

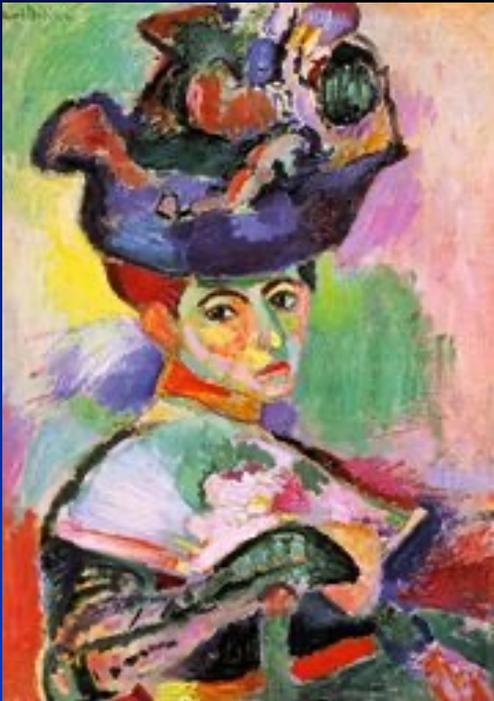
Art & Physics III



Dr Clare Z

Color

Fauvism



Henri Matisse. Woman with a Hat, 1905

Space

Cubism



Picasso. Three Musicians, 1921

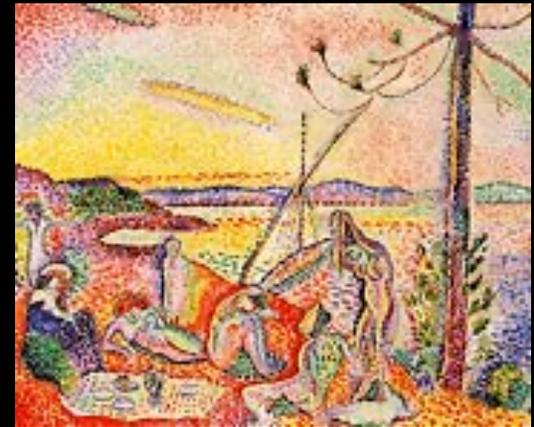
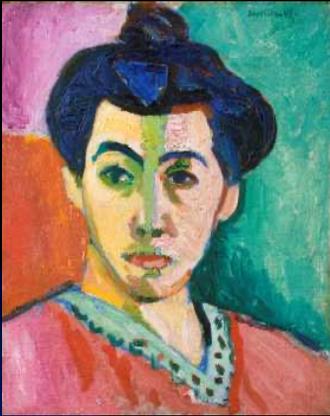
Time

Futurism



Marcel Duchamp. Nude Descending a Staircase No. 2, 1912

Fauvism



Matisse, *Luxe, Calme et Volupté*, 1904



Matisse, *Open Window, Collioure*, 1905



Andre Derain,
The Turning Road, L'Estaque 1906



Derain,
Charing Cross Bridge, London, 1906



Maurice de Vlaminck, *The River Seine at Chatou*, 1906





Matisse

“Maxwell’s equations, which were an extension of Newton’s mechanical interpretation of the world . . . failed to predict one feature of reality. This failure, which was the inability to explain why heated bodies change colors with an increasing rise in temperature, became known in physics as the problem of the ‘ultraviolet catastrophe.’ The problem remained unsolved until 1900, when Max Planck explained this mystery.

With the formulation of a deceptively simple equation, his solution opened the vista upon a whole new field of physics that would be called quantum mechanics. Planck proposed that the energy possessed by matter can be changed into radiation only in discrete chunks he called *quanta*.

Formerly, it had been believed this energy traveled through space as a smooth continuous wave. Planck’s tiny packets came as a surprise to physicists. Color was the clue to unlocking this mighty secret of nature.”

Shlain

A study of eighty-eight languages and dialects revealed that “. . . as societies advanced and added to their vocabularies, the words for color followed the spectrum of light from red to blue. Only in the most mature languages, belonging to the most sophisticated civilizations, does a separate word for the color blue make an appearance, and usually it does so very late in the culture’s development.”

Shlain

Sir Joshua Reynolds, a conservative academic painter, held that blue should be restricted to background sky and water, and taught his students that it must not be used in the foreground of a painting.

When his leading rival of the day, Thomas Gainsborough, a freer spirit, learned about Reynold's dogma, he promptly created the first predominately blue painting, *The Blue Boy* (1770), in order to prove that an artist could, from a compositional standpoint, use blue in the foreground."

Shlain



“After Monet, Gauguin, and van Gogh began to use its high energy, blue gradually came to dominate the compositions of one painting after another by the artists throughout the late nineteenth century.”

“The hummingbirdlike vibration of blue burst forth in Fauvism where it was released from its prison in the sky and then could be a tree, a face, grass, or anything. In 1901 Picasso chose blue not just for one painting but for a whole period of his work.”

Shlain



Picasso. Femme aux Bras Crois, 1902

“But for all the blue expended in this century’s art, the ‘Blue Award must go to Matisse, the Fauvist, who best captured the essence of blue. In his famous 1909 work *The Dance* a vibrant, monochromatic lapis lazuli background provides the atmosphere for the wild, circular dance of five Dionysian maenads.”

Shlain



The immense deep blue background is quite startlingly prescient because physicists have discovered since the painting was made that the representative color of nuclear energy is blue”

Shlain

1902

“Radium had something better than ‘a beautiful color’: it was spontaneously luminous. And in the somber shed where, in the absence of cupboards, the precious particles in their tiny glass receivers were placed on tables or on shelves nailed to the wall, their phosphorescent bluish outlines gleamed, suspended in the night.”

Madame Curie: A Biography by Eve Curie

In 1910 Einstein, building upon Lord John Rayleigh's work, published a paper concerning 'critical opalescence' that explained in detailed and complex equations the physical basis for the phenomenon of the sky's blue color."

Shlain

Cubism



Georges Braque, *Woman with a Guitar*, 1913



Juan Gris, *Portrait of Picasso*, 1912, oil on canvas

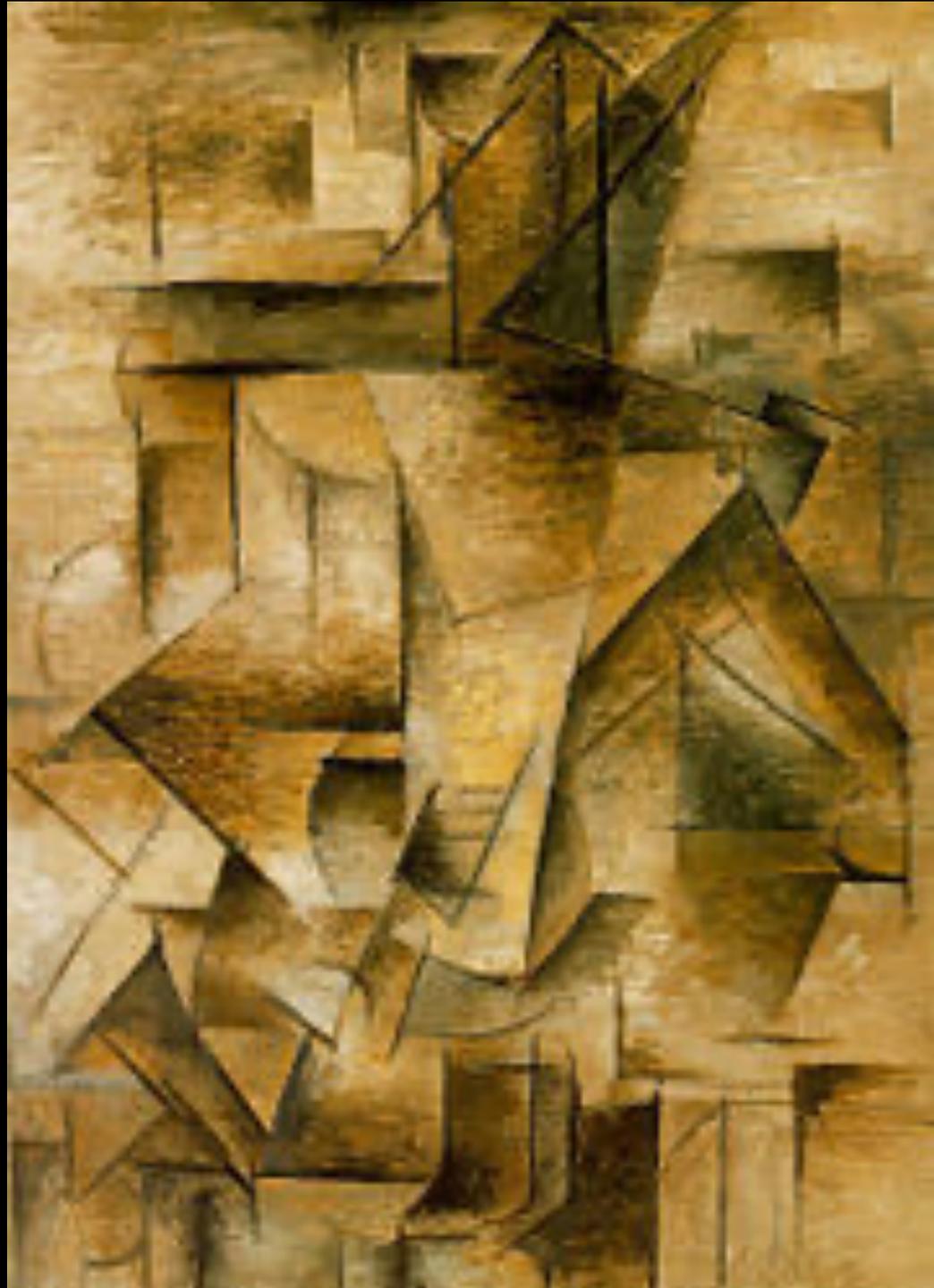


Gris, *Still Life with Fruit Dish and Mandolin* 1919, oil on canvas



Pablo Picasso, *Le guitariste*, 1910





“Illusionist perspective art has four dimensions: the three of perspective, and the moment of time the realistic painting portrays. Picasso’s visionary insight just before Minkowski’s formulation of spacetime was the development of an art form that eliminated time. The sequential frozen moment common to all previous art is gone. Cubism is an art form that has neither implicit nor explicit sequential time.” Shlain



“In many of his Cubists works, Braque inverted the artistic concept of *disegno*—contour drawing—which is based on the principle that things high in contrast appear closer than things low in contrast. While a Renaissance painter, highlighting an apple, painted a white dot where the apple was closest to the viewer’s eye and progressively shaded the rest of the apple evenly toward the periphery, Braque placed a *black* dot where the white should have been and lightened the apple’s outline as he moved toward its circumference. His disordering of shadows, flattening of length, and ambiguity of modeling faithfully represent the way shadows most likely would appear at speeds approaching *c*.”

Shlain

Futurism



Carlo Carrà, *Funeral of the Anarchist Galli* (1910-1911)



Umberto Boccioni, *The City Rises* (1910)



Giacomo Balla, *Dynamism of a Dog on a Leash* (1912)



Balla

In 1912, Marcel Duchamp was invited to exhibit with the Italian futurists. Apollinaire, spokesperson for the cubists, argued heatedly into the night with other cubists but without Duchamp. They decided to have Duchamp remove *Nude Descending a Staircase, No. 2* from the show because it was *too* futuristic.



“Since Manet and continuing through the works of Cezanne, Gaugin, and Van Gogh, artists increasingly preferred flattened perspective to illusionist depth.”

Shlain



Gauguin



Gauguin



Cezanne



Van Gogh



Van Gogh



Cezanne





“The length of objects viewed from the side windows of the relativistic train becomes increasingly contracted, creating the illusion that height elongates. This strange distortion of form is one of the quirks of the special theory of relativity. Knowledge of it did not disseminate into the general population until the late 1920s, and even then, the number of people able to understand it was small. And yet, it was Cezanne who began to explore elongation as early as the 1880s, and this odd convention went on to become a ubiquitous feature of modern art. Almost simultaneously, a wide range of artists who were not necessarily influenced by Cezanne elongated their figures.”



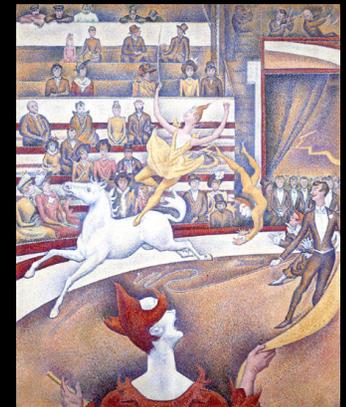
Chagall



Swiss sculptor, Alberto Giacometti



Picasso



Seurat

Shlain





Giacometti

“Kandinsky, Malevich and Mondrian all eliminated the very notion of perspective from their work . . .”

Shlain



“Even though Picasso began work on his revolutionary Cubist work *Les Femmes d'Alger* in 1907, no artist wrote about non-Euclidean space or the fourth dimension until 1911.” Shlain



“The first reference in art appeared in a speech by the French poet Guillaume Apollinaire who took it upon himself to defend the new Cubist art against its many detractors. In his speech, he spoke about young painters’ preoccupation with the ‘new measure of space, which in the language of the modern studios are designated by the term, fourth dimension.’” Shlain

