



## TECHNOLOGY & LEARNING

- 35. Graphing Calculator** Calculate Numbers of Protons, Electrons, and Neutrons. A graphing calculator can run a program that calculates the numbers of protons, electrons, and neutrons given the atomic mass and numbers for an atom. For example, given a calcium-40 atom, you will calculate the number of protons, electrons, and neutrons in the atom.

Go to Appendix C. If you are using a TI 83 Plus, you can download the program and data sets and run the application as directed. If you are using another calculator, your teacher will provide you with keystrokes and data sets to use. Remember that you will need to name the program and check the display, as explained in Appendix C. You will then be ready to run the program. After you have graphed the data sets, answer these questions.

- Which element has the greatest number of protons?
- How many neutrons does mercury have?
- Carbon-12 and carbon-14 have the same atomic number. Do they have the same number of neutrons? Why or why not?



## HANDBOOK SEARCH

- 36.** Group 14 of the *Elements Handbook* describes the reactions that produce CO and CO<sub>2</sub>. Review this section to answer the following:
- When a fuel burns, what determines whether CO or CO<sub>2</sub> will be produced?
  - What happens in the body if hemoglobin picks up CO instead of CO<sub>2</sub> or O<sub>2</sub>?
  - Why is CO poisoning most likely to occur in homes that are well sealed during cold winter months?

## RESEARCH & WRITING

- Prepare a report on the series of experiments conducted by Sir James Chadwick that led to the discovery of the neutron.
- Write a report on the contributions of Amedeo Avogadro that led to the determination of the value of Avogadro's number.
- Trace the development of the electron microscope, and cite some of its many uses.
- The study of atomic structure and the nucleus produced a new field of medicine called nuclear medicine. Describe the use of radioactive tracers to detect and treat diseases.

## ALTERNATIVE ASSESSMENT

- Observe a cathode-ray tube in operation, and write a description of your observations.
- Performance Assessment** Using colored clay, build a model of the nucleus of each of carbon's three naturally occurring isotopes: carbon-12, carbon-13, and carbon-14. Specify the number of electrons that would surround each nucleus.