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## Analysis of “*How humans—and other mammals—might have gotten their night vision*”

By Emily Underwood

### **Part A: Scientific Knowledge is Open to Revision in Light of New Evidence**

This article meets this tenet because science knowledge is constantly changing based on new evidence and discoveries. In this article, it discusses how scientists had prior knowledge of how night vision worked in humans as well as other mammals. The article states, “A single photon can activate a light-sensitive cell known as a rod cell in the retina, which sends a minute electrical signal to the brain through a ganglion cell” (Underwood, 2018). The article then discusses how one particular cell specializes in motion detection. It goes on to discuss how new studies have discovered that these particular cells in the retina temporarily change during dark conditions. This new information, data and explanation connects to this tenet and how science findings are consistently revised, or added onto, based on new evidence discovered by scientists.

### **Science is a Human Endeavor**

This tenet discusses the connection between the advances in technology and science. It also discusses how scientists work in teams and need to rely on habits of mind such as persistence and reasoning. This article fits in with this tenet because the new evidence that neurologist Greg Field and his colleagues at Duke University in Durham, North Carolina, was discovered through working together. In addition, their findings in the mice that they tested may have future effects in prosthetics for people that have vision impairments. The article discusses how these prosthetics rely largely on electrically stimulating ganglion cells, and this new knowledge on direction-selective ganglion cells (DSGCs) could help refine the technologies that already exist. Thus this new discovery in science could advance already existing technology.

### **Scientific Investigations Use a Variety of Methods**

This practice discusses the importance of using several procedures, methods, and tools to produce new knowledge as well as revise prior knowledge on a subject. Field and his colleagues used slices of mouse retinas with electrode arrays and bathed them in an oxygenated solution, so that they still function. They were able to take observations and conduct data through this method of conducting research. In addition, they utilized a computer model of four directional cells’ activity to draw conclusions. They were also able to create a control by genetically engineering mice to have gap junctions in their up-sensing neurons.

**Part B:****Use Appropriate Tools Strategically:**

This article meets this math practice because the scientists used various tools to aid them in their research. For example, they used a computer model to analyze why the “up” direction-selective ganglion cells were acting abnormally. The computer provided them data and graphs that they then needed to analyze to draw conclusions. This mathematical practice discusses how technology is used to deepen understanding of concepts, and I feel Field and his colleagues were able to accomplish this.

**Look for and make use of structure:**

In order to draw conclusions, lots of evidence needs to be collected. Looking for patterns in numbers and data is a large part of science, and was discussed in this article. Fields and his colleagues examined several slices of mouse retinas’ response to movements and then turned down the light by a factor of 10,000, to embody a moonlit scene. They were then able to analyze the data to draw conclusions and look for patterns.

**Construct viable arguments and critique the reasoning of others.**

This article meets this math practice, because using their evidence, Fields and his colleagues, were able to draw and justify their conclusions and then communicate them to others. This is evident by their new discoveries being published in several Science articles. They also were able to take into account the context of their data and noted that they are unsure yet whether or not this data will be similar in humans, thus they are responding to possible arguments of others.

Underwood, Emily (2018, September 13). *How humans-and other mammals-might have gotten their night vision*. Retrieved September 13, 2018 from *ScienceMag*.

<http://www.sciencemag.org/news/2018/09/how-humans-and-other-mammal-s-might-have-gotten-their-night-vision>