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## WHY DO STARS TWINKLE?

### How and turbulence produce sparkle

Star light, star bright, the first star you and your kids see tonight will probably be a planet. Before you waste a wish, check for signs of sparkling. If the light twinkles like diamond in the sky, then it's probably a star. But an unwavering bright disk is most likely a planet.

Twinkling is a phenomenon produced when our planet's atmosphere interferes with light shining from faraway objects. Stars (except for our own sun, of course) are some of the most distant objects from the earth. The triple-star system Alpha Centauri, for example, is more than 4.3 light-years (about 25 trillion miles) away. If our sun were the size of a basketball on the front lawn, Alpha Centauri would be the size of another basketball more than halfway around the world. And that's our nearest neighboring star system!

After a long journey across space, light beams from even the biggest stars appear as mere pinpoints in the night sky. As those narrow bands of light travel through the earth's atmosphere, they encounter moving air layers of different temperatures. These layers bend, or refract, the light, making the stars appear to flicker. (A similar thing happens on hot days when the heat waves rising off asphalt distort your view of objects near the ground.)

Refraction can also cause a star to seem to change color. Starlight is a mixture of many colors, and when it's refracted certain ones can appear more prominent. Sometimes the air layers bend the blue component of a star's light toward us, and at other times they bend the red toward us. Bright stars close to the horizon--where interference from the atmosphere is greatest--sparkle and change color the most.

The light from planets, on the other hand, isn't as strongly affected by the earth's turbulent atmosphere. Because planets are much closer to us than stars are, they appear as bright disks in the sky instead of as pinpoints. The distortion caused by refraction gets

smearred out along the edges of a planer's disk. As a result, planets shine relatively steadily.

PHOTO (COLOR): On a clear night the unaided eye can detect up to 8,000 twinkling stars. They seem to sparkle because their light's path wavers as it travels through the earth's turbulent atmosphere (bottom)

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By Alan Dyer

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