Elizabeth Allen
The Nature of Science and Math Article Response

Part A:
Science as a Human Endeavor:

In the article, *Scientists Move Closer to Understanding Schizophrenia's Cause,* by Benedict Carey, the tenants of the Nature of Science are addressed in various aspects of the writing. The research that the article is based, reflects the tenant of **Science as a Human Endeavor.** Technology of advanced statistical methods identified common variants of a particular gene, and the progress that has been made the human genome helped to uncover a variants of gene C4-A. This research was conducted by a team, and it is exploring possible causes of schizophrenia, which impacts our everyday community members.

Science is a Way of Knowing:

Science is a Way of Knowing is addressed in this article as the body of knowledge that is currently known about biological psychiatry, and that it is constantly being refined. The scientists acknowledge that it wouldn't be believed that this one discovery resolves the causes of schizophrenia, but, "'...but any step forward is not only rare and unusual, it's just one step in a journey of a thousand miles' to improved treatments."

Scientific Knowledge is Based on Empirical Evidence

As the research is discussed in the article, the use of empirical evidence is clearly defined. **Scientific Knowledge is Based on Empirical Evidence** is described as, "The team analyzed the genomes of more than 64,000 people and found that people with schizophrenia were more likely to have the overactive forms of C4-A than control subjects." Mice were then bred without the gene that produces C4, to gather additional data. This evidence was used in along with the previous theory that the MHC area of the human genome controls parts of the immune system. Whereas previous ideas held that schizophrenia may be a type of autoimmune disease, the new research suggests it may have more to do with over-pruning of synapses in the prefrontal cortex of the brain. This new evidence provides support to the existing observations that symptoms of schizophrenia often begin during adolescence, when this area of the brain is rapidly developing.

Part B:

MP 1: Make Sense of Problems and Persevere in Solving Them

In this article, part of the scientific discovery was made when the team of researchers used advanced statistical methods and identified four common variants of a gene at a particular location of the genome. The MHC location of the genome was associated with schizophrenia as displayed in the data, and is by far the tallest "building" on the bar graph of data. These mathematical relationships then prompted further scientific investigation.

MP 3: Construct viable arguments and critique the reasoning of others.

From the mathematical perspective, the data led the team to construct an argument that schizophrenia may be related to an abundance of the genes that cause pruning in this particular area of the brain. With the previous data analyzed and new evidence gained from further testing the team has examined counter-evidence and communicated their findings to the community at large.

MP 4: Model with Mathematics

In this research, the teams have used mathematics and statistics as a means to establish patterns in quantitative data and help make progress towards improved treatment for a real problem--having the affliction of schizophrenia. From the mathematical perspective, scientists were able to formulate new questions for investigation and gather further evidence.