PWOC

Protestant Women of the Chapel

Materials:
-Computer & screen for PowerPoint
-Whiteboard/chart paper and markers
-Fossils
-Research sign-up

WORKSHOP: Science and the Bible

by Jennifer Holt

LEADER'S GUIDE

RELEVANCE: 2 Timothy 3:16 says, "All Scripture is God-breathed and is useful for **teaching**, rebuking, correcting in righteousness" (NIV, emphasis added). Most would agree that Scripture is valuable for moral teaching, but what about historical teaching? Did the events described in Biblical narrative actually take place exactly as described? Can the Bible be useful for scientific teaching? The answer to all of these questions is yes. Despite what many are taught, scientific evidence actually confirms the Bible. Knowing a few bits of evidence can bolster one's faith, help someone begin to see the world through a Biblical lens and build confidence for taking part in apologetic conversations.

CONTEXT: This workshop would be most appropriate in a Workshop, or Devotion setting. It can be shortened, lengthened, or altered to fit any topic that interests the leader or participants.

TIME: 60 minutes

Note to Trainer: There is an excellent PowerPoint presentation that goes with this workshop. You may choose to change some of the illustrations (red hair, blue eyes, specific fossil locations) but use this resource if at all possible; it adds a depth to the workshop that is impacting for your participants. Note that there are elements on individual slides that are added in with the click of a mouse (or wireless presentation clicker). Be sure to preview the slides to get the hang of when the different elements of the slides appear. The slide changes are noted in the Leader's Guide as they come up, but the additional clicks within the slides are not noted in your guide.

HOOK YOUR AUDIENCE: (1-2 minutes)

PPT slide 1

> *Note to Trainer: This workshop was written by our red-haired beauty at Ft Wainwright. Likely, you are not part of this 2-3% population. Other common mutations exist that you may be able to claim: blue eyes, fair skin, color-blindness, cleft chin… Or, you could consider asking a "guest mutant" to come to your workshop (make sure they're ok with the term).* ☺

I am a mutant. It's true! PPT slide 2 Red hair is actually caused by a mutation in the MC1R gene on chromosome 16. This mutation affects anywhere from 2-3% of the world's population. In fact, I'm doubly a mutant because blue eyes and pale skin are also caused by a genetic mutation. PPT slide 3 The OCA2 gene controls melanin production. Melanin is what gives our skin and eyes their coloring. If the gene next to OCA2 (HERC2) is mutated, it causes the OCA2 gene to drastically decrease or completely shut off melanin production. Blue eyes and pale skin are present when melanin production is radically decreased.

MAKE YOUR POINT #1: **Biology- Mutations** (5 minutes)

PPT slide 4 Why are we talking about genetic mutations? Well, the Bible says in multiple places in the beginning of Genesis that God CREATED animals according to their kind and that he also CREATED humans. The Theory of Evolution suggests that random genetic mutations over a long period of time led to animals and humans evolving from simple chemicals. There are so many different things we could talk about when it comes to the Theory of Evolution. What I want us to look at today is how scientific evidence suggests that, for the most part, genetic mutations result in a loss of information and, therefore, a less desirable state. Yes, there can be positive results, but, in general, the overall outcome is negative.

Since we began by talking about my mutations, let's talk about the results of those mutations. No, red hair and blue eyes are not bad, but these characteristics do come with some consequences. PPT slide 5 You see, the mutation in the MC1R gene that causes red hair is also linked to producing mutations in skin cells that cause melanoma skin cancer. These melanoma cells are present even without exposure to the sun. The blue eyes and pale skin mutation probably has the worst consequences, though. Because of that, I have a decreased tolerance for exposure to UV and an increased susceptibility for skin and eye cancer. I am also more susceptible to heat, bruise easily, have an increased risk for macular degeneration and my eyes are more sensitive to light. Apparently I also need more anesthetic and have an increased tolerance for physical pain. Not all of that is bad, though. The biggest plus side to being so sensitive to UV exposure is that I have a much lower risk of having a Vitamin D deficiency and getting seasonal depression in a place like Fort Wainwright, Alaska.

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ENGAGE YOUR LEARNERS #1: **Research Sickle Cell Anemia** (10 minutes)

We are going to look at some information on evolution and mutations. PPT slide 6 The picture on this slide was taken directly from a UC Berkeley website. It is from a presentation called "Understanding Evolution" and most definitely does not come to us from a Biblical perspective. The first page here defines what a genetic mutation is and says, "Mutations are essential to evolution; they are the raw material of genetic variation. Without mutation, evolution could not occur." PPT slide 7 The next slide shows a portion of that same presentation called "A Case Study of the Effects of Mutations." On this page, it talks about Sickle Cell Anemia. Sickle Cell Anemia is caused by a genetic mutation that affects the ability of red blood cells to carry oxygen. This lack of an ability to carry oxygen makes the cells form a hardened sickle shape instead of an elastic round shape. The presentation shows the effects of the mutation at the DNA level, and the protein level. PPT slide 8 As you read further, it shows effects at the cellular level and then shares both positive and negative effects at the whole-organism level. Let's read what those are *(have volunteers Read #4 and 5).* Sickle Cell Anemia doesn't seem too bad, does it? In looking at this, you might come to the conclusion that the genetic mutation that causes Sickle Cell Anemia actually leads to an overall positive outcome. If these people would just avoid high elevation and intense exercise, they will be fine. And, as an added bonus, they can never get malaria! This seems to contradict what I initially said about genetic mutations, for the most part, resulting in a less desirable state. So, I decided to do some research abut Sickle Cell Anemia. PPT slide 9 We are going to break into groups of 2 or 3 and take a few minutes to look at information about the physical effects of Sickle Cell Anemia. In **Appendix A** of your Participant's Guide, you will find an article from the Mayo Clinic. Please pay special attention to the positive and negative symptoms and the complications of the disease, mentioned in the article. You will have the chance to share your findings.

Give the partners/small groups time to do their research. After about 5 minutes, invite them to share their findings. Use a whiteboard to make a list of positives and negatives for a person with Sickle Cell Anemia. Some possible answers are listed below for your reference, but allow your participants to generate their own answers.

Positives: Immune to Malaria

Negatives: Anemia**,** Episodes of Pain**,** Swelling of Hands and Feet**,** Frequent Infections**,** Delayed Growth**,** Vision Problems**,** Stroke**,** Acute Chest Syndrome**,** Pulmonary Hypertension**,** Organ Damage**,** Blindness**,** Leg Ulcers**,** Gallstones**,** Priapism**,** Shortened Life Expectancy

(Sum up the findings on overall positive and negative effects. Obviously, this list is overwhelmingly negative.)

Genetic mutations happen. Sometimes a cell doesn't copy DNA correctly. Sometimes it gets copied twice. Sometimes an amino acid is inserted or deleted. The Theory of

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Evolution relies on those random genetic mutations producing desirable changes that eventually lead to something new (animal, plant, etc.). But the evidence that we just looked at seems to contradict that theory. Genetic mutations, by and large, seem to actually produce undesirable traits. That agrees with the Bible, which teaches us that God CREATED, but because of sin, His creation is no longer perfect.

Romans 5:12 "Therefore, just as sin came into the world through one man, and death through sin, and so death spread to all men because all sinned."

MAKE YOUR POINT #2: Geology- The Fossil Record (10 minutes)

We just looked at one aspect of how the Biblical account of Creation agrees with scientific evidence with regard to biology. PPT slide 10 Now I want to take us into the field of geology.

> *Note to Trainer: Obviously, it would be better for you to share your own story here. If you do not own fossils, perhaps you can borrow them or at least get ahold of some good pictures of fossils. Tailor the story and the language in this section to make it your own.*

Geology holds a very special place in my heart. In fact, it was in a geology class in college that I first realized the Bible might actually be right. I wasn't raised in a Christian home, but I did go to a Christian elementary school… it's kind of a long story. Needless to say, I had a child's foundational knowledge of what the Bible taught, but I did not have a relationship with Jesus. I can actually still picture the classroom and where I was sitting in an introductory geology class when the professor mentioned evidence for a worldwide flood. That got my attention. This was NOT a Christian college and it was NOT a Christian professor. The evidence that he gave for a worldwide flood was that ocean fossils are found all over the world… even in the Great Plains (you know, that huge, flat area in the middle of the U.S.). One of the fossils found all over the world is that of an ammonite. PPT slide 11 An ammonite is thought to have looked something like this (show picture). It was a sea creature that is believed to have lived in deeper waters just above the sea floor. I have a few examples of ammonite fossils here. (Pass fossils around and let people hold and touch them!)

1. We bought this fossil at a bazaar in Germany. It is actually a pretty nice specimen. The man who sold it to us was the one who found it and labeled it with date and location of when and where it was found. I got so excited when I saw it because it reminded me of sitting in that geology class and learning about evidence for a worldwide flood.

2. The rest of these fossils were actually found by my children and I near our old house in Germany. There was some construction going on nearby and the construction trucks dumped huge loads of dirt, forming a small mountain in an

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open area about 100 yds from our house. Some neighborhood kids were actually playing over there and found a fairly large, absolutely beautiful ammonite fossil. They thought it was a fun, swirly rock and put it on their doorstep for decoration. When I saw it, I asked them if they knew what I was and explained that it was an ammonite fossil. We all went back to the mountain of rubble over a period of a few weeks and found many more fossils. We had so much fun on our fossil-hunting adventures! These fossils are special because they hold memories of treasured times with my children, but they also speak to the truthfulness of the Bible and faithfulness of God.

3. The necklace I am wearing is also an ammonite fossil. I bought it at one of those tourist trap stores down in Seward last summer. It's a little bigger than the jewelry I normally wear, but it is one of my favorites! To me, it's a wearable reminder of how AWESOME God is.

PPT slide 12 With the exception of the necklace, all of these fossils were found right about here *(star on map)*. As you can see, there is no ocean nearby. How would these fossils of sea creatures get there? A flood seems to make sense, doesn't it?

PPT slide 13 I also have an article here from Science Daily that was published in June of 2008. It is titled, "Fossils Found in Tibet Revise History of Elevation, Climate." The summary states, "About 15,000 feet up on Tibet's desolate Himalayan-Tibetan Plateau, an international research team led by Florida State University geologist Yang Wang was surprised to find thick layers of ancient lake sediment filled with plant, fish and animal fossils typical of far lower elevations and warmer, wetter climates." Later in the article it states, "Many of the places we've visited in Tibet are now deserts, and yet we found those thick deposits of lake sediments with abundant fossil fish and shells." I look at that article and wonder, "Why are they surprised?"

Would anyone be willing to read **Genesis 7:11-12**?

- *11 In the six hundredth year of Noah's life, on the seventeenth day of the second month—on that day all the springs of the great deep burst forth, and the floodgates of the heavens were opened. 12 And rain fell on the earth forty days and forty nights.* (NIV)

How about **Genesis 7:17-20**?

- *17 For forty days the flood kept coming on the earth, and as the waters increased they lifted the ark high above the earth. 18 The waters rose and increased greatly on the earth, and the ark floated on the surface of the water. 19 They rose greatly on the earth, and all the high mountains under the entire heavens were covered. 20 The waters rose and covered the mountains to a depth of more than fifteen cubits.*

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That, to me, seems to explain how these fish and water plant fossils could be found 15,000 ft up on a mountain plateau.

Note: Creation geologists believe that many of the mountains that we have today were actually raised to higher elevations during the time of the flood. They believe that the "springs of the great deep" refers to volcanic activity, which would also lead to tectonic activity. The time of the flood would have been a very violent geological time.

ENGAGE YOUR LEARNERS#2: **Matthew Maury** (10 minutes)

PPT slide 14 Has anyone ever heard of Matthew Maury? In **Appendix B**, you will find two articles about his life and his contributions to geological sciences that I thought we might take a look at. Work with your same partner(s). As you read the articles, answer the three questions in your Participant's Guide:

1. **Who was Matthew Maury and when did he live?**
2. **What differences do you see between the two articles?**
3. **What inspired Matthew Maury to begin searching for ocean currents?**

(Give your participants time to work together. They have two articles to read, so it will take them a little longer. Once everyone seems finished, you can quickly go through the answers to the questions, allowing your participants to hit the highlights without completely rehashing the information.)

I think it's so awesome that Matthew Maury started his research about ocean currents using God's Word and knew he was going to find something amazing! This is just one story of a well-respected scientist who took God's Word as scientific truth. There are many, many more. In fact, *Answers in Genesis* has a whole section of their website dedicated to short biographies of Bible-believing scientists. Trust me, I got distracted for HOURS!

MAKE YOUR POINT #3: **Astronomy-The Age of the Universe**

(5 minutes)

PPT slide 15 We are going to switch gears now... We have looked at snippets of how scientific evidence confirms what is written in the Bible in the areas Biology and Geology and now we will look at Astronomy. I love astronomy! From the time I was 5 years old, I had a plan. I knew what college I wanted to attend and that I wanted to be an astronaut when I "grew up." I actually attended that college. My dreams of becoming an astronaut were not to be fulfilled, though… I get motion sickness way too easily and, more importantly, God had other plans for my life. I am still fascinated by astronomy, though.

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Psalm 19:1-6 says:

- *The heavens declare the glory of God; the skies proclaim the work of his hands. [2] Day after day they pour forth speech; night after night they reveal knowledge. [3] They have no speech, they use no words; no sound is heard from them. [4] Yet their voice goes out into all the earth, their words to the ends of the world. In the heavens God has pitched a tent for the sun. [5] It is like a bridegroom coming out of his chamber, like a champion rejoicing to run his course. [6] It rises at one end of the heavens and makes its circuit to the other; nothing is deprived of its warmth.* (NIV)

That psalm was written by David and it is just so beautiful how it is able to describe the sun, moon and stars. This was written at a time well before we even had the telescopes and satellites that give us some of those spectacularly beautiful photos that we have of distant planets and galaxies.

Jeremiah 33:22 says,

- *I will make the descendants of David my servant and the Levites who minister before me as countless as the stars in the sky and as measureless as the sand on the seashore.*

The book of Jeremiah was written about 600bc. The first telescope wasn't invented until 1608. At the time Jeremiah was prophesying, people could have scoffed at what God told him to say. With the naked eye, you can see a few thousand stars (maybe 3,000). However since the invention of telescopes and satellites, we now know that there are way more than just a few thousand stars. Scientists estimate anywhere between 100 and 400 billion stars in our galaxy. And, they estimate that there may be about 400 billion galaxies. Now THAT would be a number that you could never count to in your lifetime!

In the 1920s, secular scientists discovered that the Universe is expanding. But, **Isaiah 40:22** says, *He sits enthroned above the circle of the earth, and its people are like grasshoppers. He stretches out the heavens like a canopy, and spreads them out like a tent to live in.* Some translations say it is "like a curtain." **Jeremiah 10:12** says, *But God made the earth by his power; he founded the world by his wisdom and stretched out the heavens by his understanding.* It may be subtle, but when God speaks about astronomy in His Word, He gets it right!

The time period for the writing of the book of Job is highly debatable. However, most conservative historians believe that it was written about 2000 bc. At that time, it was widely believed that the world was a flat disc that floated in water. However, in **Job 26:7**, it states, *He spreads out the northern skies over empty space; he suspends the earth over nothing.* Once again, it may seem subtle, but when God mentions astronomy in His Word, He is accurate.

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Now let's move on to something controversial…

PPT slide 16 The age of the Universe is a highly debated topic. If you believe the days of Creation refer to a 24 hour period and you add up all of the genealogies in the Bible, you get something around 6,000 years old. Secular scientists, however, believe that the Universe is somewhere around 14 billion years old. That is what I was taught in school. However, in the past 5 or 6 years, I've become aware of what Young-Earth Creation Scientists have to say. They actually have evidence that does not match up with the belief that the Universe is billions of years old.

PPT slide 17 For example, secular scientists believe that the moon was formed about 4.5 billion years ago when a Mars-sized rock crashed into a baby Earth. The theory says that this collision caused some of the material in the rock to stick with the Earth and some to form the moon. Did you know that the moon is actually moving away from the Earth? It is moving away at a rate of about 1.5 inches per year. If you take that data and extrapolate it back, the Moon would crash into the Earth somewhere between 1.4 and 1.5 billion years ago. That causes a problem with the common belief for the age and formation of the Earth/Moon system. However, if you believe in the Biblical account of Creation, and you hold to the fact that the Earth and Moon were both created about 6,000 years ago, that pulling away of the Moon is no longer a problem. It would only put the moon about 730 ft closer to the Earth than it is today.

PPT slide 18 Another problem with the Universe being 14.5 billion years old is the presence of comets. Comets are large balls of ice and rock that travel around the solar system. Some scientists believe them to be leftover balls of material from the formation of the Universe. As a comet gets closer to the sun, it begins to heat up and "outgas" or spew out dust and gas. The outgassing is what gives comets their tails. Because of their nature, comets cannot last forever. Every time they travel close to the sun, they lose mass. Scientists have calculated that the typical comet can last about 100,000 years. If you believe in the Biblical account of Creation and that the Universe is only about 6,000 years old, comets do not pose a problem. However, if the Universe as 14.5 billion years old, comets should not exist. Because of this, secular scientists have proposed the existence of an Oort Cloud. In short, the Oort Cloud is a purely theoretical comet-generator. It has never been observed. It was a proposed solution to the problem of the existence of comets.

PPT slide 19 There are many other examples of problems with a 14.5 billion-year-old Universe, but another one that is easier to think about is the internal heat of the giant planets. Jupiter gives off about twice as much heat as it takes in. Because of that, it should eventually run out of heat. If Jupiter were billions of years old, it would no longer be able to give off more heat than it takes in. Neptune has the same problem. I have heard the example of comparing the heat given off by these planets compared to taking

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a baked potato out of the oven. When you first take it out, it will emit more heat than it takes in. Over time, however, that will die off and the potato will return to room temperature. Much like the potato, Jupiter and Neptune give off heat. Both of these planets, however, could emit heat for thousands of years, but not billions.

(Much of the information in this section was taken from seminars taught by Dr. Jason Lisle from the Institute for Creation Research)

ENGAGE YOUR LEARNERS #3: **Topics for Further Investigation** (10 minutes)

Let's take a step back and review the adventure we've been on today. We first talked about how the Biblical description of Creation lines up with the scientific evidence observed in the field of Biology when we look at genetic mutations. We then talked about Geology and the fossil evidence for a worldwide flood as described in Noah's time and found in Genesis. We then stepped into the topic of Astronomy and looked at a few of pieces of evidence for the Biblical account of Creation.

> *Note to Trainer: This section will generate more questions than answers. You may want to offer a means to share information after your workshop ends, maybe even assigning topics for individuals to research. Perhaps a Facebook page or an email group could be set up to share your findings. If you decide to do this, you will want a sign-up sheet of some sort so that you have the contact information you need for those that are interested in continuing their research.*

PPT slide 20 Now you are going to come up with a few questions. What do you want to investigate? If you had an expert in Creation Science or Biblical interpretation of scientific evidence, what would you ask? What is one thing that you have been taught can only be interpreted in a way that would go against Bible (whether Creation, the Flood, dinosaurs, etc)? For example… and you can't use this one… "How was the Grand Canyon formed?" If the Colorado River didn't slowly carve the canyon over millions of years, how did it form? We are going to take a few minutes to think about this. Discuss it. Write down your questions. When we come back together, each group will share at least one of their questions.

Give your participants a few minutes to generate questions, then allow them to share out. Record their answers on a whiteboard or chart paper. You likely will not have solid answers to all of their questions, but perhaps you could share tidbits of truth along the way- just little morsels to let them know there's more than what meets the eye, or more than what they've been taught by secular science. Obviously, there will not be time to do justice to even one topic. Following this question-generating time up with a plan to share findings would be ideal. If your group is having trouble generating topics, see the sample questions below:

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1. *If the Creation happened the way the Bible says, does that mean humans lived with dinosaurs?*
2. *Do we have archaeological evidence for the destruction of Jericho?*
3. *How many animals could really fit on the arc? Would it be enough to repopulate the planet?*
4. *What other sea creature fossils (other than ammonites) are found all over the Earth?*
5. *How does the Biblical timeline match up with the Ice Age?*

In **Appendix C**, you will find a list of resources to help you answer these and other questions you may have. I would love for us to form a research group to answer these questions that we have generated. I'll pass around a sign-up sheet for those who are interested in being part of that research and the sharing of information.

APPLY IT TO LIFE: (3-5 minutes)

The point of all of this is pretty simple… God's Word is truth. Just as 2 Timothy 3:16 says, "All Scripture is God-breathed and is useful for **teaching**, rebuking, correcting in righteousness" (NIV, emphasis added). ALL SCRIPTURE. Just because I said it is a simple point doesn't mean it is simple to grasp. Many of us have been taught to believe that scientific evidence counters what God's Word says. It is so hard to change the way you interpret the world around you…trust me, I KNOW. I wasn't saved until the summer before my last year of college. When I got saved, I KNEW that God was real, that He loved me and that He sent His Son to die for me, but, I wrestled with Him about Creation. I am a science person. I have my degree in Chemistry and took a lot of Physics, and Geology in college. I was well-educated in the Theory of Evolution and that that the Universe was billions of years old. I had no idea that there was another way to interpret the evidence. It wasn't until I was doing a family Bible study that was put out by *Answers in Genesis* that I realized I didn't have to give up my love of science. PPT slide 21 In that study, the presenter talked about going to the Grand Canyon. He talked about standing at the rim looking at the beauty and grandness of it all. Someone next to him said, "Isn't it amazing that a little bit of water over a long period of time could carve all of this?" And he said, "Isn't it amazing that a whole lot of water over a little bit of time carved all of this?" Did you catch that shift? How simple, yet profound! It is the same evidence… just a different way of interpreting it. Hearing that simple question about a lot of water over a little time has changed the way I view many things.

And, I would just like to challenge you to begin trying to look at scientific evidence a little differently as well. The next time you see an article talking about millions of years, ask yourself how it would fit into a Biblical timeline. The next time you hear about the Theory of Evolution as fact, don't be afraid to question it- it's still a "theory" and not scientific "law" for good reason. Let's remember to ask ourselves what God's Word says. If you start with His Word, you can't go wrong!

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Appendix A

MAYO CLINIC

Sickle cell anemia

Overview

Sickle cell anemia is an inherited form of anemia — a condition in which there aren't enough healthy red blood cells to carry adequate oxygen throughout your body.

Normally, your red blood cells are flexible and round, moving easily through your blood vessels. In sickle cell anemia, the red blood cells become rigid and sticky and are shaped like sickles or crescent moons. These irregularly shaped cells can get stuck in small blood vessels, which can slow or block blood flow and oxygen to parts of the body.

There's no cure for most people with sickle cell anemia. But treatments can relieve pain and help prevent problems associated with the disease.

Symptoms

Signs and symptoms of sickle cell anemia, which vary from person to person and change over time, include:

- Anemia. Sickle cells break apart easily and die, leaving you without enough red blood cells. Red blood cells usually live for about 120 days before they need to be replaced. But sickle cells usually die in 10 to 20 days, leaving a shortage of red blood cells (anemia).

  Without enough red blood cells, your body can't get the oxygen it needs to feel energized, causing fatigue.
- Episodes of pain. Periodic episodes of pain, called crises, are a major symptom of sickle cell anemia. Pain develops when sickle-shaped red blood cells block blood flow through tiny blood vessels to your chest, abdomen and joints. Pain can also occur in your bones.

  The pain varies in intensity and can last for a few hours to a few weeks. Some people have only a few pain episodes. Others have a dozen or more crises a year. If a crisis is severe enough, you might need to be hospitalized.

  Some adolescents and adults with sickle cell anemia also have chronic pain, which can result from bone and joint damage, ulcers and other causes.
- Painful swelling of hands and feet. The swelling is caused by sickle-shaped red blood cells blocking blood flow to the hands and feet.
- Frequent infections. Sickle cells can damage an organ that fights infection (spleen), leaving you more vulnerable to infections. Doctors commonly give infants and children with sickle cell anemia vaccinations and antibiotics to prevent potentially life-threatening infections, such as pneumonia.
- Delayed growth. Red blood cells provide your body with the oxygen and nutrients you need for growth. A shortage of healthy red blood cells can slow growth in infants and children and delay puberty in teenagers.
- Vision problems. Tiny blood vessels that supply your eyes may become plugged with sickle cells. This can damage the retina — the portion of the eye that processes visual images, leading to vision problems.

When to see a doctor

Although sickle cell anemia is usually diagnosed in infancy, if you or your child develops any of the following problems, see your doctor right away or seek emergency medical care:

- Unexplained episodes of severe pain, such as pain in the abdomen, chest, bones or joints.
- Swelling in the hands or feet.
- Abdominal swelling, especially if the area is tender to the touch.
- Fever. People with sickle cell anemia have an increased risk of infection, and fever can be the first sign of an infection.
- Pale skin or nail bed

- Yellow tint to the skin or whites of the eyes.
- Signs or symptoms of stroke. If you notice one-sided paralysis or weakness in the face, arms or legs; confusion; trouble walking or talking; sudden vision problems or unexplained numbness; or a headache, call 911 or your local emergency number right away.

Causes

Sickle cell anemia is caused by a mutation in the gene that tells your body to make the red, iron-rich compound that gives blood its red color (hemoglobin). Hemoglobin allows red blood cells to carry oxygen from your lungs to all parts of your body. In sickle cell anemia, the abnormal hemoglobin causes red blood cells to become rigid, sticky and misshapen.

The sickle cell gene is passed from generation to generation in a pattern of inheritance called autosomal recessive inheritance. This means that both the mother and the father must pass on the defective form of the gene for a child to be affected.

If only one parent passes the sickle cell gene to the child, that child will have the sickle cell trait. With one normal hemoglobin gene and one defective form of the gene, people with the sickle cell trait make both normal hemoglobin and sickle cell hemoglobin. Their blood might contain some sickle cells, but they generally don't have symptoms. But they are carriers of the disease, which means they can pass the gene to their children.

Risk factors

For a baby to be born with sickle cell anemia, both parents must carry a sickle cell gene. In the United States, it most commonly affects black people.

Complications

Sickle cell anemia can lead to a host of complications, including:

- Stroke. A stroke can occur if sickle cells block blood flow to an area of your brain. Signs of stroke include seizures, weakness or numbness of your arms and legs, sudden speech difficulties, and loss of consciousness. If your baby or child has any of these signs and symptoms, seek medical treatment immediately. A stroke can be fatal.
- Acute chest syndrome. This life-threatening complication causes chest pain, fever and difficulty breathing. Acute chest syndrome can be caused by a lung infection or by sickle cells blocking blood vessels in your lungs. It might require emergency medical treatment with antibiotics and other treatments.
- Pulmonary hypertension. People with sickle cell anemia can develop high blood pressure in their lungs (pulmonary hypertension). This complication usually affects adults rather than children. Shortness of breath and fatigue are common symptoms of this condition, which can be fatal.
- Organ damage. Sickle cells that block blood flow through blood vessels immediately deprive the affected organ of blood and oxygen. In sickle cell anemia, blood is also chronically low on oxygen. Chronic deprivation of oxygen-rich blood can damage nerves and organs in your body, including your kidneys, liver and spleen. Organ damage can be fatal.
- Blindness. Sickle cells can block tiny blood vessels that supply your eyes. Over time, this can damage the portion of the eye that processes visual images (retina) and lead to blindness.
- Leg ulcers. Sickle cell anemia can cause open sores, called ulcers, on your legs.
- Gallstones. The breakdown of red blood cells produces a substance called bilirubin. A high level of bilirubin in your body can lead to gallstones.
- Priapism. Men with sickle cell anemia can have painful, long-lasting erections, a condition called priapism. As occurs in other parts of the body, sickle cells can block the blood vessels in the penis. This can damage the penis and lead to impotence.

Prevention

If you carry the sickle cell trait, seeing a genetic counselor before trying to conceive can help you understand your risk of having a child with sickle cell anemia. He or she can also explain possible treatments, preventive measures and reproductive options.

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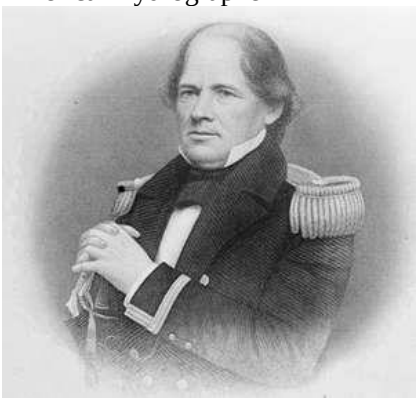
Appendix B

Matthew Fontaine Maury

American hydrographer



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Matthew Maury's Search for the Secret of the Seas

His Faith in the Bible Led Him to Some Great Scientific Discoveries

Originally published in Creation 11, no 3 (June 1989): 30
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Maury entered the US Navy in 1825, but an accident in 1839 partially disabled him, so he left active sea duty. Three years later, still with the Navy, he was appointed superintendent of the US Naval Observatory in Washington, and also of the US Depot of Charts and Instruments.

Over the next 19 years Maury devoted himself to studying the winds, clouds, weather, and ocean features ... as well as the Bible. In his Bible studies, the words of Psalm 8 stuck in his mind: *...whatsoever passeth through the paths of the seas.*[1] Maury determined that if God's Word said there were "paths" in the seas, then there must be paths. So he set out to find them.

He studied old ships' logs. From these he compiled charts of ocean-wind and sea currents. To study the speed and direction of the ocean currents Maury set adrift weighted bottles known as "drift bottles." These floated slightly below the surface of the water, and thus were not affected by wind. Instructions were sealed in each bottle directing anyone who found one washed ashore to return it. From the location and date on which the bottles were found, Maury was able to develop his charts of the ocean currents—*the paths of the seas*—which greatly aided the science of marine navigation.

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> **Matthew Fontaine Maury, Pathfinder of the Seas, the genius who first snatched from the oceans and atmosphere the secret of their laws. His inspiration, Holy Writ, Psalm 8:8; Ecclesiastes 1:6.**[3]

It is often claimed that the Bible is not a scientific textbook. Yet the Bible's accuracy when touching on scientific subjects has led many great scientists, including Matthew Maury, to some outstanding scientific discoveries.

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[1] **Psalm 8:3-9** When I consider your heavens, the work of your fingers, the moon and the stars, which you have set in place, what is mankind that you are mindful of them, human beings that you care for them? You have made them a little lower than the angels and crowned them with glory and honor. You made them rulers over the works of your hands; you put everything under their feet: all flocks and herds, and the animals of the wild, the birds in the sky, and the fish in the sea, all that swim the paths of the seas. LORD, our Lord, how majestic is your name in all the earth!

[2] **Job 28:20-28** Where then does wisdom come from? Where does understanding dwell? It is hidden from the eyes of every living thing, concealed even from the birds in the sky. Destruction and Death say, "Only a rumor of it has reached our ears." God understands the way to it and he alone knows where it dwells, for he views the ends of the earth and sees everything under the heavens.
When he established the force of the wind and measured out the waters, when he made a decree for the rain and a path for the thunderstorm, then he looked at wisdom and appraised it; he confirmed it and tested it. And he said to the human race, The fear of the Lord—that is wisdom, and to shun evil is understanding.

[3] **Ecclesiastes 1:5-7** The sun rises and the sun sets, and hurries back to where it rises. The wind blows to the south and turns to the north; round and round it goes, ever returning on its course. All streams flow into the sea, yet the sea is never full. To the place the streams come from, there they return again.

Appendix C: Where Do I Go From Here?

Christian Resources:

Answers in Genesis- lots of books and dvds and free information on their website

Jonathan Park- An amazing audio drama that includes scientific facts presented in a Biblical Worldview. It is made for kids, but adult will definitely get into the story and learn, too.

Is Genesis History?- A feature-length documentary starring Del Tackett (the same man that was featured in the "Truth Project" study that was popular a few years ago).

The Institute for Creation Research- they are all about scientific research from a Biblical Creation perspective.

Ray Comfort- Living Waters is the name of his ministry. I am not as familiar with him as I am with other, but he does have a few books on scientific facts and the Bible.

Intelligent Design:

Center for Science and Culture- https://www.discovery.org/id/

Intelligent Design Network- http://www.intelligentdesignnetwork.org/

Stephen C. Meyer- well-known scientist that believes in Intelligent Design

William A. Debmski- well-known scientist that believes in Intelligent Design

Evolutionist:

Richard Dawkins- well-known Evolutionist

UC Berkeley- https://evolution.berkeley.edu/evolibrary/home.php

National Science Teachers Association- http://www.nsta.org/evolution/

PWOC

Protestant Women of the Chapel

WORKSHOP: Science and the Bible

by Jennifer Holt

PARTICIPANT'S GUIDE

RELEVANCE: 2 Timothy 3:16 says, "All Scripture is God-breathed and is useful for **teaching**, rebuking, correcting in righteousness" (NIV, emphasis added). Most would agree that Scripture is valuable for moral teaching, but what about historical teaching? Did the events described in Biblical narrative actually take place exactly as described? Can the Bible be useful for scientific teaching? The answer to all of these questions is yes. Despite what many are taught, scientific evidence actually confirms the Bible. Knowing a few bits of evidence can bolster one's faith, help someone begin to see the world through a Biblical lens and build confidence for taking part in apologetic conversations.

POINT 1: Biology- Mutations

- The Creation perspective is based on Genesis, chapter one, which states that people and animals are *created* beings.
- The Theory of Evolution suggests that random genetic mutations over a long period of time led to animals and humans evolving from simple chemicals.
- Genetic mutations result in a loss of information and, therefore, a less desirable state. The overall outcome is negative.
- "Mutations are essential to evolution; they are the raw material of genetic variation. Without mutation, evolution could not occur." - UC Berkeley website

ACTIVITY 1: Research Sickle Cell Anemia

You will be working with one or two other people. You and your partner(s) will take a few minutes to look at information about the physical effects of Sickle Cell Anemia. In Appendix A, you will find information from the Mayo Clinic. Please pay special attention to the **positive and negative symptoms** and complications mentioned in the article- you may choose to take notes in the space below. You will have the chance to share your findings.

- **Romans 5:12** *Therefore, just as sin came into the world through one man, and death through sin, and so death spread to all men because all sinned.*

POINT 2: Geology- The Fossil Record

- The fossil record shows evidence of a world-wide flood.

- **Genesis 7:11-12** (NIV) *11 In the six hundredth year of Noah's life, on the seventeenth day of the second month—on that day all the springs of the great deep burst forth, and the floodgates of the heavens were opened. 12 And rain fell on the earth forty days and forty nights.*

- **Genesis 7:17-20** (NIV) *17 For forty days the flood kept coming on the earth, and as the waters increased they lifted the ark high above the earth. 18 The waters rose and increased greatly on the earth, and the ark floated on the surface of the water. 19 They rose greatly on the earth, and all the high mountains under the entire heavens were covered. 20 The waters rose and covered the mountains to a depth of more than fifteen cubits.*

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ACTIVITY 2: Matthew Maury

You may work with your partner(s) to explore the life and work of Matthew Maury by taking a look at two articles, found in Appendix B. As you and your small group read, answer the following questions:

1. **What did Matthew Maury do as a scientist? When did he live?**

2. **What differences do you notice between the two articles?**

3. **What inspired Matthew Maury's research?**

FYI, *Answers in Genesis* (answersingenesis.org) has a whole section of their website dedicated to short biographies of Bible-believing scientists.

POINT 3: Astronomy- The Age of the Universe

Even though the Bible was written long before telescopes and key discoveries about our planet and its place within our galaxy, and our galaxy within the Universe, the wording supports what we know to be true in our day and age.

- **Psalm 19:1-6** *The heavens declare the glory of God, the skies proclaim the work of his hands. [2] Day after day they pour forth speech; night after night they reveal knowledge. [3] They have no speech, they use no words; no sound is heard from them. [4] Yet their voice goes out into all the earth, their words to the ends of the world. In the heavens God has pitched a tent for the sun. [5] It is like a bridegroom coming out of his chamber, like a champion rejoicing to run his course. [6] It rises at one end of the heavens and makes its circuit to the other; nothing is deprived of its warmth.*

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Before telescopes:

- **Jeremiah 33:22** *I will make the descendants of David my servant and the Levites who minister before me as countless as the stars in the sky and as measureless as the sand on the seashore.* (c. 600bc)

Before secular scientists discovered that the Universe is expanding:

- **Isaiah 40:22** *He sits enthroned above the circle of the earth, and its people are like grasshoppers. He stretches out the heavens like a canopy, and spreads them out like a tent to live in.*

- **Jeremiah 10:12** *But God made the earth by his power; he founded the world by his wisdom and stretched out the heavens by his understanding.*

When people believed that the earth was a flat disc floating in water:

- **Job 26:7** *He spreads out the northern skies over empty space; he suspends the earth over nothing.* (c. 2000bc)

The age of the Universe is a highly debated topic. If you believe the days of Creation refer to a 24-hour period and you add up all of the genealogies in the Bible, you get something around 6,000 years old. Secular scientists, however, believe that the Universe is somewhere around 14 billion years old.

- The moon is moving away at a rate of about 1.5 inches per year. If you take that data and extrapolate it back, the Moon would crash into the Earth somewhere between 1.4 and 1.5 billion years ago. However, if you believe in the Biblical account of Creation, and you hold to the fact that the Earth and Moon were both created about 6,000 years ago, that pulling away of the Moon is no longer a problem. It would only put the moon about 730 ft closer to the Earth than it is today.

- Scientists have calculated that the typical comet can last about 100,000 years. If you believe in the Biblical account of Creation and that the Universe is only about 6,000 years old, comets do not pose a problem. However, if the Universe as 14.5 billion years old, comets should not exist. Because of this, secular scientists have proposed the existence of an "Oort Cloud." In short, the Oort Cloud is a purely theoretical comet-generator. It has never been observed. It was a proposed solution to the problem of the existence of comets.

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- Jupiter gives off about twice as much heat as it takes in. Because of that, it should eventually run out of heat. If Jupiter were billions of years old, it would no longer be able to give off more heat than it takes in and should be frozen by now. Neptune has the same problem. Both of these planets could emit heat for thousands of years, but not billions.

ACTIVITY 3: Topics for Further Investigation

Now we are going to come up with a few questions. What do you want to investigate? If you had an expert in Creation Science or Biblical interpretation of scientific evidence, what would you ask? What is one thing you have been taught that can only be interpreted in a way that would go against Bible? Take a few minutes to think about it. Discuss it with your partner(s). Write down your questions. When we come back together, each group will share at least one of their questions.

APPLY IT TO LIFE:

The point of all of this is pretty simple… God's Word is truth. Just as 2 Timothy 3:16 says, "All Scripture is God-breathed and is useful for **teaching**, rebuking, correcting in righteousness" (NIV, emphasis added). ALL SCRIPTURE. Many of us have been taught to believe that scientific evidence counters what God's Word says. However, there is probably a different way of interpreting the evidence. The next time you see an article talking about millions of years, ask yourself how it would fit into a Biblical timeline. The next time you hear about the Theory of Evolution as fact, don't be afraid to question it. It's still a "theory" and not a "law" for good reason. Let's remember to ask ourselves what God's Word says. If you start with His Word, you can't go wrong!

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Appendix A

MAYO CLINIC

Sickle cell anemia

Overview

Sickle cell anemia is an inherited form of anemia — a condition in which there aren't enough healthy red blood cells to carry adequate oxygen throughout your body.

Normally, your red blood cells are flexible and round, moving easily through your blood vessels. In sickle cell anemia, the red blood cells become rigid and sticky and are shaped like sickles or crescent moons. These irregularly shaped cells can get stuck in small blood vessels, which can slow or block blood flow and oxygen to parts of the body.

There's no cure for most people with sickle cell anemia. But treatments can relieve pain and help prevent problems associated with the disease.

Symptoms

Signs and symptoms of sickle cell anemia, which vary from person to person and change over time, include:

- Anemia. Sickle cells break apart easily and die, leaving you without enough red blood cells. Red blood cells usually live for about 120 days before they need to be replaced. But sickle cells usually die in 10 to 20 days, leaving a shortage of red blood cells (anemia).

  Without enough red blood cells, your body can't get the oxygen it needs to feel energized, causing fatigue.
- Episodes of pain. Periodic episodes of pain, called crises, are a major symptom of sickle cell anemia. Pain develops when sickle-shaped red blood cells block blood flow through tiny blood vessels to your chest, abdomen and joints. Pain can also occur in your bones.

  The pain varies in intensity and can last for a few hours to a few weeks. Some people have only a few pain episodes. Others have a dozen or more crises a year. If a crisis is severe enough, you might need to be hospitalized.

  Some adolescents and adults with sickle cell anemia also have chronic pain, which can result from bone and joint damage, ulcers and other causes.
- Painful swelling of hands and feet. The swelling is caused by sickle-shaped red blood cells blocking blood flow to the hands and feet.
- Frequent infections. Sickle cells can damage an organ that fights infection (spleen), leaving you more vulnerable to infections. Doctors commonly give infants and children with sickle cell anemia vaccinations and antibiotics to prevent potentially life-threatening infections, such as pneumonia.
- Delayed growth. Red blood cells provide your body with the oxygen and nutrients you need for growth. A shortage of healthy red blood cells can slow growth in infants and children and delay puberty in teenagers.
- Vision problems. Tiny blood vessels that supply your eyes may become plugged with sickle cells. This can damage the retina — the portion of the eye that processes visual images, leading to vision problems.

When to see a doctor

Although sickle cell anemia is usually diagnosed in infancy, if you or your child develops any of the following problems, see your doctor right away or seek emergency medical care:

- Unexplained episodes of severe pain, such as pain in the abdomen, chest, bones or joints.
- Swelling in the hands or feet.
- Abdominal swelling, especially if the area is tender to the touch.
- Fever. People with sickle cell anemia have an increased risk of infection, and fever can be the first sign of an infection.
- Pale skin or nail bed

- Yellow tint to the skin or whites of the eyes.
- Signs or symptoms of stroke. If you notice one-sided paralysis or weakness in the face, arms or legs; confusion; trouble walking or talking; sudden vision problems or unexplained numbness; or a headache, call 911 or your local emergency number right away.

Causes

Sickle cell anemia is caused by a mutation in the gene that tells your body to make the red, iron-rich compound that gives blood its red color (hemoglobin). Hemoglobin allows red blood cells to carry oxygen from your lungs to all parts of your body. In sickle cell anemia, the abnormal hemoglobin causes red blood cells to become rigid, sticky and misshapen.

The sickle cell gene is passed from generation to generation in a pattern of inheritance called autosomal recessive inheritance. This means that both the mother and the father must pass on the defective form of the gene for a child to be affected.

If only one parent passes the sickle cell gene to the child, that child will have the sickle cell trait. With one normal hemoglobin gene and one defective form of the gene, people with the sickle cell trait make both normal hemoglobin and sickle cell hemoglobin. Their blood might contain some sickle cells, but they generally don't have symptoms. But they are carriers of the disease, which means they can pass the gene to their children.

Risk factors

For a baby to be born with sickle cell anemia, both parents must carry a sickle cell gene. In the United States, it most commonly affects black people.

Complications

Sickle cell anemia can lead to a host of complications, including:

- Stroke. A stroke can occur if sickle cells block blood flow to an area of your brain. Signs of stroke include seizures, weakness or numbness of your arms and legs, sudden speech difficulties, and loss of consciousness. If your baby or child has any of these signs and symptoms, seek medical treatment immediately. A stroke can be fatal.
- Acute chest syndrome. This life-threatening complication causes chest pain, fever and difficulty breathing. Acute chest syndrome can be caused by a lung infection or by sickle cells blocking blood vessels in your lungs. It might require emergency medical treatment with antibiotics and other treatments.
- Pulmonary hypertension. People with sickle cell anemia can develop high blood pressure in their lungs (pulmonary hypertension). This complication usually affects adults rather than children. Shortness of breath and fatigue are common symptoms of this condition, which can be fatal.
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Appendix B

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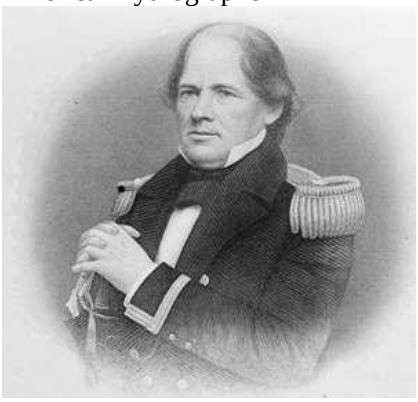

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[1] **Psalm 8:3-9** When I consider your heavens, the work of your fingers, the moon and the stars, which you have set in place, what is mankind that you are mindful of them, human beings that you care for them? You have made them a little lower than the angels and crowned them with glory and honor. You made them rulers over the works of your hands; you put everything under their feet: all flocks and herds, and the animals of the wild, the birds in the sky, and the fish in the sea, all that swim the paths of the seas. LORD, our Lord, how majestic is your name in all the earth!

[2] **Job 28:20-28** Where then does wisdom come from? Where does understanding dwell? It is hidden from the eyes of every living thing, concealed even from the birds in the sky. Destruction and Death say, "Only a rumor of it has reached our ears." God understands the way to it and he alone knows where it dwells, for he views the ends of the earth and sees everything under the heavens.
When he established the force of the wind and measured out the waters, when he made a decree for the rain and a path for the thunderstorm, then he looked at wisdom and appraised it; he confirmed it and tested it. And he said to the human race, The fear of the Lord—that is wisdom, and to shun evil is understanding.

[3] **Ecclesiastes 1:5-7** The sun rises and the sun sets, and hurries back to where it rises. The wind blows to the south and turns to the north; round and round it goes, ever returning on its course. All streams flow into the sea, yet the sea is never full. To the place the streams come from, there they return again.

Appendix C: Where Do I Go From Here?

Christian Resources:

Answers in Genesis- lots of books and dvds and free information on their website

Jonathan Park- An amazing audio drama that includes scientific facts presented in a Biblical Worldview. It is made for kids, but adult will definitely get into the story and learn, too.

Is Genesis History?- A feature-length documentary starring Del Tackett (the same man that was featured in the "Truth Project" study that was popular a few years ago).

The Institute for Creation Research- they are all about scientific research from a Biblical Creation perspective.

Ray Comfort- Living Waters is the name of his ministry. I am not as familiar with him as I am with other, but he does have a few books on scientific facts and the Bible.

Intelligent Design:

Center for Science and Culture- https://www.discovery.org/id/

Intelligent Design Network- http://www.intelligentdesignnetwork.org/

Stephen C. Meyer- well-known scientist that believes in Intelligent Design

William A. Debmski- well-known scientist that believes in Intelligent Design

Evolutionist:

Richard Dawkins- well-known Evolutionist

UC Berkeley- https://evolution.berkeley.edu/evolibrary/home.php

National Science Teachers Association- http://www.nsta.org/evolution/