Day 1 - Station 2: Science

Structure

- Introduction (5min)
- Experiment (10min)
- Material Body (15min) - Different for each level
- *Questions can be asked at any time*

Introduction

- What is Science?
  - Physical, Empirical
  - Hypothesis, Collect Data, Conclusions

- Why would we want to refute?
  - Because Science (Physical) is making claims about the metaphysical: namely, that God does not exist
    - They say: Evolution is where humans came from, therefore God doesn't exist
    - They say: The Big Bang is where matter came from, therefore God doesn't exist

- How to refute scientific theories?
  - Refute the Data itself
  - Identify a gap between the data and the conclusion
  - Offer alternative conclusions using the same data

Experiment

- Refute the Data itself
  - Data:
    - Here is a rock (small rock)
    - Here is another rock (medium rock)
    - Here is another rock (large rock)
    - Here is a fourth rock (very large rock)
    - Here is a fifth rock (soccer ball)
  - Conclusions:
    - Since we found all of these on the ground, they must all be rocks. Therefore, anything that was found on the ground is a rock

- Identify a gap between the data and the conclusion

    - Data:
        - Here is a rock (very small rock)
        - Here is another rock (small rock)
        - Here is another rock (medium rock)
        - Here is another rock (large rock)
        - Here is a fourth rock (very large rock)
    - Conclusions:
        - All rocks start small and then grow over time. So here we have a young rock, an older rock, an even older rock, and a very old rock. - NOT GREAT! There's a missing piece of data… there's no evidence that rocks can grow. The gap between the data and the conclusion is too large.
        - The Rocks must be formed from water since they all have different shapes and water doesn't hold its form. So they used to be water that kept its form. - NOT GREAT! There's no evidence or indication that water can turn into rock! The gap is too large.

- Offer alternative conclusions based on the same data
    - Data:
        - Same as above
    - Conclusions:
        - They all came from the same rock, and broke off at different sizes.
            - This is based on some other things that have already been proven (i.e. that rocks can break - especially when weathered)
            - This can also be reproduced! We can take a big rock and hit it with a hammer and watch it break into smaller rocks of varying sizes
        - They came from different rocks!
            - This is also based on some observations (e.g. different colors of the rocks, collected in different areas, etc.)
            - This can also be reproduced
        - They were all bigger rocks, and three of them got smaller due to weather conditions
            - This can also be reproduced! We can take several large rocks and submerge them in different weather conditions: water, heat, ice, etc. and monitor them over periods of time and watch them decompose
            - This can also be observed in nature
- How does this relate to Evolution?
    - There are two types of evolution:
        - Adaptation (Microevolution)
        - Darwinian Evolution
    - Adaptation is proven science and accepted by us. It has been observed by science. An example of this is our immune system which over time is able to adapt better to different diseases. Someone who gets COVID once, is much less likely to get it again. This is actually an indication of Intelligent Design… the Creator is so Intelligent that His Creation can adapt!
    - Darwinian Evolution is a theory and it is not supported by evidence… the theory that one species can evolve into another species

    - What is the Data?
        - Fossil Records (Pass around the pictures)
        - Similarities among living organisms (Pass around the pictures)
    - What is the Conclusion?
        - That humans evolved from monkeys who evolved from other species, who evolved from a single cell
        - That God does not exist
    - How can we challenge the Data?
        - Some fossils were found that they say are “transitional” fossils - meaning they are between monkey and human. But who’s to say they aren’t monkey? Who’s to say they aren’t human? We challenge this data. There is no indication that they belonged to a human or a monkey or something in between.
        - Both of these birds have wings, and they are similar… but is one’s wings better than the other? Does this mean the one with worse wings will go extinct and the other will flourish?
    - What kind of gaps can we identify from the Data to the Conclusion?
        - That’s exactly what we did with the rocks… Even though there is something that looks like a monkey, and something that looks like a man, and something that kind of looks like both… you can’t say one came from the other
        - Can we observe any change in species?
    - Can we offer alternative solutions?
        - The fact that there is so much variety in something as primitive as a monkey shows that Intelligence of God’s design… and yet, the fact that there is similarity among species, shows that they were created by the same Being

Material Body

Grade 6: Unanswered Questions by Evolution

- Evolution introduces more questions than it answers
    - What happened to all the missing transitional pieces?
    - Where did the first organism come from?
    - Why don’t we see innumerable transitional forms walking among us?
    - Why isn’t nature currently in confusion after millions of years of this process?
- Evolution requires more faith than believing in God

Grade 7-8: Probability

- Let’s shift our focus to mathematics and probability.
- Using these blocks, I’m going to make a human… this is a relatively simple structure! It’s just a few pieces put together in a specific order.
- But it’s only simple to me because I’m intelligent! To someone like Benjy, this is very complex - how do I get this piece to connect to that piece? How do I get them to balance

out and stand up?
- Do you think that Benjy could make this?
- Let's take it one step further… do you think that if I emptied this whole container of blocks on the floor, the blocks would arrange themselves into humans and trees and stuff like that?
  - Of course not!
  - It's not impossible…. But it's highly improbable.
- That's because of something called entropy! Entropy means that the universe gravitates towards chaos - so if I grabbed a pile of sand, and I dropped it, it wouldn't land as a sand castle! Even though it's the same sand that could make a sand castle!
- The probability is astronomical.
- Now imagine a complex organism like a human…. Some scientists will tell us that humans were formed by random. A bunch of cells got together and formed the human… but let's examine one aspect of humans. Speech.
- How do you speak?
  - It starts in the brain. There's a part in the center of the brain that knows what you want to say, so it sends signals through your nervous system to your lungs. And your lungs expel just enough air to vibrate your vocal chords in just the right way to produce sound for as long as the word is.
  - Of course where did this air come from and how did it get into your lungs is a whole nother story.
  - But you've just produced sound. How do you turn that into speech?
    - Your tongue has to move in a certain way to produce each sound… it gently touches the top front of your mouth for L, but it touches it more aggressively for D. And more towards the front for T. S needs to touch while pushing air through.
    - Then your lips have to move in a certain way to produce other sounds… there are 60 muscles that control the way your lips move. If you want to make a M B or P your lips have to close and open at just the right time. If you want F your teeth have to come in front of your bottom lip.
    - And you take all those sounds and put them in a specific way with all the air that's coming at a specific time and you get a word.
    - This is why St Gregory the Theologian in the Liturgy of St Gregory writes "You have given me the gift of speech"
    - And we do this a million times a day.
    - Did such a complex system happen randomly? What is the probability? Astronomical.
- It is not reasonable to believe that we came about randomly, with all of our complexity. But rather - just like the human made of blocks - we must have had an Intelligent Designer.

Grade 9-10: Science of Evolution

- We can also examine Evolution at the scientific level. In 9th and 10th grade at school, you learned about DNA and what it looks like and the chemical bonds that form it.
- What is DNA?

    - DNA is what stores genetic information about living organisms
    - DNA is a Double Helix that has several nucleotides that bond together.
    - These are base pairs where A (Adenine) bonds to T (Thymine) and G (Guamine) bonds to C (Cytosine).
- How does DNA store information
    - The order of these nucleotides gives us the genetic information.
        - For example ATGCCGTACCGA is a different genetic markup than TACGGGTTAACGCTA
        - AThe order is what matters
    - DNA is replicated by a process called… Replication
    - DNA is turned into proteins by a process called Transcription and Translation
    - Both of these processes depend on the order of the nucleotides
- How does the structure of DNA disprove Evolution
    - The idea of Evolution is that all of this happened by natural forces… but if it's all natural forces, then DNA cannot store information… let's examine all the natural forces on DNA
    - The helix is composed of two sugar-phosphate backbone strands
    - There are four nucleotides (A-T-G-C) that bond to those strands with a Phosphate Bond. This is on the horizontal axis
    - There is a chemical affinity that bonds A-T with a hydrogen bond or C-G with a hydrogen bond. A cannot bind to C or G; T cannot bind to C or G. This is on the horizontal axis.
    - We can do an activity to demonstrate this
        - The sugar backbone is a line along the floor. Each kid is a nucleotide stretching their hands out. The rules are:
            - Girls can only bond with girls
            - Boys can only bond with boys
            - You can only bond if the first letter in your name (first or last) matches the first letter of the other name (first or last)
        - What forces are at play?
            - Gravity attaching each person to the ground
            - Force of gender bonding girls with girls and boys with boys
            - Force of naming bonding
            - What direction are all of these forces?
            - Is there any force in the vertical direction? Is there any force or rule that says the order must be Maria then Danny then Monika then Joe, etc?
            - The same with DNA
    - All of the natural forces happen on the horizontal axis… but the data encoding happens on the vertical axis!
        - If there was a natural force that dictated the vertical axis (i.e. "T has to come after A" or "G has to come after T"), then the sequence is predictable and if it's predictable it stores no information because it will always look the same
- Conclusion:
    - The structure of DNA, itself, proves that natural forces are not the only thing at play in the formation of DNA (and thus, the formation of life).

Appendix

- Why is Evolution taught in school?
  - McClean vs Arkansas Board of Education 1981
    - Defined science as **guided by natural law**
    - Said that natural phenomenon can only be explained in school by **natural law**
    - Scientist results must **be empirically testable**
    - Scientists must hold **their views tentatively**
  - School boards reject the teaching of Creation because it is not “falsifiable” - because it is not explained by “natural law” and it is not “empirically testable”

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