

# CARBON-14 DATING – GREEK ARTIFACTS

## WORKSHEET KEY

	Animal Bone	Charcoal	Olive Leaf	Woven Fabric
Number of Original Carbon-14 Atoms	33519	21943	37489	34900
Number of Remaining Carbon-14 Atoms	29162	17335	33365	30014
Percent of Original Carbon-14 Atoms Remaining	87%	79%	89%	86%
Number of Carbon-14 Atoms Lost	4357	4608	4124	4886
Percent of Original Carbon-14 Atoms Lost	13%	21%	11%	14%
Rate of Decay	2.0	2.0	2.0	2.0
Age	2179	2304	2062	2443
*Year of Death	171 B.C.E.	296 B.C.E.	54 B.C.E.	435 B.C.E.

\*Based on the current year being 2008, please adjust accordingly for future use.

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Name \_\_\_\_\_ Date \_\_\_\_\_

For this exercise, each organic object has been allotted a hypothetical number of original carbon-14 atoms and a hypothetical rate of decay for the carbon-14 atoms (2 atoms per year). You are using these hypothetical numbers because, in reality, scientists must complete a complex calculus equation that includes the natural logarithm in order to discover an object's rate of decay. However, though they are simplified, the problems below will give you an indication of the processes involved in carbon-14 dating.

In order to solve the problems below, you need to learn this equation: the age of the organic objects is equal to the number of Carbon-14 atoms lost divided by the rate of decay.

$$\text{Carbon-14 atoms lost/Rate of decay} = \text{Age of Object}$$

To discover the year the objects died, the current year from their ages. Round each answer to the nearest whole number.

**Complete the chart below. Base your answers on the information provided.**

CARBON-14 DATING	Animal Bone	Charcoal	Olive Leaf	Woven Fabric
Number of Original Carbon-14 Atoms	33519		37489	34900
Number of Remaining Carbon-14 Atoms				
Percent of Original Carbon-14 Atoms Remaining		79%		86%
Number of Carbon-14 Atoms Lost		4608		
Percent of Original Carbon-14 Atoms Lost	13%		11%	
Rate of Carbon-14 Decay	2.0	2.0	2.0	2.0
Age				
Year of Death				

**EXERCISE:** You have received a crated artifact discovered at an archeological dig site. A local museum needs to discover the age of the artifact, so they have sent it to you. How are you to determine the age of this artifact if it is manmade and not organic? You are in luck—the museum has also sent to you objects that were discovered in the soil with the artifact! Using the information in the completed chart above, determine the ages of the organic materials found with the artifact. Then, averaging the ages of the earliest and latest objects, determine an approximate date (a circa date) for the artifact. Finally, compare and contrast the artifact to similar regional artifacts' photos to determine if it is likely that the artifact you have dated could have been created during the time that you suggest.

Using the worksheet that came with the artifact, report your findings to the museum.