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Participant’s Guide to
How Can Christians Understand the Story of Noah’s Ark?
A Study of Various Perspectives on the Interpretation of Genesis 6-9

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How to Use This Material?

This study of the relationship between the account of the flood in Genesis 6-9 and modern scientific understandings of the history of the natural world is composed of four modules. Each module contains a summary of the material addressed (usually a brief article or two), definitions of potentially unfamiliar terms, the strengths and weaknesses (as we perceive them) of the position presented in the material, and discussion questions.

This study is intended for informal, small group discussion, such as that of a Bible study or small group. The themes presented in each submodule may be unpacked on its own, but it is the hope of the authors that the entire study may be useful to the interested reader (leader and participant alike). The study is also aimed toward high school students, college students, and post-college adults with an interest in how science and the Christian faith interact.

As you read, it is our hope that you will come across (and come up with) questions which challenge you, both in understanding your personal faith and in understanding science. In these questions, you will have the opportunity to grow through asking and answering these questions: Why has the church historically believed in this answer or that answer? How might you be challenged to defend your answer?

The material assumes that each session will last for about 30-45 minutes. It also assumes that each participant will have read the assigned article(s) and considered the Discussion questions ahead of time. In addition to these questions, we offer information from other references as well as key terms, brief summaries of each article, and an explanation of perceived strengths and weaknesses in the texts.

As mentioned above, each submodule may be explored on its own, but the particular submodules will make more sense in the context of the whole set of modules. This is because some submodules contain articles which address articles referenced in previous submodules. It must also be noted that the provided discussion questions are intended as a guide for your discussion, but you should by no means restrict your discussion to these questions. Try to keep your group’s discussion relevant to the general themes addressed in the module, but be flexible.
Table of Contents

How to Use This Material.................................................................................................................. 2
Introduction to the Flood Modules.................................................................................................... 4
Bibliography......................................................................................................................................... 5

Module 1: A New Young-Earth Creationist View on the Ark Animals ............................................ 6
   The Gist ............................................................................................................................................. 6
   Terms................................................................................................................................................ 6
   The Strengths ................................................................................................................................... 7
   The Weaknesses ............................................................................................................................. 7
   Discussion Questions....................................................................................................................... 8

Module 2: A Critique of the New Young-Earth Creationist Approach........................................... 9
   The Gist ............................................................................................................................................. 9
   Terms................................................................................................................................................ 9
   The Strengths ................................................................................................................................... 10
   The Weaknesses ............................................................................................................................. 11
   Discussion Questions....................................................................................................................... 11

Module 3: A Young-Earth Creationist View on the Geology of the Flood .................................. 12
   The Gist ............................................................................................................................................. 12
   Terms................................................................................................................................................ 12
   The Strengths ................................................................................................................................... 13
   The Weaknesses ............................................................................................................................. 13
   Discussion Questions....................................................................................................................... 14
   Digging Deeper ............................................................................................................................... 15

Module 4: An Evolutionary Creationist View of the Flood............................................................. 16
   The Gist ............................................................................................................................................. 16
   Terms................................................................................................................................................ 16
   The Strengths ................................................................................................................................... 16
   The Weaknesses ............................................................................................................................. 16
   Discussion Questions....................................................................................................................... 17
   Digging Deeper ............................................................................................................................... 17

References............................................................................................................................................ Error! Bookmark not defined.
Introduction to the Flood Modules

Most of us have played with a model of Noah’s ark at some point in our lives. Perhaps your church nursery had one that opened down the middle to reveal pairs of round, charismatic mammals, or maybe your Sunday school teacher used a flannel-graph version to tell the Bible story. These models and the typical retelling of the Flood account presented in children’s Sunday school lessons almost always assume that the Flood was a global event and that all living, land-dwelling creatures made it onto the ark. From a scientific perspective, this interpretation of the Flood account seems implausible. As of yet, we have not found evidence for a global flood event, and Noah’s ark would have been very cozy indeed if two of every species of (unclean) mammal, amphibian, reptile, and bird were aboard.

There are a variety of different ways people reconcile the Biblical Flood account with modern geological, archeological, and genetic evidence. Some people, like those at Answers in Genesis, reinterpret scientific data and their reading of the Flood account to fit with a generally literal reading of Scripture. Others say that the Flood was local (not global), thus reducing the amount of perceived conflict between science and Scripture. Still others say that the Flood account should be read as a symbolic story; there never was a global flood, but the story of the Flood teaches us truths about how seriously God takes our sin and how merciful He is to preserve us in spite of our wickedness.

In this set of modules, we present a variety of interpretations of the Flood account. We hope that, by introducing participants to a diversity of opinions, they will be able both to develop a more nuanced understanding of how they view the Flood and to cultivate empathy for those who hold different opinions.
Bibliography

Module 1:

Module 2:

Module 3:

Module 4:
Module 1: A New Young-Earth Creationist View on the Ark Animals

Reading Materials: “Reimagining Ark Animals” (Michael Belknap and Tim Chaffey) and “Did Natural Selection Play a Role in Speciation?” (Nathaniel T. Jeanson)

The Gist
In “Reimagining Ark Animals,” Michael Belknap describes a Young Earth Creationist (YEC) re-envisioning of Noah’s Ark. He describes rapid post-flood diversification, which offers a solution to the problem posed by hundreds of thousands of living species and an ark that is merely 300 cubits long, 50 cubits wide, and 30 cubits high. Rapid post-flood diversification suggests that, rather than sending animals from each species as we know them today (e.g. a modern giraffe, a modern lion, a modern elephant), God sent progenitors of each kind. So, instead of sending lions, tigers, house cats, bobcats, and leopards to Noah, God sent a pair of cat-type creatures. After the flood waters had receded, this pair of progenitor cats bred and re-established the cat kind population. Each successive generation of cat kind looked different from its cousins, and eventually the cat kind came to include every cat-type creature that we know today (as well as some that have since gone extinct). Cat kinds were able to diversify because God had designed the creatures with “remarkable genetic diversity and adaptability.”

Other Answers in Genesis (AiG) resources provide a proposed mechanism for the diversification of creature kinds after the flood. In “Did Natural Selection Play a Role in Speciation,” Nathaniel Jeanson suggests that diversification could have been a product of heterozygote breeding. Many creatures are diploid, meaning that they have two copies of the same chromosome. Each copy of the chromosome contains the same genes. The chromosomes may have different versions (or alleles) of the same gene. When the organism has two different alleles of a gene, it is said to be homozygous for that gene. When an organism has two of the same alleles of a gene, it is said to be heterozygous.

Jeanson suggests that the creatures on the ark were heterozygous for many genes. When the two individuals of a kind breed, they produced some offspring that were heterozygous like themselves, but they also produced some offspring that were homozygous. These homozygous creatures may look different from their heterozygous relatives. The two homozygous populations (one with two copies of one allele and one with two copies of the second allele) may have become isolated from one another by migration.

Terms
- **Allele**: copy of a gene.
- **Diploid**: possesses two copies of each chromosome.
- **Heterozygous**: an organism that has two different alleles for one gene.
Homozygous: an organism that has two of the same alleles for one gene. Individuals may be homozygous for some genes and heterozygous for others—homozygosity and heterozygosity refers to individual genes.

Kind: definition unknown, but AiG suggests that kind is probably equivalent to the scientific denotation “families.”

Natural selection: organisms better adapted to their environment tend to survive and produce successful offspring.

Progenitor: ancestor or forbearer, a creature from which others descend.

Rapid post-flood diversification: the idea that the creatures Noah took onto the ark experienced rapid speciation after the flood, resulting in the variety of modern species we see today.

Species: definitions of species vary, but often a species is defined as a group of individuals that can breed together but cannot breed with other groups. This is called reproductive isolation.

The Strengths
This model does provide an explanation of how God could save all kinds of animals from destruction during a global flood. The model makes a literal interpretation of Genesis more plausible than the model represented by the plastic arks and pairs of farm and safari animals given to children.

The Weaknesses
It relies on a literal interpretation of the flood events and animal placement, but it embellishes the flood account with things such as rapid diversification after the flood—which Scripture gives no evidence for—and a brief Ice Age—which Scripture also does not mention. It is inconsistent in its literalness, and it is scientifically bizarre and unsupported. People who accept the theory of evolution—which is more or less what rapid post-flood diversification is, though it does not necessitate change in allele frequency—would never suggest that all modern species arose from about 1,500 pairs within about 4,000 years. The rapidity of change necessary for many millions of species (some estimate 7.77 million animal species1) to arise from 1,500 in a relatively short time frame is bewildering.

It is true that migration can cause speciation, but migration must be driven by something—creatures don’t just migrate on a whim. Perhaps one homozygous population fared better in one environment, and the other homozygous population fared better in another. If this were the case, the resulting migration would be a result of natural selection. In addition, the two homozygote populations would not be different species. If each population
continued to subdivide itself based on whether an individual was homozygous for one copy of an allele or another, many populations that looked different could be produced. However, even if these populations looked very different from each other, they still would not necessarily be considered species. And, even if they were reproductively isolated from each other, the population would have to migrate after every generation.

**Discussion Questions**
What caused the rapid diversification (according to AiG)? Would they say that the conditions of the earth change after the flood? How would they explain why creatures didn’t diversify before the flood?

Would AiG agree or disagree with this statement: “The genetic diversity within the kind progenitor genome a fail-safe mechanism God put into the creatures so He had a back-up plan when He inevitably flooded the earth.” Why or why not?

Does the Bible explicitly tell us that everything has not “always remained essentially the same”? Does a literal interpretation of Scripture necessitate that nothing about the flood story (or creation, or anything else) can be assumed if it is not stated explicitly?
Module 2: A Critique of the New Young-Earth Creationist Approach

Reading Materials: “Ken Ham’s Darwinism: On the Origin of Species by Means of Hyper-Evolution Following Noah’s Flood” (Joel Duff) and “Is Ken Ham’s Rapid Post-Flood Diversification Really Evolution?” (Joel Duff)

The Gist
In “Ken Ham’s Darwinism” and “Is Ken Ham’s Rapid Post-Flood Diversification Really Evolution?”, Joel Duff critiques the Young Earth Creationist (YEC) view of the Biblical Flood account proposed by Answers in Genesis (AiG). Based on a modern scientific understanding of speciation, it seems unlikely that the rapid post-flood diversification described by AiG could accurately explain how the thousands of modern land-dwelling animal species developed from about 1,500 progenitor kinds within the span of 4,350 years. AiG interprets “kind” to mean something akin to the scientific designation “families,” and these “kinds” would produce the many species we see today. The main issues Duff finds with the model proposed by AiG include the lack of Biblical evidence for rapid biological change in the post-flood world and AiG’s selective acceptance of scientific evidence. In addition, AiG’s rapid post-flood diversification resembles biological evolution in many ways, though they would never recognize it as such. AiG acknowledges mechanisms traditionally encompassed by the theory of evolution (e.g. genetic drift and mutation) as possible means of speciation following the flood, but it requires a timeline that, from a scientific perspective, seems unsustainable and impractical.

Terms
Common ancestor: an ancient organism whose generations of descendants have gradually undergone speciation, resulting in multiple diverse species seen today. A common ancestor is the node from which two species branch on a phylogenetic tree.

Darwinism: the theory of the evolution of species by the mechanism of natural selection. In Duff’s words, Darwinism is the idea that species arise and adapt by accumulating heritable variations, which increase the individual creatures’ ability to survive in their natural environment.

De novo: a brand-new development.

Diversification: development of diversity meaning that there has been an increase in diversity.

Family: a level of classification between order and genus. There are no hard and fast rules for what constitutes a family, but they are often based off of visible divisions. For example, most cats (lions, leopards, house cats, etc.) belong to the family Felidae.
**Fossil**: any trace of past life, including both remains of the organism and results of their activity (e.g. footprints or trails). Fossilization can occur if an organism is rapidly buried by sediment, dried out by arid conditions, or perimineralization (when ground water deposits dissolved minerals in bone or shell cavities), among other methods.

**Genome**: all the genes present in an organism.

**Hugh Ross**: an astrophysicist and Old Earth Creationist (OEC) who writes for the OEC publication “Reasons to Believe.”

**Hyper-evolution**: evolution that happens at an accelerated rate; rapid genetic mutation.

**Intermediate (species)**: a species that falls between an ancestral form and its descendants.

**Irreducible complexity**: the argument that some biological systems cannot evolve by sequential changes to existing functional systems. The idea is that any change to a functional system would result in a faulty system, not a new functional system. Much of the scientific community regards this idea as a cop-out; it seems to rely on a God-of-the-gaps stance that is not supported by scientific data.

**Kind**: a hierarchical designation akin to “family.”

**mtDNA**: mitochondrial DNA, which is DNA located in the mitochondria. Mitochondria are cellular organelles found in eukaryotic cells which convert chemical energy into a form that cells can use.

**Neo-creationism**: a new approach to creationism that seeks to make a literal interpretation of Genesis fit with certain modern scientific ideas.

**Progenitor**: ancestor or forbearer, a creature from which others descend.

**Speciation**: the formation of a new species by processes of evolution.

**Ungulate**: any animal with hooves, including horses, pigs, hippopotami, and rhinoceroses.

**The Strengths**
Duff clearly understands what Darwinian evolution is, and he uses AiG materials to demonstrate that what AiG proposes is Darwinian evolution. He highlights inconsistencies in the AiG model, including its insistence that 87% genetic similarity between creatures indicates a common kind ancestor but 92% genetic similarity indicates enough difference to necessitate a special creation event.
The Weaknesses
Duff clearly has little patience for the unscientific science of AiG and other Young Earth Creationism (YEC) proponents. The audience of this blog is likely made up of those who would not adhere to a YEC view of life, and his derision of the AiG methods probably wouldn’t earn him many friends in the YEC camp. Duff feels strongly that AiG has misused science (and Scripture). As such, Duff won’t win points for diplomacy, but his arguments are supported by a large body of scientific evidence.

Discussion Questions
Why do you think that AiG is hesitant to employ the term “evolution,” even though it seems as though it draws on many of the ideas presented by the theory of evolution?

How might Joel Duff view the Biblical account of Noah’s flood? What are the challenges of this position? What are the benefits?

Is it consistent with the nature of God to change natural laws?

What are natural laws?

How might a YEC define natural laws? How might a Theistic Evolutionist (TE) or Old Earth Creationist (OEC) define natural laws?

It would appear that YEC have changed their understanding of how the natural world works in the past few decades (see “Ken Ham’s Darwinism,” fourth-to-last last paragraph). What might this indicate?
Module 3: A Young-Earth Creationist View on the Geology of the Flood

Reading Materials: “Geology and the Flood” (Henry M. Morris)

The Gist
In “Geology and the Flood,” Henry Morris argues that the uniformitarian approach to geology we use today is inaccurate, and it only rose to general acceptance in the scientific community because it displaced geological catastrophism and made the theory of evolution geologically plausible. Morris points out that the “uniformitarian revolution” was led by amateur geologists, and that the “actual facts or [sic] geology still favored catastrophism.” Morris is skeptical of the geologists because he believes their approach to geological interpretation to be inconsistent. He says that, “Once uniformitarianism had served its purpose—namely, that of selling the scientific community and the general public on the great age of the earth—then geologists could again use local catastrophic processes whenever required for specific geological interpretations.” In addition, he feels as though the fossil record provides support for the Flood model.

Terms
**Catastrophism:** the theory that historical geological changes are a result of sudden, violent, and unusual events.

**Induction:** inductive reasoning relies on the accumulation of small observations to infer larger patterns. Induction can be used to predict yet unobserved phenomena, and additional observations will either support or challenge the induction.

**Isotope:** a variant of an element. Radioactive isotopes are unstable, and are especially prone to lose energy.

**Half-life:** the time required for a quantity of parent isotope to be reduced to half of its initial quantity.

**Uniformitarianism:** the theory that historical geological changes are a result of continuous, uniform processes.

**Methodological uniformitarianism:** the theory that historic changes of the earth’s surface may be explained by reference to causes that we still see and experience today. Methodological assumptions assume that natural law and natural processes are constant across time and space.

**Principle of simplicity:** ever heard of the more common term for this principle: “Occam’s Razor”? The principle of simplicity is basically what it sounds like: the simplest explanation of a phenomena is probably the most accurate one.
**Substantive uniformitarianism**: the hypothesis that change is typically gradual and is evenly distributed across space and time. This hypothesizes that earth is steadily progressing in a direction (though not with a purpose). This is the one Gould disliked.

**Tranquil flood**: a worldwide flood that left no geological traces. This theory seems to be mostly referenced by the Institution for Creation Research (ICR), Answers in Genesis (AiG), and other Christian apologetic organizations.

**The Strengths**
Morris highlights the difficulties of accepting a local flood. Without a global flood, it is difficult to know how to interpret God’s promise never to flood the earth again. Morris also draws attention to the social implications of scientific theories. He suggests that social Darwinism was made possible by the acceptance of the theory of evolution, which was in turn made possible by the acceptance of uniformitarianism.

**The Weaknesses**
Morris seems to misunderstand the stance and process of modern geology. Indeed, modern geologists would argue that **methodological uniformitarianism** is largely accurate, but **substantive uniformitarianism** is not scientific. **Methodological uniformitarianism** suggests that natural laws and processes are constant, and that we can expect that natural law functioned similarly historically to the way it functions today. **Substantive uniformitarianism**, on the other hand, suggests that change is evenly distributed across space and time. This hypothesis suggests that earth is slowly but steadily progressing in a direction, though it is not progressing toward any particular end goal. **Substantive uniformitarianism** is generally rejected. Scientists have not wholly rejected catastrophism, and they have not wholly rejected uniformitarianism. Rather, most scientists believe that natural laws generally remain constant, but there have also been catastrophic events in the history of the world; scientific paradigms develop over time.

On a related note, Morris quotes Gould as saying that “methodological uniformitarianism was useful only when science was debating the status of the supernatural in its realm.” This citation leaves off the first clause of that sentence, which is vital in understanding what Gould actually meant. The full quote is, “As a special term, methodological uniformitarianism was useful only when science was debating the status of the supernatural in its realm; for if God intervenes, then laws are not invariant and induction becomes invalid.” In the referenced article, Gould is denouncing the term uniformitarianism, which he believes to be redundant because it describes concepts used elsewhere in science (namely induction and simplicity). The term [methodological] uniformitarianism distinguished between a worldview in which the laws of nature were essentially constant (uniform) and a worldview in which a divine being intervened to change natural law. (Note:
Here Gould and others make the assumption that natural law and divine activity are distinct. Christian scientists would argue that this is a false dichotomy—natural law is the way God acts. Perhaps a more accurate-to-a-Christian-perspective phrasing of Gould’s sentiment is that uniformitarianism assumes that God usually acts in predictable patterns whereas catastrophism assumes that God’s actions are erratic and unpredictable.) The concept and assumptions of methodological uniformitarianism are still standard in the field of geology and science in general.

Morris also seems to misunderstand the concept of radiometric dating and how it has been applied to the interpretation of the fossil record. Radiometric dating can be done independently of the fossils in a sample of sediment. Radiometric dating determines the approximate age of a carbon or rock sample based on the radioactive substances it contains. Over time, atoms decay into slightly different atoms. In technical terms, an atom starts out as a parent isotope, and then it very, very slowly decays into a daughter isotope. The amount of time it takes for the amount of parent isotope to be reduced by half is called the half-life of the compound. As the amount of the parent isotope decreases, the amount of the daughter isotope increases proportionally. When we know something about the relative proportions of the daughter isotope and the parent isotope in a sample, we can predict the age of the sample. Radiometric dating can be done on carbon samples (e.g. fossils), but it can just as easily be done on inorganic samples. Contrary to Morris’s assertion, radiometric dating is not dependent on preconceived notions of the age of various fossil layers; radiometric dating of geological layers can be conducted independent of evolutionary science.

Discussion Questions
Based on what you know about the Flood account in Scripture, what would you expect the fossil record to look like?

Does the Biblical account of the flood suggest that there were multiple events that laid down layers of sediment?

Look at the references Morris uses. When was the most recent one published?
Morris says that “fossils of simple marine invertebrate animals are normally found at the lowest elevations in the geological strata for the simple reason that they live at the lowest elevations.” Do you think that marine invertebrates would have died in the flood?

Morris also says that “human fossils are extremely rare because men would only very rarely be trapped and buried in flood sediments at all, because of their high mobility.” Does this make sense? Would any humans who were not in Noah’s family have escaped being killed by the flood? How would human fossils have been made in places distant from the Middle East?

Digging Deeper
For additional information about how Young Earth Creationists use geological data to support the idea of a global flood, see “Geological Evidences for the Genesis Flood” by Andrew Snelling (2007).
Module 4: An Evolutionary Creationist View of the Flood

Reading Materials: “Biblical and Scientific Shortcomings of Flood Geology,” parts 1, 2, 3, and 4 (Gregg Davidson and Ken Wolgemuth)

The Gist
In “Biblical and Scientific Shortcomings of Flood Geology,” Gregg Davidson and Ken Wolgemuth express their view that the Biblical flood account is best interpreted as a story that reveals theological truths, not a historically and scientifically accurate description of an ancient, global flood. The authors are careful to point out that their perspective does not violate the sanctity and inerrancy of Scripture; rather, it looks at both means of revelation God has given us (Scripture and Creation) to develop a more thorough understanding of God’s Word. The authors cite the use of literary devices in Scripture and the lack of actual scientific evidence for a global flood as the primary reasons for rejecting a global flood.

Terms
Varves: sediment layers formed in aquatic environments.
Carbon-14: a radioactive isotope of carbon that has 6 protons and 8 neutrons. Carbon-12 is the most common isotope of carbon, and it has 6 protons and 8 protons.
Radioactive isotope: a form of an element that has a different number of neutrons.
Fixity: the state of being unchanged or permanent.

The Strengths
Davidson and Wolgemuth take a measured approach to a potentially contentious issue. They have weighed the theological implications of adopting a not-literal interpretation of the flood, and they have concluded that their approach is both consistent with an obedient interpretation of Scripture and an obedient use of God’s revelation to us through Creation. The authors present a breadth of scientific evidence to support their claim that there is not evidence for a global flood.

The Weaknesses
While the concepts addressed in the articles make for persuasive arguments and intriguing discussion, the authors assume a knowledge of science greater than the average reader might possess. Some readers who approach the website might be put off by the scientific language of the articles, even though the authors seem to have attempted to simplify their jargon.
Discussion Questions
What evidence have you heard used to support the idea of a global flood?

How does a not-literal interpretation of the flood account fit with your understanding of the Creation account?

What theological issues does a not-literal flood account raise for you?

The authors say that, “Many in the world marvel at the handiwork of God while denying the Creator. In response, the Church demands that to acknowledge the Creator, we must deny His workmanship.” What do you think of these statements? Do they match your experience with science and the Church?

The authors conclude with the statement, “Christ Himself is a sufficient stumbling block – we need not create any other!” What do you think they mean by that? Do you think it is an accurate statement?

Digging Deeper
For more information about how Evolutionary Creationists view the Flood account, see “Genesis and the Flood” by Tremper Longman (2016).

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i (Mora, Tittensor, Adl, Simpson, & Worm, 2011)
ii (Kitzmiller v. Dover Area School District, 2005)
iv *Ibid*
v (Gould, 1965)