



far planes, respectively. A value of **ANF** for **CS** means that the near and far planes are determined automatically based on the objects in the artwork.

The **Subtype** entry specifies the type of projection, which determines how objects are projected onto the near plane and scaled. The possible values are **O** for *orthographic projection* and **P** for *perspective projection*.

For orthographic projection, objects are projected onto the near plane by simply discarding their  $z$  value. They are scaled from units of the near plane's coordinate system to those of the annotation's target coordinate system by the combined factors specified by the **OS** entry and the **OB** entry.

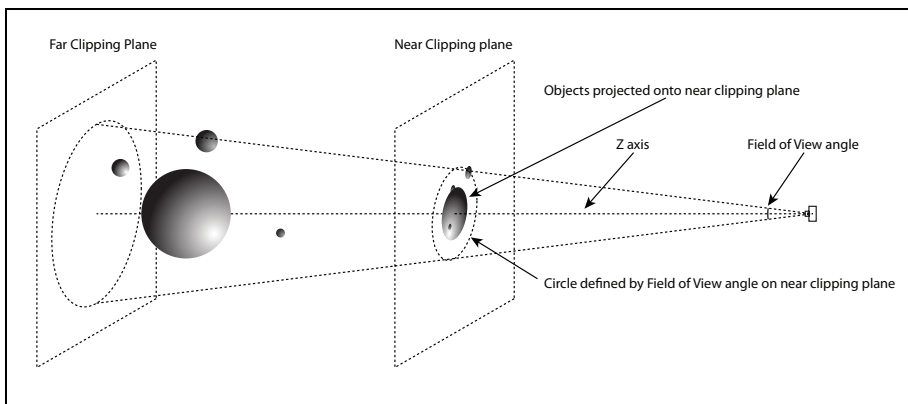
For perspective projection, a given coordinate  $(x, y, z)$  is projected onto the near plane, defining a 2D coordinate  $(x_1, y_1)$  using the following formulas:

$$x_1 = x \times \frac{n}{z}$$

$$y_1 = y \times \frac{n}{z}$$

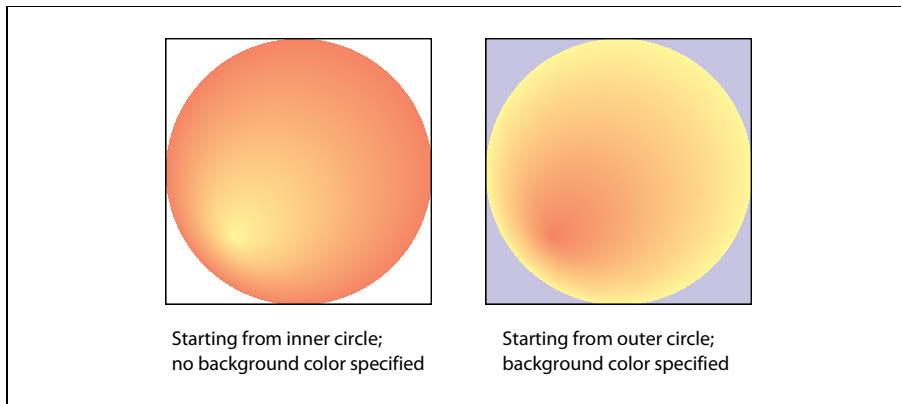
where  $n$  is the  $z$  coordinate of the near plane.

Scaling with perspective projection is more complicated than for orthographic projection. The **FOV** entry specifies an angle that defines a cone centered along the  $z$  axis in the camera coordinate system (see Figure 9.5). The cone intersects with the near plane, forming a circular area on the near plane. Figure 9.6 shows this circle and graphics from the position of the camera.

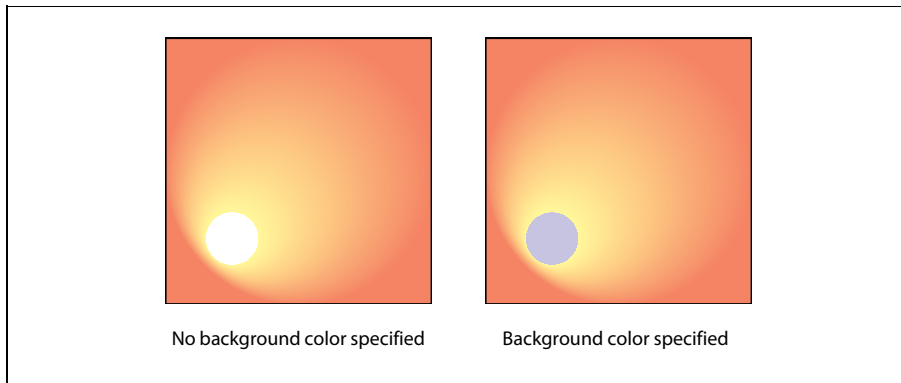


**FIGURE 9.5** *Perspective projection of 3D artwork onto the near plane*

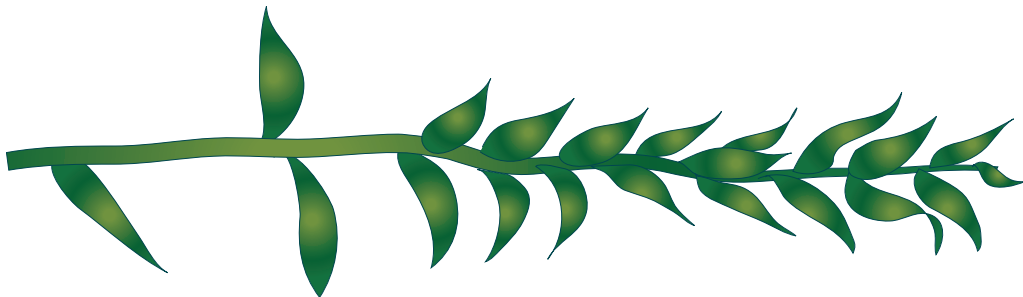


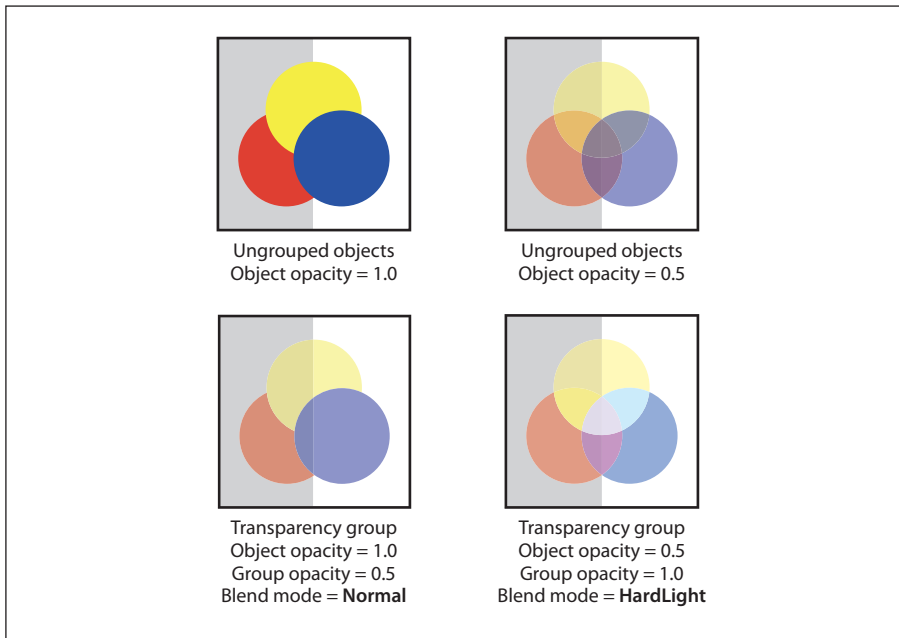


**PLATE 12** *Radial shadings depicting a sphere (“Type 3 (Radial) Shadings,” page 313)*

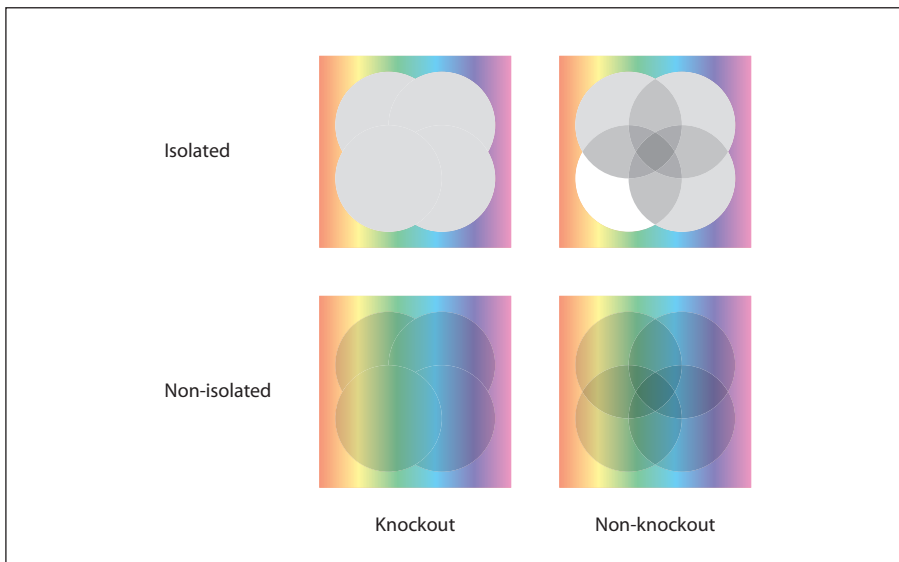


**PLATE 13** *Radial shadings with extension (“Type 3 (Radial) Shadings,” page 313)*

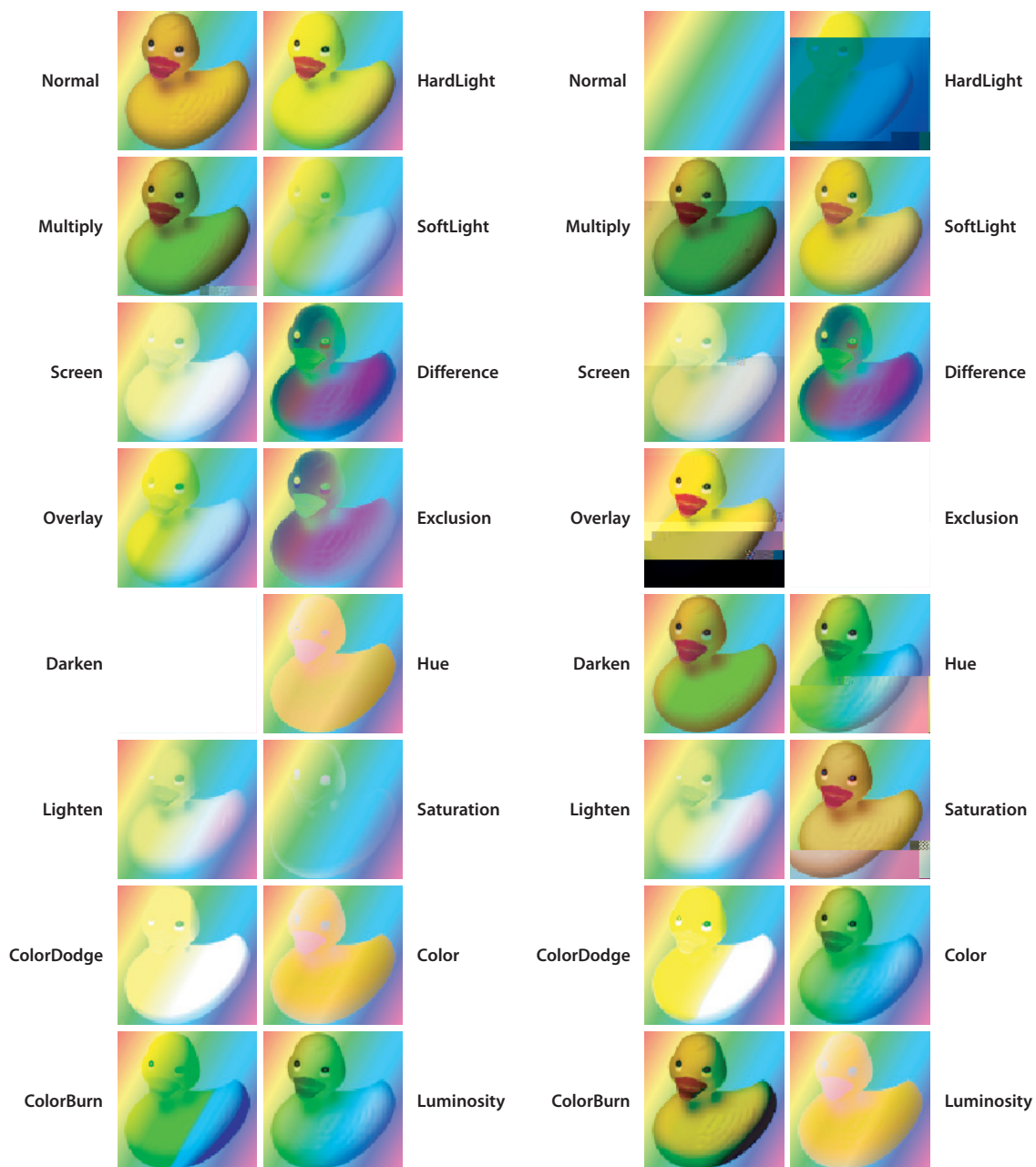




**PLATE 16** *Transparency groups (Section 7.1, “Overview of Transparency,” page 515)*



**PLATE 17** *Isolated and knockout groups (Sections 7.3.4, “Isolated Groups,” page 539 and 7.3.5, “ knockout Groups,” page 540)*



Duck in foreground, rainbow in background

Rainbow in foreground, duck in background

**PLATE 18** RGB blend modes (Section 7.2.4, “Blend Mode,” page 520)