



- ▼ Research Sir William Herschel and explain how he came to discover infrared radiation.
- ▼ Explain why we would want to use infrared radiation to study Mercury and other planets.
- ▼ Explain how excess infrared radiation is a concern for the MESSENGER mission.

#### CURRICULUM CONNECTIONS

- ▼ *History of science / Gender studies:* Have the students explore the role of women in astronomy. Sir William Herschel's sister, Caroline, was a great astronomer and made several important discoveries. Unfortunately, the general style of the times was that astronomical observations made by women were often credited to their fathers, brothers, and husbands. Have the students examine the role of women in astronomy throughout history, from the early period to modern times. Have the students profile a great female astronomer from the past or the present.
- ▼ *Technology:* Have the students choose an application where infrared radiation is used and write an essay about it.
- ▼ *Astronomy:* Have the students examine the importance of infrared astronomy, and especially the expectations laid on the final element of NASA's Great Observatories program, Spitzer Space Telescope. The other great observatories are The Hubble Space Telescope (visible light), Compton Gamma-Ray Observatory (gamma rays), and Chandra X-Ray Observatory (X-rays).
- ▼ *Art / Photography:* Purchase regular and infrared film to be used in a standard 35-mm camera. Infrared film can usually be purchased at a well-stocked photography supply store. Photograph test subjects in both infrared and visible film and see how the developed results compare.
- ▼ *Earth science:* Infrared satellites have provided a lot of information about environmental changes on Earth. Have the students explore the NASA Earth Observatory Web site (<http://earthobservatory.nasa.gov/>) and discover how various parts of the electromagnetic spectrum are used in Earth science observations.

#### CLOSING DISCUSSION

Remind students how in this lesson they discovered that there is a lot of radiation coming from the Sun besides visible light, forms of "light" that we cannot see. Discuss how we use infrared light in many places today. Use the example of MESSENGER to review ways in which infrared radiation is useful, as well as harmful.

