

TEDTALK ANNOTATED VIDEO TRANSCRIPTS

Unit 1 LOUIE SCHWARTZBERG

Hidden Miracles of the Natural World

Part 1

What is the intersection between technology, art, and science? Curiosity and wonder, because it **drives us**¹ to explore, because we're surrounded by things we can't see. And I love to use film to take us on a journey through portals of time and space, to make the invisible visible, because what that does, it **expands our horizons**,² it transforms our perception, it opens our minds and it touches our heart. So here are some scenes from my 3-D IMAX³ film, *Mysteries of the Unseen World*.⁴

There is movement which is too slow for our eyes to detect, and time-lapse makes us discover and broaden our perspective of life. We can see how organisms emerge and grow, how a vine survives by creeping from the forest floor to look at the sunlight. And at the **grand scale**,⁵ time-lapse allows us to see our planet in motion. We can view not only the vast sweep of nature, but the restless movement of humanity. Each streaking dot represents a **passenger plane**,⁶ and by turning air traffic data into time-lapse imagery, we can see something that's above us constantly but invisible: the vast network of air travel over the United States. We can do the same thing with ships at sea. We can turn data into a time-lapse view of a global economy in motion. And decades of data give us the view of our entire

planet as a single organism sustained by currents circulating throughout the oceans and by clouds swirling through the atmosphere, pulsing with lightning, crowned by the aurora borealis. It may be the ultimate time-lapse image: the anatomy of Earth **brought to life**.⁷

At the other extreme,⁸ there are things that move too fast for our eyes, but we have technology that can look into that world as well. With high-speed cameras, we can do the opposite of time-lapse. We can shoot images that are thousands of times faster than our vision. And we can see how nature's ingenious devices work, and perhaps we can even imitate them. When a dragonfly flutters by, you may not realize, but it's the greatest flyer in nature. It can hover, fly backwards, even upside down. And by tracking markers on an insect's wings, we can visualize the air flow that they produce. Nobody knew the secret, but high-speed shows that a dragonfly can move all four wings in different directions at the same time. And what we learn can lead us to new kinds of **robotic flyers**⁹ that can expand our vision of important and remote places.

Part 2

We're **giants**,¹⁰ and we're unaware of things that are too small for us to see. The **electron microscope**¹¹ fires electrons which creates images which can magnify things by

¹ Something that "drives you," motivates and compels you to take a specific action.

² The term "expand [someone's] horizons" refers to introducing new ideas that open a person's mind.

³ The IMAX film format lets large-size movies be made with images of a higher resolution than what is typical.

⁴ *Mysteries of the Unseen World* came out in 2013. It was a 3-D IMAX film.

⁵ The "grand scale" refers to the bigger perspective or purpose.

⁶ A "passenger plane" is any plane that carries people instead of things.

⁷ The phrase "brought to life" means to animate something or create relevance for it with others.

⁸ Something that is "on the other extreme" is on the other side of a spectrum based on a topic previously spoken about. The phrase is a way to introduce an opposing subject, but one that is connected to the original topic.

⁹ The "robotic flyers" that Schwartzberg is referring to are likely drones used for research.

¹⁰ Humans are called "giants" to show how small many other living organisms actually are.

¹¹ An "electron microscope" uses electron beams and high magnification, allowing it to see very tiny things in greater detail.

as much as a million times. This is the egg of a butterfly. And there are unseen creatures living all over your body, including mites that spend their entire lives dwelling on your eyelashes, crawling over your skin at night. Can you guess what this is? Shark skin. A caterpillar's mouth. The eye of a fruit fly. An eggshell. A flea. A snail's tongue. We think we know most of the animal kingdom, but there may be millions of tiny species waiting to be discovered.

A spider also has great secrets, because spider's silk thread is **pound for pound**¹² stronger than steel but completely elastic. This journey will take us all the way down to the nano world. The silk is 100 times thinner than human hair. On there is bacteria, and near that bacteria, 10 times smaller, a virus. Inside of that, 10 times smaller, three strands of DNA, and **nearing the limit**¹³ of our most powerful microscopes, single carbon atoms.

With the tip of a powerful microscope, we can actually move atoms and begin to create amazing nano devices. Some

could **one day**¹⁴ patrol our body for all kinds of diseases and clean out clogged arteries along the way. Tiny chemical machines of the future can one day, perhaps, repair DNA. We are **on the threshold**¹⁵ of extraordinary advances, born of our drive to unveil the mysteries of life.

So under an endless rain of cosmic dust, the air is full of pollen, micro-diamonds, and jewels from other planets, and supernova explosions. People **go about their lives**¹⁶ surrounded by the unseeable. Knowing that there's so much around us we can see forever changes our understanding of the world, and by looking at unseen worlds, we recognize that we exist in the living universe, and this new perspective creates wonder and inspires us to become explorers in our own backyards.

Who knows what awaits to be seen and what new wonders will transform our lives? We'll just have to see.

Thank you.

¹² The phrase "pound for pound" is used to show the value of someone or something in relation to size. It is commonly used to talk about sport fighters, such as boxers.

¹³ When something "nears the limit," it is almost at the end of what it's capable of doing.

¹⁴ The term "one day" is commonly used to talk about an unspecified time in the future.

¹⁵ When we are "on the threshold" of something, we are about to experience something new.

¹⁶ To "go about our lives" simply refers to participating in everyday life.

Unit 2 ARIANNA HUFFINGTON

How to Succeed? Get More Sleep

Part 1

My big idea is a very, very small idea that can unlock billions of big ideas that are at the moment dormant inside us. And my little idea that will do that is sleep.

This is a room of type-A women. This is a room of sleep-deprived women. And I **learned the hard way**¹ the value of sleep. Two-and-a-half years ago, I fainted from exhaustion. I hit my head on my desk. I broke my cheekbone. I got five stitches on my right eye. And I began **the journey of rediscovering**² the value of sleep. And **in the course of**³ that, I studied, I met with medical doctors, scientists, and I'm here to tell you that the way to a more productive, more inspired, more joyful life is getting enough sleep.

Part 2

And we women are going to lead the way in this new revolution, this new feminist issue. We are literally going to **sleep our way to the top**,⁴ literally.

Because unfortunately for men, sleep deprivation has become a **virility symbol**.⁵ I was recently having dinner with a guy who bragged that he had only gotten four hours' sleep the night before. And I felt like saying to him—but I didn't say it—I felt like saying, "You know what? If you had gotten five, this dinner would have been a lot more interesting."

There is now a kind of sleep deprivation **one-upmanship**.⁶ Especially here in Washington, if you try to make a **breakfast date**,⁷ and you say, "How about eight o'clock?" They're likely to tell you, "Eight o'clock is too late for me, but that's OK, you know, I can get a game of tennis in and do a few **conference calls**⁸ and meet you at eight." And they think that means that they are so incredibly busy and productive, but the truth is they're not, because we, at the moment, have had brilliant leaders in business, in finance, in politics, making terrible decisions. So a high I.Q. does not mean that you're a good leader, because the essence of leadership is being able to see the iceberg before it hits the *Titanic*. And we've had far too many icebergs hitting our *Titanics*.

¹ To "learn (something) the hard way" means that something negative was experienced before coming to a new realization.

² A "journey of rediscovering" (or rediscovery) refers to setting out to relearn something that you once knew, but have forgotten or moved away from.

³ A synonym for "in the course of" is "during."

⁴ To "sleep your way to the top" refers to having sex with superiors at work in order to get promotions. Huffington is making a joke here by using this to explain that sleeping more will contribute to our success at work.

⁵ The noun *virility* actually refers to a man's ability to procreate, or his sex drive. However, it is often used as a metaphor to talk about masculinity and power, which is why a "virility symbol" is something that is supposed to make a man seem more masculine and powerful.

⁶ "One-upmanship" refers to a competitiveness between people in which one person tries to make themselves sound better than another. For example, if someone says they slept four hours, another person brags that they only slept three.

⁷ In this case, a "breakfast date" likely refers to a meeting in the morning over breakfast, not a romantic date.

⁸ A "conference call" is a work meeting done over the phone, usually with participants calling in from multiple locations.

In fact, I have a feeling that if Lehman Brothers was Lehman Brothers and Sisters, they might still be around. While all the brothers were busy just being **hyper-connected 24/7**,⁹ maybe a sister would have noticed the iceberg, because she would have woken up from a seven-and-a-half- or eight-hour sleep and have been able to **see the big picture**.¹⁰

So as we are facing all the multiple crises in our world at the moment, what is good for us **on a personal level**,¹¹ what's

going to bring more joy, gratitude, effectiveness in our lives and be the best for our own careers is also what is best for the world. So **I urge you**¹² to shut your eyes and discover the great ideas that lie inside us, to **shut your engines**¹³ and discover the power of sleep.

Thank you.

⁹ The term “hyper-connected 24/7” means to be online and accessible twenty-four hours a day, seven days a week.

¹⁰ When someone can “see the big picture,” they have a larger perspective on a given situation or issue.

¹¹ Something that is “on a personal level” is about our individual lives, experiences, and emotions.

¹² The phrase “I urge you” is a call to action. A speaker uses this phrase to strongly suggest that others follow a suggestion.

¹³ Huffington uses the figurative expression “shut your engines” to tell us to go to sleep.

Unit 3 NEIL HARBISSEON

I Listen to Color

Part 1

Well, I was born with a rare visual **condition**¹ called achromatopsia, which is total color blindness, so I've never seen color, and I don't know what color looks like, because I come from a grayscale world. To me, the sky is always gray, flowers are always gray, and television is still in black and white.

But, since the age of 21, instead of seeing color, I can hear color. In 2003, I started a project with computer scientist **Adam Montandon**, and the result, with further collaborations with **Peter Kese** from Slovenia and **Matias Lizana**² from Barcelona, is this electronic eye. It's a color sensor that detects the **color frequency**³ in front of me—and sends this frequency to a chip installed at the back of my head, and I hear the color in front of me through the bone, through **bone conduction**.⁴ So, for example, if I have, like—this is the sound of purple. For example, this is the sound of grass. This is red, like TED. This is the sound of a dirty sock. Which is like yellow, this one.

So I've been hearing color all the time for eight years, since 2004, so I find it completely normal now to hear color all the time. At the start, though, I had to memorize the names you give for each color, so I had to memorize the notes, but after some time, all this information became a perception. I didn't have to think about the notes. And after some time, this perception became a feeling. I started to have favorite colors, and I started to dream in colors.

So, when I started to dream in color is when I felt that the software and my brain had united, because in my dreams,

it was my brain creating electronic sounds. It wasn't the software, so that's when I started to feel like a cyborg. It's when I started to feel that the cybernetic device was no longer a device. It had become a part of my body, an extension of my senses, and after some time, it even became a part of my official image.

This is my passport from 2004. You're not allowed to appear on U.K. passports with electronic equipment, but I insisted to the passport office that what they were seeing was actually a new part of my body, an extension of my brain, and they finally **accepted me**⁵ to appear with the passport photo. . . .

Part 2

So I really enjoy creating, like, sound portraits of people. Instead of drawing someone's face, like drawing the shape, I point at them with the eye and I write down the different notes I hear, and then I create sound portraits. Here's some faces. Yeah, Nicole Kidman sounds good. Some people, I would never relate, but they sound similar. Prince Charles has some similarities with Nicole Kidman. They have similar sound of eyes. So you relate people that you wouldn't relate, and you can actually also create concerts by looking at the audience faces. So I connect the eye, and then I play the audience's faces. The good thing about this is, if the concert doesn't sound good, it's their fault. It's not my fault, because . . . And so another thing that happens is that I started having this **secondary effect**⁶ that normal sounds started to become color. I heard a **telephone tone**,⁷ and it felt green because it sounded just like the color green. The BBC beeps, they sound turquoise, and listening to Mozart became a yellow

¹ The term “condition” is often used as a euphemism to describe a medical problem.

² Adam Montandon is the computer scientist who worked with Harbisson originally. Peter Kese is the software designer who helped expand the number of colors the Eyeborg could pick up, and Matias Lizana worked on developing the chip for the Eyeborg when he was still a student.

³ A “color frequency” refers to the rate of vibration per second, measured in terahertz (THz).

⁴ When “bone conduction” happens, sound is transmitted to the inner ear via the bones of the skull.

⁵ Note that Harbisson's word choice of “accepted me” is not correct English; however, he still communicates clearly that the passport office approved his request.

⁶ The expression “secondary effect” refers to a result that wasn't intended or wasn't the main goal, but still has significance. For Harbisson, his main goal was to hear color, but then he started relating colors to every sound he heard, which was also an exciting result.

⁷ When Harbisson says “telephone tone,” he is likely referring to either the ring of a telephone or the sound heard when the receiver is picked up but a call hasn't been dialed yet.

experience, so I started to paint music and paint people's voices, because people's voices have frequencies that I relate to color.

And here's some music translated into color. For example, Mozart, "Queen of the Night," looks like this. Very yellow and very colorful, because there's many different frequencies. And this is a completely different song. It's **Justin Bieber's**⁸ "Baby." It is very pink and very yellow. . . .

So I got to a point when I was able to perceive 360 colors, just like human vision. I was able to differentiate all the degrees of the color wheel. But then, I just thought that this human vision wasn't good enough. There's many, many more colors around us that we cannot perceive, but that **electronic eyes**⁹ can perceive. So I decided to continue extending my

color senses, and I added infrared and I added ultraviolet to the color-to-sound scale, so now I can hear colors that the human eye cannot perceive. . . .

We should all think that knowledge comes from our senses, so if we extend our senses, we will consequently extend our knowledge. I think life will be much more exciting when we stop creating **applications**¹⁰ for mobile phones and we start creating applications for our own body. I think this will be a big, big change that we'll see during this century. So I do encourage you all to think about which senses you'd like to extend. I would encourage you to become a cyborg. You won't be alone.

Thank you.

⁸ Justin Bieber is an American pop singer.

⁹ Harbisson calls his Eyeborg an "electronic eye."

¹⁰ An "application" or *app* refers to software, often with one specific purpose, used on computers or smartphones.

Unit 4 NIC MARKS

The Happy Planet Index

Part 1

And really, this is what I've done with my **adult life**¹—is think about how do we measure happiness, how do we measure well-being, how can we do that within environmental limits. And we created, at the organization I work for, the **New Economics Foundation**,² something we call the Happy Planet Index, because we think people should be happy and the planet should be happy. Why don't we create a measure of progress that shows that? And what we do, is we say that the ultimate outcome of a nation is how successful is it at creating happy and healthy lives for its citizens. That should be the goal of every nation on the planet. But we have to remember that there's a **fundamental input**³ to that, and that is how many of the planet's resources we use. We all have one planet. We all have to share it. It is the ultimate scarce resource, the one planet that we share. And economics is very interested in scarcity. When it has a scarce resource that it wants to turn into a **desirable outcome**,⁴ it thinks in terms of efficiency. It thinks in terms of **how much bang do we get for our buck**.⁵ And this is a measure of how much well-being we get for our planetary resource use. It is an efficiency measure. And probably the easiest way to show you that is to show you this graph.

Running horizontally along the graph is "Ecological footprint," which is a measure of how much resources we use and how much pressure we put on the planet. More is bad. Running vertically upwards, is a measure called "Happy life years." It's about the well-being of nations. It's like a **happiness-adjusted life expectancy**.⁶ It's like quality and quantity of life in nations. And the yellow dot there you see, is the global average. Now, there's a huge array of nations around that global average. To the top right of the graph are countries which are doing reasonably well and producing well-being, but they're using a lot of planet to get there. They are the U.S.A., other Western countries going across in those triangles and a few **Gulf states**⁷ in there, actually. Conversely, at the bottom left of the graph, are countries that are not producing much well-being — typically, sub-Saharan Africa. In **Hobbesian**⁸ terms, life is short and brutish there. Average life expectancy in many of these countries is only 40 years. Malaria, HIV/AIDS are killing a lot of people in these regions of the world.

But now for the good news! There are some countries up there, yellow triangles, that are doing better than global average, that are heading up towards the top left of the graph. This is an aspirational graph. We want to be top left, where

¹ A person's "adult life" usually begins after they graduate from school and start working.

² For more about the New Economics Foundation, see neweconomics.org.

³ Marks uses the term "fundamental input" to refer to what each nation uses in its effort to make its people happy.

⁴ A "desirable outcome" is a positive result, usually one that has been aimed for.

⁵ The expression "bang for your buck" refers to how much value you get for the cost of something. It is often used to talk about the monetary value of something, but Marks is speaking about how much we benefit from using the planet's resources.

⁶ A "happiness-adjusted life expectancy" is a figure that takes into account the expected level of happiness in a life, not just the number of years someone is expected to live.

⁷ The "Gulf states" are countries in the Middle East on the Persian Gulf.

⁸ The term "Hobbesian" refers to Thomas Hobbes (1588–1679), a British philosopher who wrote that man is mostly motivated by selfish reasons.

good lives don't cost the Earth. They're Latin American. The country on its own up at the top is a place I haven't been to. Maybe some of you have: Costa Rica. Costa Rica—average life expectancy is 78-and-a-half years. That is longer than in the U.S.A. They are, according to the latest **Gallup World Poll**,⁹ the happiest nation on the planet—than anybody; more than Switzerland and Denmark. They are the happiest place. They are doing that on a quarter of the resources that are used typically in [the] Western world—a quarter of the resources. What's going on there? What's happening in Costa Rica? We can look at some of the data. 99 percent of their electricity comes from renewable resources. Their government is one of the first to commit to be **carbon neutral**¹⁰ by 2021. They abolished the army in 1949—1949. And they invested in social programs—health and education. They have one of the highest literacy rates in Latin America and in the world. And they have that **Latin vibe**,¹¹ don't they? They have the social connectedness. The challenge is, that possibly—and the thing we might have to think about—is that the future might not be North American, might not be Western European. It might be Latin American. And the challenge, really, is to pull the global average up here. That's what we need to do. And if we're going to do that, we need to

pull countries from the bottom, and we need to pull countries from the right of the graph. And then we're starting to create a happy planet. That's one way of looking at it. . . .

Why is it, on the radio news every evening, I hear the FTSE 100, the Dow Jones, the **dollar-pound ratio**¹²—I don't even know which way the dollar-pound should go to be good news. And why do I hear that? Why don't I hear how much energy Britain used yesterday, or America used yesterday? Did we meet our 3 percent annual target on reducing carbon emissions? That's how you create a collective goal. You put it out there into the media and start thinking about it. And we need positive **feedback loops**¹³ for increasing well-being. At a government level, they might create national accounts of well-being. At a business level, you might look at the well-being of your employees, which we know is really linked to creativity, which is linked to innovation, and we're going to need a lot of innovation to deal with those environmental issues. At a personal level, we need these **nudges**,¹⁴ too. . . .

Part 2

What are the five things that you should do every day to be happier?

⁹ The Gallup World Poll is a global survey that collects data and opinions on a range of topics.

¹⁰ Something that is “carbon neutral” sends zero carbon emissions into the atmosphere.

¹¹ Marks uses the term “that Latin vibe” to describe the lively, warm atmosphere associated with Latin nations and its' people.

¹² The “dollar-pound ratio” refers to the strength of the British pound versus the U.S. dollar.

¹³ A “feedback loop” is an economic term that refers to a situation where the product or output is used again as input.

¹⁴ A “nudge” is a gentle push. Marks is using it here as a synonym for “reminder.”

We did a project for the **Government Office of Science**¹⁵ a couple of years ago, a big program called the Foresight program—lots and lots of people—involved lots of experts—everything evidence-based—a huge tome. But a piece of work we did was on: What five positive actions can you do to improve well-being in your life? And the point of these is they are not quite the secrets of happiness, but they are things that I think happiness will flow out the side from. And the first of these is to connect, is that your social relationships are the most important cornerstones of your life. Do you invest the time with your loved ones that you could do, and energy? Keep building them. The second one is be active. Fastest way out of a bad mood: Step outside, go for a walk, turn the radio on and dance. Being active is great for our positive mood. The third one is take notice. How aware are you of things going on around the world, the seasons changing, people around you? Do you notice what's **bubbling up**¹⁶ for you and trying to emerge? Based on a lot of evidence for **mindfulness**,¹⁷ cognitive behavioral therapy, very strong for our well-being. The fourth is keep learning and keep is important—learning throughout the whole life course. Older people who keep

learning and are curious, they have much better health outcomes than those who start to close down. But it doesn't have to be formal learning; it's not knowledge-based. It's more curiosity. It can be learning to cook a new dish, picking up an instrument you forgot as a child. Keep learning. And the final one is that most anti-economic of activities, but give. Our generosity, our altruism, our compassion, are all **hardwired**¹⁸ to the reward mechanism in our brain. We feel good if we give. You can do an experiment where you give two groups of people a hundred dollars in the morning. You tell one of them to spend it on themselves and one on other people. You measure their happiness at the end of the day, that those that have gone and spent on other people are much happier than those that spent it on themselves.

And these five ways, which we put onto these handy postcards, I would say, **don't have to cost the Earth**.¹⁹ They don't have any carbon content. They don't need a lot of material goods to be satisfied. And so I think it's really quite feasible that happiness does not cost the Earth. . . .

¹⁵ The Government Offices of Science is a U.K. organization whose role is to advise the government by providing up-to-date science reports to inform government policies.

¹⁶ Something that is “bubbling up” is coming to the surface. Marks is using it to refer to ideas, thoughts, and awareness.

¹⁷ “Mindfulness” refers to a state of being connected with a present situation both mentally and emotionally by giving it your full attention.

¹⁸ Marks uses “hardwired” to point out that something is physiologically a part of our makeup.

¹⁹ The expression “don't have to cost the Earth,” which Marks uses twice at the end of his speech, is used to explain that something doesn't have to be expensive. However, Marks is also using this as a pun, to point out that to be happy, one does not have to use up all of the Earth's resources.

The Power of Time Off

Part 1

I run a design studio in New York. Every seven years, I close it for one year to pursue some **little experiments**,¹ things that are always difficult to accomplish during the regular working year. In that year, we are not available for any of our clients. We are totally closed. And as you can imagine, it is a lovely and very energetic time.

I originally had opened the studio in New York to combine my two loves, music and design. And we created videos and packaging for many musicians that you know, and for even more that you've never heard of. As I realized, just like with many, many things in my life that I actually love, I adapt to it. And I get, over time, bored by them. And for sure, in our case, our work started to look the same. You see here a glass eye in a **die cut**² of a book. Quite the similar idea, then, a perfume packaged in a book, in a die cut. So I decided to close it down for one year.

Also is the knowledge that right now we spend about in the first 25 years of our lives learning, then there is another 40 years that's really reserved for working. And then **tacked on at the end of**³ it are about 15 years for retirement.

And I thought it might be helpful to basically cut off five of those retirement years and intersperse them in between those working years. That's clearly enjoyable for myself. But probably even more important is that the work that comes out of these years flows back into the company and into society at large, rather than just benefiting a grandchild or two. There is a fellow **TEDster**⁴ who spoke two years ago, Jonathan Haidt, who defined his work into three different levels. And they **rang very true**⁵ for me. I can see my work as a job. I do it for money. I likely already look forward to the weekend on Thursdays. And I probably will need a hobby as a **leveling mechanism**.⁶ In a career, I'm definitely more engaged. But at the same time, there will be periods when I think is all that really hard work really worth my while? While in the third one, in the calling, very much likely I would do it also if I wouldn't be financially compensated for it. . . .

Part 2

If I look at my cycle, seven years, one-year sabbatical, it's 12.5 percent of my time. And if I look at companies that are actually more successful than mine, 3M since the 1930s is giving all their engineers 15 percent to pursue whatever

¹ Sagmeister uses the term "little experiments" to refer to creative pursuits or non-work-related projects.

² A "die cut" is the cutting of paper or card using machines with sharp, steel knives.

³ Something that is "tacked on the end" or "tacked on at the end" is added after something else is finished, usually without careful thought. A *tack* is a type of short nail with a flat head.

⁴ The term "TEDster" refers to an individual who has given a TED Talk.

⁵ When something you hear or see "rings true" for you, it feels relevant and accurate for you.

⁶ A "leveling mechanism" is something that creates a flat surface. In this case, Marks means that he needs a hobby to have a better balance between work and life.

they want. There [are] some good successes. **Scotch tape**⁷ came out of this program, as well as Art Fry developed **sticky notes**⁸ from during his personal time for 3M. Google, of course, very famously gives 20 percent for their software engineers to pursue their own personal projects. . . .

When I had the idea of doing one, the process was I made the decision and I put it into my **daily planner book**.⁹ And then I told as many, many people as I possibly could about it so that there was no way that I could **chicken out**¹⁰ later on. In the beginning, on the first sabbatical, it was **rather disastrous**.¹¹ I had thought that I should do this without any plan, that this vacuum of time somehow would be wonderful and enticing for idea generation. It was not. I just, without a plan, I just reacted to little requests, not work requests—those I all said no to—but other little requests. Sending mail to Japanese design magazines and things like that. So I became my own **intern**.¹²

And I very quickly made a list of the things that I was interested in, put them in a hierarchy, divided them into chunks of time, and then made a plan, very much like in **grade school**.¹³ What does it say here? Monday, 8 to 9: story writing; 9 to 10: future thinking. Was not very successful. And so on and so forth. And that actually, specifically as a starting point of the first sabbatical, worked really well for me. What came out of it? I really got close to design again. I had fun. Financially, seen over the long term, it was actually successful. Because of the improved quality, we could ask for higher prices. And probably most importantly, basically everything we've done in the seven years following the first sabbatical came out of thinking of that one single year.

And I'll show you a couple of projects that came out of the seven years following that sabbatical. . . . This is a whole wall of bananas at different ripenesses on the opening day in this gallery in New York. It says, "Self-confidence produces fine

⁷ "Scotch tape" is a popular cellophane tape sold by 3M.

⁸ "Sticky notes," also known as Post-its, are small pieces of paper with adhesive on the back of them.

⁹ A "daily planner book" refers to a book with a calendar in which a person writes his or her daily schedule.

¹⁰ To "chicken out" means to decide not to do something because of fear.

¹¹ Sagmeister uses the term "rather disastrous" to mean it did not go well at all.

¹² An "intern" is a young staff member, often a student, who works for no pay or a very low salary in order to gain work experience.

¹³ "Grade school" refers to elementary or primary school.

results.” This is after a week. After two weeks, three weeks, four weeks, five weeks. And you see the self-confidence almost comes back, but not quite. These are some pictures visitors sent to me. And then the city of Amsterdam gave us a plaza and asked us to do something. We used the stone plates as a grid for our little piece. We got 250,000 coins from the central bank, at different darkneses. So we got brand-new ones, shiny ones, medium ones, and very old, dark ones. And with the help of 100 volunteers, over a week, created this fairly floral typography that spelled, “Obsessions make my life worse and my work better.” . . .

We are also working on the start of a bigger project in Bali. It’s a movie about happiness. And here we asked some

nearby pigs to do the titles for us. They weren’t quite **slick**¹⁴ enough. So we asked the goose to do it again, and hoped she would do somehow, a more elegant or pretty job. And I think she overdid it. Just a bit too ornamental. And my studio is very close to the monkey forest. And the monkeys in that monkey forest looked, actually, fairly happy. So we asked those guys to do it again. They did a fine job, but had a couple of **readability problems**.¹⁵ So of course whatever you don’t really do yourself doesn’t really get done properly. That film we’ll be working on for the next two years. . . .

Thank you.

¹⁴ Sagmeister says that the pigs in his project weren’t quite “slick” enough to explain that the outcome wasn’t as nice as he had hoped.

¹⁵ Sagmeister continues to joke about working with the animals by describing the monkeys as having “readability problems.”

Unit 6 JOHN McWHORTER

Txtng Is Killing Language. JK!!!

Part 1

What texting is, despite the fact that it involves the **brute mechanics**¹ of something that we call writing, is **fingered speech**.² That's what texting is. Now we can write the way we talk. And it's a very interesting thing, but nevertheless, easy to think that still it represents some sort of decline. We see this general bagginess of the structure, the lack of concern with rules and the way that we're used to **learning on the blackboard**,³ and so we think that something has **gone wrong**.⁴ It's a very natural sense.

But **the fact of the matter is that**⁵ what is going on is a kind of emergent complexity. That's what we're seeing in this fingered speech. And in order to understand it, what we want to see is the way, in this new kind of language, there is new structure coming up.

And so, for example, there is in texting a convention, which is LOL. Now LOL, we generally think of as meaning "laughing out loud." And of course, theoretically, it does, and if you look at older texts, then people used it to actually indicate laughing out loud. But if you text now, or if you are someone who is aware of the **substrate**⁶ of texting the way it's become, you'll

notice that LOL does not mean laughing out loud anymore. It's evolved into something that is much subtler.

This is an actual text that was done by a **non-male person of about 20 years old**⁷ not too long ago. "I love the font you're using, btw." Julie: "lol thanks gmail is being slow right now." Now if you think about it, that's not funny. No one's laughing. And yet, there it is, so you assume there's been some kind of **hiccup**.⁸ Then Susan says "lol, I know," again more guffawing than we're used to when you're talking about these inconveniences. So Julie says, "I just sent you an email." Susan: "lol, I see it." Very funny people, if that's what LOL means. This Julie says, "So what's up?" Susan: "lol, I have to write a 10 page paper."

She's not amused. Let's think about it. LOL is being used in a very particular way. It's a marker of empathy. It's a marker of accommodation. We linguists call things like that pragmatic particles. Any spoken language that's used by real people has them. If you happen to speak Japanese, think about that little word *ne* that you use at the end of a lot of sentences. If you listen to the way **black youth**⁹ today speak, think about the use of the word *yo*. Whole dissertations could be written about it, and probably are being written about it. A pragmatic

¹ By using the expression "brute mechanics," McWhorter is emphasizing that texting is a physical task (that resembles writing).

² The term "fingered speech" is a clear description of what texting is: speaking by writing with your fingers. He explains this in the sentence that follows when he says that with texting, "we can write the way we talk."

³ McWhorter uses "learning on the blackboard" as a figurative way to refer to formal education.

⁴ When something "goes wrong," a problem is experienced.

⁵ The expression "the fact of the matter is that" is a synonym for "in fact."

⁶ A "substrate" is a layer, often of something that is growing, and in this case McWhorter uses the term to infer that the language of texting is evolving.

⁷ Note that instead of saying "a teenage girl," McWhorter uses the more entertaining expression of "a non-male person of about 20 years old."

⁸ The word "hiccup" is used as a euphemism for a small mistake.

⁹ When he says "black youth today," McWhorter is mostly referring to black youth in the U.S.

particle, that's what LOL has gradually become. It's a way of using the language between actual people. . . .

Part 2

Another example is *slash*. Now, we can use slash in the way that we're used to, along the lines of, "We're going to have a party-slash-networking session." That's kind of like what we're at. *Slash* is used in a very different way in texting among young people today. It's used to change the **scene**.¹⁰ So for example, this Sally person says, "So I need to find people to **chill**¹¹ with" and Jake says, "Haha"—you could write a dissertation about "Haha" too, but we don't have time for that—"Haha so you're going by yourself? Why?" Sally: "For this summer program at NYU." Jake: "Haha. Slash I'm watching this video with suns players trying to shoot with one eye."

The slash is interesting. I don't really even know what Jake is talking about after that, but you notice that he's changing the topic. Now that seems kind of mundane, but think about how in real life, if we're having a conversation and we want

to change the topic, there are ways of doing it gracefully. You don't just **zip**¹² right into it. You'll pat your thighs and look wistfully off into the distance, or you'll say something like, "Hmm, makes you think"—when it really didn't, but what you're really—what you're really trying to do is change the topic. You can't do that while you're texting, and so ways are developing of doing it within this medium. All spoken languages have what a linguist calls a new information marker—or two, or three. Texting has developed one from this *slash*. . . .

And so, the way I'm thinking of texting these days is that what we're seeing is a whole new way of writing that young people are developing, which they're using alongside their ordinary writing skills, and that means that they're able to do two things. Increasing evidence is that being bilingual is cognitively beneficial. That's also true of being bidialectal. That's certainly true of being bidialectal in terms of your writing. And so texting actually is evidence of **a balancing act**¹³ that young people are using today, not consciously, of course, but it's an expansion of their linguistic repertoire . . .

¹⁰ A synonym for "scene" in this sentence is "topic."

¹¹ Sally is using the slang word "chill" to mean "hang out" or "spend time with."

¹² The verb "zip" here is used to describe being overly direct in an action.

¹³ The expression "a balancing act" refers to a situation when two different things must be done simultaneously.

Unit 7 CHIMAMANDA NGOZI ADICHIE

The Danger of a Single Story

Part 1

I'm a storyteller. And I would like to tell you a few personal stories about what I like to call "the danger of the single story." I grew up on a university campus in eastern Nigeria. My mother says that I started reading at the age of two, although I think four is probably close to the truth. So I was an early reader, and what I read were British and American children's books.

I was also an early writer, and when I began to write, at about the age of seven, stories in pencil with crayon illustrations that **my poor mother**¹ was obligated to read, I wrote exactly the kinds of stories I was reading: All my characters were white and blue-eyed, they played in the snow, they ate apples, and they talked a lot about the weather, how **lovely**² it was that the sun had come out. Now, this despite the fact that I lived in Nigeria. I had never been outside Nigeria. We didn't have snow, we ate mangoes, and we never talked about the weather, because there was no need to.

My characters also drank a lot of **ginger beer**³ because the characters in the British books I read drank ginger beer. Never mind that I had no idea what ginger beer was. And for many years afterwards, I would have a desperate desire to taste ginger beer. But that is another story.

What this demonstrates, I think, is how impressionable and vulnerable we are in the face of a story, particularly as children. Because all I had read were books in which characters were foreign, I had become convinced that books by their very nature had to have foreigners in them and had to be about things with which I could not personally identify. Now, things changed when I discovered African books. There weren't many of them available, and they weren't quite as easy to find as the foreign books.

But because of writers like Chinua Achebe and Camara Laye, I went through a mental shift in my perception of literature. I realized that people like me, girls with skin the color of

¹ The adjective "poor" is often used to offer someone sympathy in a situation. Adichie is partly making fun of herself here as she sympathizes with her mother who had to read all her young stories.

² The adjective "lovely" describes something pleasant. It is more popularly used in British English than American English.

³ The drink "ginger beer" is usually a non-alcoholic, carbonated, sweet drink. There are also alcoholic versions. In the U.S., a somewhat similar drink is called "ginger ale."

chocolate, whose **kinky hair could not form ponytails**,⁴ could also exist in literature. I started to write about things I recognized.

Now, I loved those American and British books I read. They stirred my imagination. They opened up new worlds for me. But the **unintended consequence**⁵ was that I did not know that people like me could exist in literature. So what the discovery of African writers did for me was this: It saved me from having a single story of what books are.

Part 2

I come from a conventional, middle-class Nigerian family. My father was a professor. My mother was an administrator. And so we had, as was the norm, live-in **domestic help**,⁶ who would often come from nearby rural villages. So the year I turned eight, we got a new **houseboy**.⁷ His name was Fide. The only thing my mother told us about him was that his family was very poor. My mother sent yams and rice, and our old clothes, to his family. And when I didn't finish my dinner, my mother would say, "Finish your food! Don't you know? People like Fide's family have nothing." So I felt enormous pity for Fide's family.

Then one Saturday we went to his village to visit, and his mother showed us a beautifully patterned basket made of dyed raffia that his brother had made. I was startled. It had not occurred to me that anybody in his family could actually make something. All I had heard about them was how poor they were, so that it had become impossible for me to see them as anything else but poor. Their poverty was my single story of them.

Years later, I thought about this when I left Nigeria to go to university in the United States. I was 19. My American roommate was shocked by me. She asked where I had learned to speak English so well, and was confused when I said that Nigeria happened to have English as its official language. She asked if she could listen to what she called my "tribal music," and was consequently very disappointed when I produced my tape of Mariah Carey. She assumed that I did not know how to use a stove.

What struck me was this: She had felt sorry for me even before she saw me. Her default position toward me, as an African, was a kind of patronizing, well-meaning pity. My roommate had a single story of Africa: **a single story of catastrophe**.⁸ In this single story, there was no possibility

⁴ The adjective "kinky" is commonly used to describe black or African hair. By pointing out that her hair cannot go in a "ponytail," Adichie is illustrating again how different she was from the white protagonists in the stories she read.

⁵ An "unintended consequence" is not a primary one, but secondary.

^{6 & 7} Adichie uses both the words "domestic help" and "houseboy" to refer to someone who lives in her home to help with cleaning, cooking, and other chores. The former is the more generic, accepted term to describe such a job. The term "houseboy" was likely a common colloquialism when Adichie was young.

⁸ The "single story of catastrophe" that she describes refers to the problems of poverty, illness, and famine that are often associated with Africa.

of Africans being similar to her in any way, no possibility of feelings more complex than pity, no possibility of a connection as human equals. . . .

But I must quickly add that I, too, am just as guilty in the question of the single story. A few years ago, I visited Mexico from the U.S. The **political climate**⁹ in the U.S. at the time was tense, and there were debates going on about immigration. And, as often happens in America, immigration became synonymous with Mexicans. There were endless stories of Mexicans as people who were **fleeing**¹⁰ the healthcare system, sneaking across the border, being arrested at the border, that sort of thing.

I remember walking around on my first day in Guadalajara, watching the people going to work, rolling up tortillas in the marketplace, smoking, laughing. I remember first feeling slight surprise. And then I was overwhelmed with shame. I realized that I had been so immersed in the media coverage of Mexicans that they had become one thing in my mind: the abject immigrant. I had bought into the single story of Mexicans, and I could not have been more ashamed of myself. So that is how to create a single story, show a people as one thing, as only one thing, over and over again, and that is what they become.

. . . But to insist on only these negative stories is to **flatten my experience**¹¹ and to overlook the many other stories that formed me. The single story creates stereotypes, and the problem with stereotypes is not that they are untrue, but that they are incomplete. They make one story become the only story. . . . I've always felt that it is impossible to engage properly with a place or a person without engaging with all of the stories of that place and that person. The consequence of the single story is this: It robs people of dignity. It makes our recognition of our equal humanity difficult. It emphasizes how we are different rather than how we are similar.

. . . I teach writing workshops in Lagos every summer, and it is amazing to me how many people apply, how many people are eager to write, to tell stories. My Nigerian publisher and I have just started a non-profit called **Farafina**¹² Trust, and we have big dreams of building libraries and refurbishing libraries that already exist and providing books for state schools that don't have anything in their libraries, and also of organizing lots and lots of workshops, in reading and writing, for all the people who are eager to tell our many stories. Stories matter. Many stories matter. Stories have been used to dispossess and to malign, but stories can also be used to empower and to humanize. Stories can break the dignity of a people, but stories can also repair that broken dignity. . . .

⁹ The term “political climate” is used to describe the populace’s general attitude, and surrounding tensions, in regards to a certain political topic or social issue at the time.

¹⁰ To “fleece” someone means to dishonestly take money from them.

¹¹ Adiche is likely using the word “flatten” here to describe how stereotypes make our experiences one-dimensional.

¹² Farafina’s website is farafinatrust.org.

The Power of Introverts

Part 1

A third to a half of the population are introverts—a third to a half. So that’s one out of every two or three people you know. So even if you’re an extrovert yourself, I’m talking about your co-workers and your spouses and your children and the person sitting right next to you right now—all of them **subject to this bias**¹ that is pretty deep and real in our society. We all **internalize**² it from a very early age without even having a language for what we’re doing. . . .

But now, here’s where the bias comes in. Our most important institutions, our schools and our workplaces, they are designed mostly for extroverts and for extroverts’ need for lots of stimulation. And also, we’re living through this belief system, we have a belief system right now that I call the new groupthink, which holds that all creativity and all productivity comes from a very oddly gregarious place.

So if you picture the typical classroom nowadays: When I was going to school, we sat in rows. We sat in rows of desks like this, and we did most of our work pretty autonomously. But nowadays, your typical classroom has **pods of desks**³—four or five or six or seven kids all facing each other. And kids are working in countless group assignments. Even in subjects like math and creative writing, which you would think would depend on solo flights of thought, kids are now expected to act as **committee members**.⁴ And for the kids who prefer to go off by themselves or just to work alone, those kids are seen as **outliers**⁵ often or, worse, as problem cases. And the vast majority of teachers reports believing that the ideal

student is an extrovert as opposed to an introvert, even though introverts actually get better grades and are more knowledgeable, according to research.

OK, same thing is true in our workplaces. We now, most of us, work in **open-plan offices**,⁶ without walls, where we are subject to the constant noise and gaze of our co-workers. And when it comes to leadership, introverts are routinely passed over for leadership positions, even though introverts tend to be very careful, much less likely to take **outsized risks**⁷—which is something we might all favor nowadays. And interesting research by **Adam Grant**⁸ at the Wharton School has found that introverted leaders often deliver better outcomes than extroverts do, because when they are managing proactive employees, they’re much more likely to let those employees run with their ideas, whereas an extrovert can, quite unwittingly, get so excited about things that they’re **putting their own stamp on**⁹ things, and other people’s ideas might not as easily then bubble up to the surface. . . .

Part 2

Now if all this is true, then why are we **getting it so wrong**?¹⁰ Why are we setting up our schools this way and our workplaces? And why are we making these introverts feel so guilty about wanting to just go off by themselves some of the time? One answer lies deep in our cultural history. Western societies, and in particular the U.S., have always favored the man of action over the man of contemplation and “man” of contemplation. But in **America’s early days**,¹¹ we lived

¹ When someone is “subject to bias,” they are treated unfairly due to others’ discriminatory beliefs.

² When we “internalize” a belief, we begin to unconsciously think it’s the truth, usually because we have heard it often (not because we agree with it).

³ A classroom with “pods of desks” is usually set up so that three or four desks are turned into each other, which means students face each other as they work. This classroom layout is supposed to encourage group work.

⁴ Instead of saying “teamwork,” Cain describes it as “committee members.” We can infer from her language choice that she sees this option as not ideal. This is especially clear in noting that she describes working individually with positive language: “solo flights of thought.”

⁵ An “outlier” is an individual alienated from the group. It is not a positive term.

⁶ An “open-plan office” is organized so that all desks are visible to everyone. There are usually no walls or doors. Note that students saw a picture of an open-plan office in Lesson A.

⁷ A synonym for “outsized” is “large” or “oversized.”

⁸ Adam Grant is a business professor and social science writer. He is the author of *Give and Take*.

⁹ When you “put your own stamp on something,” you make it or claim it as yours by adding your ideas to it somehow.

¹⁰ Note that “bubble up,” meaning “to emerge,” was also used by TED speaker Nic Marks in Unit 4.

¹¹ “America’s early days” refers to when the nation was founded in the 1700s.

in what historians call a culture of character, where we still, at that point, valued people for their inner selves and their moral rectitude. And if you look at the **self-help books**¹² from this era, they all had titles with things like “Character, the Grandest Thing in the World.” And they featured role models like **Abraham Lincoln**¹³ who was praised for being modest and unassuming. **Ralph Waldo Emerson**¹⁴ called him “A man who does not offend by superiority.”

But then we hit the 20th century and we entered a new culture that historians call the culture of personality. What happened is we had evolved from an agricultural economy to a world of big business. And so suddenly people are moving from small towns to the cities. And instead of working alongside people they’ve known all their lives, now they are having to prove themselves in a crowd of strangers. So, quite understandably, qualities like magnetism and charisma suddenly come to seem really important. And sure enough, the self-help books change to meet these new needs and they start to have names like *How to Win Friends and Influence People*. And they feature as their role models really great salesmen. So that’s the world we’re living in today. That’s our cultural inheritance.

Now none of this is to say that social skills are unimportant, and I’m also not calling for the abolishing of teamwork at all. The same religions who send their sages off to lonely mountaintops also teach us love and trust. And the problems

that we are facing today in fields like science and in economics are so vast and so complex that we are going to need **armies of**¹⁵ people coming together to solve them working together. But I am saying that the more freedom that we give introverts to be themselves, the more likely that they are to come up with their own unique solutions to these problems. . . .

So I just published a book about introversion, and it took me about seven years to write. And for me, that seven years was like total bliss, because I was reading, I was writing, I was thinking, I was researching. It was my version of my grandfather’s hours a day alone in his library. But now all of a sudden my job is very different, and my job is to be out here talking about it, talking about introversion. And that’s a lot harder for me, because as honored as I am to be here with all of you right now, this is not my natural milieu.

So I prepared for moments like these as best I could. I spent the last year practicing public speaking every chance I could get. And I call this my “**year of speaking dangerously**.”¹⁶ And that actually helped a lot. But I’ll tell you, what helps even more is my sense, my belief, my hope that when it comes to our attitudes to introversion and to quiet and to solitude, we truly are poised on the brink of dramatic change. . . So I wish you the best of all possible journeys and the courage to speak softly.

Thank you very much.

¹² A “self-help book” refers to a book written on a topic that encourages people to improve themselves.

¹³ Abraham Lincoln became the 16th President of the United States in 1861. He was president during the Civil War that led to the abolishment of slavery.

¹⁴ Ralph Waldo Emerson was a writer and speaker in the U.S. in the 1800s. He is best known for being a leader of the Transcendentalist movement. Transcendentalists believed that individuals have to be free to develop independently in order to be good members of society.

¹⁵ The term “armies of” is used when a large number of people or things are needed to get something done.

¹⁶ When Cain says that it is her “year of speaking dangerously,” she is making a humorous comment by referencing a popular novel and movie titled *The Year of Living Dangerously*.

The Gentle Genius of Bonobos

Part 1

There are many people who think that the animal world is **hardwired**¹ and that there's something very, very special about man. Maybe it's his ability to have **causal thought**.² Maybe it's something special in his brain that allows him to have language. Maybe it's something special in his brain that allows him to make tools or have mathematics . . .

So what I want to do now is introduce you to a species called the bonobo. This is Kanzi. He's a bonobo. Right now, he's in a forest in Georgia. His mother originally came from a forest in Africa. And she came to us when she was just at puberty, about six or seven years of age. . . .

This is Kanzi and I, in the forest. None of the things you will see in this particular video are trained. None of them are tricks. They all happened to be captured on film spontaneously, by NHK of Japan. We have eight bonobos.

Savage-Rumbaugh (video): Look at all this stuff that's here for our campfire. S-R: An entire family at our research center. S-R (video): You going to help get some sticks? Good. We need

more sticks, too. I have a lighter in my pocket if you need one. That's a wasps' nest. You can get it out. I hope I have a lighter. You can use the lighter to start the fire. S-R: So Kanzi is very interested in fire. He doesn't do it yet without a lighter, but I think if he saw someone do it, he might be able to do—make a fire without a lighter. He's learning about how to keep a fire going. He's learning the uses for a fire, just by watching what we do with fire. . . . This is his sister. This is her first time to try to drive a golf cart. S-R (video): Good-bye. S-R: She's **got** the pedals **down**,³ but not the wheel. She switches from reverse to forward and she holds onto the wheel, rather than turns it. Like us, she knows that that individual in the mirror is her. Narrator: By raising bonobos in a culture that is both bonobo and human, and documenting their development across two decades, scientists are exploring how cultural forces may have operated during human evolution. His name is Nyota. It means "star" in Swahili. Panbanisha is trying to give Nyota a haircut with a pair of scissors. In the wild, the parent bonobo is known to **groom**⁴ its offspring. Here Panbanisha uses scissors, instead of her hands, to groom Nyota. Very impressive. Subtle maneuvering of the hands

¹ Note that the term "hardwired" was also used by TED speaker Nic Marks. In this case, Savage-Rumbaugh is referring to our biological make-up.

² "Causal thought" refers to recognizing cause-and-effect relationships between events and using this to problem-solve and understand your surroundings.

³ When someone has "got something down," it means they understand. Savage-Rumbaugh is saying that Kanzi's sister has figured out how the pedals work, just not the steering wheel.

⁴ The verb "groom" is more commonly used to talk about animals than humans. With animals, it means to brush or clean hair or fur. With humans, it involves tidying your appearance, such as fixing your hair or putting on makeup.

is required to perform delicate tasks like this. Nyota tries to imitate Panbanisha by using the scissors himself. Realizing that Nyota might get hurt, Panbanisha, like any human mother, carefully tugs to get the scissors back. . . . He can now cut through tough animal **hide**.⁵ S-R Kanzi's learned to make stone tools. Narr: Kanzi now makes his tools, just as our ancestors may have made them, two-and-a-half million years ago—by holding the rocks in both hands, to strike one against the other. He has learned that by using both hands and aiming his glancing blows, he can make much larger, sharper **flakes**.⁶ Kanzi chooses a flake he thinks is sharp enough. The tough hide is difficult to cut, even with a knife. The rock that Kanzi is using is extremely hard and ideal for stone tool-making, but difficult to handle, requiring great skill. Kanzi's rock is from Gona, Ethiopia, and is identical to that used by our African ancestors two-and-a-half million years ago. These are the rocks Kanzi used and these are the flakes he made. The flat, sharp edges are like knife blades. Compare them to the tools our ancestors used; they **bear a striking resemblance**⁷ to Kanzi's.

Part 2

S-R: These are her symbols on her keyboard. They speak when she touches them. Narr: Panbanisha is communicating to Dr. Sue where she wants to go. "**A-frame**"⁸ represents a hut in the woods. Compare the chalk writing with the **lexigram**⁹ on the keyboard. Panbanisha began writing the lexigrams on the forest floor. S-R (video): Very nice. Beautiful, Panbanisha. S-R: At first we didn't really realize what she was doing, until we stood back and looked at it and rotated it. Narr: This lexigram also refers to a place in the woods. The curved line is very similar to the lexigram. The next symbol Panbanisha writes represents "collar." It indicates the collar Panbanisha must wear when she goes out. S-R: That's an **institutional requirement**.¹⁰ Narr: This symbol is not as clear as the others, but one can see Panbanisha is trying to produce a curved line and several straight lines. Researchers began to record what Panbanisha said, by writing lexigrams on the floor with chalk. Panbanisha watched. Soon she began to write as well. The bonobo's abilities have stunned scientists around the world. How did they develop?

⁵ A "hide" is animal skin that has been made into leather.

⁶ The noun "flake" here is an archeological term that refers to a small, sharp piece of stone that has been intentionally broken off to be used as a tool.

⁷ Something that "bears a striking resemblance" to something else looks almost exactly the same.

⁸ An "A-frame" describes the triangle shape of a simply constructed building.

⁹ A "lexigram" is a symbol that represents a specific word.

¹⁰ When Savage-Rumbaugh says "institutional requirement," she means that it's a rule in their research facility. Anytime a bonobo goes outside, the ape must wear a collar.

S-R (video): We found that the most important thing for permitting bonobos to acquire language is not to teach them. It's simply to use language around them, because the driving force in language acquisition is to understand what others, that are important to you, are saying to you. Once you have that capacity, the ability to produce language comes rather naturally and rather freely. So we want to create an environment in which bonobos, like all of the individuals with whom they are interacting—we want to create an environment in which they have fun, and an environment in which the others are meaningful individuals for them. Narr: This environment brings out unexpected potential in Kanzi and Panbanisha. . . .

Researcher (video): OK, now get the **monsters**.¹¹ Get them. Take the cherries, too. Now watch out, stay away from them

now. Now you can chase them again. Time to chase them. Now you have to stay away. Get away. Run away. Run. Now we can chase them again. Go get them. Oh, no! Good, Kanzi. Very good. Thank you so much. . . . S-R: So we have a bi-species environment; we call it a "panhomoculture." We're learning how to become like them. We're learning how to communicate with them, in really high-pitched tones. We're learning that they probably have a language in the wild. And they're learning to become like us. Because we believe that it's not biology; it's culture. So we're sharing tools and technology and language with another species.

Thank you.

¹¹ The word "monsters" is used to refer to the creatures in the video game that the bonobo is playing in the video. The video game, called Pac-Man, was popular during the 1980s.

Unit 10 **CHRIS HADFIELD**

What I Learned from Going Blind in Space

Part 1

What's the scariest thing you've ever done? Or another way to say it is, what's the most dangerous thing that you've ever done? And why did you do it? I know what the most dangerous thing is that I've ever done because NASA does the math. You look back to the first five shuttle launches, the odds of a catastrophic event during the first five shuttle launches was one in nine. And even when I first flew in the shuttle back in 1995, 74 shuttle flight, the **odds**¹ were still now that we look back about 1 in 38 or so—1 in 35, one in 40. Not great odds, so it's a really interesting day when you wake up at the **Kennedy Space Center**² and you're going to go to space that day because you realize by the end of the day you're either going to be floating effortlessly, gloriously in space, or you'll be dead. . . .

Announcer: 12, 11, 10, 9, 8, 7, 6—start, 2, 1, booster ignition, and liftoff of the space shuttle Discovery, returning to the space station, paving the way . . .

Hadfield: It is incredibly powerful to be on board one of these things. You are **in the grip of**³ something that is vastly more powerful than yourself. It's shaking you so hard, you can't focus on the instruments in front of you. It's like you're in the jaws of some enormous dog and there's a foot in the small of your back pushing you into space, accelerating wildly straight

up, shouldering your way through the air, and you're in a very complex place—paying attention, watching the vehicle go through each one of its **wickets**⁴ with a steadily increasing smile on your face. After two minutes, those solid rockets explode off and then you just have the liquid engines, the hydrogen and oxygen, and it's as if **you're in a dragster with your foot to the floor**⁵ and accelerating like you've never accelerated. You get lighter and lighter, the force gets on us heavier and heavier. It feels like someone's pouring cement on you or something. Until finally, after about eight minutes and 40 seconds or so, we are finally at exactly the right altitude, exactly the right speed, the right direction, the engine shut off, and we're weightless. And we're alive.

It's an amazing experience. But why would we take that risk? Why would you do something that dangerous? In my case, the answer is fairly straightforward. I was inspired as a youngster that this is what I wanted to do. I watched the first people walk on the moon and to me, it was just an obvious thing—I want to somehow turn myself into that. But the real question is, how do you deal with the danger of it and the fear that comes from it? How do you deal with fear versus danger?

And having the goal in mind, thinking about where it might lead, directed me to a life of looking at all of the small details

¹ The plural noun “odds” describes a ratio of likelihood that something will happen. The term is commonly used in gambling or betting.

² The Kennedy Space Center, in Florida, is where NASA's shuttles launch from.

³ To be “in the grip of” something describes a state of not being in control of your actions. The “something” has more power than you do in the situation.

⁴ The noun “wicket” here is used to describe the checkpoints or stages along the way that the shuttle must go through in order to safely make it to space.

⁵ A “dragster” refers to a car made for racing, and to have your “foot to the floor” means that you are accelerating that car as fast as it can go.

to allow this to become possible, to be able to launch and go help build a space station where you are on board a million-pound creation that's going around the world at five miles a second, eight kilometers a second, around the world 16 times a day, with **experiments on board that are teaching us what the substance of the universe is made of**⁶ and running 200 experiments inside. But maybe even more importantly, allowing us to see the world in a way that is impossible through any other means, to be able to look down and have—if your jaw could drop, it would—the jaw-dropping gorgeousness of the turning orb like a self-propelled art gallery of fantastic, constantly changing beauty that is the world itself. And you see, because of the speed, a sunrise or a sunset every 45 minutes for half a year. And the most magnificent part of all that is to go outside on a spacewalk.

You are in a one-person spaceship that is your spacesuit, and you're going through space with the world. It's an entirely different perspective, you're not looking up at the universe, you and the Earth are going through the universe together. And you're holding on with one hand, looking at the world turn beside you. It's roaring silently with color and texture as it pours by just mesmerizingly next to you. And if you can tear your eyes away from that and you look under your arm down at the rest of everything, it's unfathomable blackness, with a

texture you feel like you could stick your hand into. And you are holding on with one hand, one link to the other seven billion people.

Part 2

And I was outside on my first spacewalk when my left eye went blind, and I didn't know why. Suddenly my left eye **slammed shut**⁷ in great pain and I couldn't figure out why my eye wasn't working. I was thinking, what do I do next? I thought, well, maybe that's why we have two eyes, so I kept working. But unfortunately, without gravity, tears don't fall. So you just get a bigger and bigger ball of whatever that is mixed with your tears on your eye until eventually, the ball becomes so big that the surface tension takes it across the bridge of your nose like a tiny little waterfall and goes "**goosh**"⁸ into your other eye, and now I was completely blind outside the spaceship. . . .

If you're outside on a spacewalk and you're blinded, your natural reaction would be to panic, I think. It would make you nervous and worried. But we had considered **all the venom, and we had practiced with a whole variety of different spider webs**.⁹ We knew everything there is to know about the spacesuit and we trained underwater thousands of times.

⁶ Hadfield is referring to the experiments being conducted by the scientists living aboard the space station. These experiments are literally teaching us about space and the universe.

⁷ The expression "slammed shut" gives us the understanding that Hadfield's eye problem was unexpected, sudden, and dramatic.

⁸ The word "goosh" is the sound that liquid makes when a large amount of it falls down.

⁹ Hadfield is referring to the preparation work he did in training as being analogous to walking through spider webs to deal with spider phobia. This is covered in Lesson A.

And we don't just practice things going right, we practice things going wrong all the time, so that you are constantly walking through those spider webs. And not just underwater, but also in **virtual reality labs**¹⁰ with the helmet and the gloves so you feel like it's realistic. So when you finally actually get outside on a spacewalk, it feels much different than it would if you just went out first time. And even if you're blinded, your natural, panicky reaction doesn't happen. Instead you kind of look around and go, "OK, I can't see, but I can hear, I can talk, **Scott Parazynski**¹¹ is out here with me. He could come over and help me." We actually practiced incapacitated crew rescue, so he could float me like a blimp and stuff me into the **airlock**¹² if he had to. I could find my own way back. It's not nearly as big a deal. And actually, if you keep on crying for a while, whatever that **gunk**¹³ was that's in your eye starts to dilute and you can start to see again, and Houston, if you negotiate with them, they will let you then keep working. We finished everything on the spacewalk and when we came back inside, Jeff got some cotton batting and took the crusty stuff around my eyes, and

it turned out it was just the anti-fog, sort of a mixture of oil and soap, that got in my eye. And now we use **Johnson's No More Tears**,¹⁴ which we probably should've been using right from the very beginning.

But the key to that is by looking at the difference between perceived danger and actual danger, where is the real risk? What is the real thing that you should be afraid of? Not just a generic fear of bad things happening. You can fundamentally change your reaction to things so that it allows you to go places and see things and do things that otherwise would be completely denied to you . . . where you can see the hardpan south of the Sahara, or you can see New York City in a way that is almost dreamlike, or the unconscious gingham of Eastern Europe fields or the Great Lakes as a collection of small puddles. You can see the fault lines of San Francisco and the way the water pours out under the bridge, just entirely different than any other way that you could have if you had not found a way to conquer your fear. You see a beauty that otherwise never would have happened. . . .

¹⁰ A "virtual reality lab" is a room where computers create fake realities to test human reactions and skills in different situations.

¹¹ Scott Parazynski, Hadfield's partner on the spacewalk when he went blind, is an American astronaut who has been on over five shuttle flights.

¹² An "airlock" is a space with doors on either end in which the pressure is controlled so that a person can pass between two places with varying degrees of pressure.

¹³ The term "gunk" is a colloquial one used to refer to substances that are sticky.

¹⁴ "Johnson's No More Tears" is a brand of children's soap and shampoo that does not sting when it gets in the eyes.