

Research Assessment #4

Date: October 14,2016

Subject: Astrobiology: *Gravitational Waves*

Sources:

1.)LIGO. "What Are Gravitational Waves?" LIGO Lab. National Science Foundation, n.d.

Web. 14 Oct. 2016

2.)Choi, Charles Q. "Gravitational Waves May Permanently Alter Spacetime."PBS. PBS,

12 Oct. 2016. Web. 14 Oct. 2016.

Analysis:

Many say that the best discoveries happen after a long time. That seems to be the case with gravitational waves. Scientists have patiently worked for four decades to detect gravitational waves. Finally, the wait was over for them. On September 14, 2015, the LIGO Laboratory physically sensed these waves for the first time and rocked the astronomy industry and even the world. With the detection of these waves, scientists can now understand our universe in a new perspective. We have yet again reached another milestone in science.

During this time, the first detection of gravitational waves was all over the news but what is gravitational waves? Why is it so important? Well, gravitational waves are

basically ripples in spacetime caused by the most violent outer space activities. These violent processes include colliding black holes, supernovas, merging neutron and white dwarf stars. The idea of these gravitational waves emerged with Albert Einstein, through his Theory of General Relativity. His math and physics calculations insisted that gravitational waves occur as violent activities take place in outer space but even he was suspicious about this idea. However, with the detection of these ripples, scientist have confirmed Einstein's idea of gravitational waves to be true. The discovery of gravitational waves will now allow scientist to gain crucial information of the universe that were once thought to be nearly impossible to find. Caltech Scientist, Thorne stated that "gravitational-wave memory is tremendously important in modern physics when it comes to the matter of whether or not information is stored on the surface of a black hole." This is one of many discoveries we will make. Before this discovery, I remember watching a documentary in which scientists stated that black holes seem to be a dead end for us because we don't have the tool to figure out the physics laws that these black holes abide to. I now believe that the mindset will change for those scientists. We can now figure out the mechanical aspects about black holes.

The detection of waves has not only improved science , it has also improved the job outlook for individuals who are going into astrophysics. A professor that I had talked to told me that if I stayed on this route of astronomy, the opportunities will definitely be endless. Why is this though? Well, with gravitational waves being a reality now, more and more people are getting interested in this field. That means more people will be giving funds and grants for you to do research. Another reason is that we

now have a tool to unlock the greatest mysteries of this cosmos. It is definitely an exciting time for astrophysics.