

Ti f \mathbf{g}_{psn} \mathbf{Ock} dutqf djgfe cz u f \mathbf{O} fousz jt tvckf duup u f \mathbf{g}_{mpx} joh sftusjdjpot; gbjmsf up bcjef cz u fn \mathbf{dpvra} sftvmjo n jtbjrhon foupgu f $\mathbf{pwfsitx}$ x ju u f sfo-efsf 3D hsbqi jdt:

- Ti f \mathbf{g}_{psn} \mathbf{Ock} dujt bttdjbufe x ju b tqfdjgd wjfx (opux ju u f \mathbf{dbn} fsb qptj- \mathbf{ujpo} efgofe cz u f 3D wjfx ejdjpobsz). Iuti \mathbf{pvra} \mathbf{pom} cf esbx o x i fo u f vtfs obwjhbft vtjoh u f 3D wjfx, opux i fo u f vtfs i bqqfot up obwjhbft up u f tbn f psjoubjpo cz n bovbnn fbot.
- Iuti \mathbf{pvra} \mathbf{pom} cf esbx o jgu f bsux psl -up-x \mathbf{psra} n busjy i bt opucffo bmf sfe.
- Iun bz \mathbf{pom} cf tqfdjgfe jo 3D wjfx ejdjpobsjft jo x i jdi \mathbf{cpu} b \mathbf{dbn} fsb-up-x \mathbf{psra} n busjy (\mathbf{MS} boe bttdjbufe fousjft) boe b qspkfdjpo ejdjpobsz (u f \mathbf{P} fousz) bsf qstfou

Ti f \mathbf{CO} fousz tqfdjgft u f ejtubodf \mathbf{g}_{psn} u f \mathbf{dbn} fsb up u f *center of orbit* \mathbf{g}_{ps} u f 3D wjfx, x i jdi jt u f qpjoubspvoe x i jdi u f \mathbf{dbn} fsb ti \mathbf{pvra} spubf x i fo qfs- \mathbf{g}_{psn} joh bo pscju-tuzrn obwjhbjpo. Fjhvsf 9.4 jmtusbft \mathbf{dbn} fsb qptjupojoh x i fo pscjujoh bspvoe u f dfoufsgp pscju

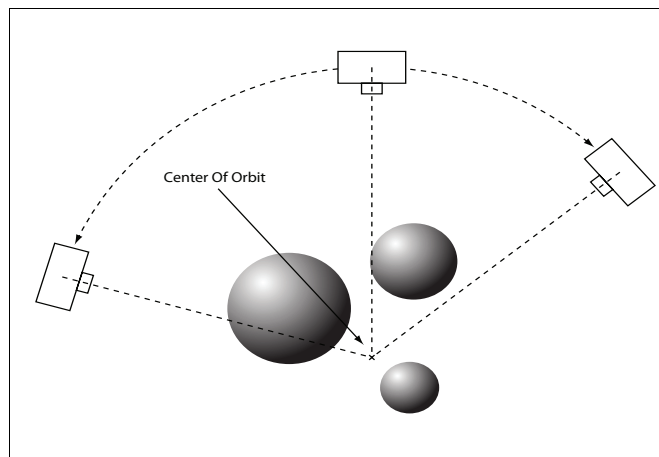


FIGURE 9.4 Rotation around the center of orbit

Ti f \mathbf{LS} fousz \mathbf{bnp} x t u f \mathbf{rjhi} ujoj pgu f 3D bsux psl up cf di bohfe x ju pvudi boh-joh u f bsux psl jutfr. Ti jt fobcrtf dpotvn fst up wjfx bhjwo qjfd pg3D bsux psl x ju b wbsjuz pgrjhi ujoj pqujpot x ju pvusfr vjsjoh n vnjqrdpqjft pgu f 3D bsux psl tusbn u buejggs \mathbf{pom} jo \mathbf{rjhi} ujoj. Iubrtf fobcrtf bsux psl x ju qpps \mathbf{rjhi} ujoj

gbs qrhof, sftqfdujwf **A** wbmf pg **ANF** gbs **CS** n fbot u buu f ofbs boe gbs qrhof bsf efufsn jofe bvupn bujdbm cbtfe po u f pckfdu jo u f bsux psl.

Ti f **Subtype** fousz tqfdjgft u f uzqf pgqspkfdupo, xi jdi efufsn joft i px pckfdu bsf qspkfdufe pou u f ofbs qrhof boe tdbfne. Ti f qpttjcrn wbmft bsf **O** gbs *orthographic projection* boe **P** gbs *perspective projection*.

Fps psu phsbqi jd qspkfdupo, pckfdu bsf qspkfdufe pou u f ofbs qrhof cz tjn qm ejtdbsejoh u fjs z wbmf. Ti fz bsf tdbfne gpn vojut pgui f ofbs qrhof dppsejobuf tztufn up u ptf pgui f boopubjpo't ubshfudppsejobuf tztufn cz u f dñ cjofe gdupt tqfdjgfe cz u f **OS** fousz boe u f **OB** fousz.

Fps qfstqfdujwf qspkfdupo, b hjwfo dppsejobuf (x, y, z) jt qspkfdufe pou u f ofbs qrhof, efgojoh b 2D dppsejobuf (x_1, y_1) vtjoh u f gmpx joh gpn vht:

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

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

xi fsf n jt u f z dppsejobuf pgui f ofbs qrhof.

Sdbjoh x ju qfstqfdujwf qspkfdupo jt n psf dñ qjdbufe u bo gbs psu phsbqi jd qspkfdupo. Ti f **FOV** fousz tqfdjgft bo bohñ u buefgoft b dpof dfoufsfe bñoh u f z byjt jo u f dñ fsb dppsejobuf tztufn (tff Fjhvsf 9.5). Ti f dpof joustfdu x ju u f ofbs qrhof, gpn joh b djsdvht bsf b po u f ofbs qrhof. Fjhvsf 9.6 ti px t u jt djsdñ boe hsbqi jdt gpn u f qptjupo pgui f dñ fsb.

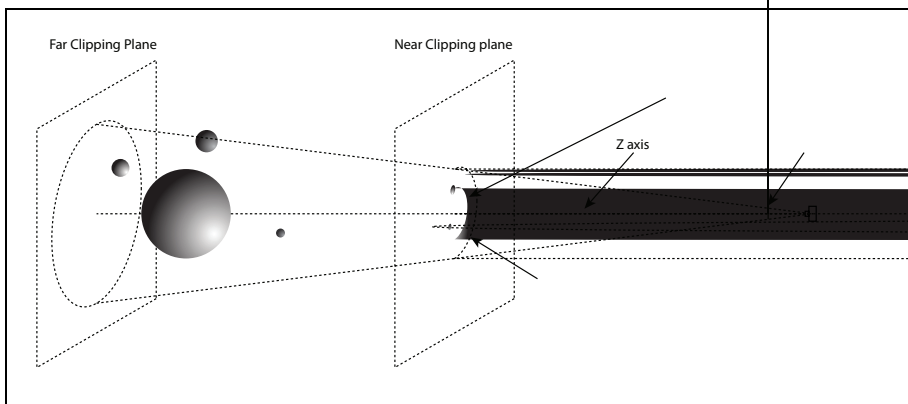


FIGURE 9.5 Perspective projection of 3D artwork onto the near plane

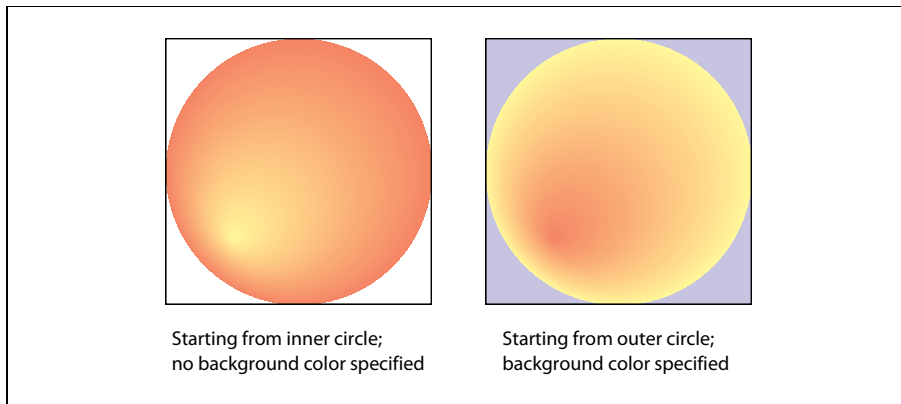


PLATE 12 *Radial shadings depicting a sphere (“Type 3 (Radial) Shadings,” page 313)*

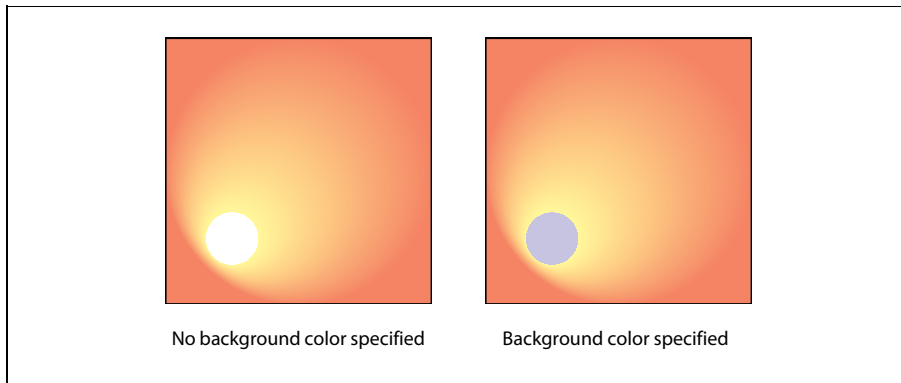


PLATE 13 *Radial shadings with extension (“Type 3 (Radial) Shadings,” page 313)*

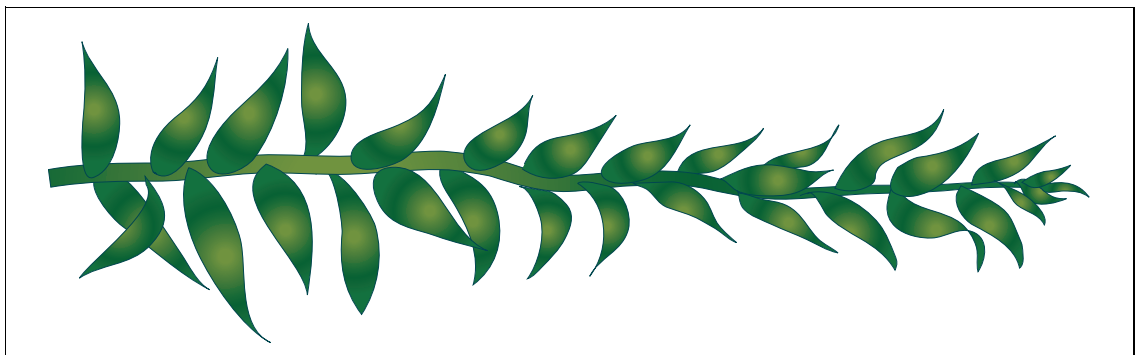
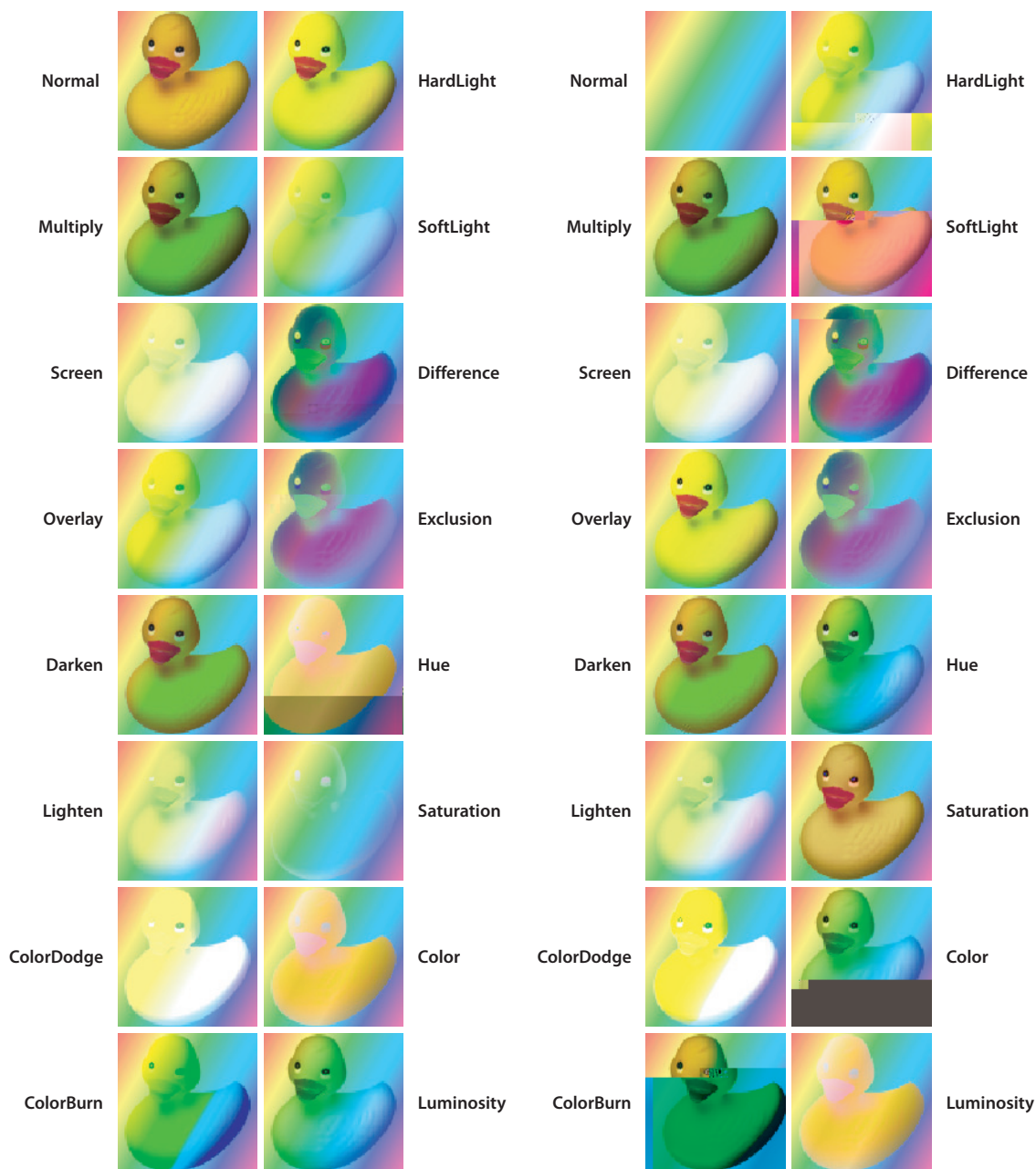


PLATE 14 *Radial shading effect (“Type 3 (Radial) Shadings,” page 313)*



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)