

ACTIVITIES

Student Activities *continued*

- c** tape the 2cm diffraction gratings on one end of the tube, with the diffraction gratings inside the tube.
- d** look through the tube from that end while pointing it at a light source and covering the other end with the slotted circle. They should spin the slotted circle until they get the widest spectrum reading.



TEACHERS

GUIDE



SPECTROSCOPE
ITEM # 3372-00

LIGHT AND COLOR - COLOR

- How can viewing a rainbow at the end of a tube answer questions about life in space?

•
Observe how different light sources create a different view of the spectrum through this metal extendable tube, 20mm in diameter, with an adjustable slit at one end. Light passing through the slit end falls on diffraction gratings at the other end and breaks into a spectrum to be viewed through the eyepiece at the opposite end of the tube. Fully extended length is 120mm.

Materials

- 4-6 Spectroscopes
- various bulbs such as fluorescent, halogen, neon, incandescent, bug lights, and a gas lantern
- paper towel roles
- constructions paper
- scissors
- 2 sheets holographic diffraction gratings cut into 2cm squares
- access to internet
- colored pencils

Goals & Objectives

Students will:

- recognize that the spectrum is like a fingerprint that indicates the source that illuminated it.
- sketch the spectrum as they see it when pointed at various light sources.
- explore what the make-up of certain known planets are and hypothesize about what astronauts might see if using high-powered spectroscopes to view each of those planets.
- build their own spectroscope.

ASSESSMENT

Sketches of spectra per light source and homemade spectroscope.

ACTIVITIES

- 1 Set up the various kinds of lights at various stations throughout the room. Label each.
- 2 Ask students to look up the electromagnetic spectrum on computers. Explain that waves create this spectrum, and only our eyes can experience some of it. Also ask them to look at absorption spectrum, which is a “map” of various kinds of gasses present in certain materials, objects, or planets.
- 3 Demonstrate which end of the spectroscope to hold to the eye, and to hold it directly toward a light source.
- 5 As they finish, they can look up Mercury, Venus, and the Sun to learn what gasses are most prevalent. For each one, they should hypothesize about what a spectroscope would show if astronauts pointed one at that celestial body.

Note

It is always best to DO an experiment ahead of time to be able to best present it to the class.



WARNING

Never aim directly at sunlight!

- 6 Next, students can pick up 1 paper towel role, construction paper, scissors, and a 2cm square of holographic diffraction gratings paper.
- 7 They should
 - a trace the end of the tube twice and cut it out.
 - b cut a 2cm square in one circle, and a narrow slit nearly the diameter of the circle in the other.

continued on page 4