God's Grand Design
Class #7
What about the distant starlight problem?
Genesis 1:14-19
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The Rock Church

INTRODUCTION

Good evening everyone. Welcome to our next God's Grand Design. My name is Josh Whitney. I am one of the pastors here at the Rock. This is our first class of 2024.

This is part 7. We will be addressing this question, What about the distant starlight problem?

This talk has a lot of science, math, and outer space. I had a lot of fun studying for this one.

This question, could be phrased a different way, how do we see light from stars and galaxies that would have taken millions of years to reach the earth. That's where we are going.

So tonight will be all about astronomy.

Next class will be all about biology.

And then the following class we will be pivoting to the flood.

One house keeping item, about new 10 people have signed up for the class in the last month. So welcome. If you are new, and you didn't get my email Monday or today, send me an email and I will add you to the list.

And every week, I email out the previous class notes, slides and audio recordings.

So let's start with prayer.

OVERVIEW

Let's look at our key slide. In this class, we are comparing two different views of origins, origins mean where everything came from?

View #1 – God created the heavens and the earth. (in six days, thousands of years ago)

I believe View #1 makes the most sense, biblically and scientifically. And that is what this class is all about.

And View #2. The heavens and earth evolved without God. (millions and billions of years ago)

View #2 is the dominant view in our world.

THE EVOLUTIONARY MODEL OF THE UNIVERSE

Before we address this question "how do we see light from stars' millions of light years away, I want to discuss the evolutionary and creation models of the universe. When I use the word evolution to speak of the universe, I speak of the gradual, step by step process that formed the entire universe without God.

First, according to the evolutionary, old earth theory. The universe exploded into existence 13.8 billion years ago. In the Big Bang theory, the universe started as a tiny, dense point that exploded into everything. Matter, energy, stars, galaxies, planets, even the physical laws that govern the universe ALL formed from this explosion.

Second, again, according to the conventional, old earth theory, the sun formed about 4.6 billion years ago. There was a giant spinning cloud of gas and dust. And according to this theory, this gas cloud collapsed under its own gravity, spinning faster and faster, and flattened into a disk. Most of the material was pulled toward the center and formed our sun.

It's thought that the sun produces energy through a nuclear fusion reaction in its core, creating helium from hydrogen. So there was a point where this ball of gas and dust went nuclear and started producing light and heat.

Third, again, according to the leading, old earth theory, about 4.5 billion years ago, the Earth formed by itself when gravity pulled the leftover gas and dust together to form our planet in a process called planetary accretion; accretion simply means clumping.

That is the theory. Here are two related quotes. Martin Harwit an astronomer said in his book Astrophysical Concepts. "Once these planetesimals [small planets] have been formed, further growth of planets may occur through their gravitational accretion [clumping] into large bodies. just how that takes place is not understood."

Or this quote. Jeff Cuzzi, a NASA research scientist, said in a Nature article, entitled Planets the First Movements. "How the first stage of this process, primary accretion [clumping], works is a fundamental unsolved problem of planetary science."

The conventional, old earth theory is that gas and dust clumped together to form the planets, but we have two quotes by experts saying, well, we are not quite sure how this works. But they are not changing their position.

Which shows us this is a faith position. Everyone has faith, for the record, creationists and evolutionists. Don't forget that.

And finally the moon. According to the old earth, evolutionary theory the moon formed 4.4 billion years ago. According to this theory, after the Earth had formed. A small planet collided with the earth. Kicked up a bunch of debris. That debris clumped to form the moon.

Here are two quotes on the formation of the moon.

Peter Noerdlinger is a researcher in the field of Astrophysics. He said in a New Scientist article talking about how the moon formed. "The collision has to be implausibly gentle. you practically need someone to hold a mars-sized object just above earth and drop it, to avoid messing up earth's orbit."

And one more quote. Erik Hauri was a geochemist at the Carnegie Institution for Science. He said this in an NPR article, again talking about how the moon formed. "It's hard to imagine a scenario in which a giant impact melts, completely, the moon, and at the same time allows it to hold onto its water... that's a really, really difficult knot to untie."

Two interesting quotes on the theory of the moon formation from leading experts.

But that's the conventional, evolutionary, old earth model.

The universe exploded from nothing. And all of the matter, energy, and physical laws that govern the universe were formed. And then cloud of gas and dust collapsed into our sun. And then it went nuclear. And some of that gas and dust clumped to form the earth. And then after a collision, the moon form from some gas and dust.

And it all just happened to be perfectly suited for life. You remember in class 3, we talked about how the earth is perfectly suited for life. Over 200 factors that all need to be perfectly aligned or the earth doesn't work.

But that's the theory. A lot of explosions, clumpings, collisions and more clumpings over billions of years and you have our planet perfectly suited for life.

And remember this is all a theory. No one is running a planetary clumping experiment. It's a theory from a computer model to explain the existence of the sun, earth, and moon without God.

THE CREATION MODEL OF THE UNIVERSE

So that is the evolutionary model of the universe.

What is the creation model? Let's go to Genesis chapter 1.

Genesis 1:1 In the beginning, God created the heavens and the earth. 2 The earth was without form and void, and darkness was over the face of the deep. And the Spirit of God was hovering over the face of the waters. 3 And God said, "Let there be light," and there was light. 4 And God saw that the light was good. And God separated the light from the darkness. 5 God called the light Day, and the darkness he called Night. And there was evening and there was morning, the first day.

So this is Day 1, God creates the earth and light.

Skip to verse 14, and day 4.

Genesis 1:14 And God said, "Let there be lights in the expanse of the heavens to separate the day from the night. And let them be for signs and for seasons, and for days and years, 15 and let them be lights in the expanse of the heavens to give light upon the earth." And it was so. 16 And God made the two great lights—the greater light to rule the day and the lesser light to rule the night—and the stars.

Many things we could say here. But,
1. God created the sun and moon to give us light.
2. For signs and seasons and days and years.
3 And God made the stars.

Verse 17 And God set them in the expanse of the heavens to give light on the earth, 18 to rule over the day and over the night, and to separate the light from the darkness. And God saw that it was good. 19 And there was evening and there was morning, the fourth day.

So on Day 4, God creates the sun, moon and the stars.

So the straight forward reading of Genesis chapter 1, God creates the earth, light, sun, moon, and then the stars. Why do I highlight the order? Some Christians say Day doesn't mean day, it's incredibly long periods of time. But I put the creation and evolution sequences by each other to you can see how they are fundamentally different models.

LIGHT BEFORE THE SUN

A quick aside. You might be wondering; in the creation model, how do we get light before the sun? That is a good question.

There is a related verse in the New Testament. We jump from the first book of the Bible, Genesis, to the last book, Revelation. This verse is describing the new heavens and new earth.

Revelation 22:5 And night will be no more. They will need no light of lamp or sun, for the Lord God will be their light, and they will reign forever and ever.

So God is totally capable of giving us light without the sun.

So in Genesis 1. God creates light first, sun second. We are like, that's not how it works, God. Look at God's opinion of the matter in.

Psalm 115:3 Our God is in heaven; he does whatever pleases him.

So if God wants to create light on Day 1. And then add a permanent light source, on Day 4. He can do it.

Back to Genesis 1:16.

Genesis 1:14 And God said, "Let there be lights in the expanse of the heavens to separate the day from the night. And let them be for signs and for seasons, and for days and years, 15 and let them be lights in the expanse of the heavens to give light upon the earth." And it was so. 16 And God made the two great lights—the greater light to rule the day and the lesser light to rule the night—and the stars.

HOW MANY STARS?

Just how many stars did God make? Every time we look deeper into space, with better telescopes, we see more galaxies. Initially, we see these points of light (on the right there) and think oh they're are stars. But then we look with a better telescope, nope, they are galaxies.

Galaxies are thought to contain 100 billion stars EACH! And there are estimated to be 200 billion galaxies.

God spoke all of that into existence. Four words. God made the stars.

So what is 200 billion galaxies times 100 billion stars per galaxy? Remember, these are all estimates. But there might be NASA Astronomers estimate that the universe could contain up to one septillion stars – which in numbers is 1,000,000,000,000,000,000,000,000. 1 10^24 zeros.

That's a lot!

Look at this verse. This is a mind blowing verse. Psalm 147:4 He determines the number of the stars; he gives to all of them their names. 5 Great is our Lord, and abundant in power; his understanding is beyond measure.

God named them all. We don't even know everyone's name in the room. God named at least a septillion stars.

This verse is an understatement. Yes, God is abundant in power. He knows the number of stars and he named them all. He made them. That's unbelievable power.

THE DISTANT STARLIGHT PROBLEM

So let's get to our problem of the evening, the distant starlight problem.

So you remember in class 2, we talked about how Genesis 1 and 2 clearly teach God created the earth and heavens, everything in the universe in 6 literal 24 hour days. We got into the meaning of the word yom or day in Hebrew.

In class 5, we added up the lifespans from Adam to Abraham in Genesis 5 and 11 and saw how the Bible clearly teaches the earth is about 6,000 years old. Go back and listen if you missed either one.

But that presents a problem.

Here is the distant starlight problem stated another way. Here is the earth. We believe the Bible teaches that the earth is about 6,000 years old. And that is the Andromeda Galaxy, which astronomers tell us, is about 2.5 million light year away. So that light has been traveling for 2.5 million years at the speed of light to reach the earth.

That is a problem we are addressing tonight.

So these incredible distances to most of the stars and galaxies present a real problem to the young earth, creation perspective. This question, along with the radiometric dating question, are the two most common objections to Genesis.

We talked about radiometric and carbon 14 dating in class 6. We are now exploring this question.

So when I think about this question. A bunch of other questions pop into my mind. How do we know the speed of light? How do we know the Andromeda Galaxy is 2.5 million light years away. Some of you might be wondering what is a light year?

HOW DO WE KNOW THE SPEED OF LIGHT?

First, how do we know the speed of light?

We google it. Hello, 2024.

What is the speed of light? how fast is that?

The speed of light (c) is 299,792,458 meters per second. But we're Americans. So 671,000,000 mph.

That is so fast. In Star Trek, that is warp 1. At that speed you could go around the earth in 0.13 seconds.

You could get to the moon in 1.28 seconds.

You could get to the sun in a little over 8 minutes.

So the speed of light is crazy fast.

How do people measure the speed of light?

In simple terms, you shoot a laser at a mirror far away and you record the time it takes for the light to travel there and back. You divide the distance by the time and you know the speed of light.

I want to show you clips from two science videos from Youtube. I like to watch science videos like this for fun. I am going to show just a couple minutes of each video. You should go home, look at my notes and watch both videos because they are just that cool.

so the first video is from smarter every day. This is Destin Sandlin, former rocket engineer, turned youtuber. He is explaining why astronauts left a reflector on the moon. We will watch 2 minutes of this video.

2:36 – 4:28

https://www.youtube.com/watch?v=dsRsap2_RAc&ab_channel=SmarterEveryDay

So you get it. You shoot a laser at a mirror on the moon and when it bounces back, you can measure the time, know the distance, calculate the speed of light.

But I want to show you a second video from Veritasium. This is Derek Muller, former phd physics guy turned youtuber. Video is Why no one has measured the speed of light. We will watch 3 minutes of this video.

Bottomline there is a huge assumption you are making when you do that speed calculation and I love that he explored it in this video. Again, watch the whole thing at home tonight.

0:05-3:20

https://www.youtube.com/watch?v=pTn6Ewhb27k&t=2s&ab_channel=Veritasium

This is significant. And again, if you want to explore this more, watch the whole 19-minute video. Basically, he is saying, and physicists agree, you can't measure the 1-way speed of light. You have to measure the 2-way speed of light. You need to bounce light off a mirror. And nobody knows what light is actually doing during the 2 way trip.

Basically you have to assume it is moving at the same speed to and from the mirror. But you don't know that.

Again, everyone assumes, and I think it is accurate, light speed is probably consistent in all directions. But that is a fundamental assumption. It could be twice as fast one way and instantaneous in the return direction. Interesting thing to ponder.

But that is how we measure the speed of light. Next question.

HOW DO WE KNOW HOW FAR AWAY A STAR OR GALAXY IS?

Second, how do we know how far away a galaxy or star is?

Astronomers use four main methods to estimate distance to a star or a galaxy.

I am teaching you the first two main methods used by astronomers to measure distance in space.

For stars that are closer, astronomers use Parallax Angle.

Hold out your arm. Hold up your thumb. Alternate opening and closing your right and left eyes. You see how your thumb appears to move back and forth in relation to the background. You know the distance between your eyes. You can calculate the angle that your thumb appears to be moving in relation to the background. Do a little trigonometry. You can calculate how far your thumb is from your face without actually measuring it.

Similarly, in astronomy, we can look at a star in the summer and the same star in the winter. We see how the stars appears to move in relationship to the background stars. We can calculate that angle. We know the distance from the sun to the earth. We can do a little trig and we calculate how far away this star is.

For the record, this parallax angle only works for stars that are relatively close. The method doesn't work beyond 10,000 light years away.

You might have noticed the word parsec. There is a Star Wars han solo joke I had to cut here for time sake. But I would love to discuss with you after the teaching. ☺

Beyond that distances beyond that, the 2nd method astronomers use to estimate the distance to a star or galaxy is standard candle.

You see the candles lined up here. The closer candle is brighter. The farther away candles are dimmer. And assuming the candles are all the same brightness, you could use this method to estimate how far away the candle is.

So for example, if this candle moves twice as far away, it will look four times dimmer than it did originally.

Similarly, in astronomy, there are supernovae and variable stars that has known brightness or magnitude. And you can work out the math on the distance based on how much the brightness has diminished. This method works up to 100 million light years away.

There are other methods to measure things even further away, like the red shift method.

But these first two methods, the parallax angle and standard candle are sufficient to give us stars and galaxies that are more than 6,000 light years away.

WHAT IS A LIGHT YEAR?

Third, What is a light year?

It is how far light travel in one year. Remember how fast light is moving. 671 million miles per hour. How many hours in a year? 8,760 hours.

So 671 million miles per hour times 8,760 hours is 5.88 trillion miles. Which is equal to one light year.

So for example. This is our nearest star is Proxima Centauri. Is almost 25 trillion miles away or 4.246 light years. Instead of saying 25 trillion miles away, you say it is 4.2 light years.

I hope that makes sense. Happy to discuss any of this afterwards.

So back to our slide one more time. We believe that Genesis 1 through 11 clearly teaches the earth is about 6,000 years old. And we estimate that the Andromeda Galaxy, is 2.5 million light years away. We can measure the two-way speed of light.

Which means this light has been traveling for 2.5 million years. Which is bigger than 6,000 years.

FOUR POSSIBLE SOLUTIONS

So how do young earth creationists approach this question?

Four main options. I am briefly going to cover these. If you want to nerd out on this topic, I will point you to 4 resources if you want to dig deeper. I am going to briefly talk about 4 options.

First option. The speed of light was faster in the past. Again, a bunch of articles and resources on this. But briefly, some creation scientists speculate and think they have evidence and reasons to believe that the speed of light was significantly faster in the past. It's slowed down now.

If the light traveled from the Andromeda Galaxy at a much greater rate of speed in the past, this would solve the distant starlight problem.

The second option is called, anisotropic synchrony convention or more simply 1 way versus 2-way speed of light. This is what the veritasium video is about. Maybe the speed of light is twice as fast in one direction and instantaneous in the other direction. We would never know. But this would solve any distant starlight problem as well.

This third option is time dilation. Like what Albert Einstein talked about with his theory of general relativity. Time is impacted by both gravity and speed. For example, right now, GPS satellites circling the earth. They are experiencing time slightly different than us. If this time difference wasn't corrected for, your gps on your phone wouldn't work. So the thought is time is running at a different rate further from the earth.

The fourth option and my personal favorite, God created a mature creation. This is a supernatural miracle. A few comments on this. I think this is the simplest to understand and the most elegant biblically speaking.

Take for example, the Garden of Eden. Adam and Eve lived in a fully mature, fully functional creation. God wasn't like come back in 30 years, Adam, this garden will be great. Adam didn't wait for little plants to grow up and mature.

If we were standing there during the creation week, I think we should have seen creation happening like a movie on fast forward. Like that Voddie film we watched in class 2.

So in this mature creation option, God created the light in transit.

I also think of John chapter 2, Jesus first recorded miracle was turning water to wine. Remember a wedding ran out of wine. Jesus' mom, Mary, asked him to help. Jesus said my time hasn't come yet. Mary said do whatever he tells you. Jesus told the servants to fill some jars with water and take some to the master of the banquet. The master of the banquet tasted it. And said, this is the choice wine. The best wine. Mature wine. Fermented wine.

Jesus created mature wine in an instant. How old was the wine from a stop watch perspective? Minutes? But it tasted like mature, choice wine. Did Jesus deceive anyone? No. He created mature, fermented delicious wine in an instant.

Similarly, God tells us how old the heavens and earth are. He created a mature creation with distant star light. Adam and Eve needed it on day six for light and time keeping. And remember the Genesis 1 text says God made the light on day 1 and the sun, moon and stars on day 4.

So that was a very brief overview of these four options. If you want to dig deeper into this topics, I want to resource you. These are some creation astronomers who have all kinds of books, videos and articles on these topics. Again, some of you are good with my overview and others want to dive deeper. So

Dr. Danny Faulkner
Dr. Jason Lisle
Dr. Russell Humpreys
Spike Psarris

I want to point you to one more resource. Spike Psarris For a number of years, he was an engineer in the U.S. military space program. Initially, he was an atheist and evolutionist, and eventually became a young-earth creationist and Christian.

He has made a serious of videos. I will put the links in my notes. If you want to look at what is happening in the solar system, the stars and galaxies, and universe. And why it ALL points to a young creation. I would highly recommend these 3 videos. Almost 5 hours of creation astronomy fun. Again, the links will be in my notes.

https://www.youtube.com/watch?v=-nOlX1SssVA&t=3403s&ab_channel=alfredochavez1906984

https://www.youtube.com/watch?v=Wjzax3E23AE&ab_channel=alfredochavez1906984

https://www.youtube.com/watch?v=TQQsb5H3xLI&ab_channel=ItHasBeenWritten

MORE PROBLEMS WITH THE EVOLUTIONARY MODEL

So is that it? Distant starlight poses a problem. But we have 4 options to explain it.

Yes, that is true. But did you know there are significant problems with the evolutionary model? For the record, I am not an astronomer. So if you want to drill down on some of these topics, those 4 men I just mentioned would be a better bet.

I want to very briefly highlight 3 problems. Feel free to dig into these more.

One, the cosmic background radiation. The temperature is essentially the same everywhere in the known universe, in all directions. There is something called the horizon problem. There has not been enough time for the cosmic microwave background radiation to essentially be the same everywhere. Nobody knows why. Astronomers have theories to explain this. But it's a major problem.

Two, the universe is expanding. We will come back to this in a minute. But it is expanding ever quicker rate. Nobody knows why. The big bang model says it exploding from a single point. But explosions slow down. They don't speed up.

But no one can explain why the universe is expanding faster and faster. Faster than the speed of light even, if I read the articles correctly. Astronomers have theories to explain this away. But it's a major problem.

And three, galaxies shouldn't hold together. They are spinning very quickly; they should fly apart. But they don't. They stick together. Nobody knows why. Astronomers have theories to explain this away. But again it's a major problem.

Bottom line, both biblical creationists and big bang supporters have proposed a variety of possible solutions to light-travel time difficulties in their respective models.

So if they are being honest, the big-bang supporters should not criticize biblical creationists for hypothesizing potential solutions distant star light problem, since they do the same thing with their models.

THINGS THE ANCIENTS SHOULDN'T HAVE KNOWN

So is that it? We have some proposals to solve this distant starlight problem.

Well, no, the Bible is a remarkable book. It is not a science book. But when it speaks to science, it's always right. God has repeatedly revealed knowledge astronomers didn't have at the time

the Bible was written. In other words, scientific data is catching up to the Bible. God gives knowledge that is beyond our understanding. I have four examples.

So I call this section. THINGS THE ANCIENTS SHOULDN'T HAVE KNOWN.

So light has a spectrum. Like a rainbow. If the light is moving away from you, it is red shifted. If light is moving toward you, it is blue shifted.

Every direction we look at with our telescopes, the galaxies and stars are moving away from us. How do we know this? Everywhere we looked the light is red shifted.

What does that mean? That means everything is moving away from the earth. The earth appears to be at or very near the center of the expanding universe. Which is wild. And highly improbable.

But this is something the ancients shouldn't have known.

Look at this verse.

Isaiah 40:22 It is he who sits above the circle of the earth, and its inhabitants are like grasshoppers; who stretches out the heavens like a curtain, and spreads them like a tent to dwell in.

This was written about 700 BC. The red shift was discovered in 1929. Edwin Hubble discovered the universe is expanding. God stretched the heavens.

How did Isaiah know this unless God told him?

Alright, the second thing the ancients shouldn't have known. Back before TV, phones and streaming, people would look up at the stars and count them.

Did you know before the invention of telescopes, people counted the stars they could see with their eyes? On a clear night, you can see a few thousand stars. So early astronomers estimated there were a few thousands stars. We counted them for the record.

But if they had read Jeremiah 33:22 As the host of heaven cannot be numbered and the sands of the sea cannot be measured, so I will multiply the offspring of David my servant, and the Levitical priests who minister to me."

In 600 BC, critics of the Bible would have said. "Well, we know that verse is not true. Look up there in the night sky. There are only a few thousand stars."

Then we invent telescopes better and better telescopes for the last 400 years and we see more and more stars. What did we say, the latest estimate is one septillion stars?

The stars are uncountable. How did Jeremiah know this unless God told him?

Alright, the third thing the ancients shouldn't have known. Look at Job 26:7 He stretches out the north over the void and hangs the earth on nothing. Written around 2,000 BC. The earth is suspended in space.

What do you mean the earth hangs on nothing? That's impossible. What were some ideas about how the earth was supported in the past? Many ancients believed the earth rested on the back of a big turtle or a flat disk that rested on the shield of Achilles.

Then you have Job writing about how the earth hangs on nothing. It wasn't until the 1960s that astronauts sent us pictures like this that show the earth indeed hangs on nothing. How did Job know this unless God told him?

And the fourth thing the ancients shouldn't have known. Look at this verse written around 2,000 B.C. Job 38:31 "Can you bind the chains of the Pleiades or loose the cords of Orion? Talking about constellation details.

This is a conversation that God is having with Job. Job had been questioning God for the hardships in his life and God shows up and points to his overwhelming power.

Pleiades and Orion are references to constellations.

Astronomers now know that Pleiades is a group of 250 of stars travelling together through space like a flock of birds flying together.

And astronomers now know that the belt of Orion is 3 stars splitting apart.

Again, you can't tell either of these things with the naked eye. How did Job know this unless God told him?

Those kind of things are fascinating to me. There are more. But 4 is enough to make my point.

TOTAL ECLIPSE

We are winding this down. This point is a personal favorite. How many of you have ever seen a total solar eclipse? Genesis 1:14 says the celestial bodies are for signs and seasons. So solar eclipses show us the precision of God's creation, and declare God's glory.

What is the diameter of the sun? 865,370 miles.
What is the diameter of the moon? 2,159 miles.
Which means the sun is 400 times bigger than the moon.

How far is the sun from the earth? 91,424,000 miles.
How far is the moon from the earth? 225,623 to 252,088 miles
Which means the sun is about 400 times farther away than the moon.

In the evolutionary model, that is a giant coincidence.

Mark Gallaway, an English astronomer said "It's a beautiful coincidence — life has been on Earth for about 400 million years, and we're living in this little window of time where this is happening, which is pretty amazing," Total solar eclipse are a giant cosmic coincidence in this model.

In the creation model, the sun, moon and stars were all perfectly created by God for a purpose.

CONCLUSION

I want to end with one more video. I love this video. 3 minutes.

0:00-3:15

https://www.youtube.com/watch?v=155tATAZZFY&ab_channel=RCMH

Psalm 19:1 The heavens declare the glory of God, and the sky above proclaims his handiwork.

As we bring this to a close. There are really two options.

The universe was created by God.
The universe created itself from nothing.

Are we going to let the heavens declare the glory of God or explain the heavens without God?

Psalm 19 is fascinating. It links our perspective on the universe to our perspective on God's Word.

If we don't think the heavens declare the glory of God, why would we obey his word? Something to chew.

Let's get in our groups and discuss till 800. Thank you!

Discussion Questions:

PRAY

See you in 2 weeks.