

Software Manual for ColorBasics

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Overview of ColorBasics

ColorBasics is a free program that introduces the ideas behind the composition of color in digital images and is designed for educational use on either PCs or Macs. The latest version of the software may be downloaded [here](#). The software provides a variety of interactive tools to investigate colors composed in various color spaces.

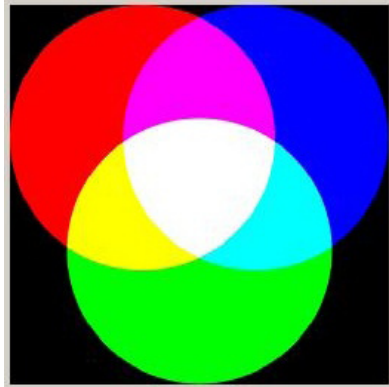
Overview of Tab Panels

Eight tab panels provide access to a variety of color investigation tools in this program: Intro (Introduction), Compare Colors, Make Colors, Play with Colors, Test Yourself, Color Spaces, Check Display's Color, and About. The Introduction panel provides a brief explanation of how colors are composed. Compare Colors allows you to compare the result of mixing two different colors as both pigments and as light. The input values for three different color spaces can be adjusted in Make Colors to see how colors are composed in each space. Play with Colors contains a color guessing game, playable with either another player or with a computer randomly selecting a color. Test Yourself allows users to check their accuracy at determining colors by eye. The three most commonly used color spaces are explained in detail in Color Spaces. Check Display's Color provides a visual test of the computer/projector display, and About provides information for about the collaborating seven institutions involved in the Measuring Vegetation Health (aka Digital Earth Watch) project.

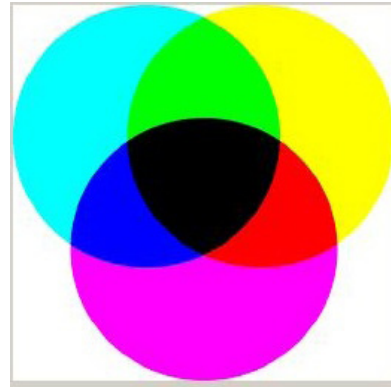
Details of Tab Panels

Intro Tab Panel

The Intro tab panel points out the difference between composing colors as pigment and as light, and indicates which tab panels to explore in order to learn more about colors. A button links directly to the Color Spaces tab for more information about the various spaces used to represent color.



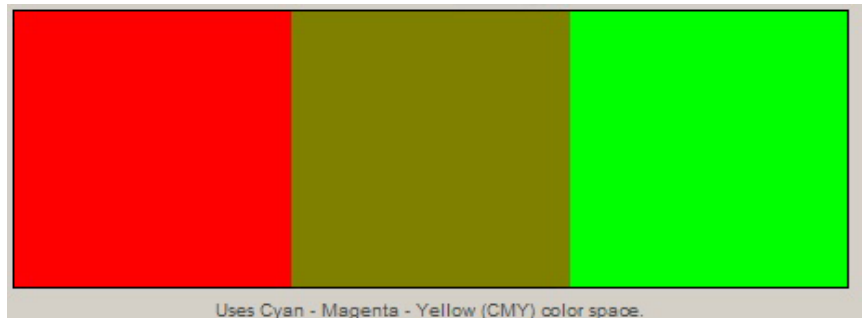
RGB (red-green-blue color space)



CMY (cyan-magenta-yellow color space)

Compare Colors Tab Panel

Combinations of two basic, pre-determined colors can be made in the Compare Colors tab panel to see how the result differs between pigment (such as with paint) and light (such as with TV and computer screens). Red, yellow, green, cyan, blue, and magenta may be selected two at a time, with the pigment and light results displayed next to each other simultaneously.



Red and green mixed as pigments






Red and green mixed as light




Make Colors Tab Panel

The Make Colors tab panel allows a user to select one of three different color spaces in which to create a color. Once this is selected, the intensities of the color components may be freely adjusted, with the result being displayed in real-time. These colors can be saved in a column along the side to allow for easier comparison of different colors in the same color space. The saved colors can be cleared if there is no more room or if a new set of saved colors is desired.

Your Saved Colors			
Red Intensity	Green Intensity	Blue Intensity	Resulting Color
50%	47%	100%	
100%	90%	49%	

Color intensities are recorded along with the saved color

Color Component	Intensity [%]	
Red	<input type="text" value="50"/>	
Green	<input type="text" value="50"/>	
Blue	<input type="text" value="50"/>	

Color Component	Intensity [%]	
Cyan	<input type="text" value="50"/>	
Magenta	<input type="text" value="50"/>	
Yellow	<input type="text" value="50"/>	

Play with Colors Tab Panel

Two users may play a game together in the Play with Colors tab panel. One user selects a color, and the other must attempt to come as close to it as possible. The level of difficulty indicates the acceptable margin of error, as it is very difficult to determine exactly the values of any one particular color. The game is also playable against the computer, in which case the computer selects a random color for the user to guess.

Color selection dialog in two-player mode

Set Your Secret Color

To create your secret color, type the intensity of each color component in the three white boxes above. You may also use the small up and down arrows to incrementally change intensities.

Intensities range from 0 to 100%.

0% means that there is no contribution from that color component.
100% means that there is maximum contribution of that color component.

Player 1 sets the Secret Color

Color Component	Intensity [%]
Red	<input type="text" value="0"/>
Green	<input type="text" value="0"/>
Blue	<input type="text" value="0"/>

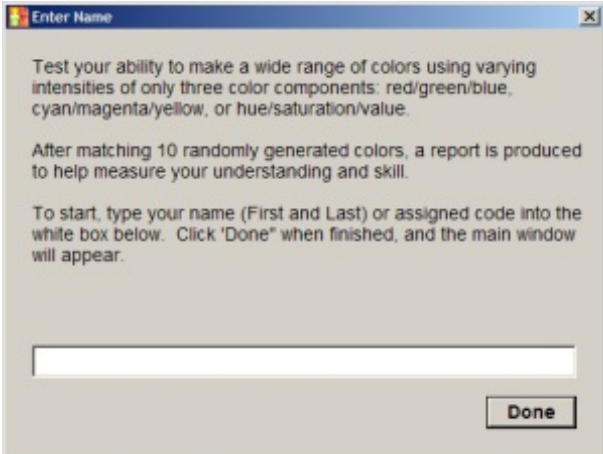
Test Color

Done

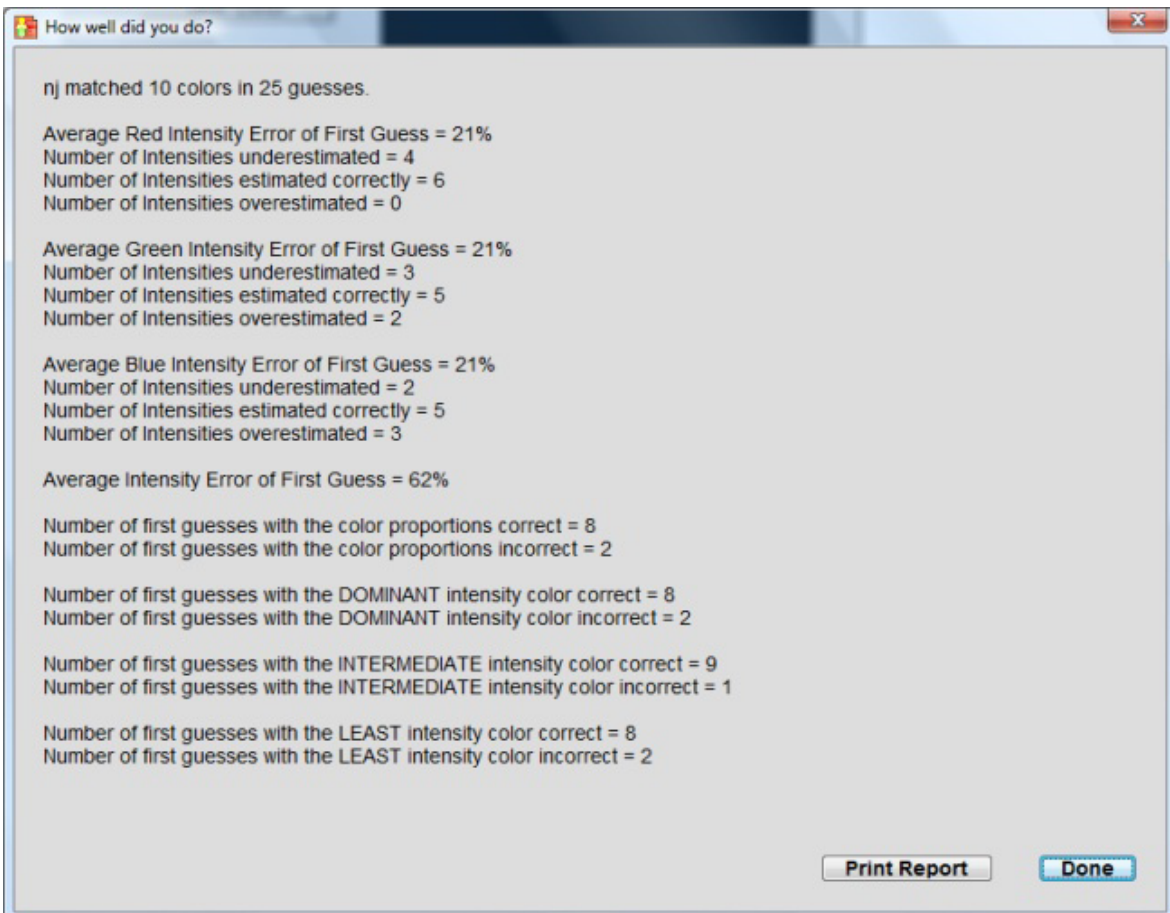
Test Yourself Tab Panel

The Test Yourself panel contains a series of randomly generated colors. After making a guess, the program indicates whether any color intensities must be adjusted up or down. When ten colors have been correctly determined, a report is displayed to evaluate performance.

*Enter your name
to test yourself*



A small dialog box titled "Enter Name" with a close button (X) in the top right corner. The text inside reads: "Test your ability to make a wide range of colors using varying intensities of only three color components: red/green/blue, cyan/magenta/yellow, or hue/saturation/value. After matching 10 randomly generated colors, a report is produced to help measure your understanding and skill. To start, type your name (First and Last) or assigned code into the white box below. Click 'Done' when finished, and the main window will appear." Below the text is a single-line text input field. At the bottom right is a button labeled "Done".



A window titled "How well did you do?" with a close button (X) in the top right corner. The window displays a detailed report of performance. The text inside is as follows:

nj matched 10 colors in 25 guesses.

Average Red Intensity Error of First Guess = 21%
Number of Intensities underestimated = 4
Number of Intensities estimated correctly = 6
Number of Intensities overestimated = 0

Average Green Intensity Error of First Guess = 21%
Number of Intensities underestimated = 3
Number of Intensities estimated correctly = 5
Number of Intensities overestimated = 2

Average Blue Intensity Error of First Guess = 21%
Number of Intensities underestimated = 2
Number of Intensities estimated correctly = 5
Number of Intensities overestimated = 3

Average Intensity Error of First Guess = 62%

Number of first guesses with the color proportions correct = 8
Number of first guesses with the color proportions incorrect = 2

Number of first guesses with the DOMINANT intensity color correct = 8
Number of first guesses with the DOMINANT intensity color incorrect = 2

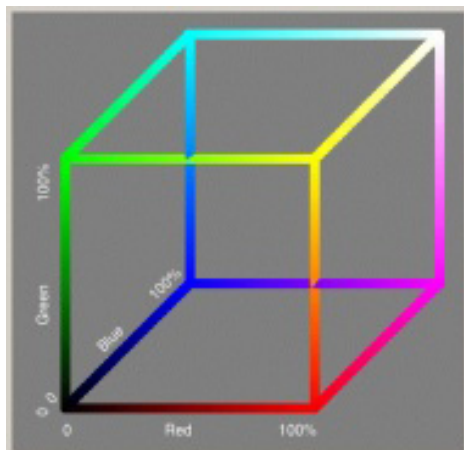
Number of first guesses with the INTERMEDIATE intensity color correct = 9
Number of first guesses with the INTERMEDIATE intensity color incorrect = 1

Number of first guesses with the LEAST intensity color correct = 8
Number of first guesses with the LEAST intensity color incorrect = 2

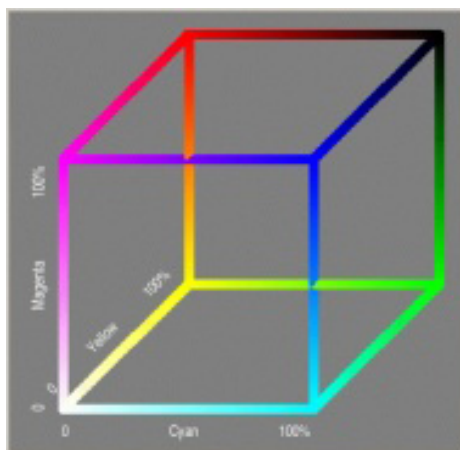
At the bottom right, there are two buttons: "Print Report" and "Done".

Color Spaces Tab Panel

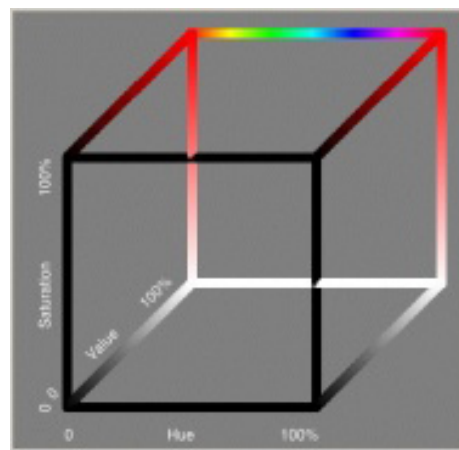
The RGB, CMY, and HSV color spaces can be viewed here, represented graphically as cubes. Each color space graph is accompanied by a detailed description of its real-world applications and how the colors are combined.



RGB



CMY

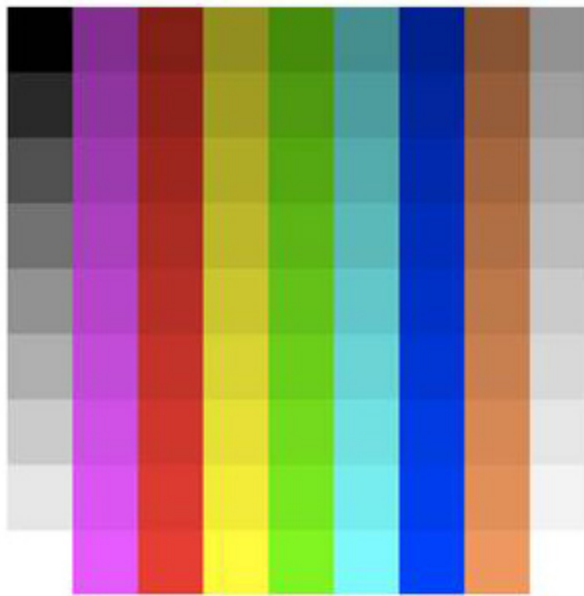


HSV

Check Display's Color Tab Panel

The Check Color tab panel has a visual test to see if the quality of the computer screen/television/projector has adequate range in color reproduction to provide a meaningful exploration of the digital image activities. The panel displays 81 color tiles of shades of gray, red, green, blue, yellow, magenta, cyan, and brown. If all 81 color tiles are visible, the quality of the display is adequate for the seeing subtle color differences in most images.

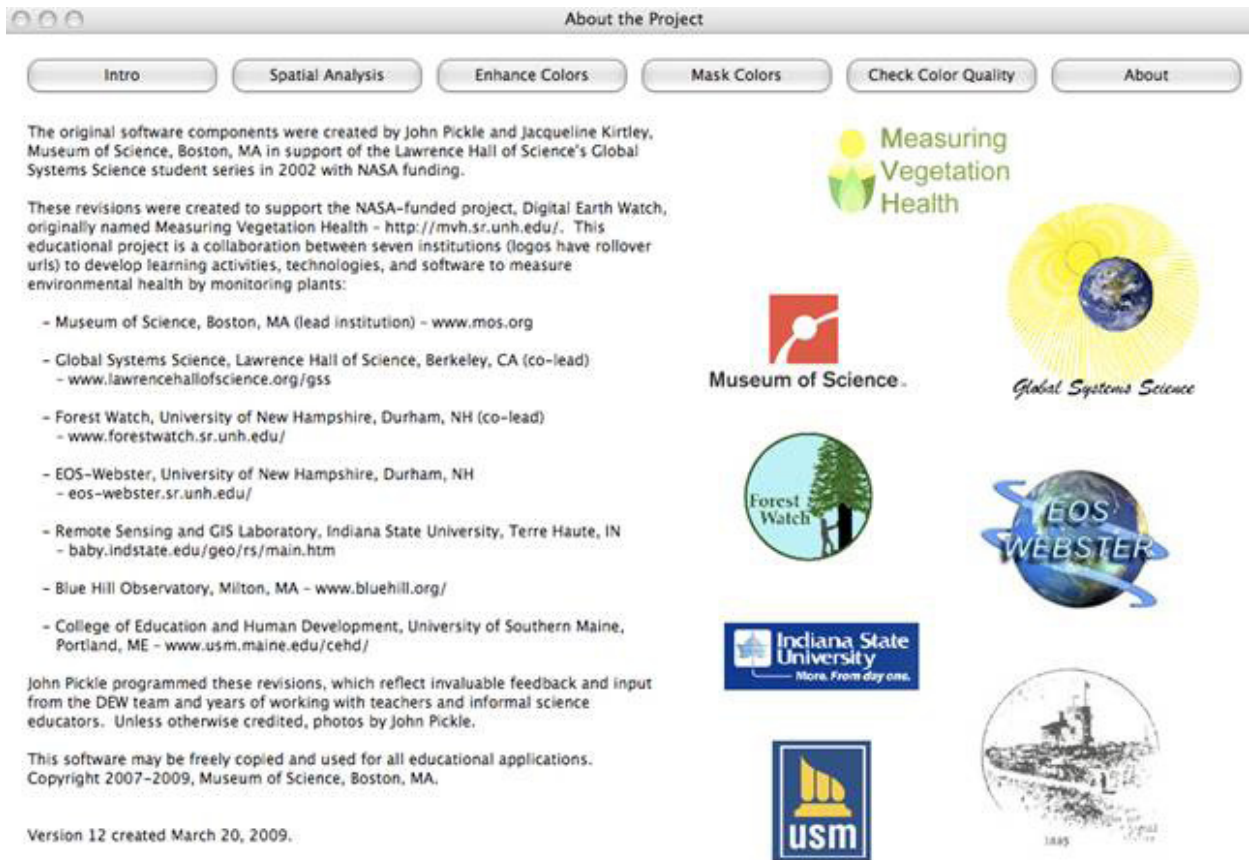
You should see 81 distinct color tiles in the image below-
9 distinct rows and 9 distinct columns.



If not, the quality of your computer display is not capable of displaying the range of colors required by this software. Since you won't be able to see all of the colors of the activities, the activities may be misleading or confusing. Try to find a computer display that has the needed color reproduction.

About Tab Panel

The About tab panel describes how the software was developed by the seven collaborating institutions funded by NASA. Move the cursor over an icon to see the address for the website for each institution.



Help Menu

Open Help as PDF

If you don't want to or can't open the help file in your browser, you can view the help as a single PDF file. Note that you will need to have a PDF viewer such as [Adobe Reader](#) installed.

Individual Sections

If you know what part of the program you need help with, you can directly access individual sections of the help file by selecting one of the options from the help menu.

Open Help in Browser

View the help files in HTML format in your web browser. The HTML help comes in both a single large file as well as multiple smaller files.

Additionally, menu items exist for accessing specific sections of the help file directly through the browser instead of browsing the table of contents.