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Most people think that determining whether an object is alive or not alive is simple as distinguishing between black and white. However, viruses fall in the gray area. It follows some of the main requirements of life, but it does not follow others. The modern requirements for life are that the object in question must maintain organized complexity, perceive and respond to stimuli, reproduce, have the capacity to evolve as a population, grow, and acquire and use of materials for energy. Viruses are not alive for that very reason. The object in question must follow all requirements of life, otherwise it cannot be considered alive.

Viruses cannot be alive because they do not meet all the requirements of life. Even if a single requirement is not reached, then the object in question cannot be considered alive. The confusion about whether viruses are alive or not stems from the fact that viruses exhibit reproduction and biological effects on its victims. In "Are Viruses Alive" by Luis P. Vilarreal, the author states, "... researchers realized that certain diseases... were caused by particles that seemed to behave like bacteria but were much smaller. Because they were clearly biological themselves and could be spread from one victim to another with obvious biological effects, viruses were then thought to be the simplest of all living, gene-bearing life-forms," (Vilarreal 1). By old standards viruses are alive, but not by modern standards. Viruses do maintain some organization as part of the requirement of life as they are nucleic acids and possibly proteins surrounded by a protein coat. Viruses do perceive and respond to stimuli and reproduce because when they come in contact with a cell, it loses its coat, "injects" its own nucleic acids, and this eventually induces the cell to make more viruses. Viruses also evolve, and an example of this is HIV. There used to be simian specific strains of HIV, but it evolved and now several strains also affect humans. However, viruses do not grow. According to the University of Idaho's paper, titled "Viruses," it states, " During maturation, the viral DNA and the viral proteins that the host cell has produced are assembled (therefore a virus does not grow) into new, intact virus particles," (University of Idaho 1). This is one requirement of life that viruses do not meet. In " The Origins of Viruses," David R. Wessner writes " Viruses do not, however, carry out metabolic processes. Most notably, viruses differ from living organisms in that they cannot generate ATP (A chemical used for generation of heat and movement in many organisms)... They... cannot independently form proteins," (Wessner 1). The second requirement not met is the use of materials for energy. Viruses do not actually move on their own, but rather wait for a cell to come in contact with them. The movement of viral material inside a cell is actually handled mainly by the cell. Thus, due to two requirements not being met, viruses are not alive.

To conclude, viruses are not alive by the modern requirements for life for the object in question: maintain organized complexity, perceive and respond to stimuli, reproduce, have the capacity to evolve as a population, grow, and acquire and use of materials for energy. Two of the requirements are not met, growth and the use of materials for energy. In fact, viruses are more akin to a small package of chemicals. There is viral genetic material, some proteins, and a protein shell. In fact, a simple poliovirus was artificially made using viral genetic material and easily purchasable chemicals. Viruses are actually possible to artificially make. The simplicity of viruses compared to a single cell is vastly different. A biologist once said, "Viruses are one of the world's greatest mysteries."

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