

Questions to guide you in your analysis of "Bones: Aliens in a Spaceship"

You will be writing a research paper that is worth a significant portion of your grade. This paper should be at least two pages long and should not be a plot summary or a commentary explaining if you liked the show or not. When you write this paper you need to assume the role of a chemistry science advisor. Your job is to identify scientific errors, determine if these errors will be so serious that the viewer will not be able to "suspend disbelief", and explain the correct science as needed. Focus on the CHEMISTRY as you write your paper. These questions may give you some ideas. Pick two or three areas to discuss. There is too much to analyze the entire show.

1. What is calcining? Is the statement that it occurs over 300 degrees valid? Are we to assume these scientists are using the Celsius scale?
2. Hodgins points out the fact that British English uses different spelling and pronunciation for the thirteenth element. Are there other elements that we commonly study that have different pronunciations and spellings?
3. What is an alloy? What does it mean to harden a metal?
4. Is it logical that the container where the boys were found would be lined with pure copper? The dimensions of the vat are 6 feet wide and 8 feet tall - what is the shape of the vat? Is this enough information to estimate the interior volume of the vat? How much oxygen would be expected to be contained in the vat if it was filled with air? What determines how long a human could survive in this atmosphere? Is 12 hours a reasonable amount of time for this container?
5. What is the composition of engine exhaust? What is suggested for the composition? For the year that the boys died would there be lead in engine exhaust? Why or why not?
6. What kind of "mini kit" would be carried by a forensic anthropologist? What is soda ash? Why would this chemical be in the kit?
7. What are agglutinate aridisols?
8. Would someone be able to smell nitrogen and sulfur?
9. What is bituminous coal? What is benzophenone?
10. What information was in the histogram shown on the camera screen? Would this be useful or possible to do really?

11. What does anodized mean? Is the statement about the composition of a car sticker reasonable? What is the composition of a Chicago City Sticker? Why would metallic tape be in one of these stickers?
12. Think about the following statement "Yea, but now we've proved it, I find that I'm really annoyed". What does this suggest about the thought processes of a scientist?
13. What does the message: $6 \times 7 = 16$ M1.4 turn out to mean?
14. Is it reasonable that puncturing a tire would give Bones and Hodgins more time to live?
15. What chemical reaction occurs between soda ash and lithium? Is the lithium in a battery available for this reaction (i.e. is it on the outside of the container)? What would have to occur to get to the lithium in a battery? Would the reaction bubble and produce oxygen as suggested? Would the amount of oxygen be significant?
16. What chemical reaction occurs in an air bag? Is the escape proposed by detonating the air bag feasible?
17. Cam states that her special talent is making "intuitive leaps". Are intuitive leaps necessary in scientific investigations?
18. What is a maceral? How would a laser pointer help to measure fluorescence?
19. How much would four feet of soil weigh if we consider the area consistent with a typical car? Would an air bag explosion be able to make a puff of soil?
20. Is this a good script in your opinion? Does this script communicate more information or more misinformation about science? Is it believable to the general public?

In addition to the chemistry in this episode there are also references to biology, electrical circuits, geology, medicine, psychology, religion, philosophy, music and physics. Carrying out an analysis like this helps you develop an awareness of the connection between classroom learning and the world at large. There are real jobs like this, science advisors. Read an interview with a science advisor ([link in handouts section](#)).