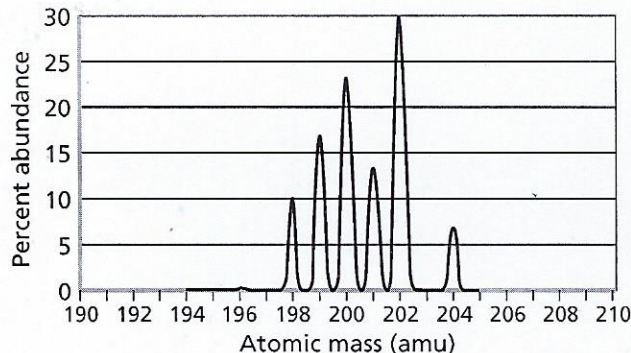


**CHAPTER 4 CHALLENGE PROBLEMS**

# Isotopes of an Element

Use with Chapter 4,  
Section 4.3

**A** mass spectrometer is a device for separating atoms and molecules according to their mass. A substance is first heated in a vacuum and then ionized. The ions produced are accelerated through a magnetic field that separates ions of different masses. The graph below was produced when a certain element (element X) was analyzed in a mass spectrometer. Use the graph to answer the questions below.



- How many isotopes of element X exist? \_\_\_\_\_
- What is the mass of the most abundant isotope? \_\_\_\_\_
- What is the mass of the least abundant isotope? \_\_\_\_\_
- What is the mass of the heaviest isotope? \_\_\_\_\_
- What is the mass of the lightest isotope? \_\_\_\_\_
- Estimate the percent abundance of each isotope shown on the graph.  
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- Without performing any calculations, predict the approximate atomic mass for element X. Explain the basis for your prediction.  
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- Using the data given by the graph, calculate the weighted average atomic mass of element X. Identify the unknown element.  
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