

Indigo

Indigo is a deep and rich color close to the color wheel blue (a primary color in the RGB color space), as well as to some variants of ultramarine. It is traditionally regarded as a color in the visible spectrum, as well as one of the seven tertiary color on the rainbow: the color between purple and blue; however, sources differ as to its actual position in the RYB color wheel electromagnetic spectrum

The color indigo is named after the indigo dye derived from the plant *Indigofera tinctoria* and related species.

The first known recorded use of indigo as a color name in English was in 1289.^[3]



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Indigo	
	
A piece of indigo plant dye from India, about 6 cm (2.5 in) square	
Wavelength	450–420 ^[1] (disputed) nm
Color coordinates 	
Hex triplet	# 4B0082
sRGB ^B (r, g, b)	(75, 0, 130)
CMYK ^H (c, m, y, k)	(42, 100, 0, 49)
HSV (h, s, v)	(275°, 100%, 51%)
Source	HTML/CSS ^[2]
B: Normalized to [0–255] (byte) H: Normalized to [0–100] (hundred)	

History

Species of *Indigofera* were cultivated in East Asia, Egypt, India, and Peru in antiquity. The earliest direct evidence for the use of indigo dates to around 4000 BCE and comes from Huaca Prieta, in contemporary Peru.^[4] Pliny the Elder mentions the Indus Valley Civilization as the source of the dye after which it was named. It was imported from there in small quantities via the Silk Road.^[5] The Ancient Greek term for the dye was Ἰνδικὸν φάρμακον ("Sindhi dye"), which, adopted to Latin as *indicum* and via Portuguese gave rise to the modern word indigo.^[6]

Indigo was actually a plant that got its name because it came from the Indus Valley Civilisation, discovered some 5,000 years ago, where it was called *nila*, meaning dark blue. And by the 7th Century BC, people started using the plant as a dye; the Mesopotamians were even carving out recipes for making indigo dye onto clay tablets for record-keeping. By 1289, knowledge of the dye made its way to Europe, when the Venetian merchant travder Marco Polo reported on it.^[7]

However, it wasn't until 1640 when demand started to pick up for indigo. Spanish explorers discovered an American species of indigo and began to cultivate the product in Guatemala. The English and French subsequently began to encourage indigo cultivation in their colonies in the West Indies.^[8]

Blue dye can be made from two different types of plants: the indigo plant, which produces the best results, and from the woad plant, also known as pastel^[9]. The British were producing indigo with woad, a plant that yielded a lesser quality dye, but a plant they could grow. They even tried to hold their monopoly on indigo dye by managing to ban the indigo plant for years, claiming that it was poisonous. But eventually the British began to focus on tea and other crops, and meanwhile, the French started to get their fair share of the market.

But this was problematic. The French had gone to war with Britain, so the British could hardly rely on the French for this precious blue dye. Consequently, the British had to turn to their colonies in America. It was Eliza Lucas from South Carolina who figured out how to grow the indigo plant and use it to make indigo cakes that would support British demand.^[7]

A similar dye is contained in the woad or pastel^[9] plant, *Isatis tinctoria*, which for a long time was the main source of blue dye in Europe. Woad was replaced by true indigo as trade routes opened up, and both plant sources have now been largely replaced by synthetic dyes.

Classification as a spectral color

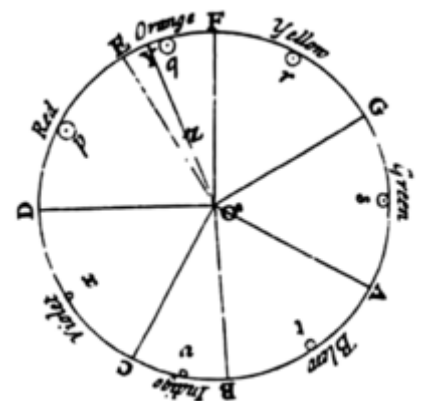
The Early Modern English word *indigo* referred to the dye, not to the color (hue) itself, and *indigo* is not traditionally part of the basic color-naming system.^[10] Modern sources place indigo in the electromagnetic spectrum between 420 and 450 nanometers,^{[1][11][12]} which lies on the short-wave side of color wheel (RGB) blue, towards (spectral) violet.

However, the correspondence of this definition with colors of actual indigo dyes is disputed. Optical scientists Hardy and Perrin list indigo as between 445^[13] and 464 nm wavelength,^[14] which occupies a spectrum segment from roughly the color wheel (RGB) blue extending to the long-wave side, toward azure.

Isaac Newton introduced indigo as one of the seven base colors of his work. In the mid-1660s, when Newton bought a pair of prisms at a fair near Cambridge, the East India Company had begun importing indigo dye into England,^[15] supplanting the homegrown woad as source of blue dye. In a pivotal experiment in the history of optics, the young Newton shone a narrow beam of sunlight through a prism to produce a rainbow-like band of colors on the wall. In describing this optical spectrum, Newton acknowledged that the spectrum had a continuum of colors, but named seven: "The original or primary colours are Red, yellow, Green, Blew, & a violet purple; together with Orang, Indico, & an indefinite varietie of intermediate gradations."^[16] He linked the seven prismatic colors to the seven notes of a western major scale,^[17] as shown in his color wheel, with orange and indigo as the semitones. Having decided upon seven colors, he asked a friend to repeatedly divide up the spectrum that was projected from the prism onto the wall:

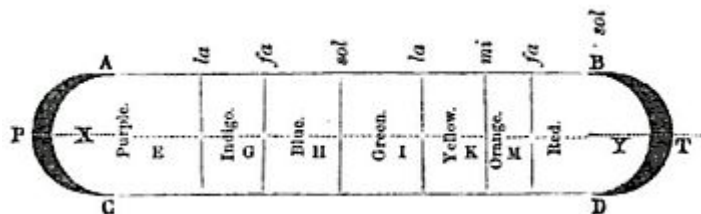


Extract of natural indigo applied to paper



Indigo is one of the colors on Newton's color wheel

I desired a friend to draw with a pencil lines cross the image, or pillar of colours, where every one of the seven aforementioned colours was most full and brisk, and also where he judged the truest confines of them to be,



Newton's observation of prismatic colors. Comparing this to a color image of the visible light spectrum will show that indigo corresponds to blue, while blue corresponds to cyan.

whilst I held the paper so, that the said image might fall within a certain compass marked on it. And this I did, partly because my own eyes are not very critical in distinguishing colours, partly because another, to whom I had not communicated my thoughts about this matter, could have nothing but his eyes to determine his fancy in making those marks!^[18]



Traditional seven colors of the rainbow

Indigo is therefore counted as one of the traditional colors of the rainbow, the order of which is given by the mnemonic Roy G. Biv. James Clerk Maxwell and Hermann von Helmholtz accepted indigo as an appropriate name for the color flanking violet in the spectrum.^[19]

Later scientists conclude that Newton named the colors differently from current usage.^{[20][21]} According to Gary Waldman, "A careful reading of Newton's work indicates that the color he called indigo, we would normally call blue; his blue is then what we would name blue-green, cyan or light blue."^[22] If this is true, Newton's seven spectral

colors would have been:

Red: ■ Orange: ■ Yellow: ■ Green: ■ Blue: ■ Indigo: ■ Violet: ■

The human eye does not readily differentiate hues in the wavelengths between what we today call blue and violet. If this is where Newton meant indigo to lie, most individuals would have difficulty distinguishing indigo from its neighbors. According to Isaac Asimov, "It is customary to list indigo as a color lying between blue and violet, but it has never seemed to me that indigo is worth the dignity of being considered a separate color. To my eyes it seems merely deep blue."^[23]

Modern color scientists typically divide the spectrum between violet and blue at about 450 nm, with no indigo.^{[24][25]}

Distinction among the four major tones of indigo

Like many other colors (orange, rose, and violet are the best-known), indigo gets its name from an object in the natural world—the plant named indigo once used for dyeing cloth (see also Indigo dye).

The color *electric indigo* is a bright and saturated color between the traditional indigo and violet. This is the brightest color indigo that can be approximated on a computer screen; it is a color located between the (primary) blue and the color violet of the RGB color wheel.

The web color *blue violet* or *deep indigo* is a tone of indigo brighter than pigment indigo, but not as bright as electric indigo.

The color *pigment indigo* is equivalent to the web color indigo and approximates the color indigo that is usually reproduced in pigments and colored pencils.

The color of indigo dye is a different color from either spectrum indigo or pigment indigo. This is the actual color of the dye. A vat full of this dye is a darker color approximating the web color midnight blue.

Below are displayed these four major tones of indigo.

Electric indigo



"Electric indigo" is brighter than the pigment indigo reproduced below. When plotted on the [CIE chromaticity diagram](#), this color is at 435 nanometers, in the middle of the portion of the spectrum traditionally considered indigo, i.e., between 450 and 420 nanometers. This color is only an approximation of spectral indigo, since actual spectral colors are outside the [gamut](#) of the [sRGB](#) color system.

Color coordinates	
Hex triplet	#6F00FF
sRGB ^B (r, g, b)	(111, 0, 255)
CMYK ^H (c, m, y, k)	(57, 100, 0, 0)
HSV (h, s, v)	(266°, 100%, 100 ^[26] %)
Source	[1]
B: Normalized to [0–255] (byte) H: Normalized to [0–100] (hundred)	

Deep indigo (web color blue-violet)

At right is displayed the web color "blue-violet", a color intermediate in brightness between electric indigo and pigment indigo. It is also known as "deep indigo".

Blue-Violet	
Color coordinates	
Hex triplet	#8A2BE2
sRGB ^B (r, g, b)	(138, 43, 226)
CMYK ^H (c, m, y, k)	(63, 81, 0, 0)
HSV (h, s, v)	(271°, 81%, 89%)
Source	X11
B: Normalized to [0–255] (byte) H: Normalized to [0–100] (hundred)	

Light indigo (web color indigo)

The color box at right displays the web color indigo which is equivalent to "light indigo", the color indigo as it would be reproduced by artists' paints as opposed to the brighter indigo above (electric indigo) that is possible to reproduce on a computer screen. Its hue is closer to violet than to indigo dye for which the color is named. Pigment indigo can be obtained by mixing 55% pigment cyan with about 45% pigment [magenta](#).

Compare the subtractive colors to the additive colors in the two primary color charts in the article on [primary colors](#) to see the distinction between electric colors as reproducible from light on a computer screen (additive colors) and the pigment colors reproducible with pigments (subtractive colors); the additive colors are significantly brighter because they are produced from light instead of pigment.

Light indigo (web color indigo) represents the way the color indigo was always reproduced in pigments, paints, or colored [pencils](#) in the 1950s. By the 1970s, because of the advent of [psychedelic art](#), artists became used to brighter pigments, and pigments called "bright indigo" or "bright blue-violet" that are the pigment equivalent of the electric indigo reproduced in the section above became available in artists' pigments and colored pencils.

Tropical indigo

Tropical Indigo

'Tropical Indigo' is the color that is called *añil* in the *Guía de coloraciones* (Guide to colorations) by Rosa Gallego and Juan Carlos Sanz, a color dictionary published in 2005 that is widely popular in the Hispanophone realm.

Color coordinates	
Hex triplet	# 9683EC
sRGB ^B (r, g, b)	(150, 131, 236)
CMYK ^H (c, m, y, k)	(48, 51, 0, 0)
HSV (h, s, v)	(251°, 44%, 93%)
Source	Gallego and Sanz ^[27]
B: Normalized to [0–255] (byte)	
H: Normalized to [0–100] (hundred)	

Other Indigo colors

Indigo Dye

The **Indigo Dye** is greenish dark blue color which is close to real indigo dye.

Indigo Dye	
Color coordinates	
Hex triplet	# 00416a
sRGB ^B (r, g, b)	(0, 65, 106)
CMYK ^H (c, m, y, k)	(100, 39, 0, 58)
HSV (h, s, v)	(203°, 100%, 42%)
Source	[2]
B: Normalized to [0–255] (byte)	
H: Normalized to [0–100] (hundred)	

In nature

Birds

- Male indigobirds are a very dark, metallic blue.
- The indigo bunting, native to North America, is mostly bright cerulean blue with an indigo head.
- The related blue grosbeak is, ironically, more indigo than the indigo bunting.

Fungi

- Lactarius indigo is one of the very few species of mushrooms colored in tones of blue.

Snakes

- The eastern indigo snake, *Drymarchon couperi*, of the southeastern United States, is a dark blue/black.

In culture

Literature

Marina Warner's novel Indigo (1992) is a retelling of Shakespeare's *The Tempest* and features the production of indigo dye by Sycorax.

Business

- IndiGo Airlines is an Indian budget airline that uses an indigo logo and operates only Airbus A320s.
- Indigo Books and Music uses an indigo logo and has sometimes referred to the color as "blue" in advertising.^{[28][29]}
- Indigo Dreams is an award-winning publishing company based in Devon, England.
- Indigo Line, a proposed MBTA commuter rail line, is set to open in 2024.
- The Indigo Tribe is a Los Angeles based home accessories company that uses natural indigo as its main dyeing agent.^[30]

Computer graphics

- Electric indigo is sometimes used as a glow color for computer graphics lighting possibly because it seems to change color from indigo to lavender when blended with white.

Dyes

- Guatemala, as of 1778, was considered one of the world's foremost providers of indigo.^[31]
- In Mexico, indigo is known as 'añil'.^[32] After silver, and cochineal to produce red, *añil* was the most important product exported by historical Mexico.^[33]

Food

- Scientists discovered in 2008 that when a banana becomes ripe and ready to eat, it glows bright indigo under black light. Some insects, as well as bats and birds, may see into the ultraviolet, because they are tetrachromats and can use this information to tell when a banana is ripe and ready to eat. The glow is the result of a chemical created as the green chlorophyll in the peel breaks down!^[34]



Indigo is created in potholes carved in pumice "tufgrond" in Karoland, Sumatra

Military

The French Army adopted dark blue indigo at the time of the French Revolution, as a replacement for the white uniforms previously worn by the Royal infantry regiments. In 1806, Napoleon decided to restore the white coats because of shortages of indigo dye imposed by the British continental blockade. However, the greater practicability of the blue color led to its retention, and indigo remained the dominant color of French military coats until 1914.

Spirituality

The Spiritualist applications use electric indigo, because the color is positioned between blue and violet on the spectrum.^[35]

- The color electric indigo is used in New Age philosophy to symbolically represent the sixth chakra (called *Ajna*), which is said to include the third eye. This chakra is believed to be related to intuition and gnosis (spiritual knowledge).^{[36][37]}
- Alice A. Bailey used indigo as the "second ray", representing "Love-Wisdom", in her Seven Rays system classifying people into seven metaphysical psychological types.^[38]
- Psychics often associate indigo paranormal auras with an interest in religion or with intense spirituality and intuition. Indigo children are said to have predominantly indigo auras. People with indigo auras are said to favor occupations such as computer analyst, animal caretaker, and counselor.^[39]

See also

- *Baptisia* (false indigo), a genus of flowering plants
- Champaran Satyagraha the first pacific rebellion of Mahatma Gandhi against the British Raj
- *Indigofera*, a genus of flowering plants
- Indiglo, a brand name for a method of electroluminescence technology
- List of colors
- *Persicaria tinctoria*, Japanese Indigo
- Rainbow, indigo is usually the sixth listed color of the rainbow

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External links

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