**Nuclear Decay of Element Z**

*Element Z has a half-life of one week. (What do you think this means? ______________________________________________________________________________)*

Use the plotted grid below to trace the decay of a 256-gram sample of element Z over a 10-week period. Each box on the grid represents 1 gram of element Z. After you complete each step, answer the following question.

<table>
<thead>
<tr>
<th>Week</th>
<th>Direction</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use a pencil to draw a large X through ½ of the boxes on the left side of the grid.</td>
<td>How many grams of element Z decayed? ______</td>
</tr>
<tr>
<td>2</td>
<td>Use a different colored pencil to draw a large X through ½ of the remaining boxes.</td>
<td>How many grams of element Z remain now, after 2 weeks? ______</td>
</tr>
<tr>
<td>3</td>
<td>Use your pencil to shade in ½ of the remaining boxes.</td>
<td>How many grams of element Z are left? ______</td>
</tr>
<tr>
<td>4</td>
<td>Repeat step 3 using the colored pencil.</td>
<td>How many grams of element Z remain? ______</td>
</tr>
<tr>
<td>5</td>
<td>Use a pencil to draw an X in ½ of the remaining boxes.</td>
<td>How many grams of element Z remain? ______</td>
</tr>
<tr>
<td>6</td>
<td>Repeat step 5 using the colored pencil.</td>
<td>How many grams of element Z remain? ______</td>
</tr>
<tr>
<td>7</td>
<td>Use your pencil to draw a circle in ½ of the remaining boxes.</td>
<td>How many grams of element Z remain? ______</td>
</tr>
<tr>
<td>8</td>
<td>Repeat step 7 using the colored pencil.</td>
<td>How many grams of element Z remain? ______</td>
</tr>
<tr>
<td>9</td>
<td>Shade in ½ of the remaining box with your pencil.</td>
<td>How much of element Z remains? ______</td>
</tr>
<tr>
<td>10</td>
<td>Repeat step 9 using the colored pencil.</td>
<td>How much of element Z remains? ______</td>
</tr>
</tbody>
</table>

**Analysis:**

On a separate sheet of graph paper, make a line graph that shows the decay of element Z over a 10-week period. Use your answers to the above 10 questions as your data. Plot weeks on the X axis and grams of element Z on the Y axis.

On the back of the graph, write answers to the following:
1. Write a sentence describing what your graph shows.
2. Describe “half-life” in your own words.
3. Research and find out: What is carbon-dating? Please explain why/how scientists use the technique of carbon-dating and what this activity has to do with it.
**Nuclear Decay of Element Z**

*Element Z has a half-life of one week.* *(What do you think this means? * answers will vary ... discuss ideas _______)*

*Use the plotted grid below to trace the decay of a 256-gram sample of element Z over a 10-week period.*

*Each box on the grid represents 1 gram of element Z. After you complete each step, answer the following question.*

<table>
<thead>
<tr>
<th>Week</th>
<th>Direction</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use a pencil to draw a large X through ½ of the boxes on the left side of the grid.</td>
<td>How many grams of element Z decayed? <strong>128 g</strong></td>
</tr>
<tr>
<td>2</td>
<td>Use a <em>different colored pencil</em> to draw a large X through ½ of the remaining boxes.</td>
<td>How many grams of element Z remain now, after 2 weeks? <strong>64 g</strong></td>
</tr>
<tr>
<td>3</td>
<td>Use your pencil to shade in ½ of the remaining boxes.</td>
<td>How many grams of element Z are left? <strong>32 g</strong></td>
</tr>
<tr>
<td>4</td>
<td>Repeat step 3 using the <em>colored pencil</em>.</td>
<td>How many grams of element Z remain? <strong>16 g</strong></td>
</tr>
<tr>
<td>5</td>
<td>Use a pencil to draw an X in ½ of the remaining boxes.</td>
<td>How many grams of element Z remain? <strong>8 g</strong></td>
</tr>
<tr>
<td>6</td>
<td>Repeat step 5 using the <em>colored pencil</em>.</td>
<td>How many grams of element Z remain? <strong>4 g</strong></td>
</tr>
<tr>
<td>7</td>
<td>Use your pencil to draw a <em>circle</em> in ½ of the remaining boxes.</td>
<td>How many grams of element Z remain? <strong>2 g</strong></td>
</tr>
<tr>
<td>8</td>
<td>Repeat step 7 using the <em>colored pencil</em>.</td>
<td>How many grams of element Z remain? <strong>1 g</strong></td>
</tr>
<tr>
<td>9</td>
<td>Shade in ½ of the remaining box with your pencil.</td>
<td>How much of element Z remains? <strong>0.5 g</strong> (½ g)</td>
</tr>
<tr>
<td>10</td>
<td>Repeat step 9 using the <em>colored pencil</em>.</td>
<td>How much of element Z remains? <strong>0.25 g</strong> (¼ g)</td>
</tr>
</tbody>
</table>

**Analysis:**

*On a separate sheet of graph paper, make a line graph that shows the decay of element Z over a 10-week period. Use your answers to the above 10 questions as your data. Plot weeks on the X axis and grams of element Z on the Y axis.*

*On the back of the graph, write answers to the following:*  
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