **Physical Characteristics:** to serve as a point, a form must be small enough to be perceived as having no length, width or depth. It is only then that it will fulfill the conceptual requirement of an element that we defined as having no dimension. In addition, a point is considered to be an element that is static, centralized and direction less.
- (iii) **Expressive Characteristics:** a point as a form expresses stability, calmness as it is static and centralization
- (iv) **Spatial Characteristics:** A point as a form will be perceived by the observer inducing the spatial effect of stability when it is either alone or at the center of its field. When it is off-centered, it will create a sense of pulling or an effect that is termed as visual tension in design.
- (v) **Representational Characteristics:** Representational characteristics are the direct results of the physical manipulation of the other characteristics of the element. As a form, a point has physical characteristics that can be used to represent ideas at a practical or abstract level. It can represent conceptual ideas such as positions, stability, calmness, etc.
- (vi) **Point and the other Forms:** A point can have different uses based on what it marks when used as a form. The following examples are used to show some of the common uses of a point with regard to other elements of form:
 - 1) **A single point:** Can be used to mark two ends of a line hence describing a conceptual element
Intersection of two lines, defining a position
Meeting of lines at a corner of a plane or volume, helping to establish the contour that define the shape or volume
Center of a field
 - 2) **Two points:** Can be used to define a Line connecting them
Axis perpendicular to the line they describe

(b) Form as a Line

At a conceptual level, we have said that a point extended becomes a line: or a point in motion creates the appearance of a line. As an extension of a point, a line inherits the properties of a point and exhibits new characteristics.

(i) Physical Characteristics

As it is generated from an element that is understood to be dimensionless, it is visually recognizable because it is possible to perceive the relationship between its length and width. The width of a line so narrow that it is neglected hence, making line only measurable in its prominent direction, that corresponds to the motion of the point that has conceptually created it.

As a form therefore, it conveys a feeling of thinness. In its conception and use therefore dependent on the following characteristics that it exhibits:

- 1)** Length: a measurable quality that proportionally dominates width to a degree where the latter is considered to be negligible
- 2)** Value: as lines are considered to be elements that have only length as a measurable quality, anything with a width should be considered as a plane. But in the design language, forms are recognized as lines when their length significantly dominates the width.

Value refers to our ability to differentiate between lines based on their visual weight that is associated with their thickness.

- 3)** Direction: a line will define a certain direction that corresponds to the motion of the conceptual element that created is. Such direction is describable as being Vertical, Horizontal, Oblique/inclined
- 4)** Position: Another characteristics at a physical level deals with the position of a line in the visual field. The position or location of a line is an important attribute it borrows from the conceptual element of a point that has helped to define it.
- 5)** Types of Lines: In our approach to design element definition, we emphasize the manner in which we can emphasize ways of establishing classification among a class of elements. The focus will be on complete understanding of the criteria for classification. In the case of lines as a class of elements, the conditions are to be defined by aspects that are related to the form's visual properties. These aspects are described by Wong as:
 - a)** Overall shape of the line: This refers to the general appearance of the form with respect to the direction of the motion of the point that conceptually created it. A line based on these criteria can be straight, curved, bent, irregular

- b) **The Body:** This concept relates to thickness of a line. If a form is perceived as a line, then an increase in its thickness or width does not make it a plane. It will remain a line, and can be differentiated as a wide or narrow line. In such cases, a line will have visible edges that define its boundary. The relationship of these edges can be utilized as a basis to categorize lines into tapering, knotty, wavy
- c) **The Extremities:** refer to the edges of the two ends of the line. With regard to the thickness of the line described above, if the thickness of the line increases, the shape of the extreme edges of the line can be used as a criteria for differentiation between lines having ends that are round, square, pointed

(ii) **Expressive Characteristics:** Lines can be used to express abstract ideas such as feelings and emotions, or realistic features of objects such as contours and elevations.

(iii) **Spatial Characteristics:** With regard to its placement in the visual field, a line can induce a sense of stability, movement, and energy depending on its direction. A change in its value can produce an effect of advance and receding in the visual space. A single line with value differences can produce effects of twisting in space, etc.

(iv) **Representational Characteristics:** Lines can be used to represent both abstract ideas or realistic features of objects such as contours and elevations.

(v) **Line and the other Forms:** A line can serve to:

- 1) Join, Link, Support, and Surround or intersect other visual elements;
- 2) Describe edges of or give shape to planes;
- 3) Articulate surfaces of a plane

(c) **Form as a Plane**

At a conceptual level, when a line is extended in a direction other than its intrinsic one, it forms a plane. A plane therefore will inherit the properties of a line, direction and position, and in addition have the following main properties:

(i) **Physical Characteristics**

- 1) **Shape:** is the primary characteristic of a plane and corresponds to the effect created by the contours of lines that define the outer most limit or extent of the plane. According to Wong, on a two dimensional frame reference, all flat forms that are not commonly recognized as points or lines become forms as plane.

- 2) **Surface:** is that visual characteristics of the plane inscribed by the contour of lines that have defined the shape. Surface exhibits complementary properties of surface color, pattern and texture
- 3) **Orientation:** The surface of the plane can be described in terms of what it is facing in a composition. As an example, in a three dimensional composition where a group of planes are composed, the observer can establish the following generic types of planes with respect to orientation:
- a) **Overhead Plane:** the plane that is placed at the top. A ceiling can be an example of an overhead plane.
 - b) **Base Plane:** When placed as a base, the top part of the plane surface becomes visible; hence the plane becomes a base plane. A floor can be an example of a base plane
 - c) **Vertical Plane:** when vertically placed, the surface or surfaces of the plane can be visualized as having a different orientation than the two mentioned above. If placed at an angle, we can get an inclined plane.

4) Types of shapes

Based on Generic Lines: It is the characteristics and interrelationships of the conceptual lines that define the edges of the form can be used to determine the shape of the planar form:

- I. **Geometric:** such forms are bounded by lines whose relationship is determined using rules of mathematics.
- II. **Rectilinear:** Such forms are bounded by lines which are not mathematically related.
- III. **Organic Shapes:** Such forms are bounded by free curves with no geometric relations
- IV. **Irregular Shapes:** Bounded by straight and curved lines with no apparent mathematical relations

Based on orientation of the surface: Based on the relationship that is established with regard to the orientation of the surface in the compositional frame, the form can be determined as being:

- I. **Static Plane**
- II. **Dynamic Planes:** when a form is positioned on a ground, its orientation can suggest a sense of motion or rest. Based on this, forms are divided into static or dynamic

Based on Interrelationship of Generic Planes

- I. **Positive or Negative Planes:** A shape can be perceived as either occupying or as a blank space surrounded by occupied space. This establishes a relationship

between the shapes in the visual field. The one occupying the space becomes positive and vice versa.

- II. Primary and Secondary shapes: looking at shapes, we can recognize that certain shapes are created from lines while others are generated from the combination of shapes. This helps us to classify shapes into primary and secondary shapes.

1. Uses of Planes

a. In design education:

- Simplify complex shapes and volumes
- Study relationships between components of a shape and volume
- Combined to create complex shapes or forms in three dimensional visual field

(d) Form as a Volume

At a conceptual level, when a plane extends in the dimension that is other than its intrinsic one, it will create a solid. It therefore exhibits all the characteristics of a plane and in addition will have the following:

Form is the primary characteristics of a solid. Form as we have defined earlier is more than just a shape. It is actually measurable in three dimensions and has all the characteristics of a plane incorporated to it.

- o It is determined by the contour of line forming the edges of the solid
- o Used to:
 - Define or enclose space
 - Used to study relationships between components of a volume
 - Used to create a complex form in the three dimensional visual field

Types of Forms: depending on the nature of the shape, they can be divided into:

- A.** Geometric and Organic Form
- B.** Regular and Irregular Form
- C.** Static and Dynamic Form
- D.** Positive and Negative Form
- E.** Primary and Secondary Form

PRIMARY SOLIDS: are created from primary shapes. Primary shapes are used to generate solids/forms that have the following characteristics:

Regularity: Objects whose parts are related to one another in a consistent orderly manner.

Symmetrical: we recognize a visual axis about which all parts on both sides of that axis are located at equal distance.

Stable: They appear to be stable in their nature

Section 4.04: Interrelationship between Forms and their Effect on the Compositional Space

Regardless of what form we are dealing with, in the visual field, we can define the possibilities in which forms encounter each other. Relationship between forms is approached from two different dimensions. The first attempts to define interrelationship between the forms while the second dimension studies the effect that former produces on the space in which the forms exist.

For the first part of our study, Wong identifies for us eight different ways of interactions. Our exploration of interrelationships will be extended to cover the effect each one will have on the surrounding and defined space. The eight conditions are therefore defined hereunder:

1. Detachment: this refers to a condition where the forms in our field of vision are not in any physical contact whatsoever.

With respect to the position of the objects from the eye, they may appear to be either equidistant or one further away than the other in the space in which they exist.

2. Touching: Means that the forms are in actual physical contact. They are touching as they are on the same surface.

With respect to the depth, orientation and direction of the objects in space from the eye, different spatial effects can be created.

3. Overlapping: When forms are not on the same surface, one will end up being on top of the other.

In this case the objects in space are related as being one above the other or one in front of the other depending on the orientation of the surfaces of the objects.

4. Penetration: unlike overlapping, in the case of penetration, we are assuming that both forms are transparent and there is no relationship that can be described in terms of above and below and the contours of both forms remain visible.

5. Union: in this case, both forms are joined and become a larger single unit which means that both forms will lose part of their contours

In most cases, the objects will appear to be equidistant in two dimensional spaces, though different effects are possible in three dimensions.

6. Subtraction: can be visualized as taking an invisible form and putting it over a visible form, where the visible part of the object that is covered by the invisible form becomes invisible

7. Intersection: in this case, the resultant form is smaller than the two forms because the intersection is that part that is formed when the two forms cross over
8. Coinciding: it is a unique case where the two forms that we started with are the same and become one.

Module Five: Operations on Solids

Section 5.01: Introduction

As any discipline of the sciences, in architecture, it is important to understand that no solid is created. As a form that exists in reality, it is made up of materials that are already present in the environment.

The concept of being able to visualize the appearance of an object in our mind is an activity that uses conceptual elements that do not exist in reality. Being able to recreate that idea in reality will force us to use materials in our surrounding for the attainment of our goal.

Hence, in order to be able to recreate those forms that are formed in our mind, we learn techniques of representing objects using the drawing sheet (projections and views) and basic operations that can be conducted on materials that exist in reality.

In this course, we will concentrate on using a form or group of forms as elements that can bring about a pre-determined emotional response from an observer. To do this, we perform basic operations to shape forms or to alter their property either individually or as a group, and use them to fulfill the purposes we set out to achieve while conducting a design activity.

Section 5.02: Definitions

The term operation is defined as an action, scope or method of working that is undertaken on something to affect its value or form. We can give mathematical operations, surgical operations as examples.

The term solid can be understood as something that is both firm in shape and measurable in three dimensions.

Operation on solids then will deal with the subject matter related to those activities that are undertaken to:

Alter the properties of solids with known outward shape or form; resulting in the change in their appearance (Transformation)

Section 5.03: TRANSFORMATION

- (a) **Definition:** Transformation should be understood as the operation of changing one configuration/ expression or state into another according to a certain rule.

We can for example try to understand all forms as transformations of primary solids. Taking a primary solid, we can come up with variety of forms by simple variations of the properties of the object we started out with.

(b) TYPES OF TRANSFORMATIONS

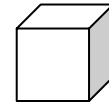
Generally there can only be three kinds of transformation.

(i) DIMENSIONAL TRANSFORMATION

Dimensional Transformation refers to altering one or more dimensions of an existing form. The objective of such transformation will be to ensure that the new form that is created will belong to a family of forms.

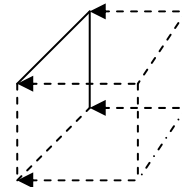
Here the underlying assumption is that all forms that we experience are transformations of the primary platonic solids discussed.

Example: CUBE



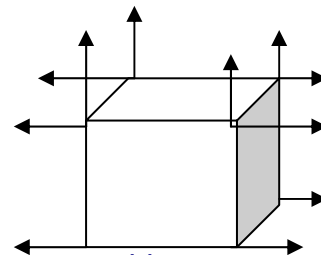
1) COMPRESSION

Can be compressed to a planar form



2) STRETCHING

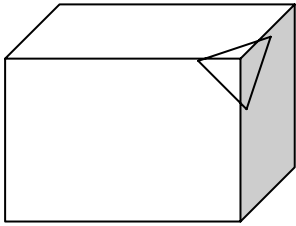
Can also be stretched to any direction



Change in length, Width or Length create different form than the parent object.

(ii) SUBTRACTIVE TRANSFORMATION

Here also what we attempt to do is to subtract a portion of a volume to achieve a new form that may or may not retain its initial identity.



There are several ways of using one of the three techniques of transformation of forms. The key determinant factor in all cases is whether or not we want the object to retain its initial identity.

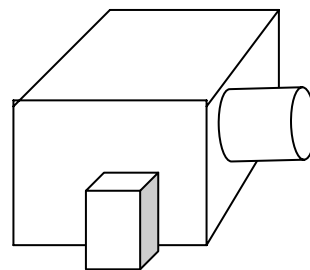
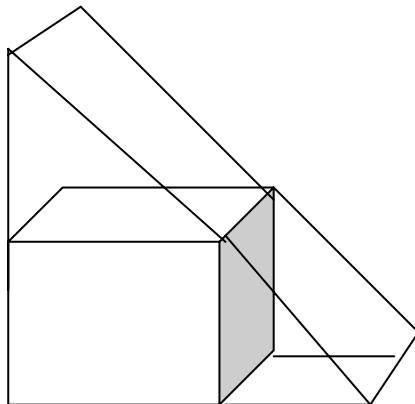
(iii) ADDITIVE TRANSFORMATION

As the name suggests, additive transformation is nothing but the addition of elements to the “Original” volume.

Our original volume is assumed to be one of the primary solids already discussed.

It is up to the designer to determine whether the identity of the initial form is to be altered or retained the designer hence can manipulate the number and relative sizes of the elements being attached to determine alter the identity of the initial form.

Ex. Cube



(iv) POSSIBILITIES FOR GROUPING TWO OR MORE FORMS

We generally recognize that we have a parent form we start with and we attach one or more subordinate forms to it. In this activity, the possibilities open for us are described by the types of “contact” that can be established between the objects. The possibilities that we have are the following:

1) SPATIAL TENSION

Here, we are attempting to establish a relationship that is based on proximity & common visual elements and not any type of actual contact.

2) EDGE-TO-EDGE CONTACT

In this case forms share a common edge and have an actual physical contact, pivoting about that edge.

3) FACE TO FACE CONTACT

In this case, the two forms need to have corresponding planar surfaces, which are parallel to each other and with surfaces that actually meet.

4) INTER LOCKING VOLUMES

In such a relation ship forms inter penetrate each others space.

Module Six: Towards Defining the Principles of Composition

Section 6.01: Introduction and Definition of Terms

Composition is essentially an act of putting together. It deals with the activity that is undertaken to arrange elements in a certain logical manner, with the target of demonstrating the dominant rule that is used to establish the relationship that is holding the elements together as one unit.

Composition is not mostly an activity that is undertaken for the fulfillment of the desires of the designer. It is rather a principle based approach that will enable the designer to create an effect that will be recognized by a casual observer.

(a) Understanding Structure of a Composition

Structure in a composition is used to define the interrelationship between the elements of design. The use of structure in a composition is particularly important as it defines and communicates the purpose, meaning or effect the elements of the composition must produce together.

We may use visible or invisible structures in a composition. The difference between the two is whether the structural elements are actually mapped on the composition or not. When visible, they could be positive or negative forms depending on how they are united with the negative or positive units of the composition.

The following section attempts to define different structures of composition.

- 1) The Basic Grid:**
- 2) Repetition Structure:**
- 3) Gradation Structure:**
- 4) Radiation Structure:**
- 5) Centrifugal Structure:**
- 6) Concentric Structure:**
- 7) Centripetal Structure:**
- 8) Anomaly:**
- 9) Contrast:**
- 10) Concentration:**

(b) Organization in Elements of Design

Additive forms will grow to merge with other forms. As designers, if we want our forms to be perceived as a group, the way in which the elements are combined must demonstrate a coherent relationship.

Forms therefore can be categorized based on the existing relationships between component forms, as well as the resulting overall configuration. When we are emphasizing the rule that determines the overall appearance of our composition, we are focusing on defining the structure that determines how the composition has been organized. In such a case, we are referring to principles of organization.

- 1) CENTRALIZED:** As the name suggests, such types of compositions are so organized to simulate a centralized object, one of the regular platonic planes. As an organization of elements to produce an effect, the composition attempts to fulfill the following minimum conditions:
 - a) Dominant central form:** In a composition that is centralized, there will be a dominant form that is located at the center of the compositional field of space and hence is dominant owing to its placement. This central element hence becomes the Primary form in the composition. To emphasize the core concept of the desired composition, the centrally placed object is usually a regular form that is centralized and static.
 - b) Secondary Forms:** Located around the central form will be secondary forms whose presence is significant as they
 - i) Are used to add to the effect of centrality by being located equidistant from the central object
 - ii) Are used to contribute to the overall effect by defining a static and stable outer boundary
- 2) LINEAR:** As the name suggests, such types of compositions are so organized to simulate a line. Therefore, we are trying to create a composition that depicts the properties and characteristics of line as a form, to fulfill the following minimum sets of conditions:
 - a) Arrangement:** In a Linear Composition, elements are arranged in a row, or along a path, having a common direction.
 - b) Organized along a path:**
 - c) Arrangement Expresses Movement:**

- 3) RADIAL:** As the name suggests, such types of compositions are so organized to simulate the physical properties of a radius of a circle. The main property that we can recognize is the fact that radiuses are lines having a common unmarked center as their origin. As lines, they have directions that in our case is perceived to be from the center to the boundary of the circle. Therefore, we are trying to create a composition that depicts the properties and characteristics of group of lines as a form, having a common center, and the following minimum sets of conditions are expected to be met:
- a) Organization where linear forms are arranged extending from a central form.
 - b) Mixture of Linear & centralized organization
 - c) Central Core: is not necessarily dominant, not necessarily geometric center, not necessarily present
- 4) GRID:** When two or more parallel lines form a regularly shaped field, we have created a grid structure. A grid structure helps us to organize the compositional elements of our choice in a logical pattern
- 5) CLUSTERED:** There are cases where compositions appear to have no organizing logic present. They just appear to be one whole unit merely because of proximity or by sharing a common field.

(c) Order among Elements of Design

In a composition that uses elements, we regardless of the logic of organization, we can establish an ordered relationship between our elements by the use of Ordering Principles. These principles, unlike organizing principles, are not the manifestation of the actual structure of the composition, rather the relationship defined between the elements as the parts of composition that contribute to the overall effect.

- 1) AXIS:** Talks about a line defined between two points: This line can be actual or implied. The overall impact of the introduction of an axis is that it establishes an order of significance between the elements of design.
- 2) SYMMETRY:** It is nothing but the arrangement of objects that are equidistant from an actual or implied axis.
- 3) HIERARCHY:** Way of establishing order from most dominant to least dominant element. It establishes primary and secondary elements that have a dependent relationship. Achieved by changing size, shape or location
- 4) DATUM:** The introduction of one dominant element in an otherwise disordered composition may produce an overall ordering effect on the existing forms. In such cases, we are considering the introduction of the form as a datum. Such a form could be a line, Plane, Volume.
- 5) REPITION:** Reoccurrence of similar elements define repetition. As a structure, repetition could be achieved by using visible structural elements of form or by the use of invisible formal elements that produce effects of repeating spaces between visible forms.
- 6) RHYTHM:** Reoccurrence of elements in a logical pattern. Rhythm is hence a sense of order established between elements that are in repetition, but not vice versa.

Module Seven: Types of Composition

Section 7.01: Introduction and Definition of Terms

As composition deals with the arrangement of elements to form something that has a larger meaning or significance, an attempt at defining types of composition should try to address how we are able to understand the main logic that is holding the elements together for the overall effect they are intended to produce. Hence, the dominant logic that each composition will portray will be our main criteria for their categorization.

Section 7.02: Types of Composition: Nature and Organization of the Element

I. Composition based on Equality: The end result of such a composition is usually a monotonous one as the elements we use are equal in all their features. There exists no visual tension as the result of their placement and interaction in the compositional plane and there is no dynamic expression perceived, resulting in static and dormant effect.

II. Composition based on Similarity: The targeted end result in this case is a harmonious effect produced through the use of elements that are similar in their main feature and yet with differences that are large enough so as to create some degree of visual tension. This could be achieved by the presence of placement variations creating unequal forces that are in constant interaction, producing a pleasant effect.

III. Composition based on contrast: The target here is to produce an effect of maximum tension produced using elements that are different in their main feature. Contrast enables us to establish differences between elements in opposition.

Section 7.03: Types of Composition: Visual Effect of a Composition

Module Eight: Grouping Tendencies in Composition

Grouping

Grouping: is made essentially by determining the degree of correspondence that exists between elements of our composition. The correspondence can be.

Dimensional

Nearness

Material

Shape

Size

Place

Position (Orientation)

Distance

Module Nine: Understanding Proportion and Scale

Understanding Proportion and Scale

Scale: Size of something compared to a reference to a reference standard or to the size of something else.

Example: One scale system could be the Human scale, where we compare the size of any object as compared to the size of an average human.

PROPORTION: The measure of the relation of one part to another or to the whole.

Example: In the case of the proportion of an average human, we can for example compare the size of the human face to neck or the proportion of the face as compared to the whole body.

THEORIES OF PROPORTION

Different theories of proportion were developed to establish a controlled relationship between the dimensions of the parts that make up the whole of a composition. All attempt to create a sense of order along elements that form visual construction.

Important distinction between ratio and proportion

Ratio: quantitative comparison of two similar things

Proportion: Equality of Ratios

Proportion: a consistent set of visual relationships b/n parts of a composition and the whole.

TYPES OF PROPORTION

- i. Commensurate: Refers to proportion systems that are composed of sizes with a common denominator
- ii. Incommensurate: Refers to system of proportions with dimensions or sizes that have no common measure.

Module Ten: Check Point One

Section 10.01: Introduction and Definition of Terms

Principles of Design

Principles of Design are the general accepted laws that we use in trying to undertake a controlled design activity. They are useful in the sense that they give us the tool that will help us approach our design problem with some sort of pre-conceived outcome of the final look or appearance.

When making a design, we generally use the following seven principles of design, namely: contrast, emphasis, balance, unity, pattern, movement, and rhythm.

1. Contrast means showing differences in two different sections of the design or showing somehow that the design being created is very different from other designs because of its contrast. Contrast can also be used to show emphasis in any part of the design.

2. Emphasis is given to an area within the design because that area is meant to be seen or is more important to be noticed when compared to other places of the design. For example, your design might be to have white parallel lines going up and down. In the center of this design, you could have a circle. This circle would be a part on the design that is emphasized.

3. Balance means keeping your design like a pattern. A balanced pattern would be if you had a border on your pattern in black. Unbalanced would be if approximately one-third of the border was orange and the other two-thirds in pink. To keep your design balanced, make your measurements as accurate as possible. Keeping your design symmetric is a good technique for good balance, but not necessarily the best for all types of designs.

4. Unity means keeping your design in a sort of harmony in which all sections of the composition make other sections feel complete. Unity helps the design to be seen as one whole design instead of disjointed pieces that are fighting for attention.

5. Pattern is simply keeping your design in a certain format. For example, you could plan to have wavy lines all around your design as a pattern, but then you must continue those wavy lines throughout the design for good patterns. It wouldn't look good if suddenly you stopped all the wavy lines and drew a picture of a dog.

6. Movement is the measure of the degree to which a sense of motion or dynamics is included in a design. It helps control the movement of the observer's eyes on the compositional frame and induces a predetermined reaction during such interactions. For example, circles going diagonally up and down from right to left could show that the design moves up and to the right or down and to the left.

7. Rhythm is the movement or variation characterized by the regular recurrence or alternation of different quantities or conditions. In simpler words, it's just like pattern and shows that the design has a 'beat' or 'flow' going with it. A plain white box has almost no rhythm what so ever.

Section 10.02: Balance

Balance is the consideration of visual weight and importance that is achieved by visual comparison of elements with regards to their attributes and placement from an indicated reference. The positioning logic of these elements will determine the logic and nature of balance attained.

- (a) Symmetrical Balance:** The butterfly below by itself is essentially symmetrical. Both sides are similar in visual weight and almost mirrored. Because symmetrical balance often looks more stiff and formal, sometimes it is called formal balance



- (b) Asymmetrical balance:** is more interesting. Above both sides are similar in visual weight but not mirrored. It is more casual, dynamic, and relaxed feeling so it is often called informal balance.



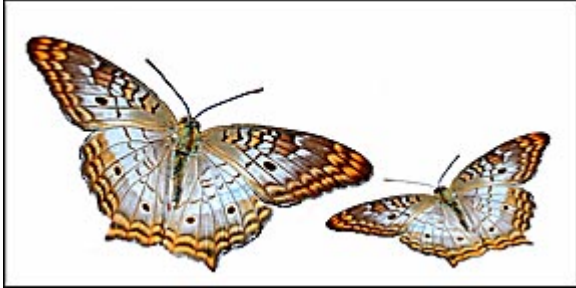
- (c) Radial balance:** is not very common in artist's compositions, but it is like a daisy or sunflower with everything arranged around a center. Rose windows of cathedrals use this design system.



This is a simple diagram of radial balance.

Variety - You create variety when elements are changed. Repeating a similar shape but changing the size can give variety and unity at the same time. Keeping the same size, but changing the color can also give variety and unity at the same time. In visual composition, there are many ways you can change something while simultaneously keeping it the same.

Depth - effects of depth, space, projection toward the viewer add interest.



Overlapping is often used by artists to create depth



Repetition can be used on all of the Visual Elements. If things are repeated without any change they can quickly get boring. However, repetition with variation can be both interesting and comfortably familiar. Repetition gives motion.

Visual Effects

When we analyze artwork we often start with visual effects. We notice something happening. Then we try to figure out why it happens.

Motion: Motion isn't a principle. It is one those magic effects when a still picture has motion. There are lots of ways to get perceptual movement that we recognize as apparent motion.

MOTION EXAMPLES

Sometimes it has to do with orientation.

A diagonal line is more dynamic than a horizontal or vertical line.
Sometimes motion depends on the character of the element itself.
A straight line may be less dynamic than a zigzag or a curving line.
A blended area may appear to flow.

Depth: Depth is another “magic” effect.

DEPTH

EXAMPLES

Sometimes the illusion of depth has to do with orientation.

If you want a chair or person to appear further away, you can place them higher on the picture plane.

Sometimes the illusion of depth depends on the character of the element itself.

A warm color can appear to project and cool color can appear to recede, other things being equal.

A light tone (value) can appear to project and dark tone can appear to recede.

Illusion

Module Eleven: Surface Qualities of Forms

(a) Objective: Why do we study Texture & Pattern?

We have so far tried to define what elements we can use to create a composition of forms, and what principles can be applied in the arrangement of forms.

Apart from forms, we have other elements of design that are properties of forms. Their primary use will be to modify the property a form, thereby making it appear to be more attractive.

These are therefore actually elements that we can use to increase the qualities our form. An existing form can be made to appear different by textural treatment. Mastering the use of texture & pattern will therefore enable us to work with an existing form and change its appearance without changing the size of the form.

Definition of Texture: The coarseness or roughness of a surface. It has a lot to do with how an object gets perceived. The primary way in which we will be able to perceive texture would be to visually determine how the object will feel if we were to use the sense of touch.

When we talk about texture, we talk about how our sense of vision relates our previous experience of the sense of touch, associates the information stored in our mind, and reflects that the surface we are looking at is rough.

Section 11.02: Types of Texture

When we talk about texture, we are referring to two different categories based on how texture is recognized using the different senses.

(a) Visual Texture: Something that is recognized through the sense of sight

(b) Tactile Texture: Something that's perceived through the sense of touch

Section 11.03: Uses of Texture

The use of textural treatment can be for functional or aesthetic purposes.

(a) Functional Uses:

Acoustical treatment of buildings

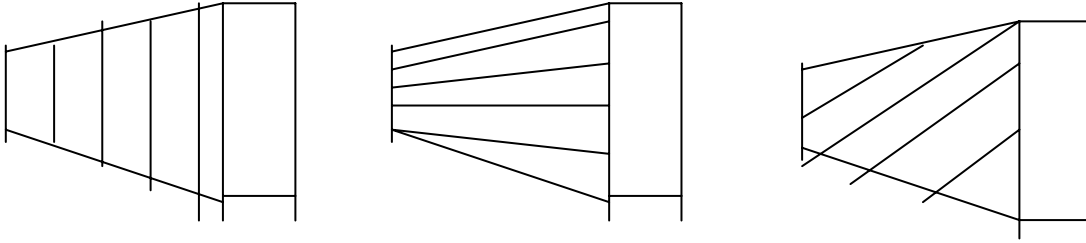
Rendering of building exterior → Long life of exterior

As elements of friction to prevent accidents on slippery surfaces

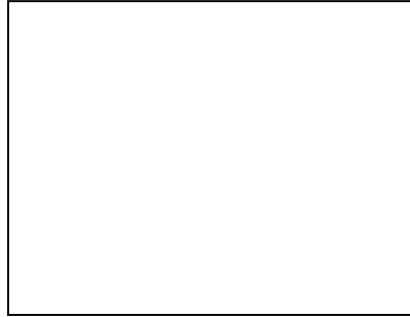
(b) Aesthetic Uses:

What textural treatment brings to our design can be better understood by paying attention to its subjective interpretations and uses. Generally speaking, textural treatment is applied on existing surfaces; hence it is easier to classify uses of texture based on what impact it will have on the parent form that it modifies. With respect to this, textural treatment can

a) Reduce or increase the directional qualities and visual weight of the form.



b) Can be used to unite elements in composition.



c) Can be used to accentuate the natural features of the form.

VISUAL TEXTURE

I. PATTERN REDEFINED

Pattern is visual sense of texture created or felt by surface variation.

Patterns are created by repetition of units. Ordered repetitions give us rhythms. Rhythms is important in architecture, as it will establish relationship between parts of a whole.

II. REPETITION & GROUPING

Repetition is used in design activity owing to the fact that our eye tends to group together objects that we find to be of the same type. Resemblance among objects will result in their belonging to the same group. It is this distinct property of visual perception that the designer will use or manipulate in getting a message across.

III. MEANINGS IN PATTERN

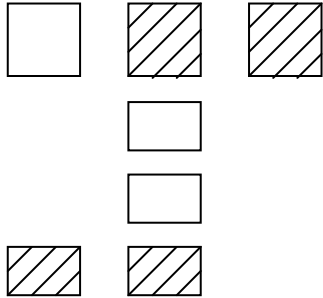
To get a message through, we organize patterns to convey one of the following.

Similarity of object

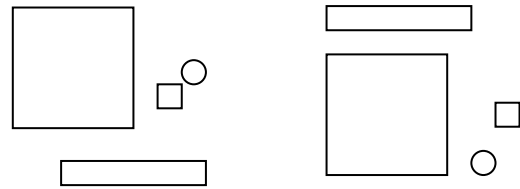


- Group triangles/Group of circles

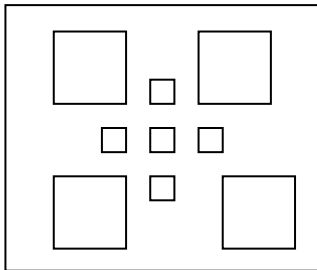
Shade (Same Shade)



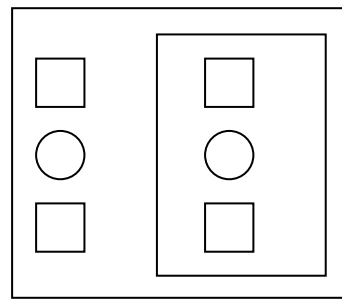
Proximity



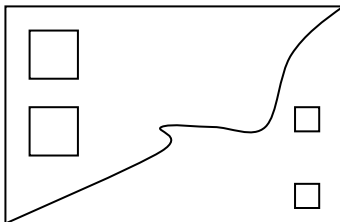
Large & Small



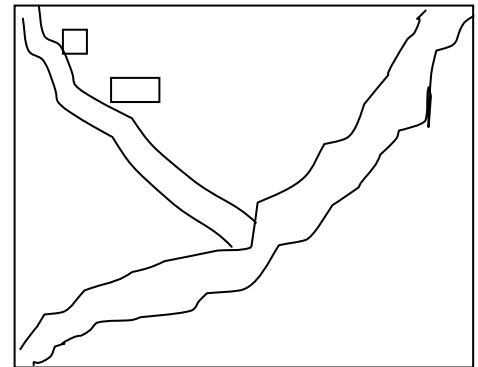
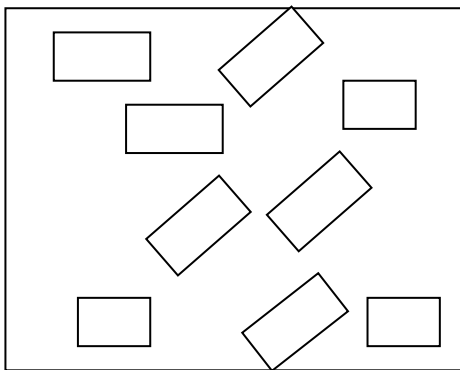
Common Enclosure.



Common Ground

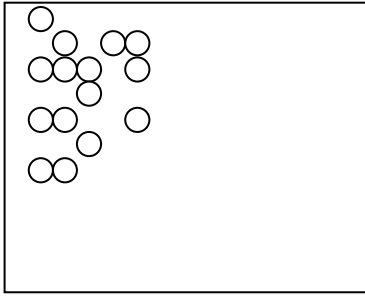


Orientation

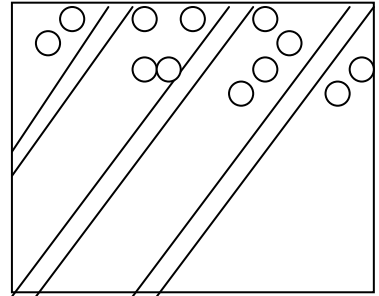


Texture can be

RANDOM



ORDERED



IV. DIFFERENCES B/N VISUAL & TACTILE TEXTURE

The difference between visual and tactile is in the manner in which they are created. In tactile there is an actual variation in the lanes while in visual, there is a difference in shade.

In tactile we can use the sense of touch as confirmation of what we see while in visual we can not.

Play of light and shadow creates visual texture while it accentuates tactile.

V. CONCLUDING REMARKS

In the use of any one of the two, it is important that Texture should be subordinate to the form. It should accentuate not break it. In addition, it is usually true that roughness of a surface will create the feeling of warmth while smoothness will create effect of chill in interiors.

Module Twelve: Principles of Light & the Mechanics of Vision

Introduction to principles of light

Sources of Light

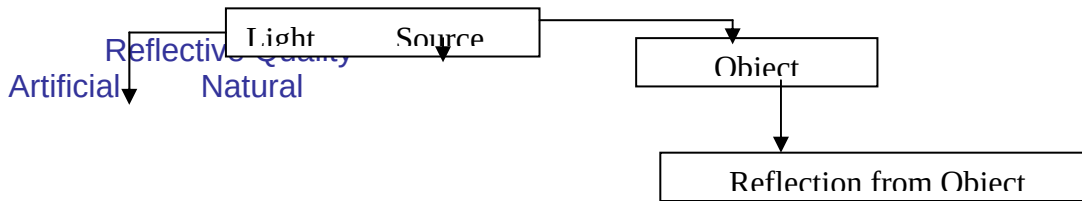
Light & Matter

Dimensions of Light

Light & Shadow

Introduction: How do we perceive objects through sense of sight.

- Light & Perception



Dimensions of Light

Brightness : How bright is the light source

- Intensity

Type of light sources

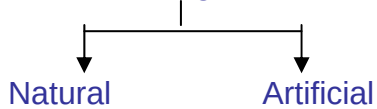
- Glowing

- Others

Light Source

Glowing

Others



Object

Reflect

Absorb

Transmits

Reflective Quality: Transparent
Translucent
Opaque

Reflecting Surfaces

Regular

- Irregular

Diffusion of light

Light on objects in space

Exercise: - A writes a brief report on the effect of light on

Object visual perception

On photographic imprint

B. Analyze any picture of an interior space and the effect of light on the space.

Prepare a detailed drawing of the retina and identify all of the major functions. Describe the role of each of the functions you have identified in the process of seeing.

Submission Date: April 12, 2005

Assignment II: April 12, 2006

Pictorially describe what refraction, reflection, scattering, diffraction and interference are. Use a colored media and accurate drawing that show the light source, the material medium through which light passes through, and the effect on the light source propagated

Submission Date: April 14, 2005

Reading Assignment

Read relevant chapters in physics books about interference, reflection and refraction. Try to also refer to wave and wave motion.

Principles of Light and Vision

I. INTRODUCTION

Light, is defined as a form of energy visible to the human eye that is radiated by moving charged particles.

What is Energy?

What are particles?

What do we mean by Atomic structure?

How do elements change from one to another?

Scientists have learned through experimentation that light behaves like a particle at times and like a wave at other times. There is a general understanding that light travels in a straight line. In this case, it is exhibiting a property of a particle. The particle-like features are actually tiny particles called photons.

When light diffracts, or bends slightly as it passes around a corner, it shows wavelike behavior. The waves associated with light are called electromagnetic waves because they consist of changing electric and magnetic fields.

Vision is defined as the ability to see the features of objects we look at. Such features will supply us with the necessary information required to recognize the object. Some of these features could be:

Color

Shape

Size

Details

Depth

Contrast

Vision is achieved when the eyes and brain work together to form pictures of the world around us.

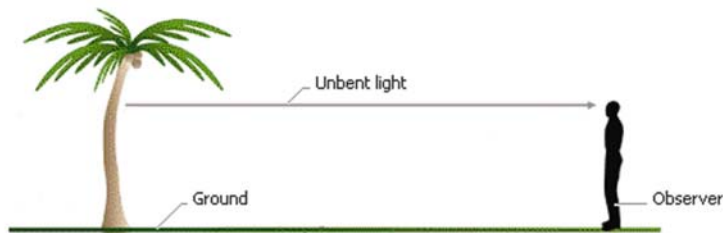
Vision begins with light rays bouncing off the surface of objects.

These reflected light rays enter the eye and are transformed into electrical signals.

Millions of signals per second leave the eye via the optic nerve and travel to the visual area of the brain.

Brain cells then decode the signals into images, providing us with sight.

Almost all animals respond to light. The one-celled amoeba responds to light by turning in its direction. Bees have complicated eyes that contain many lenses for sensing colors and shapes of flowers. However, it is the vertebrates (animals with backbones) that have eyes and a brain that work together to process light into true images. Human vision is particularly unique in that the human brain can process visual images and use them to create language and pictures and to store information for future use.



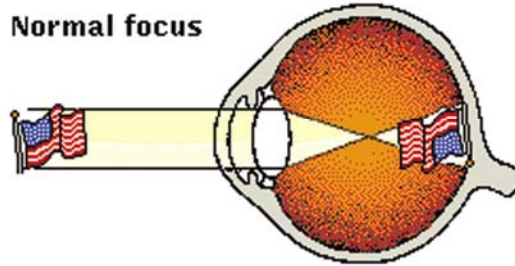
II. THE MECHANICS OF VISION

How do we see?

Light rays reflected from any object we eye and are focused by the eye's cornea, iris, pupil, and lens. The final light rays is the retina, a layer of nerve two-thirds of the back of the eye. In the retina is the macula, an area that is only in diameter. The macula is responsible most detailed vision.

The retina is made up of two types of rods.

Normal focus



look at enter the optical structures: destination of the tissue that lines center of the 1.5 mm (0.06 in) for the clearest,

cells: cones and

Prepare a detailed drawing of the retina and identify all of the major functions. Describe the role of each of the functions you have identified in the process of seeing.

What do we mean by cones and rods? What are their specific roles in the process of seeing?

Cones are nerve cells that are sensitive to light, detail, and color. Millions of cone cells are packed into the macula, aiding it in providing the visual detail needed to scan the letters on an eye chart, see a street sign, or read the words in a newspaper.

Cones also produce the sensation we call color. Cones contain three different pigments, which respond either to blue, red, or green wavelengths of light. Cones mix the color signals to produce the variety of colors we see. If a person is missing one or more of the pigments, that person is said to be color-blind and has difficulty distinguishing between certain colors, such as red from green.

Rods are designed for night vision and the detection of motion and objects. They also provide peripheral vision, but they do not see as acutely as cones. Rods are insensitive to color. When a person passes from a brightly lit place to one that is dimly illuminated, such as entering a movie theater during the day, the interior seems very dark. After some minutes this impression passes and vision becomes more distinct. In this period of adaptation to the dark the eye becomes almost entirely dependent on the rods for vision, which operate best at very low light levels. Since the rods do not distinguish color, vision in dim light is almost colorless.

Light rays that reflect from the upper half of any object we look at are focused on the lower half of the retina. Rays from the lower half of the same object are focused on the upper half of the retina. This would seem to give us an upside-down picture of the world. Fortunately, these signals are rearranged when the brain processes them into an image that is right side up.

Sources of Light

Sources of light differ in how they provide energy to the charged particles, such as electrons, whose motion creates the light we perceive. If the energy comes from heat, then the source is called

incandescent. If the energy comes from another source, such as chemical or electric energy, the source is called luminescent.

In an incandescent light source, hot atoms collide with one another. These collisions transfer energy to some electrons, boosting them into higher energy levels. As the electrons release this energy, they emit photons. Some collisions are weak and some are strong, so the electrons are excited to different energy levels and photons of different energies are emitted.

Candlelight is incandescent and results from the excited atoms of soot in the hot flame.

Light from an incandescent light bulb comes from excited atoms in a thin wire called a filament that is heated by passing an electric current through it.

The Sun is an incandescent light source, and its heat comes from nuclear reactions deep below its surface. As the nuclei of atoms interact and combine in a process called nuclear fusion, they release huge amounts of energy. This energy passes from atom to atom until it reaches the surface of the Sun, where the temperature is about 6000°C (11,000°F).

Different stars emit incandescent light of different frequencies—and therefore color—depending on their mass and their age.

A luminescent light source absorbs energy in some form other than heat, and is therefore usually cooler than an incandescent source. The color of a luminescent source is not related to its temperature. A fluorescent light is a type of luminescent source that makes use of chemical compounds called phosphors. Fluorescent light tubes are filled with mercury vapor and coated on the inside with phosphors. As electricity passes through the tube, it excites the mercury atoms and makes them emit blue, green, violet, and ultraviolet light. The electrons in phosphor atoms absorb the ultraviolet radiation, and then release some energy to heat before emitting visible light with a lower frequency.

Phosphor compounds are also used to convert electron energy to light in a television picture tube. Beams of electrons in the tube collide with phosphor atoms in small dots on the screen, exciting the phosphor electrons to higher energy levels. As the electrons drop back to their original energy level, they emit some heat and visible light. The light from all the phosphor dots combines to form the picture.

Synchrotron Radiation

Not all light comes from atoms. In a synchrotron light source, electrons are accelerated by microwaves and kept in a circular orbit by large magnets. The whole machine, called a synchrotron, resembles a large artificial atom. The circulating electrons can be made to radiate very monochromatic light at a wide range of frequencies.

Lasers

A laser is a special kind of light source that produces very regular waves that permit the light to be very tightly focused. Laser is actually an acronym for Light Amplification by Stimulated Emission of Radiation. Each radiating charge in a non-laser light source produces a light wave that may be a little different from the waves produced by the other charges. Laser sources have atoms whose electrons radiate all in step, or synchronously. As a result, the electrons produce light that is polarized, monochromatic, and coherent, which means that its waves remain in step, with their peaks and troughs coinciding, over long distances.

III LIGHT AND MATTER

Light behaves in a specific manner when it interacts with matter. Its behavior can be divided into two categories:

How light interacts with matter

How light travels, or propagates through matter

A. Interaction with Material

Why does light slow-down as it passes a material?

What is light absorption?

What is reflection?

Why do materials heat up when light passes through them?

When white Light from sources such as the sun is separated into Colored Light it appears white. The white light that we see is actually the sum effect of the different colors. The fact that the one color that we see consists of several colors can be demonstrated by passing it through a prism.

When white light passes through a prism, it separates into a spectrum of different colors. The prism bends, or refracts, light of different colors at different angles. Red light bends the least and violet light bends the most.

This effect is clearly seen on the rainbow. We see light that is bent to the different colors. The juxtaposition of these colors depends on the angle of curvature of each.

The question that we should raise here is what actually happens when light strikes a material?

Generally, when light from a source falls on any matter, the following series of reactions take place:

It interacts with the atoms in the material

Depending on the frequency of the light and the atomic structure of the material. In transparent materials, the electrons in the material oscillate, or vibrate, while the light is present.

This oscillation momentarily takes energy away from the light and then puts it back again.

This results in the slowing down of the light wave without leaving energy behind. Denser materials generally slow the light more than less dense materials, but the effect also depends on the frequency or wavelength of the light.

Materials that are not completely transparent either absorb light or reflect it.

In the process of light absorption, the energy of the oscillating electrons does not go back to the light instead going toward increasing the motion of the atoms, which causes the material to heat up.

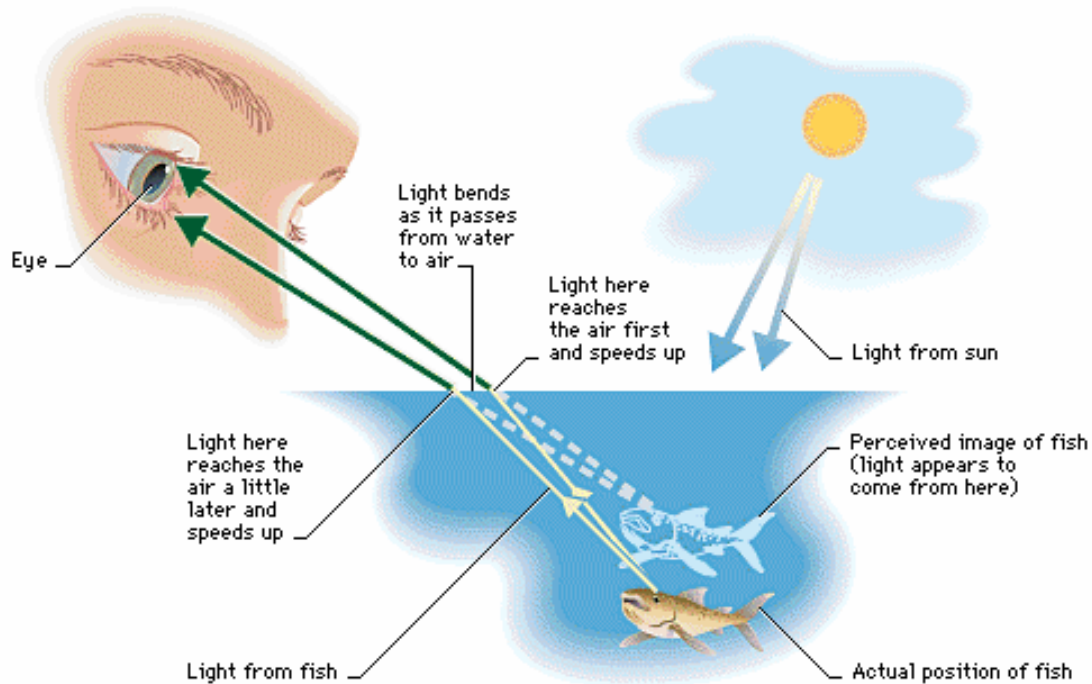
The atoms in reflective materials, such as metals, re-radiate light that cancels out the original wave. Only the light re-radiated back out of the material is observed.

The interaction with matter produces one or more of the three effects on the source of light that reached the object or material medium. These effects are described in the next section.

Exercise: Pictorially describe what refraction, reflection, scattering, diffraction and interference are. Use a colored media and accurate drawing that show the light source, the material medium through which light passes through, and the effect on the light source propagated

Refraction

Refraction is the bending of light when it passes from one kind of material into another. Because light travels at a different speed in different materials, it must change speeds at the boundary between two materials. If a beam of light hits this boundary at an angle, then light on the side of the beam that hits first will be forced to slow down or speed up before light on the other side hits the new material. This makes the beam bend, or refract, at the boundary.



Reflection

Reflection also occurs when light hits the boundary between two materials. Some of the light hitting the boundary will be reflected into the first material. If light strikes the boundary at an angle, the light is reflected at the same angle, similar to the way balls bounce when they hit the floor.

Scattering

Scattering occurs when the atoms of a transparent material are not smoothly distributed over distances greater than the length of a light wave, but are bunched up into lumps of molecules or particles. The sky is bright because molecules and particles in the air scatter sunlight. Light with higher frequencies and shorter wavelengths is scattered more than light with lower frequencies and longer wavelengths.

The atmosphere scatters violet light the most, but human eyes do not see this color, or frequency, well.

The eye responds well to blue, though it is the second most scattered color.

Sunsets look red because when the Sun is at the horizon, sunlight has to travel through a longer distance of atmosphere to reach the eye. The thick layer of air, dust and haze scatters away much of the blue.

B. How Light Travels

Dutch scientist Christian Huygens proposed the first successful theory of light wave motion in three dimensions in 1678. Huygens suggested that:

Light wave peaks form surfaces like the layers of an onion.

In a vacuum, or a uniform material, the surfaces are spherical.

These wave surfaces advance, or spread out, through space at the speed of light.

Each point on a wave surface could act like a new source of smaller spherical waves, which may be called wavelets that are in step with the wave at that point.

The envelope of all the wavelets is a wave surface. An envelope is a curve or surface that touches a whole family of other curves or surfaces like the wavelets.

This model explains:

How light seems to spread away from a pinhole rather than going in one straight line through the hole.

Blurs that we see in the edges of shadows.

Interference

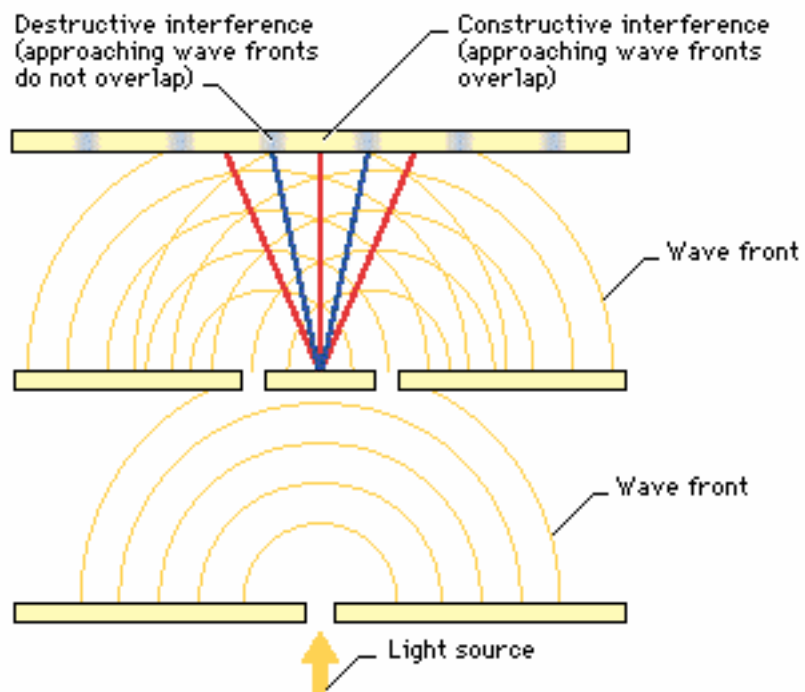
Interference in waves occurs when two waves overlap. There are two types of interference depending on the effect that is created by the overlapping waves of light. These are:

Constructive interference: If a peak of one wave is aligned with the peak of the second wave, then the two waves will produce a larger wave with a peak that is the sum of the two overlapping peaks.

Destructive interference: When a peak of one wave is aligned with a trough of the other, then the waves will tend to cancel each other out and they will produce a smaller wave or no wave at all.

Diffraction

Diffraction is the spreading of light waves as they pass through a small opening or around a boundary. As a beam of light emerges from a slit in an illuminated screen, the light some distance away from the screen will consist of overlapping wavelets from different points of the light wave in the opening of the slit. When the light strikes a spot on a display screen across from the slit, these points are at different distances from the spot, so their wavelets can interfere and lead to a pattern of light and dark regions.



How do we measure light?

IV MEASURING LIGHT

Monochromatic light, or light of one color, has several characteristics that can be measured.

The length of light waves is measured in meters.

The frequency of light waves is measured in hertz

When light is considered as a source of illumination for human eyes, it is important to measure its intensity, or brightness. Such measurement is done using units that are based on a modernized version of the perceived brightness of a candle.

A. Brightness

Scientists use candela and lumen to measure the brightness of light as perceived by humans. These units account for the different response of the eye to light of different colors.

The candela measures the amount radiated in a particular direction. The candela was originally called the candle, and it was defined in terms of the light produced by a standard candle.

The lumen measures the total amount of energy in the light radiated in all directions. The lumen can be defined in terms of a source that radiates one candela uniformly in all directions.

B. The Speed of Light

Scientists have defined the speed of light in a vacuum to be exactly 299,792,458 meters per second (about 186,000 miles per second). This definition is possible because since 1983, scientists have known the distance light travels in one second more accurately than the definition of the standard meter. Therefore, in 1983, scientists defined the meter as $1/299,792,458$; the distance light travels through a vacuum in one second.



Module Thirteen: Understanding and Using Color

Section 13.01: Important Concepts

What is Color: Color can be defined as the Visual Quality of Light

In the natural world of animals, birds, and plants, color always has a purpose -- to attract, repel, conceal, communicate, warn, or assure survival. Pigment producing plants do so for a particular reason. It is this psychology that became the driving force behind man's exploration to the world of color.

Human beings have made colored objects since the earliest times, but never in such great quantities as now. Ownership of colored objects was a luxury that was afforded only by the wealthy majority. The age of technology changed all of this and has made color and coloring accessible to all of us.

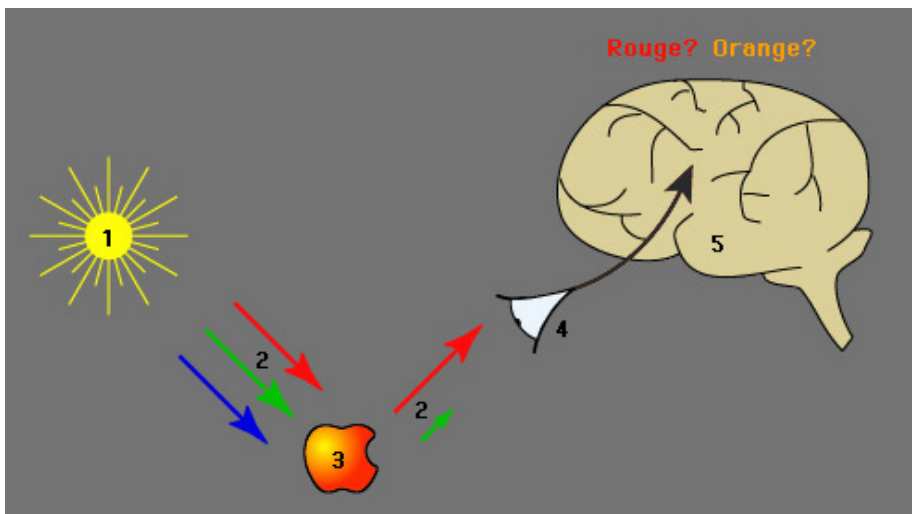
Though we have been living and using color for most of our lives, If one was to ask us the question: "what is all this color for?" most of us will not be able to provide a satisfactory answer.

For present-day humans, has color even begun to lose its purpose and meaning? Now that we have this huge bulk of manufactured color, is its use mostly indiscriminate? Or is purpose and meaning still subliminally inherent in color as a remnant of our biological heritage? Do we for example choose to dress in a particular color for a reason? And what is the significance of color in architecture?

Most of the time, we, the modern generation tend to turn to science for answers to question of this nature. For the scientist, color is nothing but a subjective experience, a mental sensation that can only occur if three requirements are fulfilled:

- An observer,
- An object,
- And sufficient light in the narrow band of wavelengths called the visible spectrum

If color is a mental sensation, how does it happen?



Scientists tell us that when light falls on an object -- for example, an orange -- the surface of the orange has the particular property of absorbing all of the wavelengths of the spectrum except that which, when reflected back to our eyes and processed through the visual system, causes the mental sensation we have named the color "orange".

This being the case, what visual qualities about color should we understand to be able to use it to

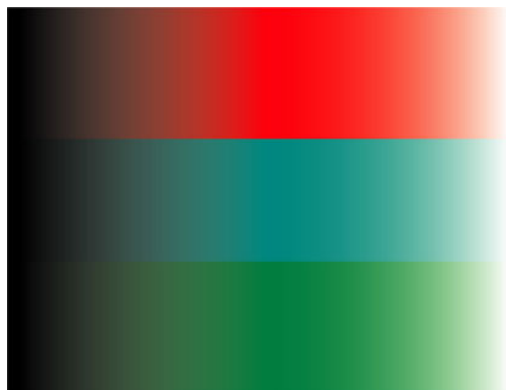
create a desired environment in the objects and spaces that we design? What elements should we learn about in order to be able to use color for design purposes?

Section 13.02: LEARNING ABOUT COLOR

We often take it for granted that we know enough about color to know what we like, and we feel that's sufficient. Yet knowing something more of the enormous body of knowledge about color would help to increase the pleasure in color. With the color we add on any surface, we learn to increase the quality of the object that is related to the expected emotional experience of the object. To be able to use color effectively, there are certain things we need to know about color that are discussed under the following topics.

(a) Color Attributes

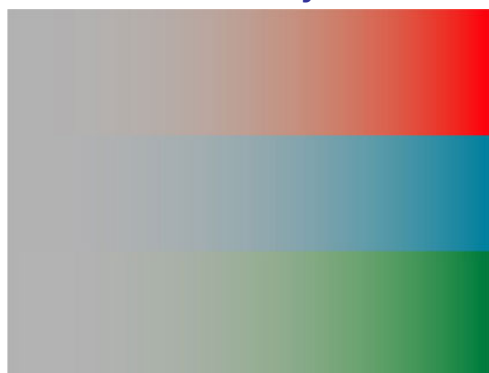
(i) **Hue:** the perceptual attribute associated with elementary color names.



Hue enables us to identify basic colors, such as blue, green, yellow, red and purple. People with normal color vision report that hues follow a natural sequence based on their similarity to one another.

With most color deficits, the ability to discriminate between colors on the basis of hue is diminished.

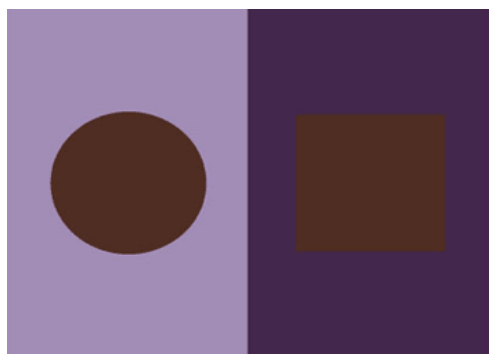
(ii) **Lightness:** corresponds to how much light appears to be reflected from a surface in relation to nearby surfaces.



Lightness, like hue, is a perceptual attribute that cannot be computed from physical measurements alone. It is the most important attribute in making contrast more effective.

With color deficits, the ability to discriminate colors on the basis of lightness is reduced.

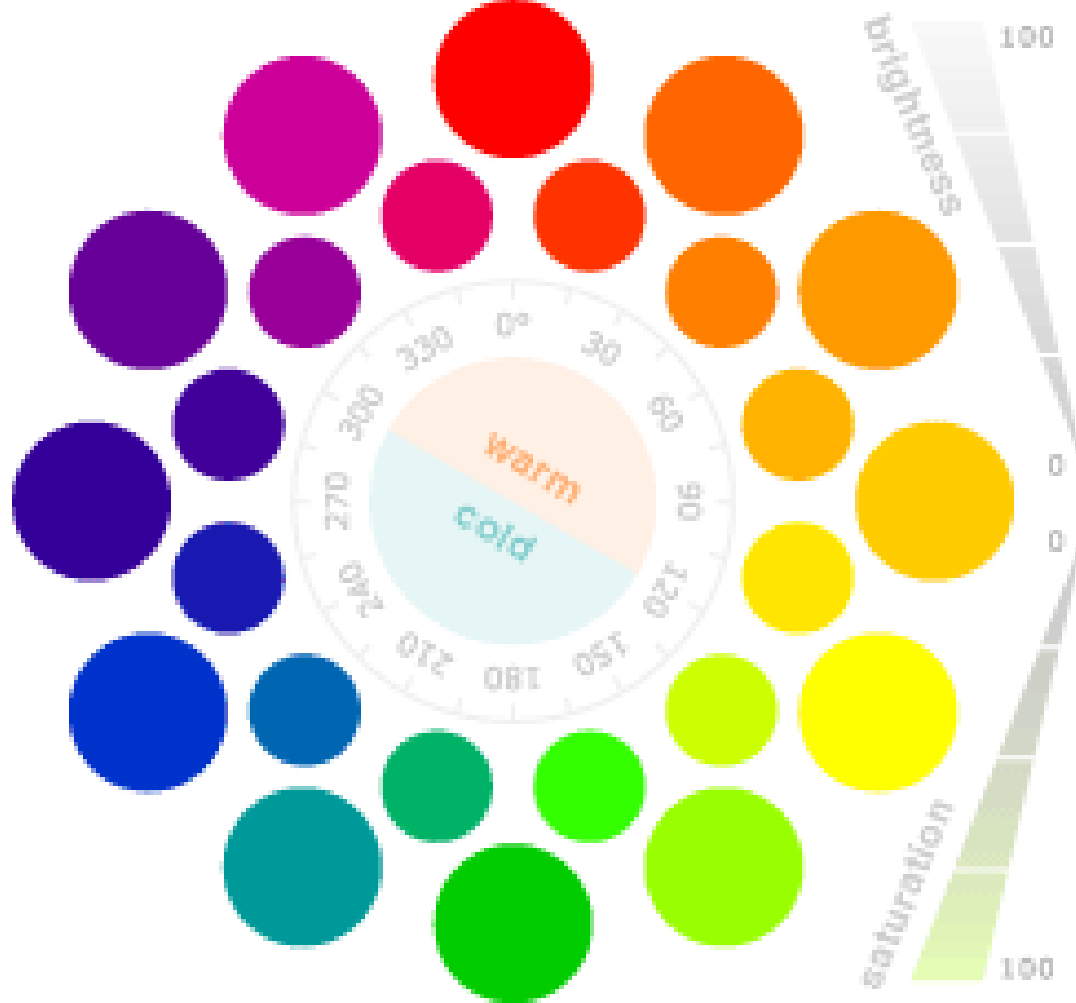
(iii) **Saturation:** is the degree of color intensity associated with a color's perceptual difference from a white, black or gray of equal lightness.



Slate blue is an example of a desaturated color because it is similar to gray. A deep blue, even if it has the same lightness as slate blue, has greater saturation.

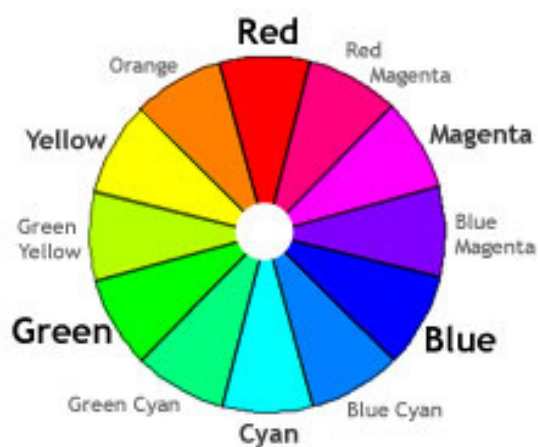
Congenital and acquired color deficits typically make it difficult to discriminate between colors on the basis of saturation.

To a person with color-deficient partial sight, the left-hand panel might appear like the right-hand panel appears to a person with normal color vision.



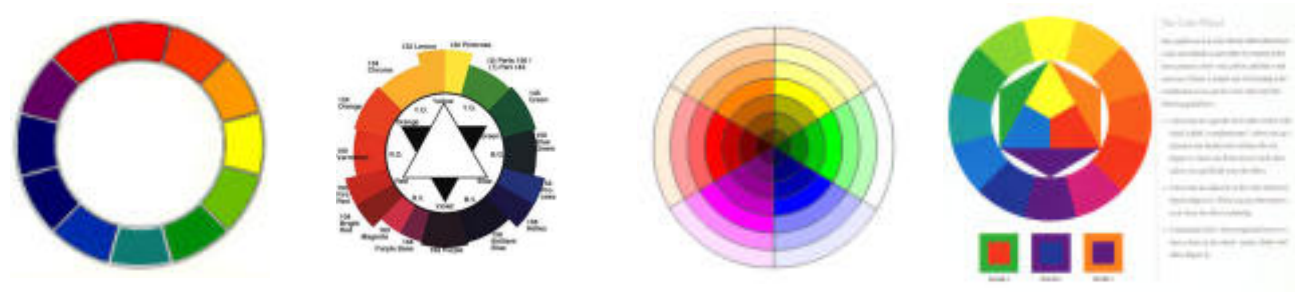
(b) WHEEL OF COLOR

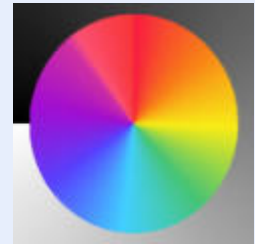
The purpose of constructing the color wheel is to set which colors are opposite each other on a wheel. This in turn will define a context that helps to talk about the possibilities in color combinations.



RGB Color Wheel

There are Different types of color wheels as indicated below.





(c) COLOR SCHEMES

The reason for the study of color schemes is to be able to use the color wheel to put colors together, in a meaningful way. To do so, we have at least three alternative approaches.



A. MONOCHROMATIC

The term monochromatic comes from - "mono" means "one", "chroma" means color; to mean one color and its values. In the case of the example below, notice how the entire composition is made up only of the different values of the color family of yellow:

Example one: Composition using the chroma yellow.

B. ANALOGOUS



As in the case of the example that follows, this sort of composition attempts to use 3 to 5 colors next to each other on the color wheel with their respective values. The example below uses the same drawing as in example one and uses the colors – red-purple, purple, blue-purple, and blue.

Example Two: Composition using red-purple, purple, blue purple, and blue

C. COMPLEMENTARY



This technique attempts to create harmony with simultaneous contrast. Using colors opposite on the color wheel and their respective values can help us create such contrast that gives a harmonious composition.

Example Three: Composition using blue and orange.



D. WARM COLORS

This attempts to use colors of sun and fire, on the right side of the color wheel and their respective values as elements that control the composition.

Example Four: Composition using reds and yellows (and their values)



E. COOL COLORS



This technique will attempt to use cool colors, colors of snow and ice, on the left side of the color wheel and their respective values.

Example Five: Composition example using blues, greens, purples (and their values)

(d) COLORS AND MEMORY

Most experienced painters would be able to differentiate between two values of the same color. For us, those with less experience, telling the difference between two will not be that easy. The reason for this is that we remember colors the way we remember anything else: vaguely, often incorrectly. There are so many shades of so many hues that it's literally impossible for anyone to recollect each of them.

Any one of us will not go to a store to purchase a piece of material to match a specific color without carrying a swatch of the required color with us. We recall with certainty only the names of colors, and the fact that they are dark, or light, very dark, or very light. It's especially difficult to remember changes in colors caused by illumination.

(e) THE MEANING OF COLORS

In his endless search for causes, reasons, explanations, and in his equally endless hope of finding answers to all questions and meanings in all phenomena, man must have stumbled on meanings of colors at an early date.

Didn't a blue sky imply a pleasant day?

Didn't dark clouds announce a storm or rain?

Wasn't the green pasture more pleasing to the eye than the dried-out, dirty-brown vegetation?

Wasn't red the color of blood?

Wasn't white the purest possible color? Didn't darkness frighten people?

Didn't the radiant sun resemble a huge disk of gold?

Later on, certain colors became associated with facts, events, ceremonies, and titles. What may surprise us is to find that some colors have different meanings in various parts of the world.

(i) SYMBOLIC COLORS

We have ample evidence that colors began to have special meanings a very long time ago, and that those meanings were clear to the entire population. As an example, we can take the Ziggurat of Ur, built between 2300 and 2180 B.C. in the Tigris-Euphrates Valley, which consisted of four main stories:

The first story, rising from a white court, was black, symbolizing the underworld;

The second was red, representing the earth;

The third was a blue shrine symbol of heaven

The fourth was a gilded top representing the sun.

Judging by the use of similar colors elsewhere, though, there can be no question that certain hues were selected for symbolical reasons.

(ii) WHAT DO COLORS STAND FOR?

Most colors have several meanings, but they are closely connected with each other. Here are a few examples:

Blue stands for sky, heaven, and water.

Green may also be water, but it generally means hope, the color of spring, the renewal of life, feed for animals, and thus, food for humans. Green also means poison, because arsenic, known in most ancient times, is green, and so is poisonous Sulphate. In more recent times, many poisons were manufactured in green powder form, in order to differentiate them from flour or sugar. Green also symbolizes jealousy, and fear, both of them deadly poisonous emotions.

Red is the color of blood; hence, it represents courage, sacrifice.

Black is death, the underworld, mourning, desolation.

White is purity, chastity, but it's the color of mourning in the Far East. Isn't white as pure, or as empty as black? It's also the color of surrender, because a piece of white on a pole could be seen from a great distance, and could not be mistaken for any kind of flag. White means cowardice, too, because some people surrender for no other reason than to save themselves.

Gold or yellow means the sun, sun-god, wealth. Yellow, however, also represents envy, treachery, cowardice. A yellow flag on a ship signifies contagious disease. In the Western world, yellow is the symbol of a certain type of sensation seeking, destructive journalism, because the most vicious kind of news was printed on colored (yellow) paper to incite the curiosity of the public.

Purple is emblematic of rank and authority. It's derived from the ancient, expensive dye prepared from the purple fish (purpura in Latin, porphyra in Greek). Purple robes were worn by Roman emperors and, later, by high ranking prelates of the Christian church.

Scarlet, a yellow-red hue of very high saturation is also a sign of dignity and high rank. Originally, it was a kind of Persian broadcloth, used for tents and flags. The textile was often dyed this particular red and, eventually, the name of the cloth became synonymous with the color. Scarlet, however, is also applied in an opprobrious manner, to women of ill repute. This association is due to Revelations

Gray means colorless, figuratively as well as literally.

(iii) PSYCHOLOGY OF COLOR

Symbolic meanings of colors have psychological connotations. Nevertheless, colors affect us psychologically regardless of any symbolism. And the psychological effect of one color can be very different from its symbolical significance.

Black may signify mourning, but a black gown or suit, such as a tuxedo, is distinguished and elegant as well, depending upon circumstances. An orange or red gown is loud and flashy, out-of-place, when worn by a woman attending a funeral; but it may be proper and attractive when the same woman wears it at a reception or dance.

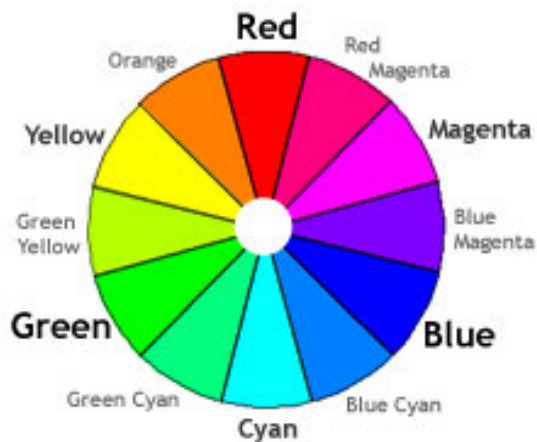
There can be hardly any question but that people prefer bright, sunny days to dark, rainy ones; a bouquet of fresh flowers is more attractive than a shabby trash can full of waste; darkness will always suggest danger and mystery; fire and flames will never cease to be fascinating as well as frightening.

As we have become more conscious of the pleasant or unpleasant reactions to colors, we employ our knowledge in a practical manner. There is now a tendency to paint the walls of hospitals and schools a pale Nile-green, rather than the previously universal dull gray or buff or glaring white; we find the soft green hue more relaxing to eye and soul.

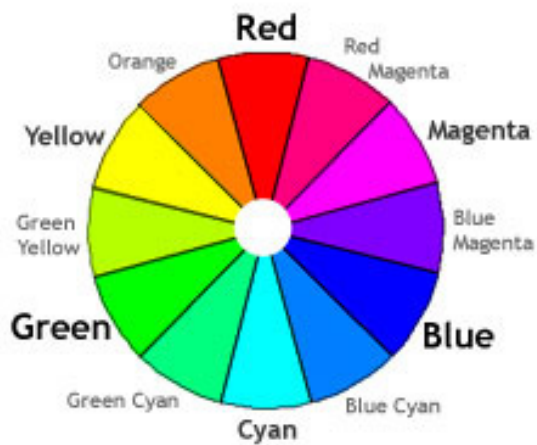
With new discoveries, we now know that:

- A small room looks bigger if painted in light tones
- It would appear to be even larger if one of its walls is done in a different hue;
- The lighter color gives a feeling of space, while the different color appears to open on another dimension.

The study of color is vast. Follow up of the study of color will be continued in the course Arch. 331 where you will be exposed techniques of water and oil painting.



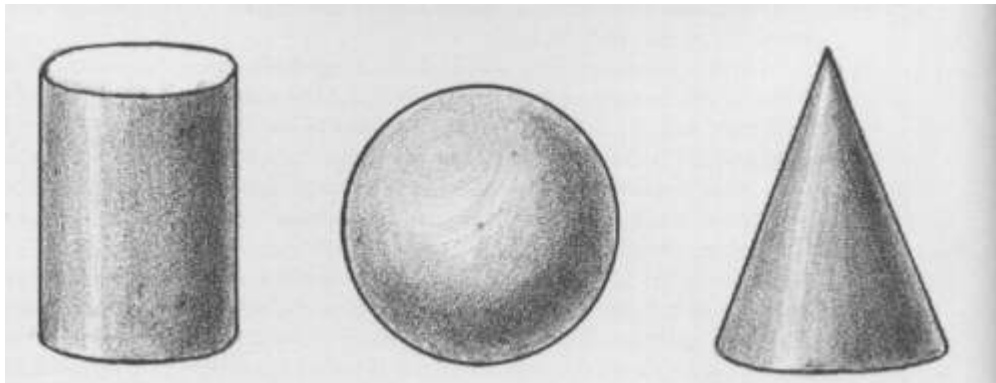
RGB Color Wheel



RGB Color Wheel

By referring to the color wheel, fill the blank circles in the first of the two figures above with opposite colors. If you start with the top circle, the bottom circle should be filled with its opposite color. Continue working by filling all the circles in a clockwise direction.

In the second figure, fill all of the circles uniformly with a single color of your choice. The color of your choice should be your favorite color. By applying a varying value coating using a pencil, create different shades of the same color family in the figure.



EFFECTS OF AFTER IMAGES: Explain what is meant by the phrase.

Module Fourteen: Space

Module Fourteen: Form and the Element of

DEFINITION OF TERMS

DIMENSIONS: Measurable extent as expressed in terms of Length, Width & Depth

FIGURE: External form or bodily shape
Two or three dimensional space enclosed by lines, or surfaces

GROUND: Extent of a subject covered or dealt with

SPACE: Continuous expanse in which objects exist

The study of space should start by limiting the scope of or discussion to three major aspects.

The first element would deal with how spaces are created. If we define space as a continuous expanse, we create a space by establishing boundaries that will divide the space in existence into the space we defined and the space that remains. The topic that deals with this subject will come under the topic "Space Defining Elements", and will explore the techniques of defining space.

The second element deals with how and where the spaces we create get represented. We as designers can represent our works both on two and three dimensional media. The techniques of representing space in the two media will be different owing to the techniques of representing depth. With regards to depth representation, the kind of work we have to undertake will be different while working on two dimensional plane when compared to the activities related to working with a three dimensional form.

Finally, we should have a study of the relationships that can be established between spaces and how we can organize spaces accordingly.

I.FIGURE-GROUND RELATIONSHIP

UNITY OF OPPOSITES

A figure cannot exist without a ground and vice versa

A figure is perceived on a ground if it has some distinction from the latter.

Two dimensional figure exists on a two dimensional ground

Such figures are abstractions that represent reality

We employ techniques of visual illusion to achieve our objective

We use them to convey messages and to study visual relationships in reality.

Three-dimensional figures exist in reality. The abstraction in this case will be that of scale.

SPACE IN TWO DIMENSIONS

Space is usually associated with three-dimensional studies as it is inseparable from the study of three dimensional forms. Where visible in two dimensions, it is usually an illusion. We can walk and exist in a three dimensional space. We represent this space in two dimensions using several techniques.

The study of space & how to represent it has been one of man's earliest fantasies. Man always attempted to communicate ideas using one form or another. The need for communicating ideas falls under the study of sharing of experiences. Early form of graphic arts therefore transmitted real experience, which was just about enough for the early man who had little in the form of higher needs.

With the rise in the need to express oneself, graphic arts became the fancy of early man. They allowed him to have a universal language that can express ideas like music and painting.

With the advancement of modern education, subject specific studies were carried out to try to create a universal language for the understanding, design and representation of spaces. The representation of spaces in two dimensions concentrates on the creation of the feeling of depth on a planar surface using several techniques.

Taking a plane as the extent of our study, we can create a defined space by introducing space defining elements as discussed in the following chapter.

II SPACE DEFINING ELEMENTS

A form is created to make an impact on the space within which it exists. Upon its introduction, it automatically makes divisions on the space. We can therefore state that a form either determines or is determined by the spaces around it.

Horizontal Planes

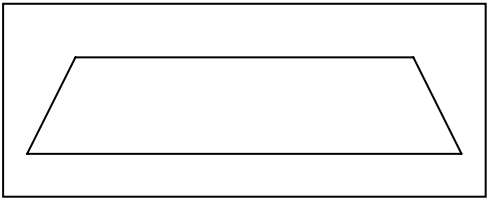
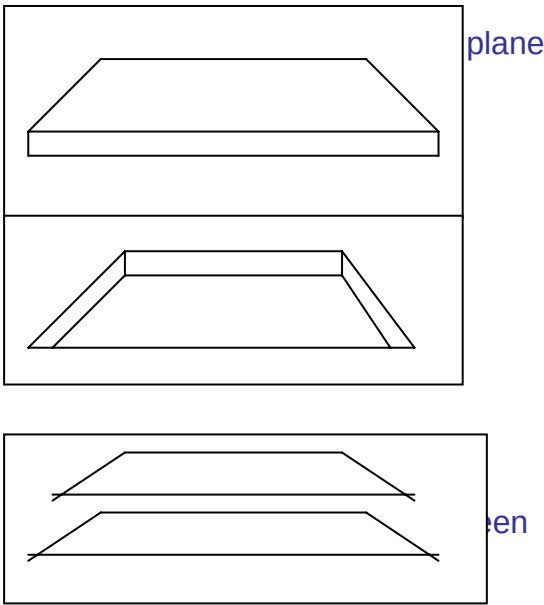


Figure Horizontal Plane -

Ground Contrasting Plane

Result = Field of space

Visual Reinforcements: Reinforcing visual separation between figure & ground

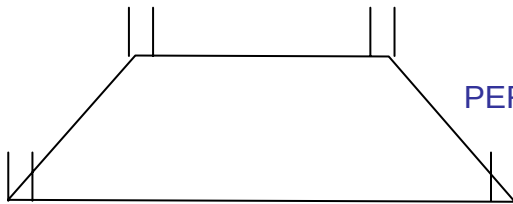


VERTICAL PLANES.

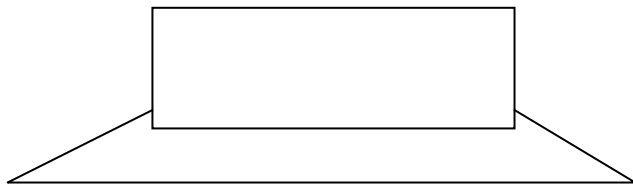
Have greater presence in our visual field.

Claim space immediately around them.

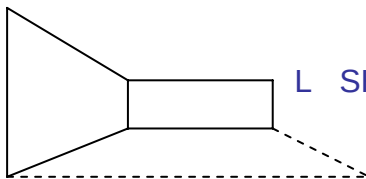
VERTICAL CLEAR ELEMENTS



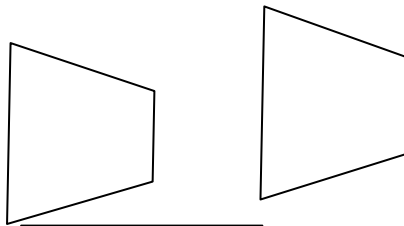
PERPENDICULAR EDGES



SINGLE VERTICAL PLANE



L SHAPED PLANES



SHAPED PLANES

SPATIAL RELATIONSHIPS

Space within a space

Interlocking Spaces

Adjacent Spaces

Space linked by a common space.

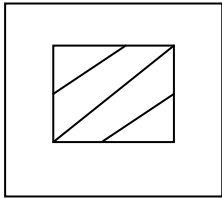
We have so far seen ways of defining space. A space has no extent or limit if not defined. We cannot define a single space. Therefore when we define a single space of interest, we are establishing a relationship between spaces.

What is a relationship?

Association/Connection

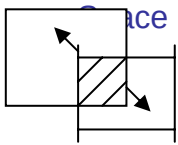
Connection, Correspondence, Contrast, Prevailing Feeling, Bond-Common or not

I. SPACE WITHIN A SPACE

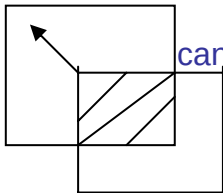


About: Smaller space belongs to the
element
relationship

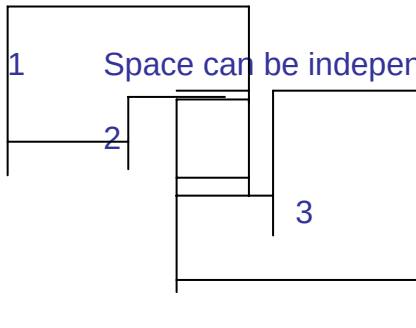
II. INTERLOCKING SPACES.



Space belongs to two larger spaces.

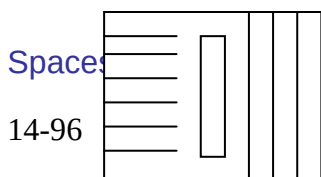


can belong to one of the larger spaces.



Space can be independently defined.

III. ADJACENT SPACES.

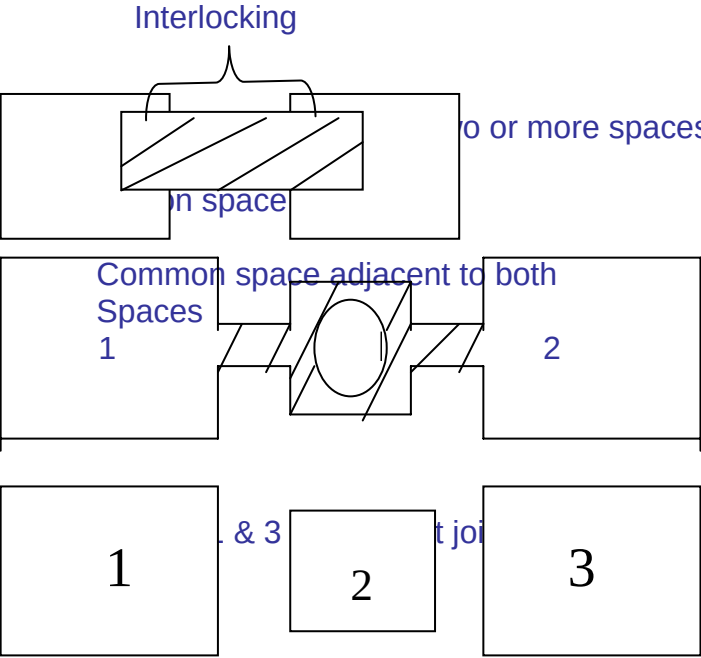


Spaces are part of division, yet they could have been one.

14-96

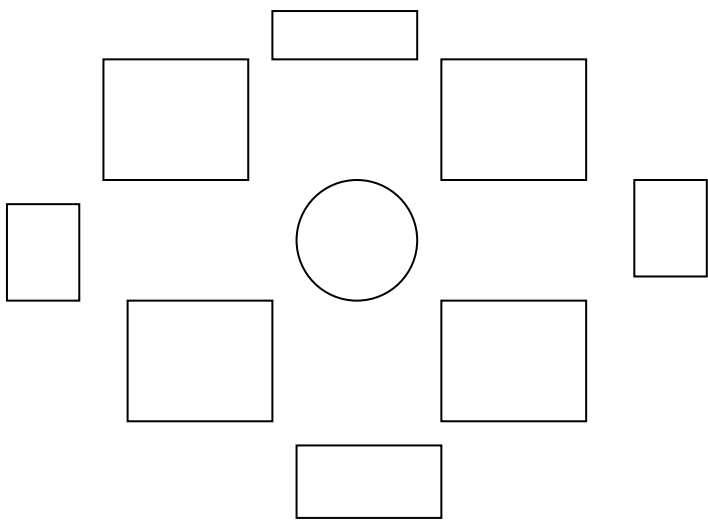


IV. SPACES LINKED BY A COMMON SPACE.



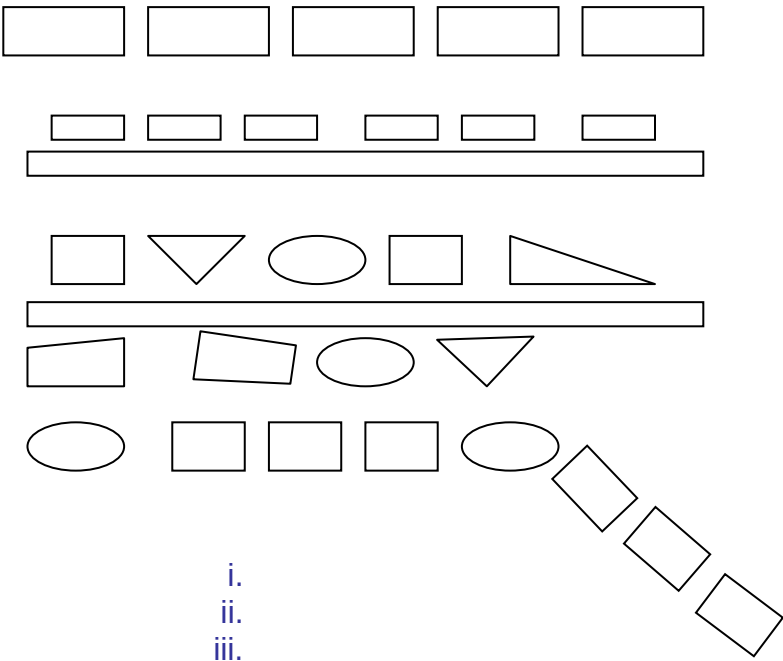
SPATIAL ORGANIZATION: Overall effect suggested by the manner of organization.

I. CENTRALIZED



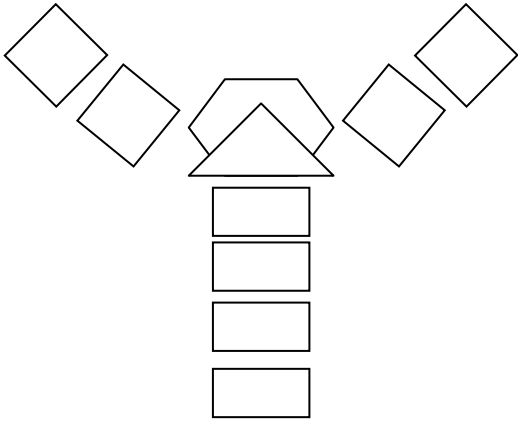
LINEAR

Linear sequence of repetitive elements



iv. III. RADIAL

A central space from which linear organizations of space extend in a radial manner



IV. CLUSTER

Spaces ground by proximity or by sharing a common visual trait.

→ Proximity
Shape.

→ Similar

Related by axis

Yet

Not Linear

V. GRID

Spaces organized within a field of structural or 3-Dimensional grid.

Module Fifteen: Putting the Semester in Perspective: A Summary of Design Basics

Principles and Use of Elements of Design

Principles of Design are the laws of designing anything! When making a design the seven principles are contrast, emphasis, balance, unity, pattern, movement, and rhythm. Consider each of these carefully for any design and you'll be guaranteed a great project!

Contrast means showing differences in two different sections of the design or showing somehow that the design being created is very different from other designs because of its contrast. Contrast can also be used to show emphasis in any part of the design.

Emphasis is given to an area within the design because that area is meant to be seen or is more important to be noticed when compared to other places of the design. For example, your design might be to have white parallel lines going up and down. In the center of this design, you could have a circle. This circle would be a part on the design that is emphasized.

Balance means keeping your design like a pattern. A balanced pattern would be if you had a border on your pattern in black. Unbalanced would be if approximately one-third of the border was orange and the other two-thirds in pink. To keep your design balanced, make your measurements as accurate as possible. Keeping your design symmetric is a good technique for good balance, but not necessarily the best for all types of designs.

Unity means keeping your design in a sort of harmony in which all sections of the pattern make other sections feel complete. Unity helps the design to be seen as one design instead of randomness all around your design.

Pattern is simply keeping your design in a certain format. For example, you could plan to have wavy lines all around your design as a pattern, but then you must continue those wavy lines throughout the design for good patterns. It wouldn't look good if suddenly you stopped all the wavy lines and drew a picture of a dog.

Movement is the suggestion or illusion of motion in a painting, sculpture, or design. For example, circles going diagonally up and down from right to left could show that the design moves up and to the right or down and to the left.

Rhythm is the movement or variation characterized by the regular recurrence or alternation of different quantities or conditions. In simpler words, it's just like pattern and shows that the design has a 'beat' or 'flow' going with it. A plain white box has almost no rhythm what so ever.

Elements of Design are components that are assembled when making a design. The seven elements of design are color, value, texture, shape, form, space, and line. Elements of design will help your design look a lot more unique from other designs, and can help make the design symbolize anything!

Line defines the position and direction of the design. If you have lines or shapes that seem to be running horizontally, then the design would seem like it's running in a left and right line. Make sure your design identifies some sort of line so that the human eye can recognize which side is the top of the design or on which side the design is suppose to start with interest.

Shape is something distinguished from its surroundings by its outline within your design. You can make your whole work a certain shape besides the common square, and then have shapes within the design shape. This makes the design more complex.

Form is similar to the idea of shape. Form is the structure of your design and how everything in the design looks like it's meant to go together. If the form is well planned and then carried out, it almost guarantees your design in black and white will be a success.

Space has to be included in your design. Space means leaving some blank areas. Why would you want to leave parts of the design blank? Sometimes a human's eye needs space to feel comfortable, and space will let the human's eye distinguish the part that's meant to be noticed compared to just the background. Sometimes not including space in your design is ok, but make sure it doesn't make it look messy.

Texture helps your design to be distinctive or have identifying character and characteristics. With the proper texture, your design will look more fascinating than the average design.

Color is an easy one. Just make sure your design's color is right for the mood! Also make sure that each section's color matches another section's color. Color is probably the biggest element to pay attention to.

Value is the relative darkness or lightness of a color. Just as said in the paragraph above, make sure the colors you put on your design are dark or light enough for the proper mood. If you want to show a sad figure in your design, most people would give the design a darker value. On the other hand to show happy children playing around most people would recommend lighter colors.

