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Article Title: Have scientists found evidence of another UNIVERSE? 'Ghost black hole' from ancient universe that died before the Big Bang has been discovered, physicists claim

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Part A

Science Models, Laws, Mechanisms and Theories Explain Natural Phenomena (NGSS, n.d.)

The article describes a growing and controversial theory amongst the scientific community called conformal cyclic cosmology (CCC). The theory involves several mechanisms that suggest a universe existed prior to the one we live in now. The theory begins with the mechanism that shows black holes reduce in mass, emitting gravitons and radiation. Gravitons and radiation are excluded from interaction with space and time. The orientation of the cosmic background radiation (CMBR) shows a pattern, where it is suggested that black holes previously existed in a prior universe (Pinkstone, 2018). Computer simulations are then compared to the current CMBR, modeling the mechanisms to support the CCC theory. It is clear that Penrose and his team are endeavouring to explain a natural phenomena; the beginning of the universe.

Science is a way of knowing (NGSS, n.d.)

The CCC theory is not accepted fully by the scientific community. The problem with the theory is that one has to logically link the aforementioned mechanisms to construct the explanation of the theory, there is no direct evidence. The article speaks to the lack of ‘proof’ to support the theory (Pinkstone, 2018). Science is a way of knowing, however, there needs to be consensus within the scientific community, if the public are willing to accept the theory as scientific knowledge. What is interesting is the discrepancy within the scientific community, as some scientist require more ‘direct’ evidence to accept the theory. It is clear that conducting this research is important for knowing how our universe began, highlighting that science is a way of knowing (NGSS, n.d.).

Science addresses questions about the Natural and Material World (NGSS, n.d.)

Science addresses the ‘big’ questions about the natural world. In this case, Penrose is trying to answer one of the most pondered questions in the history of humanity, how did the universe begin? In the article, Penrose and his team ask questions, linking multiple aspects of the natural world, to form the CCC theory. They have had to ask questions to gain understanding and address questions about the nature of black holes, the nature of the CMBR, modeling and computer simulation techniques (Pinkstone, 2018). A huge amount of research, still ongoing, had to be asked about the universe itself before the CCC theory could be formed. Questions about the natural world leading to more questions about the natural world; What are Black holes? How do they form? How do they lose mass? What is the CMBR? These were just some of the scientific questions asked in the past to explain the natural world. Our understanding has led to more questions and potentially an answer to, how the universe began, all because humans ask questions about the natural world.

Part B

Construct viable arguments and critique the reasoning of other (Common core, n.d.)

The CCC theory is constructed by a series of arguments based on prior knowledge and evidence. Penrose analyzed multiple systems and recognized how they influence each other. Penrose used reasoning to construct an argument to support CCC theory. However, since CCC theory is not widely accepted, the reasoning underpinning the theory has undergone criticism and critique. It is argued that the the reasoning is flawed based on the lack of direct evidence. Scientist are still arguing whether the hawking points in the CMBR are left from the black holes from a past aeon or if they are just white noise in the CMBR (Pinkstone, 2018). The article demonstrates how important it is for scientists to construct viable arguments to support theory, as well as the value in critiquing the reasoning of others, to establish validity in proposed theories.

Use appropriate tools strategically (Common core, n.d.)

All the knowledge and evidence to support CCC theory has been dependent on measurement. The precision of measurement depends on the choice of tools and how we choose to use them. There are two major pieces of evidence needed to support CCC theory. The first being the analysis of the CMBR. The resolution of the CMBR has improved significantly over the past decade. Satellites probes such as WMAP and COBE have collected data that have provided evidence to support CCC theory (NASA-WMAP, n.d.). Selecting the appropriate or best resolution data is critical to deciding the existence of hawking points, still under dispute (Pinkstone, 2018). The second strategically used tool would be the use of computer software that was used for predictive modelling. Since you cannot measure direct evidence of black holes from another time, the data from computer modelling has provided critical evidence to support the CCC theory. The development of CCC theory is dependent on the strategic use of measuring tools.

Make sense of problems and persevere in solving them (Common core, n.d.)

Scientist working on CCC theory are trying to make sense of one of the most pondered questions, 'How did the Universe begin?'. The answer to this problem consisted of multiple layers of problem solving to construct a reasoned argument. Making sense of the CMBR and the workings of black holes are still ongoing. Scientist must persevere in order to make progress. Penrose originally proposed CCC theory in 2010, where it was largely rejected by the scientific community (Pinkstone, 2018). For eight years, Penrose and his team continued trying to solve their problem. They have again proposed the CCC theory, where it has started to gain some credibility and traction in the scientific community, which would not have been possible without perseverance.

Bibliography

Cosmic microwave background data from WMAP Full-sky Image by the WMAP science team the WMAP achievement. (n.d.). Retrieved September 17, 2018, from NASA -WMAP website: https://wmap.gsfc.nasa.gov/mission/sgoals_universe.html

Pinkstone, J. (2018, August 25). Have scientists found evidence of another universe? 'Ghost black hole' from ancient universe that died before the big bang has been discovered, physicists claim. *Daily Mail - Mail Online*.

Common core mathematics standards. (n.d.). Retrieved September 17, 2018, from Core Standards website: http://www.corestandards.org/Math/Practice/

The nature of science in the next generation science standards. (n.d.). Retrieved September 17, 2018, from http://www.nextgenscience.org/