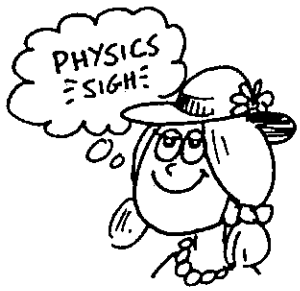
Name Period Date

Concept-Development Practice Page **39–1**

The Atomic Nucleus and Radioactivity

1. *Complete the following statements.*



   a. A lone neutron spontaneously decays into a proton plus an _____.

   b. Alpha and beta rays are made of streams of particles, whereas gamma rays are streams of _____.

   c. An electrically charged atom is called an _____.

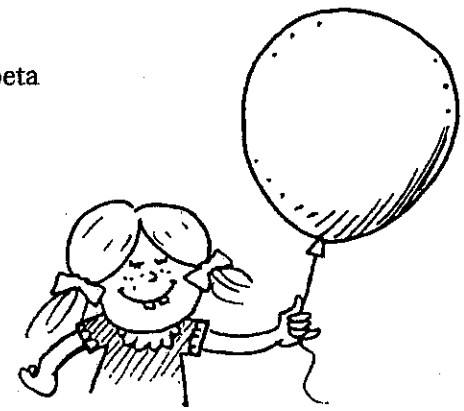
   d. Different _____ of an element are chemically identical but differ in the number of neutrons in the nucleus.

   e. Transuranic elements are those beyond atomic number _____.

   f. If the amount of a certain radioactive sample decreases by half in four weeks, in four more weeks the amount remaining should be _____ the original amount.

   g. Water from a natural hot spring is warmed by _____ inside the earth.

2. The gas in the little girl's balloon is made up of former alpha and beta particles produced by radioactive decay.



   a. If the mixture is electrically neutral, how many more beta particles than alpha particles are in the balloon?

   _____

   _____

   b. Why is your answer not "same"?

   _____

   _____

   c. Why are the alpha and beta particles no longer harmful to the child?

   _____

   _____

   d. What element does this mixture make?

   _____

Conceptual PHYSICS

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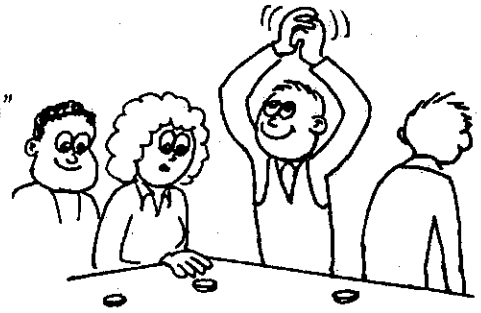
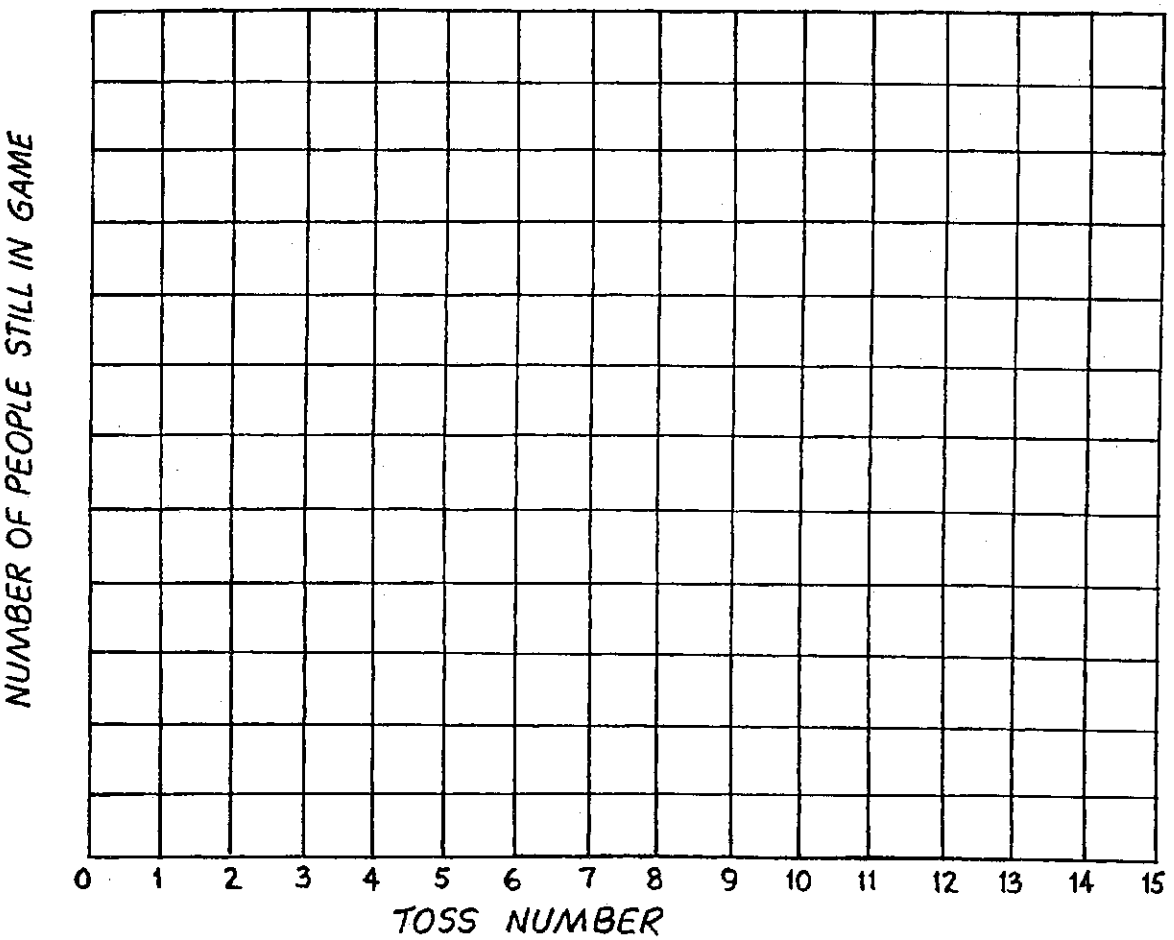
Radioactive Half Life



You and your classmates will now play the "half-life game." Each of you should have a coin to shake inside cupped hands. After it has been shaken for a few seconds, the coin is tossed on the table or on the floor. Students with tails up fall out of the game. Only those who consistently show heads remain in the game. Finally everybody has tossed a tail and the game is over.

1. On the graph below, plot the number of students left in the game after each toss. Draw a smooth curve that passes close to the points on your plot. What is the similarity of your curve with that shown in Figure 39.13 of your textbook?



2. Was the person to last longest in the game *lucky*, with some sort of special powers to guide the long survival? What test could you make to decide the answer to this question?

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