The four laws of thermodynamics define fundamental physical quantities (temperature, energy, and entropy) that characterize thermodynamic systems at thermal equilibrium. The laws describe how these quantities behave under various circumstances, and preclude the possibility of certain phenomena (such as perpetual motion).

The four laws of thermodynamics are:

1. The First Law
2. The Second Law
3. The Third Law
4. The Zeroth Law

The First Law

The First Law of Thermodynamics was formulated originally by Robert Mayer (1814-1878). He stated: "I therefore hope that I may reckon on the reader’s assent when I lay down as an axiomatic truth that, just as in the case of matter, so also in the case of force [the term used at that time for energy—JM], only a transformation but never a creation takes place" (as quoted in King, 1962, p. 5). That is, given a certain amount of energy in a closed system, that energy will remain constant, though it will change form (see Figure 1). As evolutionist Willard Young says in defining the First Law, “Energy can be neither created nor destroyed, but can only be converted from one form to another” (1985, p. 8).
This principle, also known as the “conservation of energy principle” (Cengel and Boles, p. 2), can be demonstrated by the burning of a piece of wood. When the wood is burned, it is transformed into a different state. The original amount of energy present before the burning is still present. However, much of that energy was transformed into a different state, namely, heat. No energy disappeared from the Universe, and no energy was brought into the Universe through burning the wood. Concerning the First Law, Young further explains that

the principle of the conservation of energy is considered to be the single most important and fundamental ‘law of nature’ presently known to science, and is one of the most firmly established. Endless studies and experiments have confirmed its validity over and over again under a multitude of different conditions (p. 165, emp. added).

This principle is known to be a fact about nature—without exception. One thermodynamics textbook, Fundamentals of Thermodynamics, says:

The basis of every law of nature is experimental evidence, and this is true also of the first law of thermodynamics. Many different experiments have been conducted on the first law, and every one thus far has verified it either directly or indirectly. The first law has never been disproved (Borgnakke and Sonntag, 2009, p. 116, emp. added).

That is why the McGraw-Hill Dictionary of Scientific and Technical Terms defines a scientific law as “a regularity which applies to all members of a broad class of phenomena” (2003, p. 1182, emp. added). Famous atheist, theoretical physicist, and cosmologist of Cambridge University, Stephen Hawking, concurred:

But what’s really important is that these physical laws, as well as being unchangeable, are universal. They apply not just to the flight of the ball, but to the motion of a planet and everything else in the Universe. Unlike laws made by humans, the laws of nature cannot ever be broken. That’s why they are so powerful…. [T]he laws of nature are fixed (“Curiosity: Did God Create the Universe?” 2011, emp. added).

The Second Law

In the nineteenth century, Lord Kelvin and Rudolph Clausius (1822-1888) separately made findings that became known as the Second Law of Thermodynamics (Suplee, 2000, p. 156). The Second Law builds on the First, stating that though there is a constant amount of energy in a given system that is merely transforming into different states, that energy is becoming less usable. Extending our wood burning illustration above, after the wood is burned, the total amount of energy is still the same, but transformed into other energy states. Those energy states (e.g., ash and dissipated heat to the environment) are less retrievable and less accessible (see Figure 2).
Well-known atheist, physicist, cosmologist, and astrobiologist of Arizona State University, Paul Davies, explained it this way:

> [T]he celebrated second law of thermodynamics... says, roughly speaking, that in any change the Universe becomes a slightly more disorderly place; the entropy goes up, the information content goes down. This natural tendency towards disintegration and chaos is evident all around us (1978, 80[1129]:506).

This process is irreversible. Lord Kelvin stated that energy is ‘irrecoverably lost to man and therefore ‘wasted,’ although not annihilated’ (Thomson, 1882, p. 189, ital. in orig.). This principle is known as entropy. Simply put, entropy states that nature is tending towards disorder and chaos. Will the paint job on your house maintain its fresh appearance over time? Will your son’s room actually become cleaner on its own, or will it tend toward disorder? Even without your son’s assistance, dust and decay take their toll. Although work can slow the entropy, it cannot stop it. Renowned evolutionary science writer Isaac Asimov explained:

> Another way of stating the Second Law then is “The universe is constantly getting more disorderly!” Viewed that way we can see the Second Law all about us. We have to work hard to straighten a room, but left to itself it becomes a mess again very quickly and very easily. Even if we never enter it, it becomes dusty and musty. How difficult to maintain houses, and machinery, and our own bodies in perfect working order: how easy to let them deteriorate. In fact, all we have to do is nothing, and everything deteriorates, collapses, breaks down, wears out, all by itself—and that is what the Second Law is all about (1970, p. 6).

Entropy is simply a fact of nature. Entropy can be minimized in this Universe, but it cannot be eradicated. That is where engineers come in. Engineers work to discover ways of minimizing energy loss and maximizing useful energy before it is forever lost. Thousands of engineering jobs are dedicated to addressing this fundamental fact of the Second Law of Thermodynamics. Your energy bill is affected directly by it. If the Second Law was not fixed—unchanging—engineers could not develop the technology necessary to maximize usable energy, thereby lowering your energy costs.

Some engineers devote their entire careers to minimizing entropy in the generation of power from energy. All this effort is based on the principles established by the Second Law of Thermodynamics. These principles are established as fact in the scientific community. The American Heritage Dictionary of the English Language defines “law” as “a statement describing a relationship observed to be invariable between or among phenomena for all cases in which the specified conditions are met” (2000, p. 993, emp. added). Since laws are invariable, i.e., unchanging and constant, they have no exceptions. Otherwise, they would not be classified as laws. Tracy Walters, a mechanical engineer working in thermal engineering, observed:

> It has been my experience that many people do not appreciate how uncompromising the Laws of Thermodynamics actually are. It is felt, perhaps, that the Laws are merely general tendencies or possibly only theoretical considerations. In reality, though, the Laws of Thermodynamics are hard as nails, and...the more one works with these Laws, the deeper respect one gains for them (1986, 9[2]:8, emp. added).

Evolutionist Jeremy Rifkin stated that “the Entropy Law will preside as the ruling paradigm over the next period of history. Albert Einstein said that it is the premier law of all science; Sir Arthur Eddington referred to it as the ‘supreme metaphysical law of the entire universe’” (1980, p. 6). Borgnakke and Sonntag, in Fundamentals of Thermodynamics, explain:

> We can say that the second law of thermodynamics (like every other law of nature) rests on experimental evidence. Every relevant experiment that has been conducted, either directly or indirectly, verifies the second law, and no experiment has ever been conducted that contradicts the second law. The basis of the second law is therefore
The Law of Thermodynamics has no known exceptions. The Law is accepted as fact by all scientists in the scientific evidence. The initial creation of energy from nothing amounted to a miracle. Thus, according to Stenger, the creation hypothesis is confirmed based on the Law of Thermodynamics.

Evolutionary physicist Victor Stenger, in his book, "The God Delusion" (2007), states that the First Law of Thermodynamics states that in a closed system, the amount of energy present in that system is constant, though it transforms into other forms of energy. So, if the Universe as a whole initially contained no mass, matter, or energy, and then all of the mass, matter, and energy in the Universe spontaneously generated, the First Law would be violated. Without intervention from an outside force, the amount of mass, matter, and energy in the Universe would have remained constant (unchanged) at the start of the big bang (2007, pp. 115-116, emp. added).

The First Law of Thermodynamics states that in a closed system, the amount of energy present in that system is constant, though it transforms into other forms of energy. If there is no God, the existence of the Universe must be explained without Him. The Big Bang theory claims that all matter in the Universe initially was condensed in a sphere smaller than the size of a period at the end of this sentence. That sphere exploded and helps to explain why the Universe, according to many cosmologists, appears to be expanding or inflating (see Thompson, et al., 2003, 23[5]:32-34,36-47). Even if the Big Bang were true (and it is not, cf. Thompson, et al.), this theory offers no explanation for the origin of that sphere. Evolutionist Alan Guth, a cosmologist and physics professor at M.I.T., admitted that "[i]nflation itself takes a very small universe and produces from it a very big universe. But inflation by itself does not explain where that very small universe came from" (as quoted in Heeren, 1995, p. 148). He further stated, "[A] proposal that the universe was created from empty space is no more fundamental than a proposal that the universe was spawned by a piece of rubber. It might be true, but one would still want to ask where the piece of rubber came from" (Guth, 1997, p. 273). So where could the "rubber" have come from?

The only logical possibilities for the origin of the matter and energy comprising the Universe are that they are responsible for their own existence (i.e., they popped into existence out of nothing—spontaneous generation or they always existed—eternity) or Someone is responsible for their existence (i.e., they were placed here by something outside of the Universe—Creation) (see Figure 3).

As the well-known philosopher and evolutionist from the 19th century, Herbert Spencer said, "Respecting the origin of the Universe three verbally intelligible suppositions may be made. We may assert that it is self-existent [i.e., eternal—JM]; or that it is self-created [i.e., spontaneously generated—JM]; or that it is created by an external agency" (1882, p. 30).

Possibility 1: Spontaneous Generation of the Universe

Consider the entire physical Universe as a system consisting of all mass, matter, and energy that exists in the Universe. If one believes in the Big Bang model, the system's boundary would be outside of the blast radius of the Big Bang, or outside of the original cosmic dot that exploded. Without God (i.e., something outside of the bounds of the Universe—something supernatural), this Universe would have to be a closed system. Since our system encompasses the entire Universe, there is no more mass that can cross into our system from the outside, which necessitates our system being closed. If mass, matter, and energy could enter and/or exit the system, the system would be an open system. Evolutionist Alan Guth, a cosmologist and physics professor at M.I.T., admitted that "[i]nflation itself takes a very small universe and produces from it a very big universe. But inflation by itself does not explain where that very small universe came from" (as quoted in Heeren, 1995, p. 148). He further stated, "[A] proposal that the universe was created from empty space is no more fundamental than a proposal that the universe was spawned by a piece of rubber. It might be true, but one would still want to ask where the piece of rubber came from" (Guth, 1997, p. 273). So where could the "rubber" have come from?

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Conservation of energy [i.e., the First Law—JM] and other basic laws hold true in the most distant observed galaxy and in the cosmic microwave background, implying that these laws have been valid for over thirteen billion years. Surely any observation of their violation during the puny human life span would be reasonably termed a miracle. In principle, the creation hypothesis could be confirmed by the direct observation or theoretical requirement that conservation of energy was violated 13.7 billion years ago at the start of the big bang (2007, pp. 115-116, emp. added).

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The First Law of Thermodynamics states that in a closed system, the amount of energy present in that system is constant, though it transforms into other forms of energy. If, the Universe as a whole initially contained no mass, matter, or energy, and then all of the mass, matter, and energy in the Universe spontaneously generated, the First Law would be violated. Without intervention from an outside force, the amount of mass, matter, and energy in the Universe would have remained constant (unchanged) at nothing. According to the scientific evidence, matter/energy could not have originally spontaneously generated. Thus, according to Stenger, the creation hypothesis is confirmed based on the scientific evidence. The initial creation of energy from nothing amounted to a miracle.

As was mentioned earlier, there are no exceptions to laws, or else they would not be laws. The First Law of Thermodynamics has no known exceptions. The Law is accepted as fact by all scientists in...
general and utilized by engineers in particular. Therefore, the Universe, composed of all mass, matter, and energy, could not have spontaneously generated (popped into existence on its own) without violating the exceptionless and highly respected First Law of Thermodynamics. The energy level of the Universe would not have been constant. Spontaneous generation would amount to the creation of energy from nothing (see Figure 4). The Universe could not have come into existence without the presence and intervention of a Force outside of the closed system of the entire physical Universe. The Universe therefore must be an open system that was created by a non-physical Force (i.e., a Force not composed of mass, matter, and energy) outside of the physical boundary of this Universe (above nature, or supernatural) with the capability of bringing it into existence out of nothing. That Force can be none other than a supernatural God. To develop a theory that requires the violation of that principle would be against the scientific evidence. It would be unscientific. The evidence from science indicates that matter could not and cannot spontaneously generate.

Figure 4

Unfortunately, though this truth is so glaringly obvious to many, there has been a recent surge of sentiment in the impossible notion that this Universe could have created itself—that something could come from nothing. British evolutionist Anthony Kenny (1980), physics professor from City University in New York, Edward Tryon (1984), and physicists Alan Guth from M.I.T. and Paul Steinhardt of Princeton (1984) are just a few who are open proponents of this notion. Stephen Hawking said, “Bodies such as stars or black holes cannot just appear out of nothing. But a whole universe can…. Because there is a law like gravity, the universe can and will create itself from nothing” (2010, p. 180). However, the truth still stands. Until the First Law of Thermodynamics ceases to be a fundamental law explaining this Universe, the spontaneous generation of this Universe from nothing is impossible. No wonder Victor Stenger, a proponent of the idea of spontaneous generation, said, “I must admit that there are yet no empirical or observational tests that can be used to test the idea of an accidental origin” (1987, 7[3]:30). According to Stenger, the idea is “speculative” (p. 30). No solid evidence. Just speculation. Famous evolutionary astronomer, Robert Jastrow, the founder and former director of the Goddard Institute for Space Studies at NASA, said:

But the creation of matter out of nothing would violate a cherished concept in science—the principle of the conservation of matter and energy—which states that matter and energy can be neither created nor destroyed. Matter can be converted into energy, and vice versa, but the total amount of all matter and energy in the Universe must remain unchanged forever. It is difficult to accept a theory that violates such a firmly established scientific fact (1977, p. 32).

Science studies what occurs in nature, not super-nature. In nature, matter and energy can be neither created or destroyed, but “must remain unchanged forever.” This is a “firmly established fact.” Nothing comes from nothing. If a molecule will not pop into existence from nothing, a sphere containing all of the matter and energy of the entire Universe will certainly not pop into existence.

Possibility 2: Eternal Existence of the Universe

Again, considering the entire Universe as a system necessitates that it be a closed system. The Second Law of Thermodynamics states that though energy in a closed system is constant (First Law of Thermodynamics), that energy is transforming into less usable forms of energy (i.e., the Universe is “running down”). This process is irreversible. There is a finite amount of usable energy in the Universe (which explains the widespread interest in conserving energy). In the Big Bang model, that energy was originally in the cosmic egg that exploded, and now would be found within the blast radius of the original explosion. That usable energy is depleting according to the Second Law. Engineers strive to slow this inevitable depletion of energy, but it cannot be stopped.

If the Universe has always existed (i.e., it is eternal), but there is a finite amount of usable energy, then all usable energy already should be expended (see Figure 5). Yet, usable energy still exists. So, the Universe cannot have existed forever. It had to have a beginning. The eternality of matter would be the equivalent of a system with an energy input and 100% usable energy output (see Figure 6). It would be the equivalent of describing the Universe as a perpetual motion machine—a design that attempts to violate either the First or Second Law of Thermodynamics by, for instance, running forever without an energy input. No such machine has ever been designed, since such a machine would violate the laws of thermodynamics. Philip Yam, writing in Scientific American said, “Claims for perpetual-motion machines and other free-energy devices still persist, of course, even though they
inevitably turn out to violate at least one law of thermodynamics” (1997, 277[6]:82).

Figure 5

No wonder evolutionists, themselves, have long conceded this truth. In his book, *Until the Sun Dies*, renowned evolutionary astronomer Robert Jastrow stated:

The lingering decline predicted by astronomers for the end of the world differs from the explosive conditions they have calculated for its birth, but the impact is the same: modern science denies an eternal existence of the Universe, either in the past or in the future (1977, p. 30, emp. added).

In his book, *God and the Astronomers*, Jastrow reiterated this truth:

And concurrently there was a great deal of discussion about the fact that the second law of thermodynamics, applied to the Cosmos, indicates the Universe is running down like a clock. If it is running down, there must have been a time when it was fully wound up.... Now three lines of evidence—the motions of the galaxies, the laws of thermodynamics, the life story of the stars—pointed to one conclusion; all indicated that the Universe had a beginning (1978, pp. 48-49, 111).

Evolutionist Kitty Ferguson, award-winning science writer, agreed. She said, “It’s also common knowledge that the universe isn’t eternal but had a beginning” (1994, p. 89). Any person who develops a theory that claims that the Universe could be a perpetual motion machine, is guilty of contradicting the solid evidence from science. They are being unscientific, and their unscientific mindset has resulted in an unscientific theory.

Possibility 3: The Inevitable Implication

What does the scientific evidence actually say about the matter of origins? Forget speculation, conjecture, hypothesis, and theory—wishful, hopeful thinking that there might be some way to avoid a supernatural explanation and the restrictions that Being might have on our desires. What does the evidence say?

To repeat, logically, there are only three possible explanations for the existence of matter in the Universe. Either it spontaneously generated, it is eternal, or it was created by a non-physical Being outside of the boundaries of the Universe. Atheists use the theory of evolution in an attempt to explain the existence and state of the Universe today. In order for the theory of evolution to be true, thereby accounting for the existence of mankind, either all of the mass, matter, and energy of the Universe spontaneously generated (i.e., it popped into existence out of nothing), or it has always existed (i.e., it is eternal). Without an outside force (a transcendent, omnipotent, eternal, superior Being), no other options for the existence of the Universe are available. However, as the Laws of Thermodynamics prove, the spontaneous generation and the eternality of matter are logically and scientifically impossible. One and only one possible option remains: the Universe was created by the Creator. The scientific evidence points to the existence of God. Bottom line: God designed the laws of thermodynamics. Creationists believe them. Engineers use them. Atheists cannot harmonize them with their beloved theory.

CONCLUSION

Evolutionists claim that science and the idea of God are irreconcilable. “Only one of them can be true,”
At the very beginning of the Bible, the First Law of Thermodynamics was expressed when Moses penned, "Thus the heavens and the Earth, and all the host of them, were finished. And on the seventh day, God ended His work which He had done, and He rested on the seventh day from all His work which He had done" (Genesis 2:1-2, emp. added). In Exodus 20:11, Moses wrote, "For in six days, the Lord made the heavens and the earth, the sea, and all that is in them, and rested (i.e., ceased) the seventh day." Everything in the Universe was made in six days, and then the Lord stopped creating. Nothing else is coming into existence naturally. After the six days of Creation, the mass, matter, and energy creation process was terminated. As evolutionist Willard Young said regarding the First Law: "Energy can be neither created nor destroyed, but can only be converted from one form to another." The thrust of the First Law of Thermodynamics was expressed in the Bible thousands of years ago, although it was not discovered and formally articulated by scientists until the 19th century.

Through the hand of the psalmist, God also stated centuries ago what scientists call the Second Law of Thermodynamics: "Of old You laid the foundation of the Earth, and the heavens are the work of your hands. They will perish, but You will endure; yes, they will all grow old like a garment; like a cloak You will change them, and they will be changed. But You are the same, and Your years will have no end" (102:25-27, emp. added). The Universe is wearing out—decaying, like an old shirt: the Second Law of Thermodynamics. Once again, the Creation model is in perfect harmony with science.

The evolutionary model fails its thermodynamics test.

The inspired writer wrote in Hebrews 11:3, "By faith we understand that the worlds were framed by the word of God, so that the things which are seen were not made of things which are visible." Paul declared in Acts 14:17, "Nevertheless He did not leave Himself without witness, in that He did good, gave us rain from heaven and fruitful seasons, filling our hearts with food and gladness." The psalmist affirmed, "The heavens declare the glory of God; and the firmament shows His handiwork" (19:1). Paul assured the Romans, "For since the creation of the world His invisible attributes are clearly seen, being understood by the things that are made, even His eternal power and Godhead, so that they are without excuse" (1:20, emp. added). The scientific evidence points to God. There will be no excuse in the end for those who deny it.

In closing, we return to Lord Kelvin, the Father of Thermodynamics, for fitting final thoughts. In a short public speech in 1903, reported by The Times and followed up by an amending letter to the paper by Kelvin, Kelvin said:

I do not say that, with regard to the origin of life, science neither affirms nor denies Creative Power. Science positively affirms Creative Power.... It is not in dead matter that we live and move and have our being [Acts 17:28—JM], but in the creating and directive Power which science compels us to accept as an article of belief.... There is nothing between absolute scientific belief in a Creative Power, and the acceptance of the theory of a fortuitous concourse of atoms.... Forty years ago I asked Liebig, walking somewhere in the country if he believed that the grass and flowers that we saw around us grew by mere chemical forces. He answered, "No, no more than I could believe that a book of botany describing them grew by mere chemical forces".... Do not be afraid of being free thinkers! If you think strongly enough you will be forced by science to the belief in God, which is the foundation of all Religion. You will find science not antagonistic but helpful to Religion (as quoted in Thompson, 1910, pp. 1097-1100, emp. added).

According to the Father of Thermodynamics, evolutionists are failing to "think strongly enough." No wonder the psalmist asserted: "The fool has said in his heart, 'There is no God'” (14:1).

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Second Law of Thermodynamics—Does this basic law of nature prevent Evolution? See this page in: Portuguese. Evolutionary tree—scene from the ORIGINS motion picture series. Evolution versus a basic law of nature. A law of science: basic, unchanging principle of nature; a scientifically observed phenomenon which has been subjected to very extensive measurements and experimentation and has repeatedly proved to be invariable throughout the known universe (e.g., the law of gravity, the laws of motion). Thermodynamics: the study of heat power; a branch of physics which studies the efficiency of energy transfer and exchange. 1. Decaying buildings. Massive structures may appear to be capable of lasting almost forever, but they will not. Thermodynamic Processes - the laws of thermodynamics mostly apply to thermodynamic processes, when a thermodynamic system goes through some sort of energetic transfer. Development of the Laws of Thermodynamics. The laws of thermodynamics do not particularly concern themselves with the specific how and why of heat transfer, which makes sense for laws that were formulated before the atomic theory was fully adopted. They deal with the sum total of energy and heat transitions within a system and do not take into account the specific nature of heat transference on the atomic or molecular level. The Zeroth Law of Thermodynamics. This zeroth law is sort of transitive property of thermal equilibrium. Search for “The Laws of Thermodynamics” on Amazon.com. Share this Rating. Title: The Laws of Thermodynamics (2018). 6/10. Want to share IMDb's rating on your own site? In Barcelona (Catalonia, northeast to Spain), Manel is a neurotic scientist obsessed with the idea that the three laws of thermodynamics rules the daily life of all people, writing a thesis about it while he works as teacher assistant in the university. His happy life with his long-time girlfriend Raquel ends the day that casually he crashes in the street at the same time with Elena (a sexy and famous top model), Eva (a beauty young lawyer who recently has opened her own law firm) and his friend Pablo (an Argentinian CEO of an advertising company and an unstoppable womanizer).