

Chapter 2

Use with Section 2

ENRICHMENT**• SI Units****Defining the Meter**

Over the years, scientists have used different ways to set the exact length of the meter. In 1790 it was suggested that the meter be defined as the length of a pendulum having a period of one second.

In 1791 it was proposed that the meter equal one ten-millionth of the distance at sea level from the north pole to the equator. In 1799 a platinum bar one ten-millionth of the length of the part of the meridian that reached from the north pole through Paris to the equator was created as the prototype for the meter. This bar, the Metre des Archives, was one meter long from end to end at 0°C. In 1889 a meter bar made of platinum and iridium and measured at 0°C became the standard.

In 1960 a definition based on the wavelength of krypton-86 radiation in a vacuum was instituted. The definition changed again in 1983, when the current definition was established. A meter is now defined as the length traveled by light in a vacuum in $1/299\,702\,458$ of a second.

1. What other unit needed to be standardized before the meter could be defined under the 1983 definition?

2. What are some possible problems with using a physical model as a prototype?

3. Why was it necessary to specify a particular meridian when determining the length of a meter?

4. How precise is an everyday meterstick compared to the length of the standard meter?
