THE DNA SHOW

As teacher is giving lecture, Alien enters the room. As he starts to speak, teacher says something to the effect of, “What’s going on here? I’m calling Agent Scully” and leaves the room.

Alien: Greetings, Earthlings. Do not be alarmed – I mean you no harm. I come from a planet in a galaxy far, far away. We have been observing your planet…[checks notes] “Earth” for some time now, and I have been sent to catalogue the creatures of your planet. Please remain calm – I assure you, my intentions are purely peaceful. We are here to serve you [has “To Serve Man” book under his arm]. Now, if you’ll just answer a few simple questions, we can wrap this up shortly, and I’ll be on my way.

Scully: [Enters, flashes badge] Agent Scully, X Files. Alright, what’s going on here?

Alien: Greetings, Earthling. Do not be alarmed – I mean you no harm.

Scully: Okay, I’m going to need to see some ID.

Alien: [looking confused] I come from a planet in a galaxy far, far away.

Scully: Right. Remain calm and stay in your seats; I’ll handle this. [exits]

Alien: [still looking confused – to audience] Greetings, Earthlings. Do not be alarmed – I mean you no harm. I come from a planet in a galaxy far, far away. I have been sent to catalogue the creatures of your planet. I’m going to call out each species in alphabetical order, so if you would just sit quietly, we should have this finished in no time. Alright, first on the list: aardvark. [pause] Aardvark. [pause – Cop re-enters with tub labeled, “Alien Intervention Kit” and sets it on the desk] Aardvark! [pause] You know, if you could all just pay attention when I call your name, we could get this done very efficiently. Aardvark. [pause – sigh] Why do I always get the uncooperative planets?

Scully: Klattu barada nikto.

Alien: Excuse me?

Scully: Eep op ork ah ah.

Alien: Beg pardon?

Scully: Na-noo-na-noo?

Alien: [Checks Scully with tricorder] Hmmm…according to my calculations, you’re a “human being.” Have a seat; I’ll get to you. I’m not up to the “H’s” yet. Okay, we’ll skip the aardvarks for now, and go on to antelopes. Antelope. [pause] Would the antelope please step forward?

Scully: Alright, what are you doing here?

Alien: I am a superior life form from the planet Gore-Tex. We are light years beyond your puny civilization. I have been studying the planet…[looks through notes]

Scully: Earth.

Alien: …“Earth” for eons of your years. I’m an expert on your life forms!
Scully: Hey, buddy, we’ve been on this planet a lot longer than you have.

Alien: Now, if there are no more interruptions, I’ll continue with my mission. Beetle…blowfish…crab…dingo…elephant…ferret…goat…hamster…Homo sapiens. Homo sapiens…could I have a volunteer from the homo sapiens, please. [Looks at Cop] You’ll do. [Focuses tricorder on Cop and directs positions Cop in front of room]

Scully: Hey, how did you do that?

Alien: You don’t want to know.

Scully: What do you want from us?

Alien: I am on a mission to explore strange new worlds, to seek out new life and new civilizations…

Scully: [Shatneresque] …to boldly go where no one has gone before!

Alien: Huh?

Scully: Never mind. I think I can help you with your mission – I used to work for the Immigration Service, so I have experience with aliens. For starters, we’re all human beings in here. Well, human beings and whatever you are.

Alien: You can’t expect me to believe that you’re ALL human beings? I didn’t just fall off the intergalactic turnip truck, you know. If you’re all human beings, why do you look different?

Scully: We’re not clones. We’re not even related.

Alien: What’s the matter with clones? I’ll have you know that my entire family is cloned. Wait, I’ve got some pictures. Here’s my son, Glaxo…that’s my wife, Spandex…and our daughter, Expedia. Isn’t she cute? [shows photos]

Scully: She sure takes after you.

Alien: That’s the point.

Scully: Well, I have to say, I still prefer the old-fashioned way.

Alien: What’s that? [Cop whispers in his ear – Alien reacts with disbelief, giggles, etc.] You’re kidding.

Scully: Nope.

Alien: But that’s so…so…so…random! So disorganized! So…messy!

Scully: Yeah, but we like it.

Alien: But look at the results! You can’t possibly be doing it right – look here: [indicating different audience members – this section should be improved to describe various kids in the audience] this one’s short, that one’s tall. He has curly hair, she has straight hair. Everyone on my planet looks exactly the same. It’s neat, it’s orderly, and, if I do say so myself, very attractive. You must not have read the instructions correctly before you started reproducing.

Scully: No, it’s DNA.

Alien: DNA?

Scully: It’s short for deoxyribonucleic acid.

Alien: How do you spell that?
Scully: D-E-O-X-Y-...uh, just put down DNA.

Alien: [writing] ...D-N-A. Got it. What is it?

Scully: Basically, it’s information. DNA is what makes us who we are. [pointing to various audience members] It’s what makes her a girl and him a boy; it makes his hair curly and her eyes blue and makes her have freckles.

Alien: That seems simple enough – we used to do it that way on my planet. You simply fill out your request in triplicate, check off your preferences, the appropriate ingredients are added to the test tube...

Scully: That’s not exactly how it works here. We don’t pick and choose – it’s a little more random than that.

Alien: But how do you know how the new creature is going to turn out? What if it’s not what you wanted?

Scully: Well, we kind of like the element of surprise. Now, if you’ll just stand back, I’ll try to explain how this works. Could I get some volunteers up here? I need 8 people [brings audience members up].

Alien: [as audience members are coming onstage] Aaah! Warning! Warning! Sensory overload! Danger, Will Robinson! Danger! [adjust knob on his belt]. Whew – that’s better.

Scully: Are you alright?

Alien: Sorry about that – it’s just overwhelming. You’re all so...so...different-looking.

Scully: You’re sure you’re all the same species?

Scully: Positive. [to volunteers] Okay, let’s make some DNA!

Alien: Whoa! Hey, this is a family audience!

Scully: Don’t worry – it’s just a model. Now, each of you is going to represent a nucleotide. All DNA is made up of only four different nucleotides.

Alien: [writing] Slow down – I’m trying to get all this down. What’s a nucleotide?

Scully: It’s a piece of information – actually, it’s the smallest piece of information, sort of like a single letter of the alphabet. By itself, it doesn’t mean anything [covering up lettering on shirt, leaving only one letter visible]. But if you put that letter –

Alien: – or nucleotide –

Scully: Right, or nucleotide – together in a specific combination with other nucleotides, it’s like combining letters to make a word [removes hands, revealing complete word on shirt]. And it just grows from there. You put a string of nucleotides together in a particular sequence, that’s a gene. It’s like putting individual letters together to form a sentence. A string of genes packaged together is a chromosome – which is like putting paragraphs together to form a volume. And all the chromosomes of a single organism are like whole set of encyclopedias. Got it?


Scully: Genes contain specific instructions for particular traits, like eye color, ear shape, hair texture, etc. Now, as I was saying, there are only four different nucleotides that make up the DNA language or alphabet...

Alien: Wait a minute – how can that be possible? There are only four of these nucleotides and your species are all so different?
Scully: If you keep interrupting, we’ll never get through this.

Alien: Sorry.

Scully: Let me show you how it works and I’ll explain it as we go along. I just happen to have my Alien Intervention Kit with me – the special DNA edition. [pulling puzzle pieces out of tub]. It comes equipped with some puzzle pieces representing the four different types of bases –

Alien: Oh, I know this one: first, second, third and home plate [makes baseball sound effects]. The Cardinals win the pennant! The Cardinals win the pennant! Holy cow! It’s outta here! [crowd noises].

Scully: Not those kind of bases. These are nucleotide bases – “A” for adenine, “T” for thymine, “C” for cytosine, and “G” for guanine. [to volunteers] Each of you take one of these bases and hold it in your right hand. Now, before we put this puzzle together, do you notice anything about these pieces? Right! Only A and T will fit together, and only C and G will fit together.

Alien: Not a very challenging puzzle. It amazes me that your species ever discovered fire – not to mention figuring out how to reproduce.

Scully: Everybody’s a critic. The structure of DNA is really simple. It looks like a twisted ladder – like this [Alien has a ladder-shaped insignia on his uniform, which Guy removes and twists into DNA double helix]. Those puzzle pieces are like the rungs of the ladder and the people holding them are the sides of the ladder. So, if I can have four volunteers line up here. I need an “A,” a “C,” a “T” and a “G.” What’s that in your right hand? [if volunteers/audience don’t remember “a base,” Alien can shout it out] [Guy glares at Alien for shouting answer]

Alien: Sorry – I got excited.

Scully: Now, I need my other four volunteers to find a match with someone in the first group. Put your nucleotide bases together and make sure they fit. Perfect! [Kids face each other with the bases touching]

Alien: It worked!

Scully: Those are the rungs of the ladder – next we need to hook the sides together. The sides of the ladder are made up of alternating sugar and phosphate molecules. Let’s have your heads be the sugar molecules and your left arms are the phosphate molecules. Got it? Shake your sugar! Wave your phosphate! Now, put your phosphate on the shoulder of the person next to you. Ladies and gentlemen, please give a big hand to the amazing strand of DNA! [You should end up with two rows of people facing each other, left hands on the shoulder of the person next to them, right hand holding the base and matching it with the person facing them]. Thanks for your help – you can sit down now.

Alien: Impressive! You know, it’s a lot bigger than I expected.

Scully: It’s not actual size. A human egg cell is only this big [makes a period on a piece of paper and holds it up]. If all of the DNA in just one of our cells were stretched into a single line, it would be about two yards long [stretches out a 6-foot piece of string]. And, since the human body has about a hundred trillion cells, that means the total length of DNA in each of us would stretch the 93 million miles from here to the sun 60 times!

Alien: That’s almost halfway to Gore-Tex! Amazing – I didn’t think you Earthlings would be so complex.

Scully: Thanks – I think…So, it all makes sense now, right?

Alien: Not so fast Earth creature. I have another question for you. DNA is made up of only four nucleotides, right?

Scully: Right – A, C, G and T.
Alien: And they can only fit together one way, right?

Scully: Right. A matches T and C matches G.

Alien: Then why don’t you all look the same? If there are only four nucleotides available, and they can only fit together one way, it seems to me that’s going to limit how many different designs of humans are possible.

Scully: But you’re forgetting that even though the pieces only fit together one way, when you line them up, they can be in any order. And the order they’re in is what decides the different traits of that particular person.

Alien: Okay, I understand that all of you humans are made up of only four brightly colored puzzle pieces with the letters A, C, T and G on them, and each of these letters – combined with a sugar [shakes his head] and a phosphate [waves his left arm] is a nucleotide. But you still haven’t explained how DNA works. I’m looking at those puzzle pieces and they’re just sitting there. How does this [holds up puzzle pieces] make this? [points to kid in audience]

Scully: Let me see if I can explain this. Imagine a computer that can build itself. Its software contains the instructions that direct its hardware how to assemble itself. A living cell is just like that computer.

Alien: But if the hardware needs software to operate, and the software can’t be read without the hardware, how did this get started in the first place?

Scully: There’s a brainteaser we have here on earth: which came first – the chicken or the egg?

Alien: That’s simple; any fool could answer that. The egg. Stupid humans…

Scully: But where did the egg come from?

Alien: Why, a chicken, of course.

Scully: Uh huh. And where did that chicken come from?

Alien: An…egg…

Scully: And that egg came from…

Alien: Stop it! You’re going to destroy my circuits! There is no answer.

Scully: Actually, the answer is “neither.” But it shows you how DNA works.

Alien: [making notes] “DNA is like a chicken…”

Scully: Think of the chicken as the hardware and the egg as the software. [Guy pulls chicken and egg out of backpack] The chicken hardware manufactures information – an egg – and that software gives instructions to the chicken.

Alien: So, a chicken is just an egg’s way of making another egg.

Scully: Yeah, I guess you could say that.

Alien: So it sounds to me like the chicken came first.

Scully: But where did the chicken come from?

Alien: An egg.

Scully: Which came from a chicken…

Alien: Alright, alright! Enough already – I get your point.
Scully: I’ve got another one for you. [gets two decks of cards out of backpack].

Alien: Ooo, magic! Presto-changeo, abracadabra, Siegried and Roy, hocus pocus…

Scully: Sssh. Now, let’s say this is my mom [holds up one deck of cards] and this is my dad [holds up other deck].

Alien: I hear your dad was really a card. A real joker. He’ll have to be dealt with. Har, har, har. I think I’m starting to get the hang of this “earth humor.”

Scully: That’s what you think. Now pay attention. Pretend that each card represents a gene.

Alien: Wait – I know this one: genes contain specific instructions for particular traits, like hair texture, eye color, ear shape, etc.

Scully: Right, and a gene is just a string of nucleotides. [holding up puzzle piece] Remember?

Alien: Okay, I’ve got it. Continue.

Scully: Now, my mom and dad each have 52 genes. Actually, they have about 50,000 genes, but I couldn’t find a deck of cards that big. Anyway, mom and dad meet, they go on a few dates, spend some time together, and eventually decide to get married [throws rice or puts little wedding veil and top hat on cards] and have children.

Alien: You do realize that these are decks of cards, don’t you?

Scully: I’m just trying to make a point here.

Alien: And your point is…?

Scully: Remember when I told you how we humans make new humans?

Alien: You mean the egg and the squirm?

Scully: Sperm.

Alien: Whatever.

Scully: Every time a female makes an egg, all of her genes are shuffled and half of them go into the egg [shuffles mom deck of cards, and takes half of deck and sets it to one side]. And the same thing happens when a man’s body creates sperm – all of his genes are shuffled, and half of his genes go into each sperm cell [shuffles dad deck of cards, and takes half of deck and sets it aside]. When the egg and sperm join to create a baby, half of the mother’s genes are combined with half of the father’s genes [shuffles two half decks together]. So, each living creature is a random combination of the DNA of its parents. [holds up and fans new combined deck]

Alien: I saw David Copperfield do this once – I love this trick. [Alien picks a card; Guy ignores him]

Scully: How many genetic combinations do you think are possible by shuffling two decks of 52 genes together?

Alien: Is this part of the trick? Okay, 52 cards in a deck times two decks…1,704 combinations.

Scully: Ooo, you’re so close. Actually, it’s more like this [holds paper up showing “250”]

Alien: 250? That doesn’t sound right.

Scully: [pulls open accordion-pleated paper to show 250,000,000,000,000,000,000,000,000,000,000,000,000] Actually, it’s 25 followed by 28 zeros. But that’s just how many combinations you can get from shuffling two decks of
cards together. Since human beings actually have 50,000 genes – not just 52 [holds up deck of cards] – the number of possible combinations that any couple can produce is \(10^{3000}\) – 10 followed by 2,999 zeros.

Alien: [puts card back in deck] Now that’s a good trick.

Scully: So you see, an incredibly large number of differences can result from a small number of variables.

Alien: Well, what good are all these variations? Some are useful and not entirely unattractive, but some of you are just downright strange looking. Why not figure out how to do it right, and then make all humans alike?

Scully: You mean besides the fact that it would be incredibly boring? For one thing, genetic variety improves our odds of survival. Take an apple, for example [pulls apple out of bag].

Alien: Thanks, don’t mind if I do [eats apple].

Scully: Pretty good, huh?

Alien: Not bad.

Scully: Let’s say we worked on developing the perfect apple. We kept pollinating and cross-pollinating to get the best flavor and color until we finally came up with the perfect breed of apple.

Alien: Now you’re talking sense.

Scully: And let’s say that, in the process of doing this, we eliminate all the other types of apples that were too tart or too mushy or whatever. Now we just have one type of apple.

Alien: But it’s perfect.

Scully: Right. But, what if that perfect apple gets infected by blight or bugs or worms [Alien – still eating apple – react. Spit take?]. Maybe this disease kills off our perfect apple species. If we had other types of apples, some of the other ones might have survived the blight. But since we only had one species of apple…

Alien: No more apples?

Scully: No more apples.

Alien: [looking at remainder of apple in his hand] Then this is probably worth a lot of money. [holds up apple like auctioneer] What’ll you give me for the last apple on earth?

Scully: [gets another apple out of backpack] Fortunately, we do have more than one species of apple. So, a little variety can be a good thing.

Alien: Sounds reasonable to me. Let’s see, I’ve covered nucleotides, genes and chromosomes, chickens, eggs, cards – male and female – DNA, apples – red and green – sugars, phosphates –

Scully: – and homo sapiens.

Alien: Yeah, that too. Well, that should about cover it. I should have enough to file my report on “Earth.” [starts to leave]

Scully: That’s it? We’ve barely scratched the surface. We didn’t talk about chromosomes, or mutations, or natural selection. I’ve got props here I didn’t even use yet!

Alien: How about if I just take this with me, okay? [taking tub]

Scully: Sure. Have you got your notes?

Alien: Yes, I have my notes. Well, I’ve gotta go now.
Scully: There’s another apple in there, in case you get hungry.

Alien: Thanks. We’ll do this again real soon. Well, bye! [starts to leave]

Scully: Hey, mister!

Alien: [sigh] Yes?

Scully: [very solemn] The force be with you! [does Spock hand thing]

Alien: Um…yeah…okay. Back atacha. [does Spock hand thing in return and exits]

Scully: I’ll just stay here, then. Don’t worry about me; I’ll be fine. I’ll probably never get to see outer space, but that’s alright, I don’t mind. [sniffle]

Alien: [sigh] Would you like to go with me? I sure would like to hear more about DNA.

Scully: Great! I’d love to! I did a term paper on genetic mutations – I can’t wait to tell you about. [to teacher] Sorry for the interruption – I’ll let you get back to class now. Bye!