# Pigments and Colour Theory

## 3000 BCE to the present

**Learning Goals:**

- A brief history of pigments and their uses
- Controlling hue, value, and intensity of colour
- Exemplars for abstract colour design project

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# A Basic History of Pigments

More than 15,000 years ago cavemen began to use colour to decorate cave walls. These were earth pigments, yellow earth (Ochre), red earth (Ochre) and white chalk. In addition they used carbon (Lamp) black by collecting the soot from burning animal fats.

These colours were all that were needed to produce the sensitive and exquisite drawings and stencils which we are still able to see today.

Cave painting, Lascaux, France, 15,000 to 10,000 B.C.

# A Basic History of Pigments

**The Egyptians** (6,000 years ago)
By 4,000 BCE the Egyptians show evidence of serious colour manufacture.

The **earths colours** had been cleaned by washing, increasing their strength and purity and new pigments appear from the use of minerals.

Perhaps the most famous is **Egyptian Blue**, first produced around 3,000 BC. This was a blue glass made from sand and copper which was then ground into a powder.

# A Basic History of Pigments

*Red Leaves*
*By Qi Baishi*
*Early to mid 1900's*

**The Chinese**
(2500 years ago)

**Vermilion** was developed in China around 2,000 years before it was used by the Romans.

**Vermilion** was made by heating mercury and sulphur, producing an extremely opaque, **strong red pigment**.

# A Basic History of Pigments

**The Ancient Greeks**
**(2600 – 2800 years ago)**

The Greeks also added to the artists' palette, namely by manufacturing **white lead**, the **first fully opaque white** (Flake White, Cremnitz White). This took several months, by stacking lead strips in a confined space amongst vinegar and animal dung.

The Greeks also made **red lead**, which was used for priming metal until the 1990's when lead pigments were banned for use by the general public.

# A Basic History of Pigments

## Medieval Painting

Verona Green or Terre Verte (Green Earth) was the principle underpainting colour for flesh tones.

The overpainting on this medieval illumination faded over the centuries revealing the terre verte underpainting beneath

# A Basic History of Pigments

**The Renaissance** (500 years ago)

The Italians further developed the range of earth pigments by roasting siennas and umbers to make the deep rich red of Burnt Sienna and the rich brown of Burnt Umber.

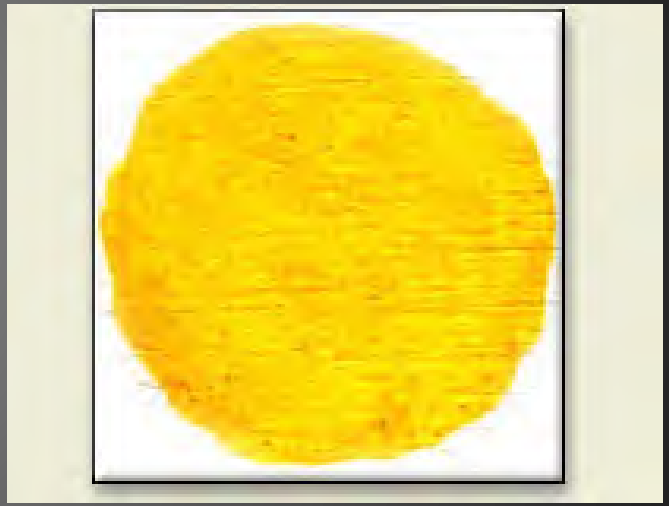

Earth colours featured heavily in their painting technique, Terre Verte (Green Earth) being the principle underpainting colour for flesh tones.

# A Basic History of Pigments

## Post-Enlightenment/Industrial Revolution

Stromeyer discovered metallic cadmium in 1817 but production of the cadmium pigments was delayed until about 1840 because of the scarcity of the metal.

Cadmium sulfide was prepared with an acid solution of cadmium salt (either chloride or sulfate) which was heated with hydrogen sulfide gas until a powder was formed. Hues ranging from a lemon yellow to a deep orange were made in this way.



Cadmium yellow

The deeper varieties of cadmium yellow and orange were the most permanent. The paler varieties were known to fade on exposure to sunlight.

# A Basic History of Pigments

**Modern Pigments of the 20th Century**

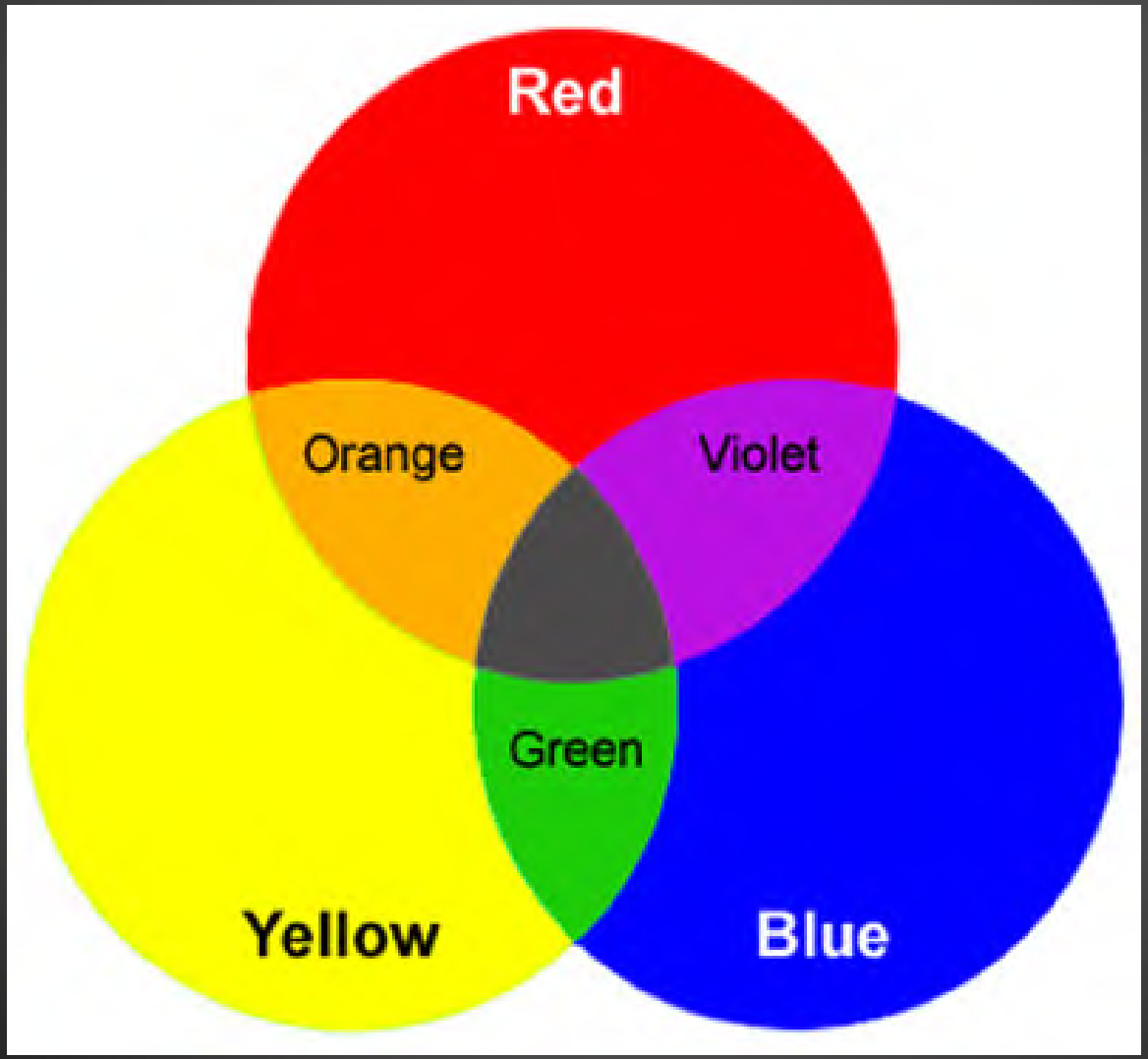
The permanence of colours available to the artist today is beyond the imagination of previous generations.

*The Joy of Life* by Henri Matisse

Modern organic pigments derived from petroleum have yielded colours of great brilliance and permanence. The complex chemical nature of these colours results in the similarly complex names of the colours.

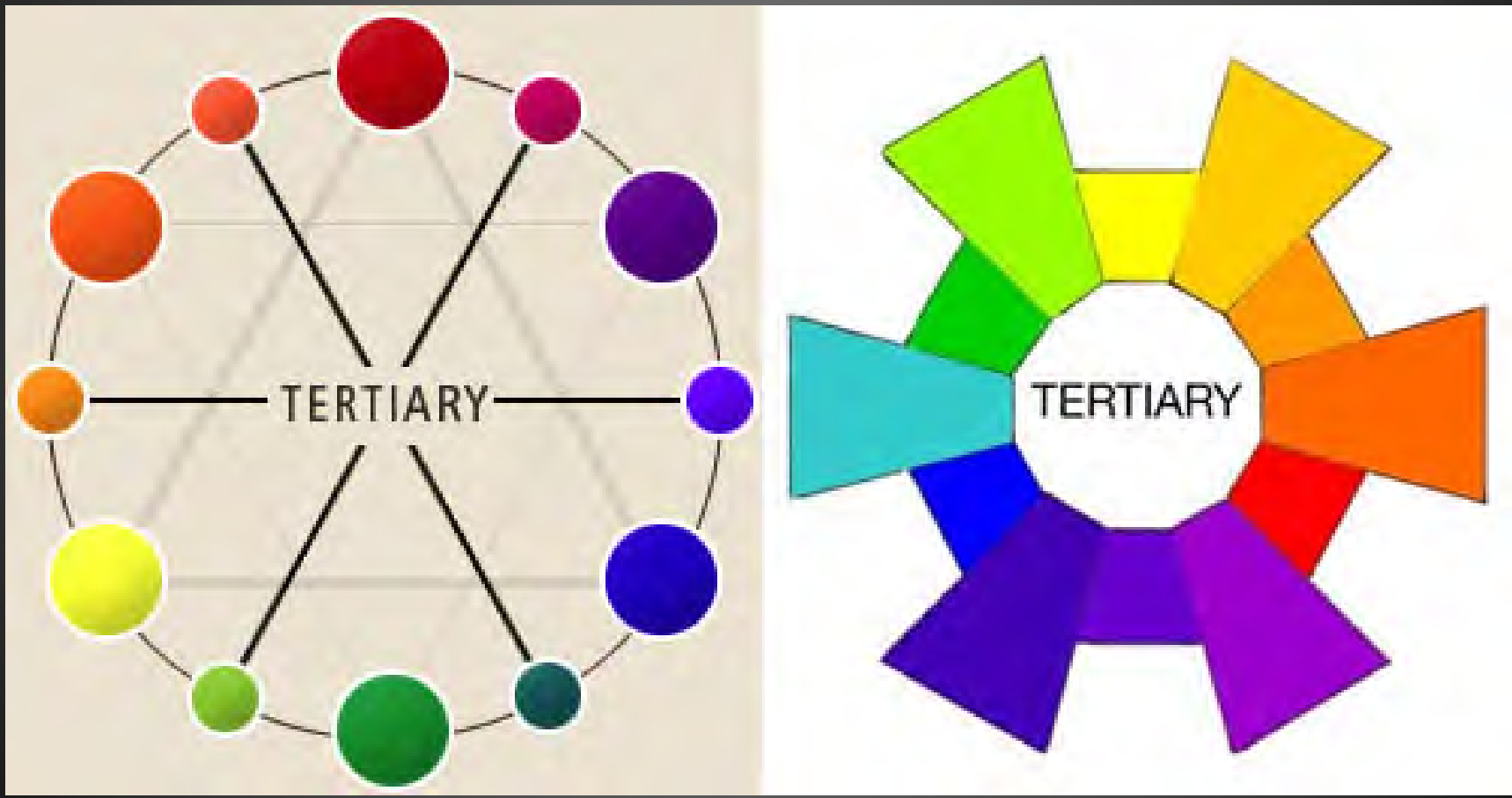
# An introduction to Colour

## Primary and Secondary Pigments



# An introduction to Colour

**Tertiary Pigments**



# An introduction to Colour

## Hues, Tints and Shades

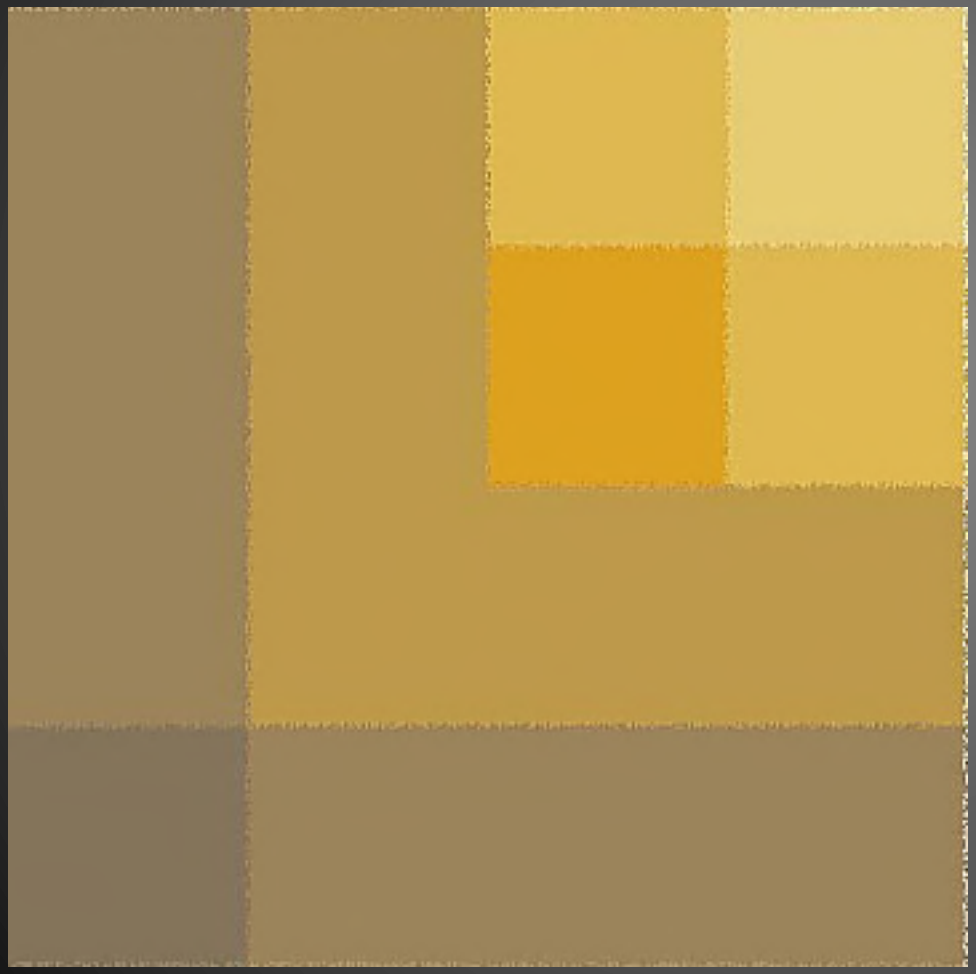

**Hue** is the term used for the name of any color, e.g. yellow, orange, red, and blue all are hues. The main property of the color.

**Tints** are the lightened versions of the hue (made by adding white)

**Shades** are the darkened versions of the hue. Amateurs add black to create shades, more advanced painters use the **complement** of the hue to darken it

# An introduction to Colour

**Intensity (purity/saturation)**



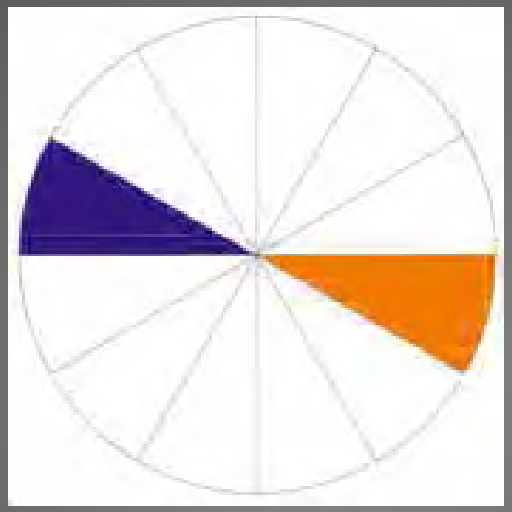
**Intensity** is the saturation or purity of the color, its brightness or dullness.

In other words it's the force of the color, full force might be a bright red color.

The blocks of colour in this painting have similar values, but varying intensities

# An introduction to Colour

## Intensity (purity/saturation)



Blue and orange are opposite each other on the colour wheel – this makes them **complements**.


**Intensity** is controlled by mixing the hue and its **complement**, as well as some white together.

The more complement is added, the grayer (less intense) the colour becomes. Without white the colour will darken, in some cases to a black.

Thus if an artist has control over the amount of white and complement added to the hue s/he is working with, many new colour possibilities emerge.

# *Exemplar – Assignment #1*

Creative Colour Wheel with Secondary & Tertiary Colours

# *Exemplar – Assignment #2*

Creative Colour Value scale showing tints, hues & shades

# *Exemplar – Assignment #3*

Abstract Design using four **monochrome** palettes