Tubular Telescope

Simple STEM Activity

Purpose:	The purpose of this activity is to construct a working telescope to view faraway objects, like stars.
Standard(s):	**S4P1. Obtain, evaluate, and communicate information about the nature of light and how light interacts with objects.** c. Plan and carry out an investigation utilizing everyday materials to explore examples of when light is refracted. (Clarification statement: Everyday materials could include prisms, eyeglasses, and a glass of water.)
Materials:	2 paper towel tubes, scissors, tape, 2 convex lenses (lenses from an old pair of reading glasses will work), crayons, markers, and/or stickers (optional)
Procedures:	1. Cut one of the paper towel tubes lengthwise (up the side). 2. Wrapping one edge slightly over the other, slide this tube into the other tube and release. 3. Using tape, attach one of the convex lenses to the outer edge of the inner tube (the lens should be curving inward). This is your eyepiece. 4. Attach the other lens to the outer edge of the second tube (the lens should be curving outward). This is your objective lens. 5. Decorate the outside of your tube (optional). 6. Look through the lens of the inner tube. Aim your telescope at faraway objects*. Bring them into focus by sliding the inner tube in and out. **Safety note: Never look directly at the Sun.*
Science Behind It:	Telescopes are tools used by astronomers to see faraway objects. The first telescopes used pieces of curved, clear glass called lenses (refracting telescopes), but most telescopes today use mirrors (reflecting telescopes). Telescopes use these lenses or mirrors to gather the light better than our eyes can do on their own. In a refracting telescope, the objective lens gathers and bends the light, then the eyepiece focuses and magnifies the light, enlarging the image for our eyes. The size of the image produced by the telescope depends on the curvature of the lenses. Lenses with different curvatures will change the magnification of the telescope, so thicker lenses make more powerful telescopes.

Questions to Ask:	• What is a telescope? • How does a telescope work?