Ch 8 Natural Sciences

1. “Science is a way of thinking more than it is a body of knowledge.” –Carl Sagan   
   I think this quote means that science is more about a thinking process rather than a vast deposit of theories or laws. This idea is extremely important because you need a scientific mind and a scientific approach to make scientific conclusions. Without this thinking, you are dabbling in pseudoscience, which has no grounds in establishing knowledge.  
     
   “The arrogance of scientists is not nearly so dangerous as the arrogance that comes from ignorance.”—Lewis Wolpert  
   This quote implies that ignorance is dangerous, and when I read this quote it makes me think of politicians who claim to know more than the scientific community. This is especially true when it comes to the issue of global warming, which has been proven with empirical evidence. For politicians who support industries which pollute, there is obviously a conflict of interest, which explains why it is so easy to dismiss scientific facts and claim instead that they are merely beliefs.
2. The difference between science and pseudo-science is an important idea because so many people can be easily misled by the allure of pseudo-science because its promise is so great. I remember a time when my dad was drinking this colloidal silver drink, which claims to have amazing antibiotic properties, capable of stopping infection and promoting a healthy immune system. Yet, health clinics have conducted scientific experiments on this concoction and reported not only no health benefits, but possible harmful side-effects given that the body has no use for such minerals in the body. So someone believes they are being cured when in fact they may be poisoning themselves.  
     
   Confirmation bias is an important idea because scientists should strive for the objective truth, rather than just the evidence that supports the hypothesis. To be free from confirmation bias, one would have to behave as a robot, free from the emotions that stir our passions. No one likes to be wrong, especially after investing long hours and perhaps an entire career. But for a scientist to say “I was wrong” is the most noble behavior a scientist can have. If scientists test their hypothesis and find the evidence does not support, then they are still on the path to discovery. What does the evidence suggest?  
     
   I appreciate Kuhn’s concerns about ‘normal science’ because we are often lulled into a sense of complacency and idleness. I we simply allow ourselves this luxury, there would be no scientific revolutions. This connects to me as a teacher because often I hear claims that it is normal to ‘do it this way,’ rather than examine the data and the research. For example, standardized tests are administered every year, and the claim is made that these tests can accurately measure a student’s learning. Yet, it makes huge assumptions about what kind of learning has taken place. In education, there should be more scientific revolutions rather than the status quo.
3. Linking Questions—What role does imagination play in the sciences? If you study Einstein and his thought process, you will quickly come to realize that imagination is very important. Art and imagination allows us the freedom to explore ideas without the restrictions of natural laws. Einstein, for example, would imagine himself on an elevator falling in space, or he would imagine himself on a spaceship travelling at near the speed of light. These imaginings allowed him to develop some of his greatest insights into the nature of the universe. Just stop and think about it.  
     
   What are the moral responsibilities of scientists? I think it safe to say that many scientists ARE funded by the weapons and defense industry, which means that many of our top scientists are making observations and collecting data with the expressed purpose of helping our military become even more powerful. When power, superiority, and greed are the inspiration for discover, I believe that we limit our discovery potential. Scientists, I believe, should be more like doctors and take a Hippocratic Oath to nature to do no harm. What is the moral guideline for science? Should there be a moral guideline?
4. My questions—If math and logic are the only two types of knowledge that can provide certainty, then to what degree should science make claims of certainty, e.g., evolution, big bang, meteoric destruction of the dinosaurs?  
     
   Why have great scientific discoveries often been lambasted or lampooned rather than immediately recognized?