WS 5.5 Carbon-14 Dating

In the spaces below, write and illustrate as though it were a comic strip, a description of the entire process of C-14 dating in the 6 squares provided, showing: **1)** how and where C-14 is produced, **2)** how it decays and establishes a small but constant level in the atmosphere, **3)** how this same level also becomes established in plants... **4)** and in animals, **5)** the significance of death, and **6)** how a Geiger counter can be used to determine the age of an artifact.

Be detailed enough so that someone else could understand these 6 steps.

1	2	3
4	5	6

1. In what ways is C-14 different than regular carbon (C-12)? Name at least two:

2. Do C-14 and C-12 react the same chemically? If no, explain why not. If yes, explain why.

(more questions on back!)

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3. What's wrong with this statement: "When an animal dies, the C-14 inside it starts to decay, and then after a while you can tell how long it has been dead by using C-14 dating."

4. Rewrite the statement in #3 above to be more correct.

5. For each of the following, decide whether or not C-14 dating could be used.

• **If you answer no, explain why not!**

____ To determine the age of a bronze axe, believed to be 10,000 - 13,000 years old.

____ To determine the age of the oldest living pine tree believed to be 5,000 - 10,000 years old.

____ To determine the age of an animal skin, believed to be 3,000 - 4,000 years old.

____ To verify the age of a man claiming to be 6,493 years old.

____ To determine the time of death of a murder victim found last Tuesday.

____ To determine the age of a wooded spear, believed to be 100,000 - 120,000 years old.

6. If a newly cut piece of wood gives a C-14 Geiger tube reading of 124 cpm (counts per minute) and an artifact gives a reading of 31 cpm, how old is the artifact? **(don't use the half-life equation)**

7. If a newly cut piece of wood gives a C-14 Geiger tube reading of 124 cpm, and an artifact gives a reading of 47 cpm, how old is the artifact? **(use the half-life equation)**

8. If a newly cut piece of wood gives a C-14 Geiger tube reading of 124 cpm what reading would be given by an artifact that is... **(use the equation & show your work!)**

a) 18,500 years old? Ans: _____

b) 6 days old? Ans: _____

c) 435,000 years old? Ans: _____

Ans (IRO+3): N N N N N Y 1.74×10^{-21} 2.52 13.2 124 8020 11,460 23,920 cherry-tree mustache
Units (IRO): years, years, cpm, cpm, cpm