

Student: “I was presented with a law that I vaguely remembered from elementary and middle school – the second law of thermodynamics. This law claims that “Systems will go spontaneously in one direction only – toward increasing entropy”. To me, if this is a law of science that has gone through testing and is widely accepted in the field of science, it is ironic to me that many scientists believe in evolution. As defined in the book, entropy is “a measure of the degree of disorder in a system,” which according to the second law of thermodynamics means that if things are left alone, then the amount of disorder in a system will increase. If people believe that we (humans) are the result of evolution, they are claiming that we were made spontaneously through the product of increasing disorder. To me, this does not make sense as the human system is intricate with multiple systems that work together simultaneously to make up the human body. If the human body was created through the process of evolution despite increasing entropy, then I guess we are lucky that our bodies were spontaneously put together so well.”

Kestas:

You are right that the 2nd Law of TD is well established. What you probably have not learned yet is that it is applicable to closed systems only. You'd probably know that if you had higher level chemistry, such as General Chemistry or Physical Chemistry. Closed systems do not exchange matter or energy with their surroundings. Since living systems do, they are open systems, and the Second Law of TD is not applicable to living systems unless their surroundings are included. So, if you included the surroundings, you'd realize that living systems keep themselves highly organized at the expense of disorganizing surroundings. For example, you. You eat highly organized food and disperse disorganized waste and heat. This allows you to keep high organization inside of you. Highly organized systems are very efficient in disorganizing surroundings, and that often makes them better fit to survive and reproduce. Thus, with this fuller understanding of the second law of TD, I hope that you see now that this law not only has no contradiction with the theory of evolution but rather supports it. The evolution is also a very well established law, and all modern biology and medicine rests on it. If one does not believe in it as a matter of a principle, they should not use (because of this principle position) modern hospitals or drugs, and not to try get cure from bacterial infections or cancers (for example, bacteria evolve to get resistance to older antibiotics all the time). One has to admit that if you are willing to use modern medicine, modern biology to help themselves, then you should not be hypocritical about the evolution either. Scientists have worked on these theories for many tens of years, and believe me if there was a way to disprove any of these two theories, they would have done that a long time ago. I would, if I could. As is, these both theories stand as fundamental and complimentary pieces of our current understanding of the world. I encourage you to talk to me, if you have any facts to support your position. I will be glad to change my mind, like any other scientist, as no theory is complete, and they all evolve and change with time, as new facts are discovered.