GIA

COLORED DIAMONDS

Color Reference Charts

John M. King, Editor

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Gemological Institute of America®

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Introduction

GIA Colored Diamond Color Reference Charts

For colored diamonds, the aspect of color far outweighs the other "C's" (clarity, cut, and carat weight) in the determination of value. Therefore, it is critical to understand the relationship of color appearances that affect color grades and descriptions. For most people, color is an intuitive response rather than a true knowledge of the systematic ordering of color appearances. Both, however, are crucial when the romance of color also becomes the business of color.

GIA has developed this booklet of color reference charts to help the diamantaire, retailer, and consumer understand the ways in which diamond color appearances transition and relate. Color is described using three attributes: hue (the appearance of red, blue, green, or anything in between), tone (the relative lightness or darkness of a color), and saturation (the relative strength or weakness of a color). *The color appearance of a gem is the result of a combination of these three attributes.* By standardizing the organization of these three attributes, a color's appearance can be located in color space. The manner in which GIA organizes color is reflected in the tone/saturation charts in this booklet. Understanding this organization will help the reader grasp the relationship of GIA's color grades and descriptions.

The overview of GIA's color grading terminology and methodology that follows was first presented in the Winter 1994 *Gems & Gemology* article "Color Grading Colored Diamonds at the GIA Gem Trade Laboratory." *G&G*'s subsequent articles on the grading and characterization of type IIb blue (Winter 1998), pink (Summer 2002), and yellow (Summer 2005) diamonds discuss a number of circumstances encountered in color grading that are important to achieve consistent results. The reader is referred to these articles for more information on this topic. All can be found in *Gems & Gemology in Review: Colored Diamonds* (J. M. King, Editor, Gemological Institute of America, Carlsbad, CA, 2006), to which this charts booklet is a companion piece.

Following the reviews of methodology and terminology are three hue circles. All 27 of GIA's hues for colored diamonds are represented on the first hue circle. The diamonds shown are all of relatively strong saturation, where differences between colors are most readily distinguished. The observer will note that on this hue circle, different hues reach their highest saturation at different tones (i.e., lighter in the yellow hue and darker in the blue and violet hues).

Unlike the first hue circle, the next two circles focus on particular tones. The second example shows lighter tone and corresponds to grades of approximately Light to Fancy Light, while the third demonstrates darker tone and corresponds to Fancy Dark. The eye discerns fewer colors at these extremes of tone, where colors do not reach high levels of saturation. Therefore, the light and dark tone hue circles show a smaller number of examples than the one at higher saturation.

The three hue circle charts are followed by a series of tone/saturation charts. From our experience

grading hundreds of thousands of colored diamonds, we have learned that they do not occur consistently throughout their color space. Therefore, we have chosen to reproduce charts for hues that the observer is more likely to encounter and that occur in relatively broad ranges of appearances. The eight representative hues included here are: yellow (warmer and cooler appearances), orange-yellow, yellow-orange, orangy red (orangy pink), red (pink), purplish red (purplish pink), blue, and yellow-green. By representing a range of hues around the hue circle, these charts illustrate the full range of appearance transitions in warm and cool colors.

Methodology

Colored diamonds are color graded in the face-up position only, in a grooved, matte-white, non-fluorescent plastic tray. The surrounding environment and ambient lighting are removed from the equation by the use of a viewing box that eliminates distractions and shields external light. A standard geometry between the diamond, the light source, and the observer is used for the visual assessment. The face-up color is evaluated most consistently when the light source is positioned directly above the diamond and the observer views the diamond approximately perpendicular to the table facet. For critical color evaluation, the observer should be routinely tested for normal color vision.

When viewed face-up, a diamond's appearance is based on a combination of its size, shape, faceting arrangement, and color. GIA describes a single color as being "characteristic" of the diamond as a whole. This characteristic color is the overall blend of appearances that is not obvious surface reflection, dispersion, windowing, or extinction.

Once the characteristic color has been determined, it is bracketed by means of side-by-side comparison under the same lighting conditions with two or more color references of known location in color space. Diamonds are typically compared to one reference diamond at a time, and both are placed in the same orientation in the viewing tray. In the GIA grading system, the objective of the comparison process is to place the diamond being graded in a range between various references, not to match it to a particular reference. In this manner, each of the diamond's color attributes (i.e., hue, tone, and saturation) is bracketed.

Terminology

GIA's colored diamond color grading terminology uses a combination of fancy grades and color descriptions to locate a diamond's characteristic color in a region of color space. A fancy grade (e.g., Fancy Light, Fancy Intense) represents the combined effect of tone and saturation on the color of a diamond. These grades correspond to regions of tone and saturation in color space; they are also hue dependent, since different colors reach their highest saturation at different levels.

The color descriptions accompanying a fancy grade are determined by the hue, and by the tone and saturation of the hue. Some of the 27 hue names include modifiers such as *purplish* or *yellowish*. A modifier in a hue name does not denote a lack of potential strength, or purity, to the color.

Light or dark colors at low levels of saturation are challenging to discern. Thus, fewer terms are used in these areas (as evident in the hue circles for lighter and darker tone). These terms may be modified in one of two ways. The first is the use of the word *pink* as a substitute for *red* in the medium to light tones and moderate to weakly saturated versions of reddish purple, red-purple, purple-red, purplish red, red, orangy red, and reddish orange. The other is the addition of *brown*/*brownish* or *gray*/*grayish* to the description. As colors transition darker or weaker, they appear more brown or gray. Warm hues (such as yellow, orange, or red) appear browner as they darken or weaken; cool colors (such as blue or green) appear grayer.

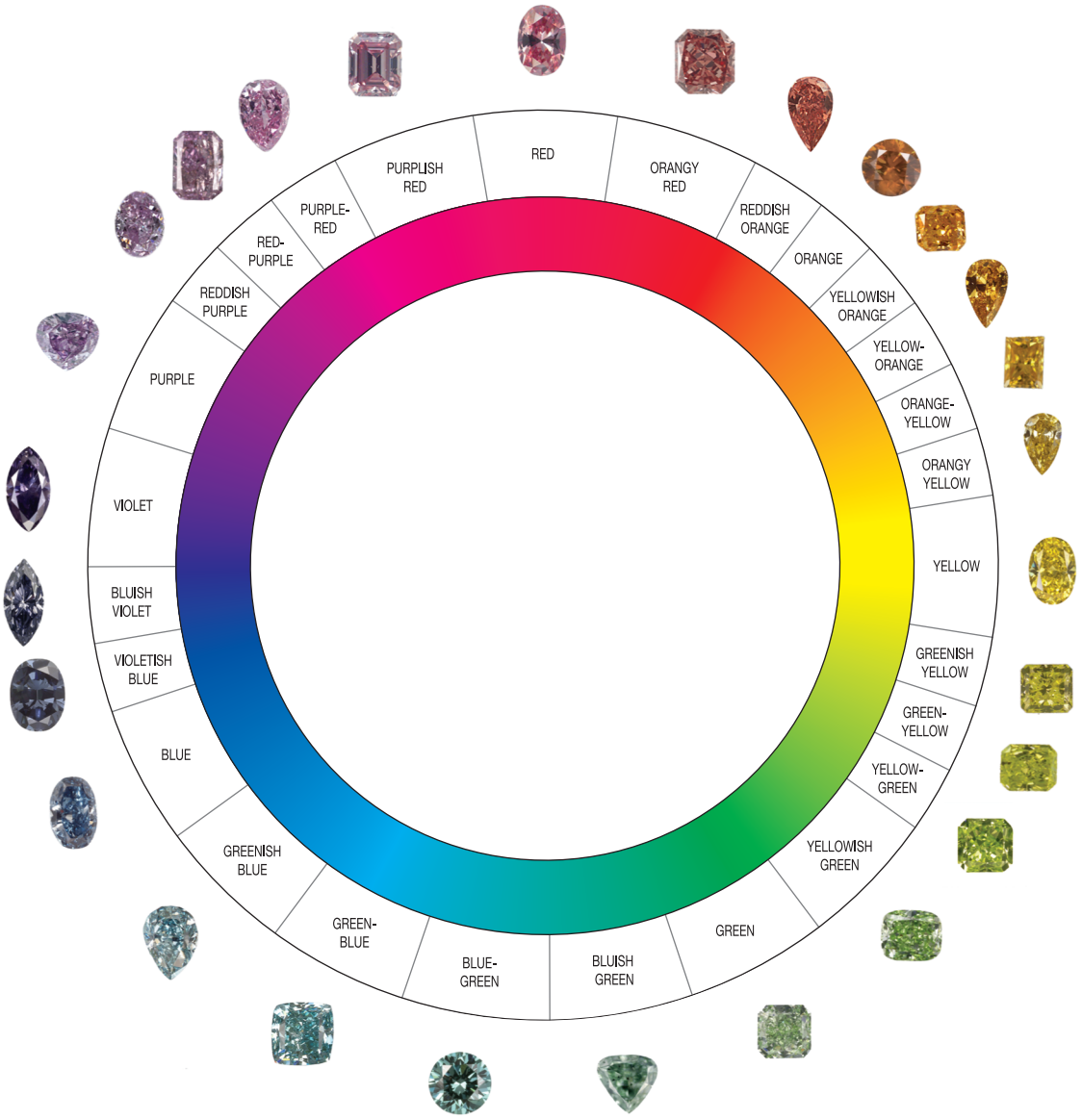
In each instance, the fancy grades and color descriptions represent a range of color sensations, not a "single" color sensation.

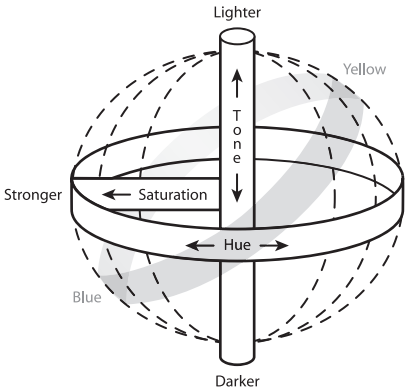
Acknowledgments

Photography for the charts throughout this booklet was provided by Elizabeth Schrader and C. D. Mengason (GIA New York and Carlsbad, respectively). Akira Hyatt, Joshua Cohn, and Thomas H. Gelb of the GIA Laboratory in New York and Scott S. Guhin of the GIA Laboratory in Carlsbad provided helpful discussions and assistance in the diamond selections and appearance relationships for the various images.

John M. King
Editor

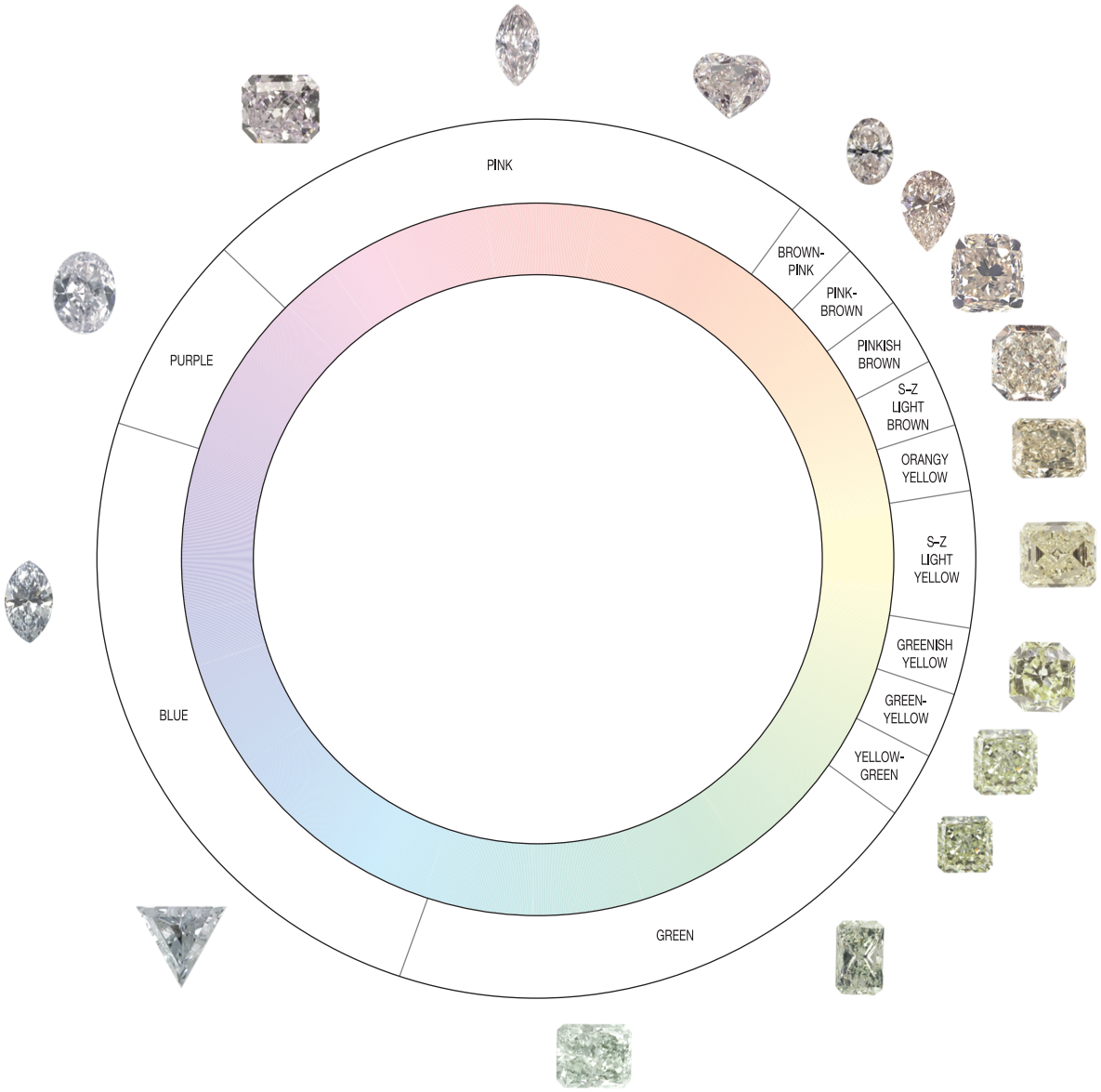
The subtle color appearances of diamonds in the GIA color grades of Faint and Very Light are not reproduced in the following charts. In each instance, diamonds in these grades would occur in the upper left corner of the charts. Also, please note that this booklet contains photos illustrating subtle distinctions in color. Because of the inherent difficulties of controlling color in printing, as well as the instability of inks over time, the color in an illustration may differ from the actual color of the diamond.

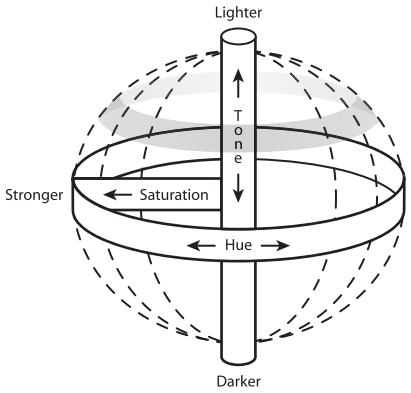




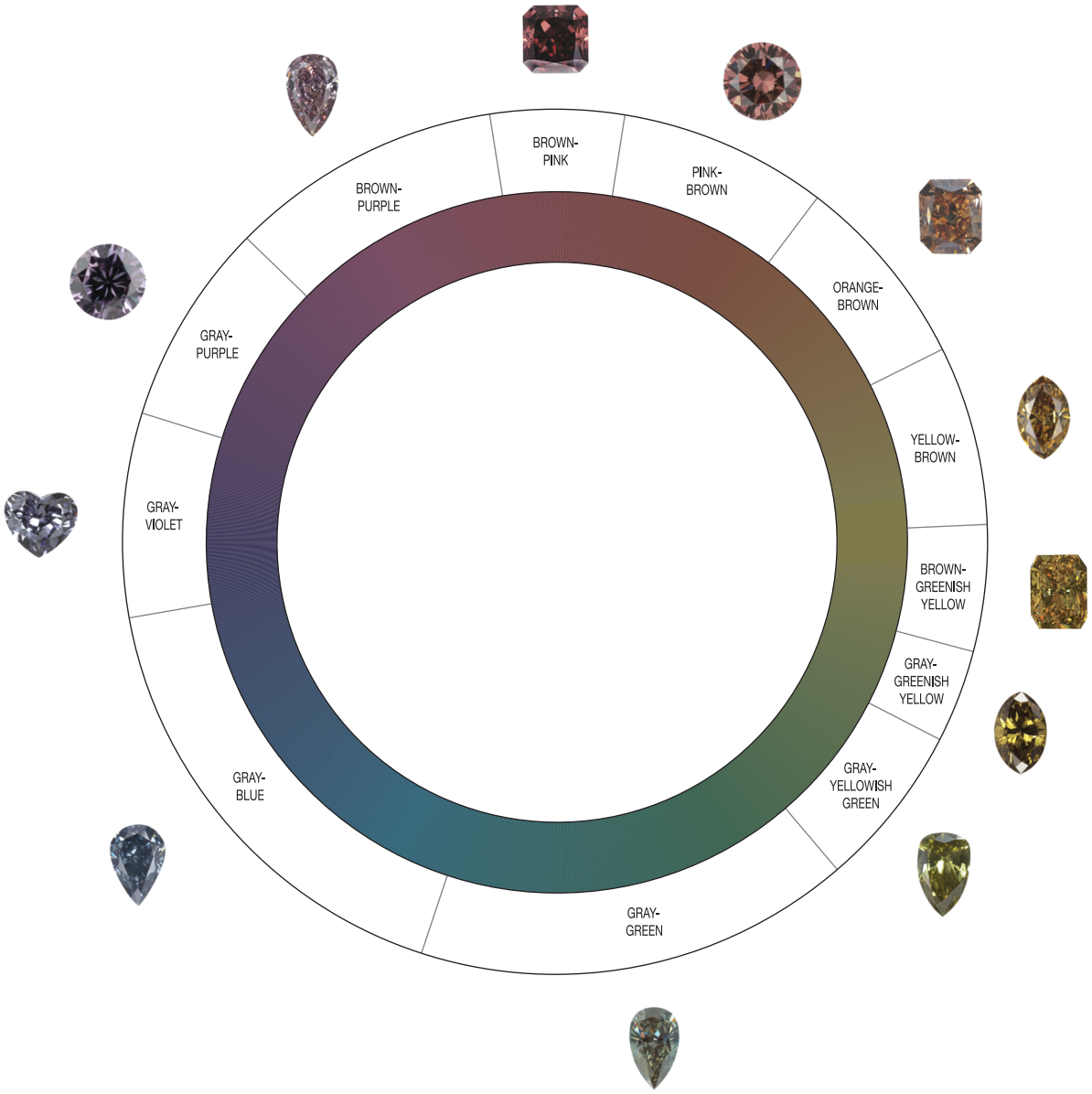
This hue circle illustrates each of the 27 hues GIA uses to describe colored diamonds. The examples are reproduced at strong saturation levels for each hue. Colors reach their strongest saturation at different tones, and this is illustrated in the samples (e.g., the yellow sample is lighter than the blue). The gray band on the model at left also illustrates the general locations of these samples as they transition around the hue circle.

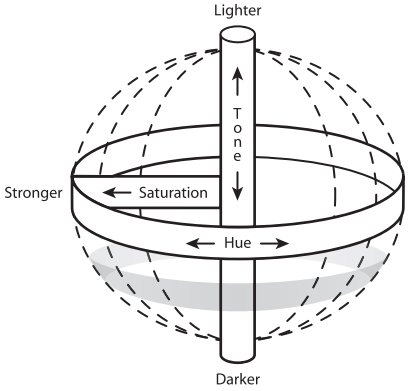
Lighter Tone Hue Circle





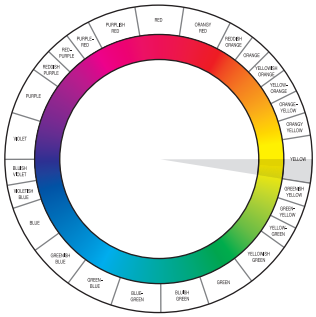
Colors do not reach high levels of saturation at lighter tones; nor does the eye discern as many colors at these locations in color space. Therefore, fewer color terms are used. The gray band on the illustration at right shows the relative locations of the samples on the chart. These diamonds often correspond to GIA color grades of Light and Fancy Light.



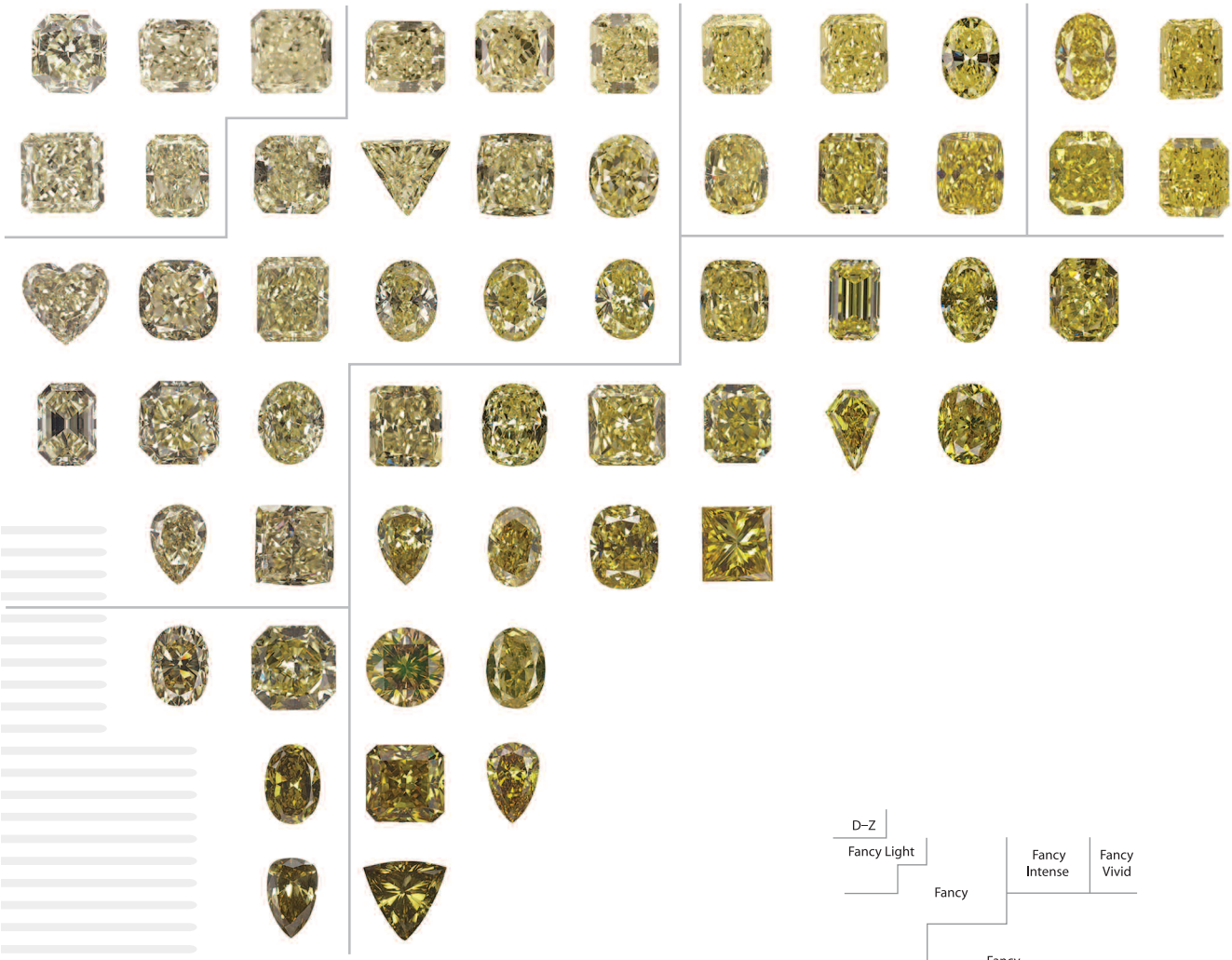


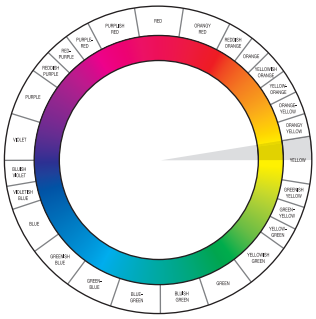
Similar to light-toned diamonds, dark diamonds do not reach high levels of saturation. This is also an area of color space in which the eye discerns fewer colors. Accordingly, fewer color terms are used here. The gray band on the illustration of color space marks the general locations of the diamonds on the hue circle. These diamonds often correspond to the GIA grade range of Fancy Dark, and have a gray or brown modifier.

Yellow (Cooler)

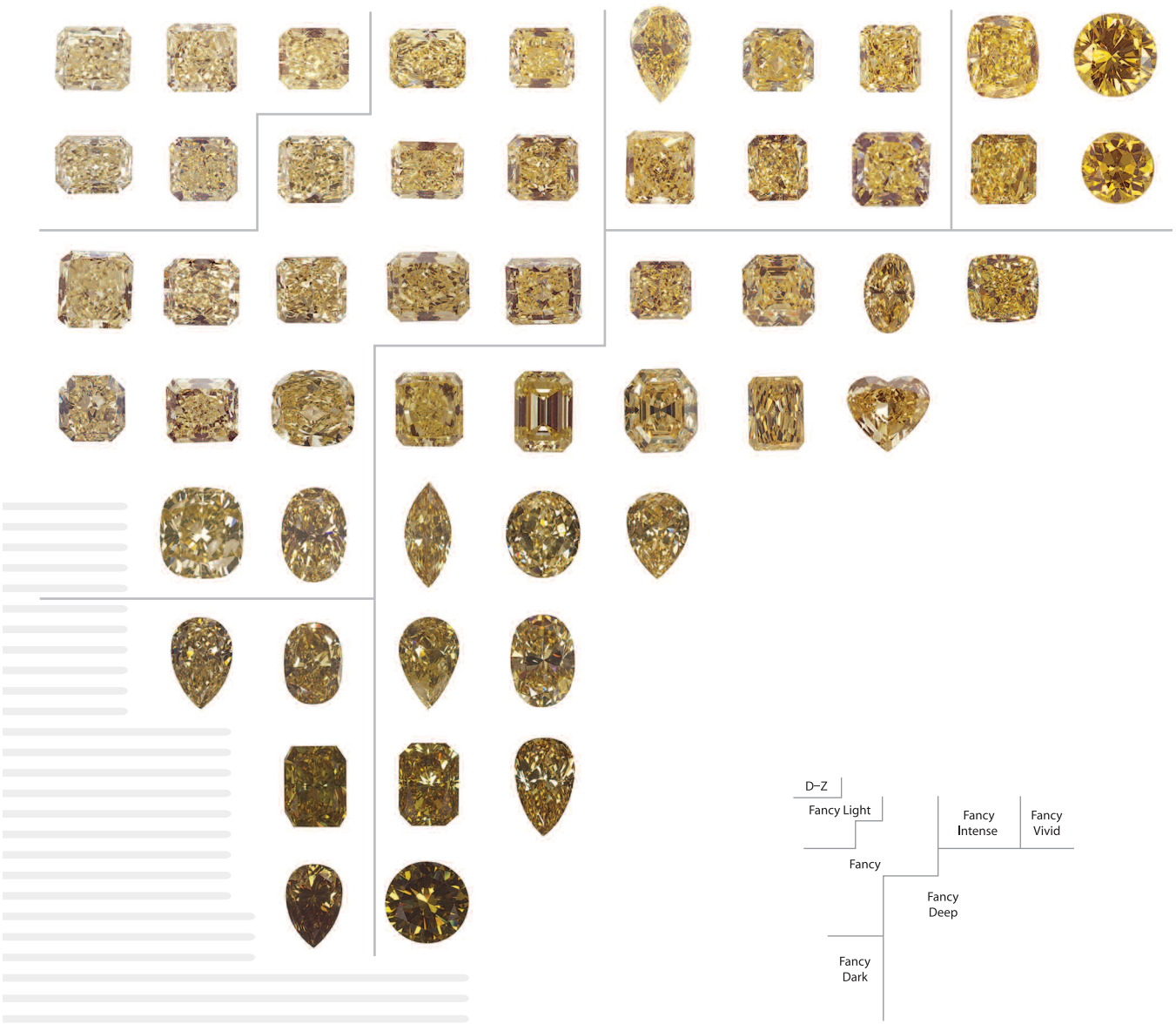


These two charts illustrate color appearances at two locations in the yellow hue range: “warmer” colors toward the yellow/orangy yellow hue boundary and “cooler” ones toward the yellow/greenish yellow boundary. Yellow diamonds occur in some of the highest levels of saturation of any colored diamond. Unlike many of the other charts in

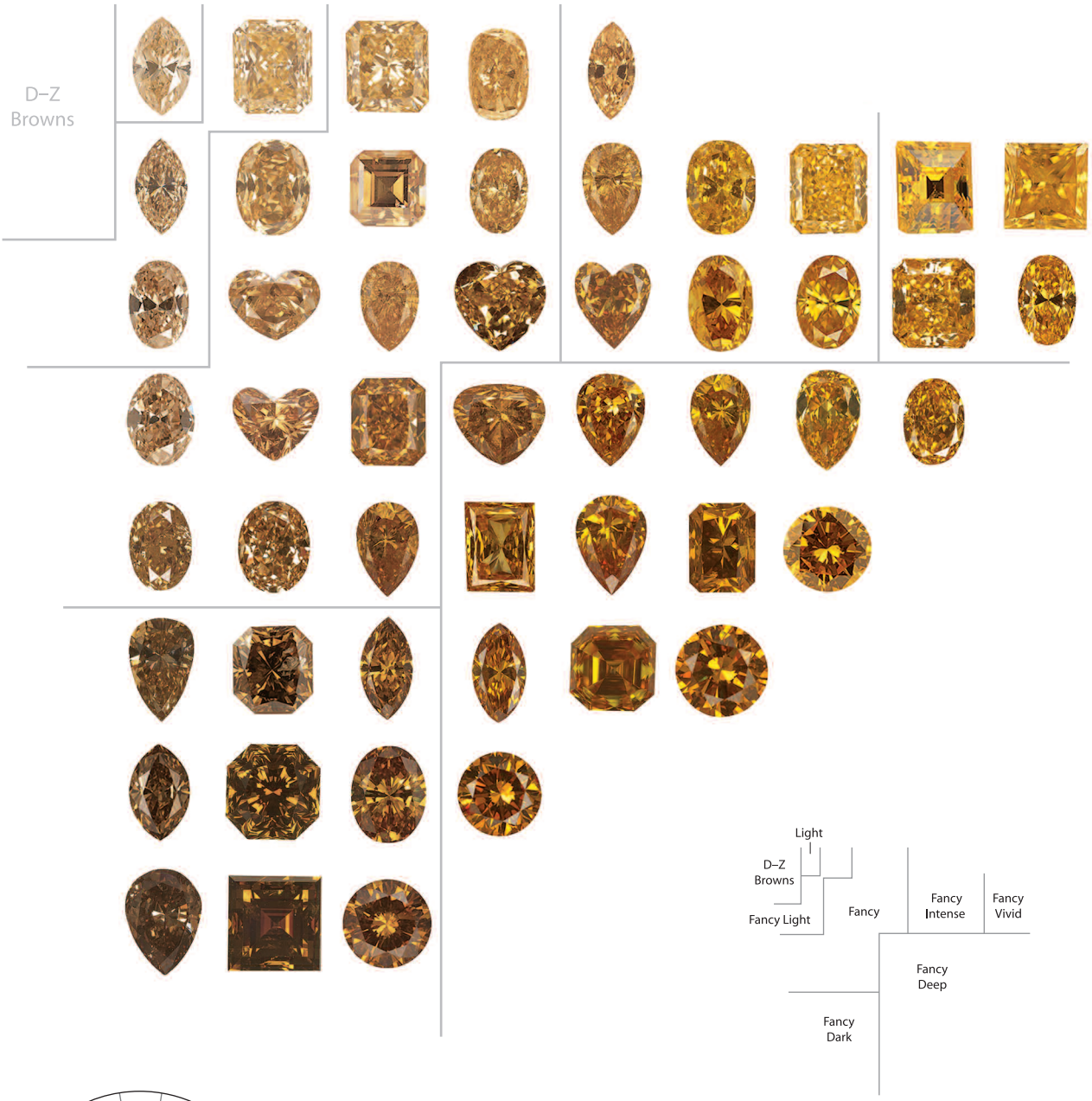


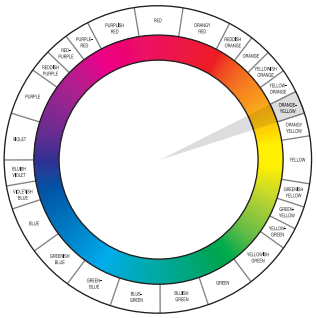


this booklet—which start with Faint, Very Light, and/or Light—yellow diamond color grades begin with Fancy Light; paler yellow diamonds are part of GIA's D-to-Z color scale. The shaded areas on the two charts, where no diamonds are illustrated, indicate areas in the yellow hue range in which diamonds are described as predominantly brown.

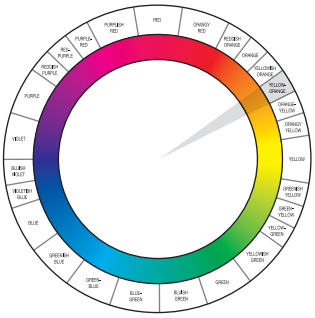


Orange-Yellow





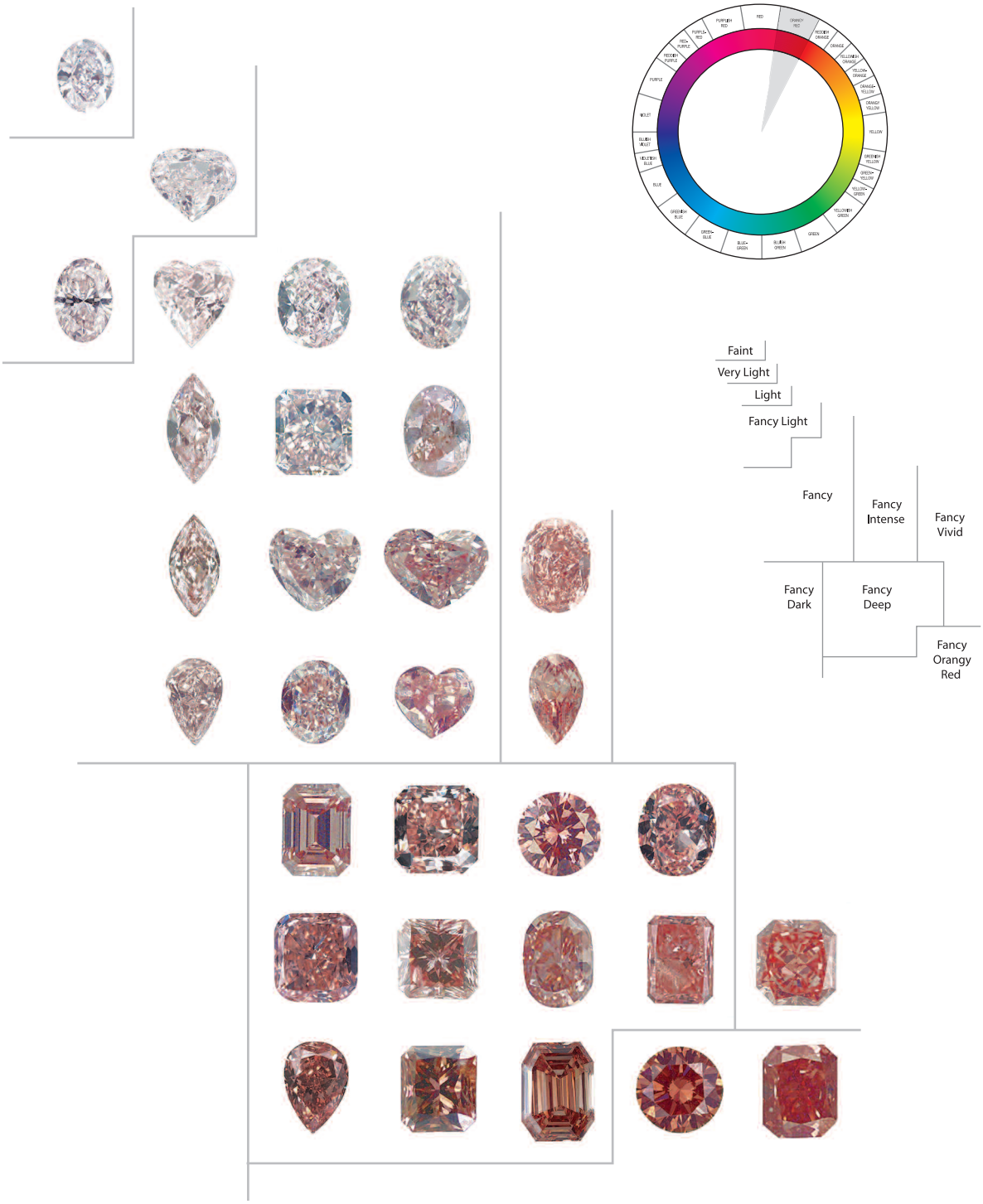
Orange-yellow diamonds occur in tones and saturations similar to those in the yellow hue. It is in this hue range that most D-to-Z brown diamonds occur. As with yellow diamonds, there are no grades of Faint or Very Light in this hue range. Unlike the yellow charts, diamonds described as predominantly brown are illustrated. Since the use of the term *brown* (or *gray* for cooler hues) is associated with color appearances that are weaker and or darker, the predominantly brown colors are located toward the lower left of the chart. In this hue, the term *brown* can be modified by *yellow* or *yellowish*.



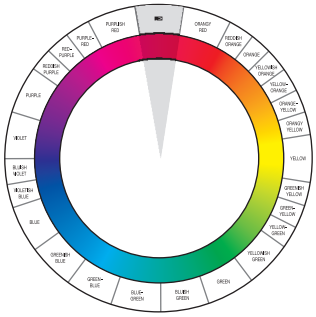
Faint
Very Light
Light
Fancy Light
Fancy
Fancy Intense
Fancy Vivid
Fancy Deep
Fancy Dark

Yellow-orange diamonds occur in a wide tone range and reach their strongest saturation at a slightly darker tone than do yellow diamonds. It is not unusual for diamonds in this hue range to be modified by *brown* or *brownish*. Predominantly brown diamonds are shown toward the lower left on this chart. In this hue, the term *brown* can be modified by *orange* or *orangy*.

Orangy Pink

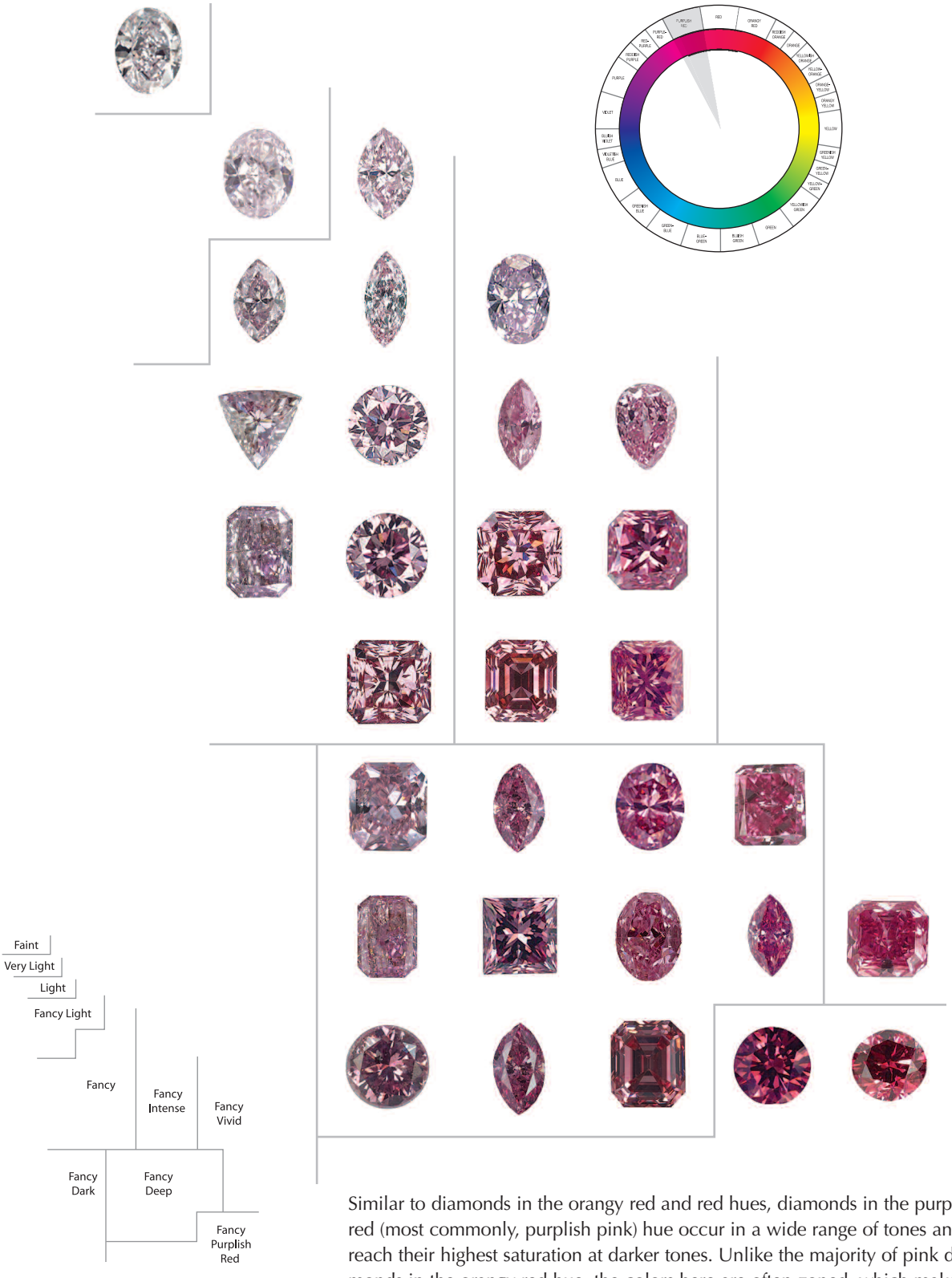


Diamonds in the orangy red hue do not typically reach as high a saturation level as those in yellow, orange-yellow, or yellow-orange. Therefore, the grades are slightly more compressed. Except for the two orangy red diamonds at lower right, the diamonds represented on this chart are described as predominantly pink; that is, their descriptions do not end in the word *brown*.

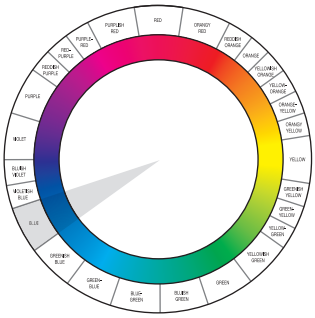


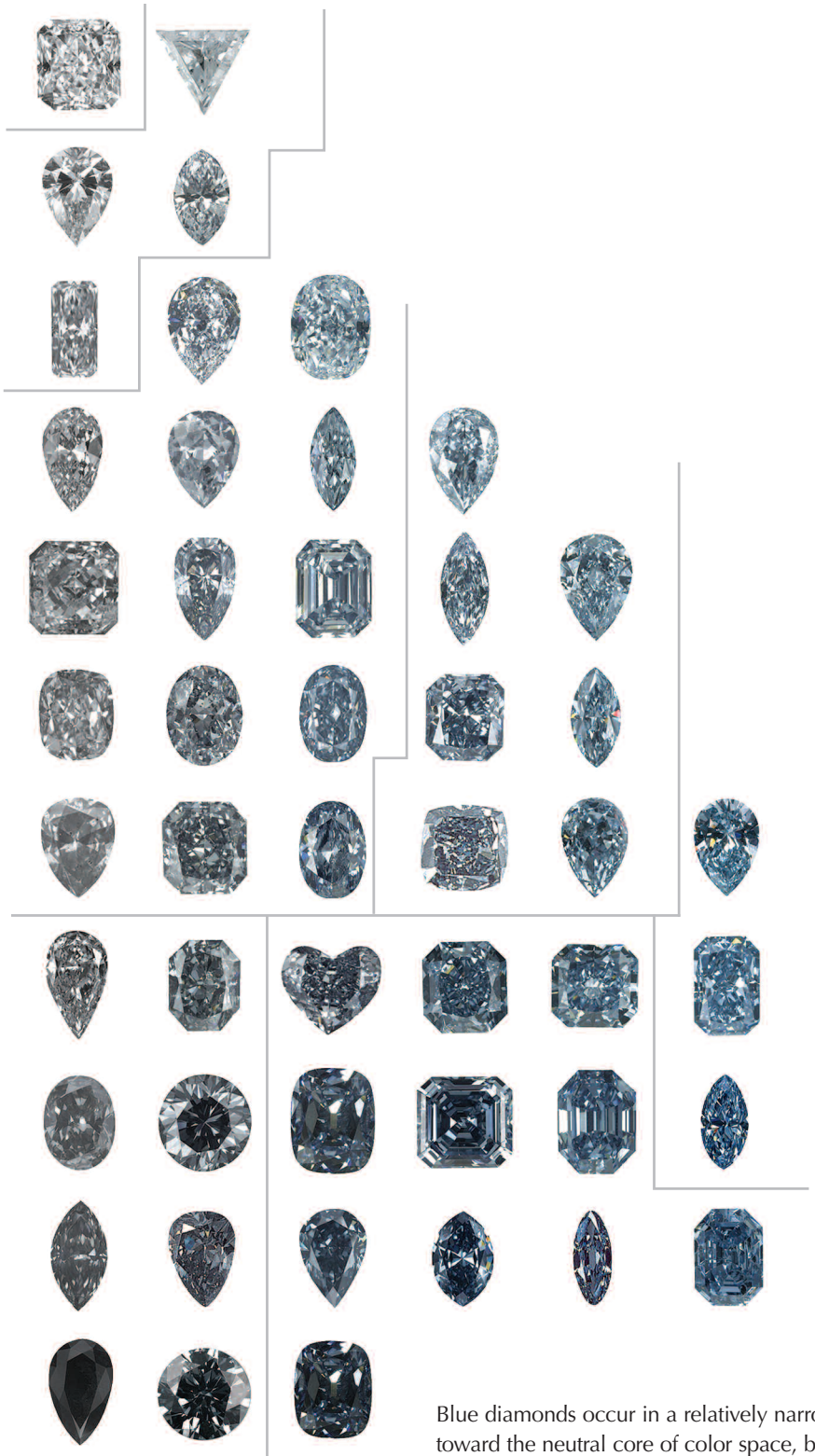
Diamonds in the red hue occur in tones and saturations similar to those in the orangy red and purplish red hues. Again, most of the diamonds represented on this chart would be described as predominantly pink. However, this chart also includes examples of very dark colors that would be described as red-brown or reddish brown. The dark tones of these colors might be confused with saturation if not compared to known references.

Purplish Pink



Similar to diamonds in the orangy red and red hues, diamonds in the purplish red (most commonly, purplish pink) hue occur in a wide range of tones and reach their highest saturation at darker tones. Unlike the majority of pink diamonds in the orangy red hue, the colors here are often zoned, which makes cutting choices with regard to face-up color challenging.

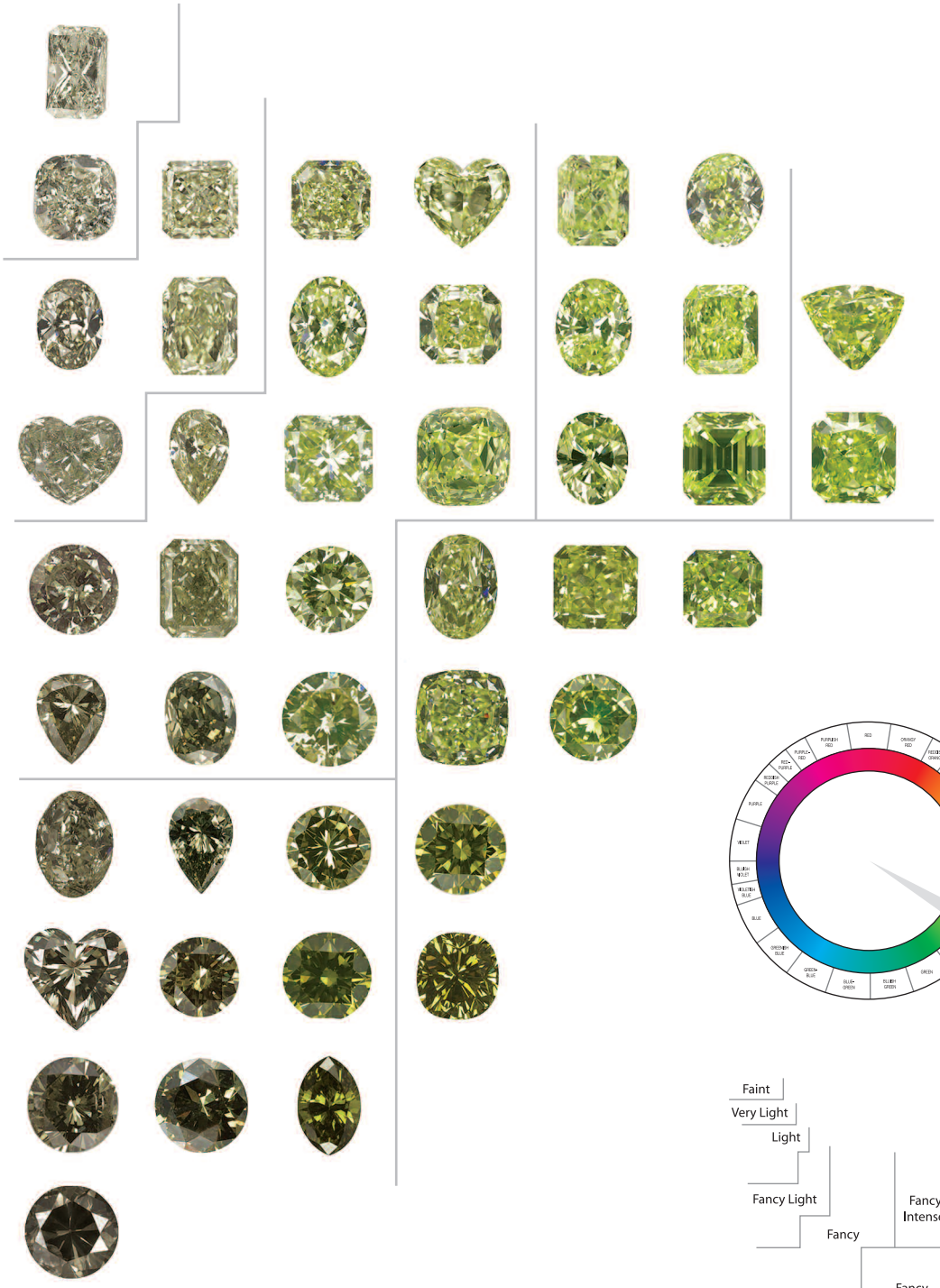




Faint
Very Light
Light
Fancy Light
Fancy
Fancy Intense
Fancy Vivid
Fancy Dark
Fancy Deep

Blue diamonds occur in a relatively narrow saturation range, typically toward the neutral core of color space, but they vary widely in tone. They reach their highest saturation at medium to dark tones, which are toward the lower right of the chart. The diamonds in the column on the far left represent an area of little discernable saturation where different appearances are primarily due to tone.

Yellow-Green



Yellow-green diamonds typically occur in slightly lower saturations and slightly darker tones than do yellow diamonds. Yellow-green diamonds transition smoothly throughout their hue range. Weaker, darker colors appear predominantly gray. Such colors can be seen at the lower left on the chart.

About GIA

An independent nonprofit organization, the Gemological Institute of America (GIA) is recognized as the world's foremost authority in gemology. Established in 1931, GIA has translated its expert knowledge into the most respected gemological education available. In 1953, the Institute created the International Diamond Grading System™, which today is recognized by virtually every professional jeweler in the world. Through research, education, gemological laboratory services, and instrument development, the Institute is dedicated to ensuring the public trust in gems and jewelry by upholding the highest standards of integrity, academics, science, and professionalism. To learn more about GIA, go to www.gia.edu.