Biblical Worldview Scope for Pre-Algebra (3rd ed)

Overarching theme: What is a number?

Introduction: This document is an attempt to answer (in the form of a scope) the question, "What must a student comprehend and value in order to understand pre-algebra from a biblical worldview?" What follows is a list of the themes that we believe are essential for eighth grade math students to understand and internalize. We anticipate that early in the course students will be required to recall and explain these themes. However, as these themes recur, we plan to require students to evaluate ideas within them, formulate a Christian understanding of them, and apply what they have learned about them to real-life situations. We hope to achieve high levels of internalization wherever students are required to apply their learning.

Knowledge and Numbers

Creation: God created a world that is to be understood. Man was created to understand the world not as an interpreter but as one who agrees with God's interpretation of His own creation. God communicates His interpretation to us through His Word, and God created us with the necessary abilities to understand His interpretation. This understanding is for the purpose of obeying His commandment to fill, subdue, and rule over the earth (Gen. 1:28). One ability God gave man to help him understand the world is the ability to name things (Gen. 2:19). Naming allows man to organize, distinguish, and make predictions. Numbering is part of that work of naming. This means that numbers are purpose oriented. Our work in numbering is part of God's creative work in us. The work of numbering is useful in imitating God's work of ordering, distinguishing, and applying and/or relating one thing to another. Therefore, a working definition of "number" can be "naming the quantitative value of objects or concepts."

Fall: The Fall has caused us to imagine that we are the interpreters of the world, not God. Fallen mankind, then, views elements of creation as objectively true in a similar way that Christians view God Himself as objective. Therefore, for unbelievers, numbers fit into two categories. Either they believe numbers are purely objective so that numbers are themselves truth (taught by Plato, Frege, and Russell), or they believe numbers are purely dependent upon our minds and we determine truth for ourselves (taught by Kant). In either case, the unbeliever concludes that numbers and axioms are based on a world without God as Creator and Interpreter.

Some Christians, too, have fallen prey to these philosophies. Some want to believe that numbers and axioms are objective truths (Christian Platonism). They believe that numbers and axioms are an insight into the mind of God. This argument is supported by the belief that numbers and axioms have "divine attributes."[1] This means they think that numbers and axioms are reflections/replications of God's attributes. In other words, they hold that mathematics is fundamentally a part of the nature of God Himself. In Johannes Kepler's words, they believe that numbers and axioms are a way of "thinking God's thoughts after Him." This way of thinking has several theological problems, but one of the two biggest is that we can never and will never think a thought identical to God's. This is a heresy since God's thoughts are identical to His being. The second is that mathematics is inferential by nature. This means that math logically moves from concept to concept, using numbers to come to a concluding result. God does not think by way of inference (Job 38; Isa. 55:8–9; Rom. 11:34).

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[1] Vern S. Poythress, *Redeeming Mathematics: a God-Centered Approach* (Crossway, 2015), 16-28.

Instead, we can think God's thoughts after Him only in terms of thinking His interpretation after Him. This interpretation is of Himself and the world as He has revealed this interpretation in Scripture. This interpretation is a "creaturely" way of communication that is not identical to His own mind but remains fully true and accurate.

Redemption: A major temptation for Christians is to seek out common ground with the world to demonstrate the reasonableness of Christianity. In a postmodern world in which truth has lost its meaning, objectivity is viewed as a fairytale, and knowing is a matter of perspective, mathematics seems like a good way to demonstrate to a doubting world that objective truth remains. However, it is essential for Christians to formulate a view of numbers that does not offend God's being or make numbers more foundational than they ought to be. Instead, a biblical view of numbers includes a purpose-oriented aspect that indicates that numbers are not foundational (of God Himself) but directional (pointing back to God). Numbers are part of the God-given ability of naming and are designed to point to God through the understanding of His works. Advocating this position will distance Christians from unbelievers instead of creating common ground. However, this also means that numbers (if purpose oriented) have vast applications in improving one's attitude toward mathematics, glorifying God in mathematics, and even growing in relationship with the Creator through mathematics.

Chapter Objectives

Chapter 3: Explain the statement that our work in numbering demonstrates God's creative work. (Knowledge—Creation)
Chapter 4: Distinguish between the biblical and nonbiblical views of numbering. (Knowledge—Fall and Redemption)

Modeling with Numbers

Creation: It is impossible for us to know everything about the universe. It is even impossible for us to experience or observe everything in the universe. God designed our minds to make representations of the world and to use those representations to understand complex systems and phenomena. For instance, Adam did not set his eyes on every single animal in the world to give each one a different name. Rather, his naming involved categorizing animals into sets. Organizing the animals into sets meant recognizing and including the various aspects of animals: shared characteristics, habits, diet, reproduction, and so forth. This way of ordering things into sets is a form of modeling. Modeling well involves right representation. This means that the model must involve not only the appropriate number of aspects but also the right assumptions about each aspect and the purpose for its inclusion.

Fall: Some thinkers view certainty as the goal of mathematics, and this goal is attempted by way of modeling. In this philosophy, numbers and axioms are understood as derivative of logic. These thinkers' modeling of numbers involves reducing the complex aspects of numbers to mere logic. The aspects of numbers that are ethical, social, and spatial are all ignored. This modeling is problematic due to its internal contradictions and incomplete connection from logic to numbers. Focusing on just one or two aspects and ignoring others will always cause a model to contain an unacceptable amount of contradiction or incomplete representation.

Redemption: Mathematical models can be incredibly persuasive and demonstrate great usefulness. Yet, these two elements of credibility ought not to be the source of the Christian's sense of certainty.[2] The purpose of model making is to understand better what God has made and even who God is. However, Christians must formulate criteria for a

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[2] Calvin Jongsma and Kevin N. Vander Meulen, "A Neo-Kuyperian Approach to Mathematics," 2017. 24.

biblical view of what certainty is. Certainty may be achieved with or without truth. That should cause Christians to rely on the Holy Spirit for a sense of certainty that is not false.

Chapter Objectives

Chapter 8: Describe three benefits of mathematical models. (Modeling—Creation)
Chapter 9: Evaluate the effectiveness of mathematics for giving certainty. (Modeling—Fall)
Chapter 10: Explain the proper use of a mathematical model. (Modeling—Redemption)

Reasoning with Numbers

Creation: Humans have been created with the powerful capacity for rational thought. In other words, we have been given a gift of natural intolerance for contradiction. Contradiction is detected or avoided in mathematics most obviously through deduction. Numbers serve as a language for exercising the deductive method of thinking. Using numbers in deductive reasoning allows for stronger certainty that this method of thinking is consistent. Using consistent methods to increase our accuracy is a way we can mimic the work of the Creator. Reasoning allows us better insight into God's creation, work, and character.

Fall: Because of the seeming objectivity of numbers, many (both Christian and non-Christian) have come to believe that mathematical deduction alone is a means of finding truth. Numbers are viewed as objective due to being rooted outside of this world (in forms or nature of God), making them self-evident truths that need not be questioned. This view of numbers has caused reason to be revered and elevated to a divine capacity. As conservative theologian Albert Mohler said, "You can't suggest that two plus two equals four is categorically a different kind of statement than God was in Christ incarnate."[3] Note the one-to-one ratio between a math statement and a theological truth from Scripture. These are indeed categorically different. But this does not mean we do not believe that numbers allow consistency and accuracy. Numbers do allow for more consistent and more accurate reasoning than other languages. But reasoning has its limits. Kurt Gödel demonstrated these limits with his incompleteness theorem.

Redemption: Although Christians are tempted to find security in creaturely things like reasoning and numbers, they must formulate a biblical view of reasoning that admits reason's limitations. Although they might be tempted to connect mathematical reason to God's nature, they must use math within its capacities.

When Aaron crafted a golden calf for the Israelites, he did so with God in mind. The people wanted God to be closer to them: more relatable, more tangible. They were still attempting to engage in the worship of God while also attempting to be comforted by something they could understand—the golden calf. At times, Christians have made a golden calf out of reason. They make something creaturely divine so that the creaturely thing will comfort them. This idol making fools them into thinking they are closer to God. They convince themselves that they are still revering God as they bow at the altar of reason. Instead, the idol pulls them further away. When Christians formulate a biblical view of reason, they are better prepared to recognize the tendency to make a golden calf out of reason. As they use reason with understanding of its actual capacities, it forces them to rely on the work of the Holy Spirit through Scripture for truth.

Chapter Objectives

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[3] "Is Math Oppressive? Seattle Public Schools Think So: What This Reveals and Why Christians Should Celebrate Math," Albert Mohler, last modified October 30, 2019, https://albertmohler.com/2019/10/30/briefing-10-30-19

Chapter 5: Describe several benefits of mathematical reasoning. (Reasoning—Creation)
Chapter 6: Explain why even correct mathematical reasoning cannot lead to certainty. (Reasoning—Fall and Redemption)

Design through Numbers

Creation: God gave us capacities like the skills of modeling and reasoning. The question is, what makes activities like reasoning and modeling possible? A random universe would not allow for these skills since these skills require patterns—and predictable ones at that. The reason these skills are possible is because God has designed a world that mimics (in a creaturely way) what God is like. As image bearers, we are designed not only to mimic our Creator but also to be impacted and inspired by the Creator's design. Numbers and axioms are the content of mathematical design, and the skills needed to observe and appreciate that design should be sought after and coveted by any who long to see the Creator's handiwork and give Him thanks.

Fall: Man has been confronted by design in mathematics but has attempted to recognize design without giving God thanks. Some believe that design is not in the world but in our mind. These people hold that since we can know only what we experience, we are the ones that bring meaning to that experience. In other words, this belief holds that the source of meaning lies not in God's interpretation of the world, but in our interpretation. In this case, to see design we need a filter between our mind and the world we observe. Math is that filter. We do not get mathematics from the world; we bring it to the world. We look at the world through the spectacles of mathematics. Time (sequence of numbers) is one dimensional. Space is three dimensional. All are understood with the spectacles of mathematics.

Redemption: For Christians, design is both in the world and in the mind, and this harmony is an imperfect reflection of the Creator. Christians must meet the challenge of applying non-mathematical relations to mathematical practices to have a more robust understanding of mathematics. For instance, there is nothing mathematical about desiring to glorify God, thank God, and reverence God, yet that desire is essential to pursuing a mastery of the skills needed to observe God's design in mathematics. A proper formulation of math includes design. This design reflects God as the master builder of this world. Christians must guard themselves from believing that math contains patterns incidentally or that God did not reveal anything about Himself in math. Applying one's desire for God to honing one's skills of mathematics has become a challenge because we live in a fallen world. But it can be overcome by a strengthening of faith. If God is truly the designer, and God is truly to be praised by those who observe that design, then a strengthening of faith is directly proportional to the study of math. As one's affections grow for the Designer, so will one's understanding of that which is designed.

Chapter Objectives

Chapter 1: Explain what it means to number. (Design—Creation)
Chapter 2: Evaluate the idea that design is imposed upon the world by our minds. (Design—Fall and Redemption)
Chapter 7: Create your own product that gives glory to God for design in creation that mathematics has helped you to recognize. (Design—Application)

Ethics and Numbers

Creation: God's command to subdue and rule over the earth has conditions. One of these conditions is to subdue and rule in a way that demonstrates love for one's neighbor and respect for the creation. The God-given ability to use numbers allows us to calculate, record keep, and predict for the purpose of protecting and preserving other people and the environment.

Fall: We misuse numbers in two ways. First, using number systems and formulas, we have developed technology that assists in killing unborn babies and terminally ill people, violating the command to love one's neighbor. Second, in many cases, we manipulate statistics, misuse percentages, and create models that disproportionately over-emphasize particular data for the purpose of advancing a cause or political position.

Redemption: Christians oftentimes are reactionary and are tempted to develop similar strategies as their enemies. However, Christians must formulate a biblical view of research and data collection that is dedicated to loving one's neighbor and loving truth. This might mean including research and data that diminishes their own political views or personal causes. In data collection, calculation, and prediction, applying biblical principles and maintaining biblical motivations are evidence of both loving one's neighbor as well as loving truth.

Chapter Objectives

Chapter 11: Explain the basis of ethics in mathematics. (Ethics—Creation)
Chapter 12: Formulate a biblical view of statistics and probability. (Ethics—Fall and Redemption)