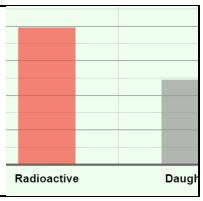
Activity A: **Decay curves**	Get the Gizmo ready: • Click **Reset** (↺). Be sure that **User chooses half-life** and **Random decay** are selected. • Check that the **Half-life** is 20 seconds and the **Number of atoms** is 128.	

Question: How do we measure the rate of radioactive decay?

1. Observe: Select the BAR CHART on the right side of the Gizmo and click **Play**.

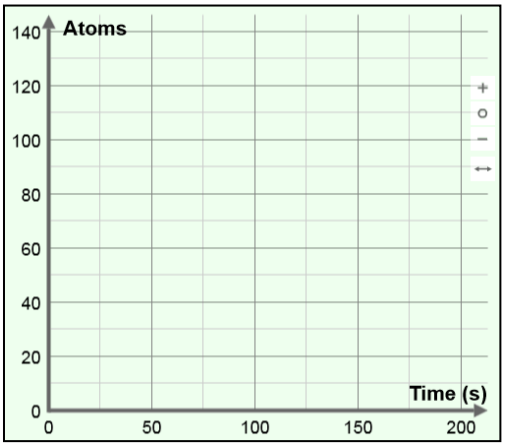
   A. What happens to the numbers of radioactive and daughter atoms as the simulation proceeds? _____

   _____

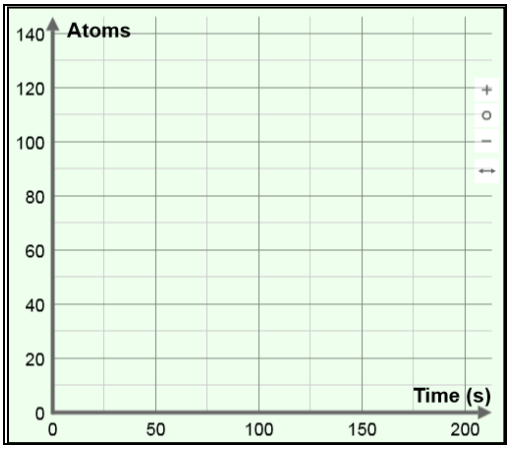
   B. Do the numbers of radioactive and daughter atoms change at the same rate throughout the simulation? Explain. _____

   _____

2. Experiment: Click **Reset**, and select the GRAPH tab. Run a simulation with the **Half-life** set to 5 seconds and another simulation with the **Half-life** set to 35 seconds. Sketch each resulting decay curve graph in the spaces below.



Half-life = 5 seconds



Half-life = 35 seconds

3. Interpret: How does the **Half-life** setting affect how quickly the simulated substance decays?

   _____

   _____

(Activity A continued on next page)

Activity A (continued from previous page)

4. Collect data: Click **Reset**. Change the **Half-life** to 10 seconds and click **Play**. Select the TABLE tab and record the number of radioactive atoms at each given time below.

   0 s: _____ 10 s: _____ 20 s: _____ 30 s: _____ 40 s: _____ 50 s: _____

5. Analyze: What pattern, if any, do you see in your data? _____

   _____

6. Revise and repeat: Use your data from #4 above to fill in the first line of the data table below. Then repeat the experiment four more times. Calculate the average number of radioactive atoms for each time.

Trial	0 s	10 s	20 s	30 s	40 s	50 s
1						
2						
3						
4						
5						
Averages:						

7. Analyze: A **half-life** is defined as the amount of time it takes for half of the radioactive particles to decay. For the simulated substance, every 10 seconds represents one half-life.

   How does your data demonstrate the definition of a half-life? _____

   _____

   _____

8. Revise and repeat: Click **Reset**. Real radioactive samples will contain billions of radioactive atoms. To model the decay of a large sample, change from **Random decay** to **Theoretical decay** on the SIMULATION pane. Click **Play** and record the numbers of radioactive atoms:

   0 s: _____ 10 s: _____ 20 s: _____ 30 s: _____ 40 s: _____ 50 s: _____

   How does this data demonstrate the meaning of half-life? _____

   _____

   _____