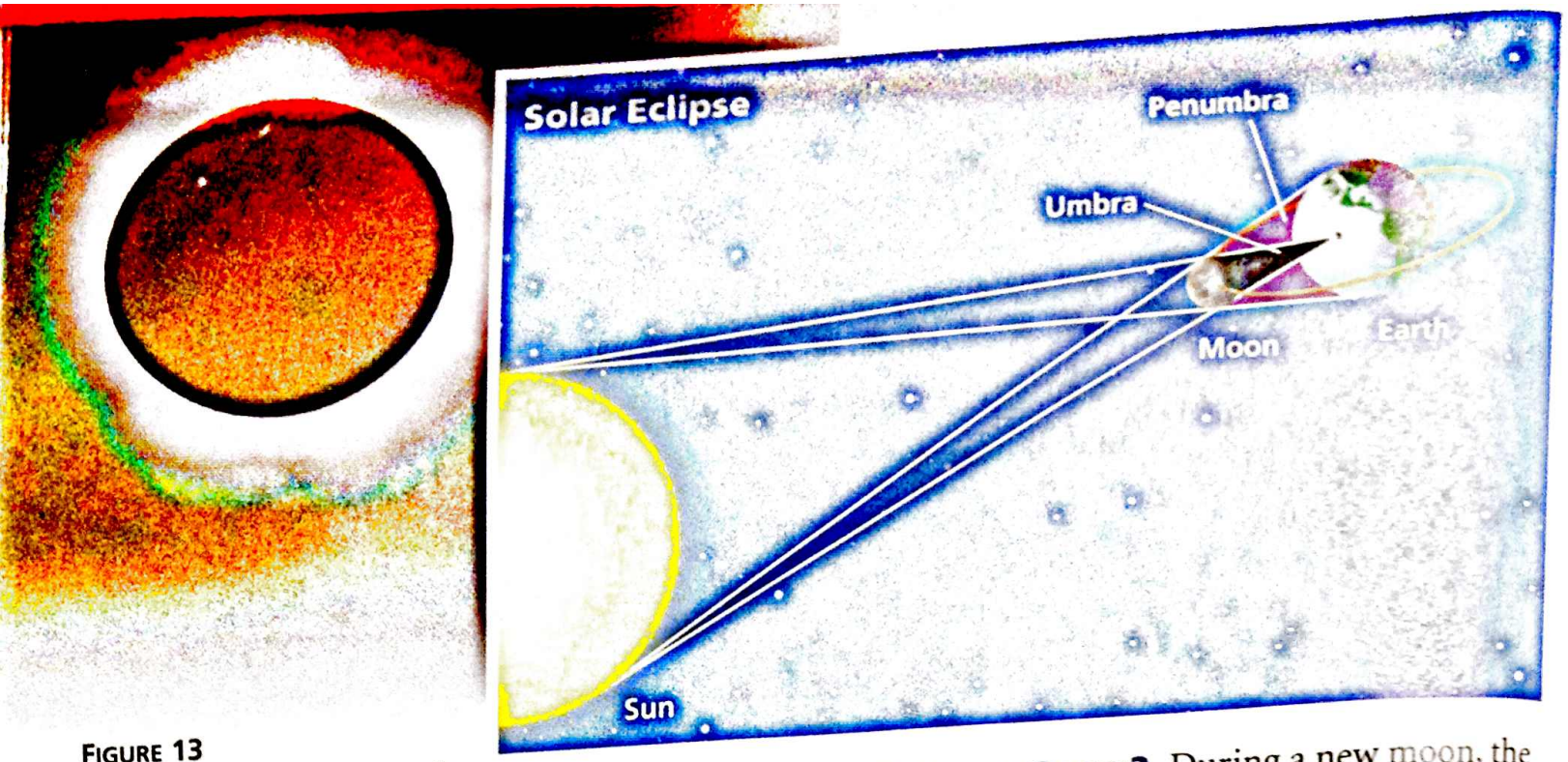

FIGURE 13
The outer layer of the sun's atmosphere, the solar corona, is visible surrounding the dark disk of the moon during a solar eclipse. During a solar eclipse, the moon blocks light from the sun, preventing sunlight from reaching parts of Earth's surface.

When Do Solar Eclipses Occur? During a new moon, the moon lies between Earth and the sun. But most months, as you have seen, the moon travels a little above or below the sun in the sky. **A solar eclipse occurs when the moon passes directly between Earth and the sun, blocking sunlight from Earth.** The moon's shadow then hits Earth, as shown in Figure 13. So a **solar eclipse** occurs when a new moon blocks your view of the sun.

Total Solar Eclipses The very darkest part of the moon's shadow, the **umbra** (UM bruh), is cone-shaped. From any point in the umbra, light from the sun is completely blocked by the moon. The moon's umbra happens to be long enough so that the point of the cone can just reach a small part of Earth's surface. Only the people within the umbra experience a total solar eclipse. During the short period of a total solar eclipse, the sky grows as dark as night, even in the middle of a clear day. The air gets cool and the sky becomes an eerie color. You can see the stars and the solar corona, which is the faint outer atmosphere of the sun.

Partial Solar Eclipses In Figure 13, you can see that the moon casts another part of its shadow that is less dark than the umbra. This larger part of the shadow is called the **penumbra** (peh NUM bruh). In the penumbra, part of the sun is visible from Earth. During a solar eclipse, people in the penumbra see only a partial eclipse. Since an extremely bright part of the sun still remains visible, it is not safe to look directly at the sun during a partial solar eclipse (just as you wouldn't look directly at the sun during a normal day).

Lab zone **Skills Activity**

Making Models

Here is how you can draw a scale model of a solar eclipse. The moon's diameter is about one fourth Earth's diameter. The distance from Earth to the moon is about 30 times Earth's diameter. Make a scale drawing of the moon, Earth, and the distance between them. (*Hint:* Draw Earth 1 cm in diameter in one corner of the paper.) From the edges of the moon, draw and shade in a triangle just touching Earth to show the moon's umbra.