Tremendously high heat removal rates are achieved by the bubbling activity during boiling on a heated solid surface. With nearly a century of scientific advancement, only recently have experimentalists, using micro-sensing technology, uncovered the reasons why this is so. Even still, advancement is sluggish due to the time consuming nature of these experiments. This work takes advantage of the advancement in computing technology to solve the bubble growth & heat transfer problem mathematically using numerical techniques. In particular, the physical models and solution techniques do not incorporate empiricism or adjustable parameters. In this way the nature of bubble expansion is explained and understood without the results being ambiguous. In this work the fundamental nature of bubble expansion is first understood by considering the simplest case of spherically symmetric bubble growth in a uniformly superheated quiescent liquid. Knowledge gained from this geometrically simplified scenario is then leveraged to gain insight into the nature of the more complex scenario where bubbles expand atop a heated surface in microgravity.