

Unit 1

3 b The American lawn and the lawn mower

Track 1

Speaker 1: We're going to share with you how the perfect lawn became a symbol of the American Dream – and of course, all that grass inspired innovations in mowing.

There's a few steps to take along the way to the perfect front lawn, so I have enlisted the help of some experts to answer the question. So, let's get started by asking: Why do you need to mow grass in the first place?

Speaker 2: Why you need to mow grass? Well, we need to go back a little in time.

With the rise of suburbia in post-WW II America, the perfect lawn became a potent symbol of the American dream. By contrast, Europe's historical development of lawns had largely expressed values of elitism and power: Some medieval castle dwellers needed their tall grass hand-cut in order to see approaching enemies. Landowners with livestock required fields cut down to grazeable heights. And wealthy people with leisure time tamed nature into neatly trimmed surfaces for sporting endeavors like golf, tennis and lawn bowling.

Speaker 3: Historic context done, the first step was certainly the G.I. Bill and Home Ownership that came with it.

In 1944, President Franklin Roosevelt signed the Servicemen's Readjustment Act, better known as the G.I. Bill, to provide educational and home loan benefits for millions of veterans returning from World War II. As homeownership rates rose from 44 percent in 1940 to almost 62 percent in 1960, owning a home became synonymous with the American dream. A manicured lawn became a physical manifestation of that dream. "A fine lawn makes a frame for a dwelling," explained Abe Levitt, "It is the first thing a visitor sees. And first impressions are the lasting ones."

Speaker 4: Alright, but the one person and yes, it is one person who started it all, was Frederick Law Olmsted, father of the American lawn.

Frederick Law Olmsted is best known as the landscape architect of New York's Central Park with its rolling meadows. But in 1868, he received a commission to design one of America's first planned suburban communities. Each house in the Riverside, Illinois development was set 30 feet back from the street. And unlike the homes in England, which were often separated by high walls, Richmond's yards were open and connected to give the impression of one manicured lawn, evoking the possibility that the lawn was accessible to everyone.

New York Times journalist Michael Pollan wrote in 1989, lawns came to unify and define the American landscape: "France has its formal, geometric gardens, England its picturesque parks, and America this unbounded democratic river of manicured lawn along which we array our houses."

Speaker 5: And this is where we get techy: no neat lawn without a lawn mower, so let's look at the rise of rotary power mowers.

Olmsted's idyllic and boundless lawn had to be perfectly manicured. "The lawn is the owner's principal contribution to the suburban landscape – the piece of the "Park" he keeps up himself," wrote Robert Fishman, a professor of architecture and urban planning at the University of Michigan.

For that job, homeowners needed mowers. In 1830, Englishman Edwin Bear Budding crafted a series of blades around a cylinder to earn the first patent for a mechanical lawn mower. Forty years later, Elwood McGuire, Richmond, Indiana machinist, became the first to design a lightweight push mower. His contraption became the "official mower" of the 1893 Chicago World's Fair, where men demonstrated its use on a large lawn. According to Mike Emery of Richmond's daily newspaper, *The Palladium-Item*, McGuire's invention helped the Indiana city become the lawn mower capital of the world: "Ten Richmond companies produced two-thirds the world's reel push mowers, and the city's innovators and entrepreneurs helped transition to power reel, then power rotary mowers."

In 1935, Leonard Goodall, a Warrensburg, Missouri mechanic, developed a power rotary mower, which made it easier to maintain lawns than the reel-type mowers, which could cut golf greens down to one inch, but had blades that needed constant sharpening.

"[Reel mowers] could not cut high grass, which made it difficult for individuals to push them long enough to mow a large yard," wrote Leonard E. Goodall, the mower pioneer's son. "The post-World

War II suburbanization movement created a great need for a mower that could be used on large lawns.” Goodall’s rotary power mower responded to that need.

The popular power rotary mower drove massive industry growth. According to Virginia Jenkins in *The Lawn: A History of an American Obsession*, power mower production increased from under 35,000 before World War II to 362,000 in 1947 to nearly 1.2 million in 1951.

Speaker 1: But of course, all of that could be taken up yet another notch. From a nice lawn to the wish to have a perfect lawn as vivid as golf greens.

In 1966, when CBS telecast the Masters Golf Tournament in color for the first time, TV viewers could see the perfectly manicured, wall-to-wall vivid green color of the Augusta National Golf Club, whose beautiful Bermuda grass exemplified improvements in turfgrass management. “Virtually everywhere golf courses exhibit magnificent turf, often through 12 months of the year,” *Sports Illustrated* asserted in 1966, “and having seen what is possible, millions of homeowners feel compelled to go and do likewise.”

For a culture growing obsessed with golf in the 1960s, “the perfect lawn rose to become an icon of the American Dream,” wrote Ted Steinberg, a history professor at Case Western Reserve University and a leading scholar on the American lawn.

4 c Morgan from Gold Shaw Farm

Track 2

Hi, it’s Morgan again from Gold Shaw Farm here and today, I’ll be talking to you about why I love homesteading here in Vermont, in this cold climate and how all of this is pretty much like *Star Trek*. But, we’re actually starting with some of our friends. So, my friends Ben and Meg over at the Hollar Homestead have been doing this long ten-month road trip across America really trying to explore the country and figure out where they wanted to ultimately live.

They started out in California and really, you know, just kind of zigzagged their way across the US and I think they hit most of the states. I think there were like three or four that they missed, but, you know, you got to give them a lot of credit for being able to do all that.

Ah, what a great story – it’s amazing to see this family come together as they go across the country. But there was this moment in their podcast which made me say, “Wait a minute!” And it was basically Meg talking about how when they were up here in New England, I think they were in Maine at the time, when they kind of came to this conclusion that their growing season here is from June to September. And that’s kind of a factor why they didn’t want to live here, because really our growing season *is* from June to September and then outside of that you’re pretty much done.

I can’t dispute that fact, so that is very much true here, like, you really shouldn’t be planting anything that’s not in a high foil tunnel before, say, Memorial Day. And then, you know, come the day of the equinox in September – yeah, we should be expecting snow any minute! So, it is entirely true that we don’t have a long growing season, that’s just what it is, but I will say this: If you think about it, it’s kind of nice having a short growing season.

I’m gonna fully acknowledge living up here in a cold climate and trying to be self-sufficient in a cold climate isn’t for everybody. There’s a lot of things you’ve got to consider that, you know, people in a warmer climate – like if you’re down south or you’re out west in California – don’t have to think about. But as long as you can deal with the cold and as long as you can prepare and get the right systems into place ... whether it’s managing animals out in the cold or, you know, keeping your heat on in your house or figuring out how to grow enough food in a short period of time so that you can preserve it and hang on to it ... there’s just some awesome stuff about the short season.

I mean, think about it: how many of you guys who are living in warmer climates where you’re able to do three distinct plantings still have stuff in your garden come December? I mean, how burnt-out are you with gardening by that point then? If you also think of the other flipside of it all here in Vermont, we’ll have like less than ten days a year that are north of 90 degrees (that’s 32 degrees Celsius for Europeans who are listening in!) and when you think about our summers, overall, they are absolutely incredible. They are these crisp, beautiful, warm early-hour days, and yeah, we have enough rain mixed in, but it’s not too humid, just quite temperate – I mean the summer months here are outstanding. The fall, I mean the foliage in the fall is just incredible out here. I think trying to homestead out here in a northern climate – it’s a lot like *Star Trek*: it’s not for everybody, but the people who like it are way

into it! Or else, of course, if you're unsure: try a simpler costume, don't go for the full-on Klingon warrior, if you know what I mean.

I mean, for me personally, I love it in this type of setting – I love getting bundled up, I like the rituals that you have to have and the simplified life that has to exist, just pushing things through. And I don't personally find anything wrong with the fact that when there's two feet of snow out in the pasture, the only way you're getting around is either by snowmobile or snowshoes. I mean it's not to say there aren't the crappy things too out here, you know. Having to wake up every morning and plow and shovel to even get to your car, having your water freeze on your ducks on a constant basis – but, that said, I love being out here in the cold and I love the rest period in the winter.

So, that is me standing on my soapbox relating to you why I like it here in a cold climate. If you want to learn more about us and how we manage our homestead here in northern Vermont be sure to check out one of our other podcasts and I'll see you next time here on Gold Shaw Farm, where we're trying to build a farm and a home in Vermont. Thanks.

Unit 2

4 a Targeting the individual

Track 3

John: Every time you go shopping, you share intimate details about your consumption patterns with retailers. And many of those retailers are studying those details to figure out what you like, what you need, and which coupons are most likely to make you happy. Target, for example, has figured out how to data-mine its way into your womb, to figure out whether you have a baby on the way long before you need to start buying diapers. Target tries to hook parents-to-be at that crucial moment before they turn into rampant – and loyal – buyers of all things pastel, plastic, and miniature. With me here is marketing and data expert Deborah Garcia who can shed some light on how it's done. Hi, Deborah.

Deborah: Hi, John.

John: So how did they do it? How could Target predict a pregnancy?

Deborah: Well, Target assigns every customer a guest ID number, tied to their credit card, name, or email address that becomes a bucket that stores a history of everything they've bought and any demographic information Target has collected from them or bought from other sources.

John: So they have our data and use it for advertising purposes, is that right?

Deborah: You could put it like that, but let me continue ... Using the data, they looked at historical buying data for all the ladies who had signed up for Target baby registries in the past. They ran test after test, analyzing the data, and before long some useful patterns emerged. Lotions, for example. Lots of people buy lotion, but someone noticed that women on the baby registry were buying larger quantities of unscented lotion around the beginning of their second trimester. Another analyst noted that sometime in the first 20 weeks, pregnant women loaded up on supplements like calcium, magnesium and zinc. Many shoppers purchase soap and cotton balls, but when someone suddenly starts buying lots of scent-free soap and extra-big bags of cotton balls, in addition to hand sanitizers and washcloths, it signals that they could be getting close to their delivery date. Target was then able to identify about 25 products that, when analyzed together, allowed them to assign each shopper a "pregnancy prediction" score. More importantly, they could also estimate her due date to within a small window, so Target could send coupons timed to very specific stages of a pregnancy.

John: Isn't that just crazy? Deborah, you also wanted to share the story of a concerned father, is that right?

Deborah: Yes, well, Target started sending coupons for baby items to customers according to their pregnancy scores. There is an anecdote – so good that it sounds made up – that conveys how eerily accurate the targeting is. An angry man went into a Target outside of Minneapolis, demanding to talk to a manager. He complained that his daughter had got coupons for baby clothes and cribs in the mail although she was still in high school. He actually accused Target of encouraging her to get pregnant. The manager didn't actually have any idea what the man was talking about. He looked at the mailer. Sure enough, it was addressed to the man's daughter and contained advertisements for maternity clothing, nursery furniture and pictures of smiling

infants. The manager apologized and then called a few days later to apologize again. On the phone, though, the father was somewhat abashed. He had had a talk with his daughter, and it turned out there'd been some activities in his house he hadn't been completely aware of. His daughter was due in August.

John: So, Target was actually right about the pregnancy?

Deborah: Yes, they were. But what Target discovered fairly quickly was that it creeped people out that the company knew about pregnancies in advance. So Target got sneakier about sending the coupons. The company can create personalized booklets; instead of sending people with high pregnancy scores books of coupons solely for diapers, rattles, and strollers, they more subtly spread them about: they started mixing in all these ads for things they know pregnant women would never buy, so the baby ads looked random. They'd put an ad for a lawn mower next to diapers or a coupon for wineglasses next to infant clothes. That way, it looks like all the products were chosen by chance.

John: I think most of us will find it both unsettling and unsurprising. With all the talk these days about the data grab most companies are engaged in, Target's collection and analysis seem as expected as its customers' babies. But with their analysis moving into areas as sensitive as pregnancy, and so accurately, who knows how else they might start profiling Target shoppers?

Unit 3

2 a The power of YET

Track 4

I heard about a high school in Chicago where students had to pass a certain number of courses to graduate, and if they didn't pass a course, they got the grade "Not Yet." And I thought that was fantastic, because if you get a failing grade, you think, I'm nothing, I'm nowhere. But if you get the grade "Not Yet", you understand that you're on a learning curve. It gives you a path into the future.

"Not Yet" also gave me insight into a critical event early in my career, a real turning point. I wanted to see how children coped with challenge and difficulty, so I gave 10-year-olds problems that were slightly too hard for them. Some of them reacted in a shockingly positive way. They said things like, "I love a challenge," or, "You know, I was hoping this would be informative." They understood that their abilities could be developed. They had what I call a growth mindset. But other students felt it was tragic, catastrophic. From their more fixed mindset perspective, their intelligence had been up for judgment, and they failed. Instead of luxuriating in the power of yet, they were gripped in the tyranny of now.

So what do they do next? I'll tell you what they do next. In one study, they told us they would probably cheat the next time instead of studying more if they failed a test. In another study, after a failure, they looked for someone who did worse than they did so they could feel really good about themselves. And in study after study, they have run from difficulty. Scientists measured the electrical activity from the brain as students confronted an error.

With the fixed-mindset students, there's hardly any activity. They run from the error. They don't engage with it. But students with the growth mindset show that abilities can be developed. They engage deeply. Their brain is on fire with yet. They engage deeply. They process the error. They learn from it and they correct it.

How are we raising our children? Are we raising them for now instead of yet? Are we raising kids who are obsessed with getting As? Are we raising kids who don't know how to dream big dreams? Their biggest goal is getting the next A, or the next test score? And are they carrying this need for constant validation with them into their future lives? Maybe, because employers are coming to me and saying, "We have already raised a generation of young workers who can't get through the day without an award."

So what can we do? How can we build that bridge to yet?

Here are some things we can do. First of all, we can praise wisely, not praising intelligence or talent. That has failed. Don't do that anymore. But praising the process that kids engage in, their effort, their strategies, their focus, their perseverance, their improvement. This process praise creates kids who are hardy and resilient.

There are other ways to reward yet. We recently teamed up with game scientists from the University of Washington to create a new online math game that rewarded yet. In this game, students were

rewarded for effort, strategy and progress. The usual math game rewards you for getting answers right, right now, but this game rewarded process. And we got more effort, more strategies, more engagement over longer periods of time, and more perseverance when they hit really, really hard problems.

Just the words “yet” or “not yet,” we’re finding, give kids greater confidence, give them a path into the future that creates greater persistence. And we can actually change students’ mindsets. In one study, we taught them that every time they push out of their comfort zone to learn something new and difficult, the neurons in their brain can form new and stronger connections, and over time, they can get smarter.

Look what happened: In this study, students who were not taught this growth mindset continued to show declining grades over this difficult school transition, but those who were taught this lesson showed a sharp rebound in their grades. We have shown this now, this kind of improvement, with thousands and thousands of kids, especially struggling students.

So let’s talk about equality. In the US, there are groups of students who chronically underperform, for example, children in inner cities, or children on Native American reservations. And they’ve done so poorly for so long that many people think it’s inevitable. But when educators create growth mindset classrooms steeped in yet, equality happens. And here are just a few examples. In one year, a kindergarten class in Harlem, New York scored in the 95th percentile on the national achievement test. Many of those kids could not hold a pencil when they arrived at school. In a year to a year and a half, Native American students in a school on a reservation went from the bottom of their district to the top, and that district included affluent sections of Seattle. So the Native kids outdid the Microsoft kids. This happened because the meaning of effort and difficulty were transformed. Before, effort and difficulty made them feel dumb, made them feel like giving up, but now, effort and difficulty, that’s when their neurons are making new connections, stronger connections. That’s when they’re getting smarter.

Let’s not waste any more lives, because once we know that people of all abilities are capable of such growth, it becomes a basic human right for children, all children, to live in places that create that growth, to live in places filled with “yet”.

6 b Diving headfirst into another language and culture during your school day

Track 5

The Peel District School Board recognizes the importance of exposing children to a second language at an early age. That’s why we are proud to offer our Early French Immersion program.

The Early French Immersion program begins in grade one and Extended French starts in grade seven. French Immersion is a form of bilingual education in which students who do not speak French as a first language will receive instruction in French. The type of instruction they receive depends on the grade the child is in. So how do you know if French Immersion is right for your child?

Here are some of the key things to look for to answer this question.

If they’re very verbal, they enjoy telling stories, they’re not shy, they like to mimic, they have a good memory and they’re willing to try new things. If they get excited about reading books, and about books being read to them.

Also, children who have a dramatic, theatrical flair are very often kids who will be successful in French Immersion.

What’s important though is that parents should continue to speak in the child’s native tongue.

What are some of the indicators we look for that a child is succeeding in French Immersion?

My biggest indicator is that the child is happy. First and foremost, they’re excited about coming to school. And at home they are teaching all of the family members the new French vocabulary and certainly trying to demonstrate their extrovert skills.

Also, they might be singing the songs that they’re learning at school, they’re counting, they’re repeating words, they’re beginning to identify objects in the home using the French vocabulary, they’re sharing their excitement of learning a new language with the family.

They also enjoy hearing the French language in audio books, French audio books, that are available at the library, as well as TV programs in French.

One of the biggest pieces of advice I can give students who are unsure is to stick with it. It may be challenging at first and French Immersion might not be right for everyone, but it pays huge dividends in the end.

Some of these children also demonstrate a keener interest in learning other languages, including home languages that they may not have thought about in the past.

In the French Immersion program, your child will have the same opportunities to join clubs, programs, and extracurricular activities as they would in the regular school program.

Canadian Parents for French, or CPF, is the national network of volunteers that values French as an integral part of Canada and is dedicated to the promotion and creation of French second language learning opportunities for young Canadians. They offer workshops and programs to parents. It helps with learning, supporting your kids at home as well as providing different techniques you can use as parents. Call 905-366-1012 for more information or visit us online.

Unit 4

1 b Considering the role of language for successful integration

Track 6

Mamacita is the big mama of the man across the street, third-floor front. Rachel says her name ought to be *Mamasota*, but I think that's mean.

The man saved his money to bring her here. He saved and saved because she was alone with the baby boy in that country. He worked two jobs. He came home late and he left early. Every day.

Then one day *Mamacita* and the baby boy arrived in a yellow taxi. The taxi door opened like a waiter's arm. Out stepped a tiny pinky shoe, a foot soft as a rabbit's ear, then the thick ankle, a flutter of hips, fuchsia roses and green perfume. The man had to pull her, the taxicab driver had to push. Push, pull. Push, pull. Poof!

All at once she bloomed. Huge, enormous, beautiful to look at from the salmon-pink feather on the tip of her hat down to the little rosebuds of her toes. I couldn't take my eyes off her tiny shoes.

Up, up, up the stairs she went with the baby boy in a blue blanket, the man carrying her suitcase, her lavender hatboxes, a dozen boxes of satin high heels. Then we didn't see her.

Somebody said because she's too fat, somebody because of the three flights of stairs, but I believe she didn't come out because she is afraid to speak English, and maybe this is so since she only knows eight words. She knows to say: *He is not here* for when the landlord comes, *No speak English* if anybody else comes, and *Holy smokes*. I don't know where she learned this, but I heard her say it one time and it surprised me.

My father says when he came to this country, he ate *hamandeggs* for three months. Breakfast, lunch, and dinner. *Hamandeggs*. That was the only word he knew. He doesn't eat *hamandeggs* anymore.

Whatever her reasons, whether she is fat, or can't climb the stairs, or is afraid of English, she won't come down. She sits all day by the window and plays the Spanish radio show and sings all the homesick songs about her country in a voice that sounds like a seagull.

Home. Home. Home is a house in a photograph, a pink house, pink as hollyhocks with lots of startled light. The man paints the walls of the apartment pink, but it's not the same, you know. She still sighs for her pink house, and then I think she cries. I would.

Sometimes the man gets disgusted. He starts screaming and you can hear it all the way down the street.

Ay, she says, she is sad.

Oh, he says. *Not again*.

¿Cuándo, cuándo, cuándo? she asks.

¡Ay caray! We are home. This is home. Here I am and here I stay. Speak English. Speak English. Christ! ¡Ay! *Mamacita*, who does not belong, every once in a while, lets out a cry, hysterical, high, as if he had torn the only skinny thread that kept her alive, the only road out of that country.

And then to break her heart forever, the baby boy, who has begun to talk, starts to sing the Pepsi commercial he heard on TV.

No speak English, she says to the child who is singing in the language that sounds like tin. *No speak English, no speak English*, and bubbles into tears. *No, no, no*, as if she can't believe her ears.

3 b Listening to a refugee expert

Track 7

Ari Shapiro, host: David Miliband is head of the International Rescue Committee, and he joins us to talk about the Ukrainian refugee crisis and the global response. It's good to have you here again.

David Miliband: Thank you, Ari. It's really good to talk to you.

Ari Shapiro: One thing that makes this refugee crisis different from any other that I have reported on is that there are no refugee camps. Ukrainians are not living in tents on the border. How has Europe avoided that?

David Miliband: The answer from Europe has been very, very striking. It's to say every Ukrainian is guaranteed three years residence in Europe, three years work permits in Europe, three years access to social services, including education. Every Ukrainian is guaranteed access to welfare benefits. And what they've then done is said, the government is playing its part. We appeal to the European population to house these people on a short-term basis and then facilitate their entry into rented housing for the longer term.

From my point of view, this is very positive, because although refugee camps often typify the image of a refugee, they're not the main experience. Most refugees are in urban areas, not in camps. And for those who do go into a camp, how many times have you and I heard the camp is set up on a temporary basis, and then people are still there 20 years later? I describe refugee camps as funeral homes for dreams. And so I think the fact that the Europeans have avoided creating new cities as refugee camps is very positive.

Ari Shapiro: Do you see a double standard because of the way that Poland has welcomed Ukrainian refugees is such a contrast to the walls and roadblocks that Poland and other countries put up to Syrians, Afghans and others? Even today, African students who were studying in Ukraine when the war broke out tell me they have been treated poorly in Poland.

I met a Nigerian student named Shakira who was getting her master's degree when the war began. Now she's living in a shelter outside of Warsaw, and this is what she said to me.

Shakira: We've been here for, like, going two months. You're stuck in between. You know, you can't go forward. You can't go backward. The law should favour us also. We are not Ukrainians, yes, but you should understand that we were there when this war happened.

Ari Shapiro: David Miliband, do you think Ukrainians are being treated differently as refugees because they're European, because they're white?

David Miliband: Yes, they are, and that's quite wrong. It's actually formalized, which is that the European commitment that Ukrainian refugees can have the three years of work, residency, etc. – that's not true if you're not a Ukrainian. And, of course, globally, rights to work, rights to residency are much prized but not often given in the way that they have been. And I think it's – there's a bigger bit of politics here because although 141 countries around the world did condemn the Russian invasion in the UN General Assembly, 50 countries also didn't. And one of the reasons that they didn't want to condemn the Russian invasion is that they saw double standards – in the way that the refugees from Ukraine were being treated compared to the way other refugees are being treated.

And so I think there is both a moral argument, a legal argument, but also a geopolitical argument that this needs to be a learning moment for the way the world recognizes that a refugee is defined not by their nationality, but by their status. And that's what it says in the law, and that's what should be played out, especially by richer countries who have no excuse, frankly, for the discrimination that exists.

Ari Shapiro: We talked about the reasons it's helpful not to have refugee camps. On the flip side of that, having people dispersed and scattered means it's more difficult to offer medical help, to offer education, to offer some of the things that everybody who's dislocated needs. How does the international community respond to those challenges, which are in some ways unique to this refugee crisis which does not have people centralized in one place?

David Miliband: Well, it's true in other refugee crises that if you go to Beirut in Lebanon, Lebanon won't have any refugee camps for Syrians because of their – they know the history of what happens with refugee camps. They had refugee camps set up in the late 1940s for Palestinians, and they're still there 70 years later.

But I think that our experience now is that there is good practice for how to do this dispersed integration effectively. And the Ukrainians are clear, just like many other refugee populations, they want to go home when it's safe. The trouble is they don't know when it's going to be safe. And that needs to be respected.

Ari Shapiro: As you've laid out, there are open-ended questions and needs that still have to be met. That said, how would you compare the success of this refugee effort to other crises that you've been involved with?

David Miliband: Well, we can compare it, first of all, in funding. And effectively, seven, eight times the amount of funding per head has been available for Ukrainians as for Syrians or Afghans or South Sudanese or Rohingya fleeing from Myanmar. Secondly, I think the organization has been facilitated by the fact that Europe's a very rich continent by global standards. Globally, it's poor countries that host refugees, not rich countries. Eighty-five percent of the world's refugees are in lower-middle income or poor countries. Europe's been able to rally because it has the infrastructure to do so.

Unit 5

2 a Overlooked the women scientists? No way!

Track 8

Historically, science has been a male-dominated field. Despite dramatic increases in representation over the last 40 years, today, fewer than 30 percent of researchers globally in science, technology, engineering and mathematics, also referred to as STEM – careers are women.

Women scientists are paid less for entry level jobs, they tend to have shorter careers with less progression and growth and only make up about 25 percent of scientific paper authors despite publishing an equal number as their male counterparts. It's even less in fields like math, physics and computer science, where women authorship is 15 percent.

Yet in the face of enormous challenges, numerous women have fought their way to the fore and flourished. Here are six lesser-known women scientists who defied the norm, excelled, and made lasting impacts in their fields and beyond.

Eunice Foote, American scientist (1819–1888)

The greenhouse effect – the gradual warming of Earth's atmosphere – is one of the foundational discoveries of climate science that is often credited to British scientist John Tyndall. But it was actually the pioneering scientist and women's rights activist Eunice Foote who first theorized and demonstrated the greenhouse effect.

In the 1850s, she performed a series of experiments, where she filled glass cylinders with different gases, placed them in the sun, and measured temperature changes. Her findings demonstrated that the sun's rays are warmer when passing through moist air compared to dry air – and they are warmest when shining through carbon dioxide.

In 1857, she published her ground-breaking findings in the *American Journal of Science*, but was largely overlooked (she even had to ask a male colleague to present her findings at a scientific conference because she was not allowed). Despite publishing her results three years before Tyndall, he was credited with discovering the greenhouse effect until recently. Today, climate scientists seeking to right past wrongs are pushing to give Foote her due credit and recognition for her early discoveries.

Lise Meitner, Austrian & Swedish physicist (1878–1968)

The discovery of nuclear fission – the ability to split atoms – changed nuclear physics and the world, laying the foundation for the development of the atomic bomb and nuclear reactors. We have physicist Lise Meitner to thank for it. She suggested her chemist colleagues, Otto Hahn and Fritz Strassman, try bombarding uranium atoms with neutrons in order to learn more about uranium decay. But being a Jewish woman living in Berlin in 1938, she was abruptly forced to flee to Stockholm to avoid persecution by the Nazis, and left her research behind. While she was in forced exile, Hahn and Strassman began to get some unexpected and hard-to-explain results. She partnered with Austrian-born British physicist Otto Frisch, who was also in Sweden at the time, and the duo named and described what Hahn and Strassman uncovered: fission.

Despite her involvement, the men surrounding Meitner were credited with the discovery. When a Nobel Prize was awarded to Hahn for "his discovery of the fission of heavy nuclei" in 1945, Meitner

was never mentioned. She was nominated 48 times for Physics and Chemistry Nobel Prizes but never won. In 1966, Meitner was finally recognized for her contributions to nuclear fission when the US awarded her the Enrico Fermi Award alongside Hahn and Strassman. She passed away two years later.

Alice Ball, American chemist (1892–1916)

Leprosy, also known as Hansen’s Disease, is a devastating, highly stigmatized bacterial infection that has plagued humankind for eons – the earliest mention of a leprosy-like disease comes from an Egyptian papyrus dating to around 1550 B.C. Traditionally, one of the most common methods for treating contagious patients was no treatment at all – they were often taken to isolated locations where they would suffer and eventually die in isolation. Oil from the chaulmoogra tree, a traditional Chinese and Indian medicine, was known to alleviate symptoms, but it was difficult to apply and couldn’t be injected because the oil didn’t mix with blood.

In 1916, African American chemist Alice Ball discovered a breakthrough in treatment. Twenty-three-year-old Ball, the first woman and the first Black chemistry professor at the University of Hawaii, discovered how to transform chaulmoogra oil into fatty acids and ethyl esters that would make the medicine injectable. Months after her faculty appointment and discovery, Ball died from complications related to a lab accident. The head of her department, Arthur Dean, continued her work and published Ball’s chemical process under the name “Dean’s method” after himself. Fortunately, one of Ball’s colleagues spoke up and helped change the name to “Ball’s method.”

Bessie Blount, American nurse, inventor and handwriting expert (1914–2009)

As a child, Bessie Blount was once reprimanded by her schoolteacher for being left-handed. So naturally, she learned how to write with both hands as well as with her mouth and toes. After becoming a nurse and accredited physiotherapist she used her unique skill set to help young amputees returning from World War II learn new ways of accomplishing daily tasks.

She went on to invent devices that made everyday activities easier for veterans with disabilities, including a self-feeding apparatus for amputees. She shared it with the American Veteran’s Association and was the first Black woman to appear on the *The Big Idea*, a TV show about modern inventions, in 1953 – but had trouble garnering support. She eventually donated the patent for the self-feeding apparatus to the French government so people could freely benefit from the invention. Some of her later health-oriented inventions are still used in hospitals today.

Elinor Ostrom, American economist (1933–2012)

American economist Elinor Ostrom was the first woman to be awarded the Nobel Prize for Economic Sciences in 2009. She received the award for her groundbreaking research demonstrating that ordinary people are capable of creating rules and institutions that allow for the sustainable management of shared common resources such as fresh water, forests or fishing rights. According to her research, these are best managed when those who benefit from them the most are close to that resource. For Ostrom, the tragedy occurred when external groups exerted their political, economic or social power to gain a personal advantage. For a long time, it was assumed that humans weren’t great at sharing and that individuals will act in their own self-interest and exploit or deplete those resources, even if it is bad for the whole group, when they have unregulated access to resources. Ostrom documented communities around the world that effectively managed their shared natural resources to ensure that they remained viable even for future inhabitants by organizing access at the local level. Ostrom suggested that local and regional organization is paramount to tackling the climate crisis and cautioned against relying heavily on global policy as a solution.

Carolina Vera, Argentinian meteorologist (born 1962)

From a very young age, Carolina Vera has been fascinated by the weather. Inspired by her mother who taught her to admire natural phenomena, such as clouds and heavy storms, she decided to pursue a career in applied physics, but ultimately chose to study meteorology.

When Carolina started her PhD at the University of Buenos Aires (UBA), she quickly became aware that being a woman working in science had both advantages and disadvantages. She realized that some male senior scientists and professors treated her differently from her fellow male students. For example, one of the professors did not feel comfortable discussing science topics with her during meetings and even went as far as to tell her: “I don’t want you to contradict me in public.” With her strong personality, Carolina was able to overcome these issues and find her own way as a scientist.

Despite its challenges, being a woman from a developing country gave Carolina the opportunity to participate in international scientific committees and programmes at a very early stage in her career. On some occasions, she was the only woman in a meeting or a committee. Although she grasped these opportunities wholeheartedly, she always worked very hard to show that she deserved to be there on merit and not just because of gender or geographical balance. That's what makes the passionate University Professor an important voice for underrepresented groups. Vera continues to pave the way for other female climate scientists. She serves as Vice Chair of Working Group 1 of the Intergovernmental Panel on Climate Change (IPCC), headquartered in Geneva, Switzerland, which was founded in 1988 and remains one of the most authoritative global sources on climate science and plays a key role in global policy.

Focus on sRP

2 a Aspect: arts and culture

Track 9

You are going to listen to a podcast about the use of AI in art. First you will have 45 seconds to study the task below, then you will hear the recording twice. While listening, match the beginnings of the sentences (1–9) with the sentence endings (A–K). There are two sentence endings that you should not use. Write your answers in the spaces provided. The first one (0) has been done for you.

After the second listening, you will have 45 seconds to check your answers.

Lizzie O'Leary: Drew Harwell covers technology for *The Washington Post*. But recently he wrote a story about a piece of art called 'Théâtre d'Opéra spatial'. That's French for 'space opera theater'.

Drew Harwell: It's this gorgeous-looking painting of a giant baroque hall where there are these three women on stage. It looks sort of sci-fi and mysterious, but also kind of old world. It's a really cool image.

Lizzie O'Leary: What's so important about it?

Drew Harwell: Well, it was created by an AI called Midjourney. You type in a text prompt and it spits out an image.

Lizzie O'Leary: This particular image was entered into the Colorado State Fairs Fine Art competition by a man named Jason Allen. Allen said the piece was made with Midjourney, but nobody really knew what that meant. And you can guess where this is going. He won.

Drew Harwell: He was one of 21 people to submit in the digitally manipulated photography category. This opened up this big debate over, you know, are we comfortable with AI beating us at our own game? After he won, many people were angry and convinced that he had cheated and had actually lied to the judges.

Lizzie O'Leary: Art generated by AI isn't just something that wins prizes or is a fascinating subject for debate. It has valuable commercial uses that, to some, are a little frightening. If you're, say, a graphic designer.

Drew Harwell: You're already starting to see some of these images illustrating news articles, being used as logos for companies, or used in the form of stock art for small businesses and websites. Anything where somebody would have gone and paid for an illustrator or graphic designer or artist to make something, they can now go to this AI and create something in a few seconds at a fraction of the price. And from a commercial perspective, that's scary, right? I think it is a legitimate fear, when something can mirror your skill set. Not 100% of the way, but enough of the way that it can replace you. You know, the software engineers see it like they're just creating the new generation of digital camera, the new generation of Photoshop and they don't feel any kind of moral responsibility because their technology could put people out of jobs.

Lizzie O'Leary: This is making me wonder about the humans underneath the data sets that the AI is trained on. The criticism is, of course, that these businesses are making money off of thousands of artists' work without their consent or knowledge and that it undermines their work.

Drew Harwell: I'm actually really sympathetic to that argument because, you know, some people could call this plagiarism, right? AIs use data sets that literally include images of thousands of artists. And when the AI wants to make something, it's going to look exactly at those images and infer things from them.

Lizzie O'Leary: There's no question that an AI can make compelling images or even beautiful ones. But when you start to think beyond technical skill to the emotional resonance or cultural commentary contained in great art, a computer seems destined to fall far short of a human. I'm thinking of the artist Kara Walker. A lot of her art draws on hyperracialized, hypersexualized images of black people and black women. I could very quickly see an AI trained on Kara Walker's work not having the commentary, not being subtle or interesting or critiquing in that way, and just popping out some racist images.

Drew Harwell: Yeah, totally. And that's where the humans get back the upper hand, right? We can understand things about cultural context and the AI is just nowhere close to understanding it. When we talk about 'Space Opera', we think of *Star Wars* and *Star Trek*. But when you look at Allen's image, it looks like there's elements of space images and there's elements of Italian opera. Like, that's why I think the women are in these operatic baroque robes. It's a mix of images the AI found in the data set.

Lizzie O'Leary: The pro argument is that art is always evolving and so are the tools that humans use to make it. They're just different depending on the era.

Drew Harwell: A hundred or 200 years ago, there was a view that, you know, even photography was not real art, right? It was just somebody hitting a button on a camera, capturing what they saw in real life. And now we understand that it's photography. It's become an artform. So we can actually say that Allen's 'Space Opera' is a piece of art as well.

2 b Aspect: nutrition

Track 10

You are going to listen to a recording about an 18th century physician and his views on dieting. First you will have 45 seconds to study the task below, then you will hear the recording twice. While listening, choose the correct answer (A, B, C or D) for each question (1–10). Write your answers in the spaces provided. The first one (0) has been done for you.

After the second listening, you will have 45 seconds to check your answers.

The list of fad diets out there today is a long one and I've tried them all: Keto, Atkins, Paleo, but I have never tried the first fad diet from Georgian England, Doctor George Cheyne's vegetable and milk diet. George Cheyne lived in London at the beginning of the 18th century and frequented London's most fashionable clubs and taverns where he led a lavish lifestyle, drinking wine and eating lots of exquisite food with other people because he believed that this was the best way to get acquainted with them. As he gained more and more weight, his practice grew as well and soon he found himself working all day and then staying up late into the night drinking and eating and making new friends. He was living the London high life but quickly noticed he was growing excessively fat, constantly short of breath and lethargic. In 1705, after only three years of living in London, George Cheyne – who had never been a slight man – found himself at 32 stone or 203 kilograms. And after a series of what he describes as mild heart attacks or even strokes, he had a complete collapse in his health.

So, being a doctor and using his scientific mind he decided that he was going to find a way to solve his current predicament. Dr Cheyne decided to go on a crash diet of milk, seed bread, mealy root vegetables and fruit and in a matter of six months he claims that he lost 110 kilogram and felt, quote, "lank, fleet and nimble". Those who knew him were in awe of this miracle diet and so he became a bit of a celebrity, but he reverted to his old lifestyle. In a few years had gained most of the weight back and his health was even worse than before.

So, he concluded two things: London was not for him, and it was time to get back on the diet. He moved his family to Bath and rededicated himself to the diet, though in a less strict version, and he wrote an essay on health and long life that would eventually become a best seller.

His new and improved diet did seem to work, especially because as the years went on, he realized that it wasn't a one-size-fit-all kind of thing and would change it slightly based on each patient, sometimes

even including some wine and meat. His patients were some of the cream of English society, such as the poet Alexander Pope. It makes sense that these were the people who suffered from what he called the “English malady” as, quote, “nervous disorders are the disease of the wealthy, the voluptuous, and the lazy... and are mostly produced and always aggravated and increased by luxury and intemperance”. Now the good doctor was not beloved by all. He had his detractors; mostly other doctors. Sour grapes? Perhaps. But Cheyne’s methods were not above scrutiny. I mean, one thing that he prescribed was to quote, “produce gentle vomits each morning”. But it was not the purging that the other doctors scoffed at, but rather his insistence on eating vegetables and getting eight hours of sleep each night. See, Cheyne believed that it was unnatural to be awake late into the evening even though it was something that he had done in his younger years, the reason being that you were susceptible to the noxious damp air and vapours that were produced in the evening hours.

Now, the other part of his diet that was absolutely crucial was his insistence on daily exercise, though nothing too strenuous. According to Cheyne, riding on horseback is the best of all. He says that it is a good exercise because it allowed for all of your internal organs to move up and down in unison. Next to these, are the active games and sports, such as hunting, shooting, bowls, billiards, badminton and the like. But the exercise should only be physical, never mental. Quote, “Study of difficult and intricate matters will infallibly do hurt. Reading must be light, entertaining, and diverting... Conversation must be easy and agreeable, without disputes or contradiction.”

Following his own suggestions, more or less strictly, he lived to the respectable age of 72.

2 c Aspect: sport

Track 11

You are going to listen to an interview between former world number one tennis player Ash Barty and fellow Australian athlete, Casey Dellacqua. First you will have 45 seconds to study the task below, then you will hear the recording twice. While listening, complete the sentences (1–9) using a maximum of four words. Write your answers in the spaces provided. The first one (0) has been done for you.

After the second listening, you will have 45 seconds to check your answers.

Casey Dellacqua: Ash, it’s always so great to see you. I have a slight inkling I know why I’m here. Probably don’t want to acknowledge it, but why am I here today?

Ash Barty: Yeah, I kind of wasn’t quite sure how I’m going to do this, but I think there’s so many times in my life, both my professional and my personal, where you’ve been there for me and I just couldn’t think of a better way. There’s no wrong way, it’s just my way and this is perfect for me to share it with you, to talk to you about it, with my team: I will be retiring from tennis. That’s the first time I’ve actually said it out loud. And yeah, it’s hard to say, but I’m so happy and I’m so ready and I just know at the moment in my heart, for me as a person, this is right. And I know I’ve done this before, but with a very different feeling and I’m so grateful for everything that tennis has given me. It’s given me all of my dreams plus more. But I know that the time is right now for me to step away and chase other dreams, and to put the rackets down.

Casey Dellacqua: Thank you for trusting me, again. Yeah, you’re an inspiration to so many and it can’t be easy, but it also must feel nice too, in a way, to get it off your chest. Why now? I think it’s probably going to be the most common question: why now?

Ash Barty: Yeah, it’s something I’ve been thinking about for a long time, and I’ve had a lot of incredible moments in my career that have been unforgettable moments. And Wimbledon last year changed a lot for me as a person and for me as an athlete – when you work so hard your whole life for one goal ... And I’ve been able to share that with so many incredible people. But to be able to win Wimbledon, which was my dream, my one true dream that I wanted in tennis, that really changed my perspective. I just had that gut feeling after Wimbledon, and had spoken to my team quite a lot about it – there was just a little part of me that wasn’t quite satisfied, wasn’t quite fulfilled, and then came the challenge of the Australian Open and I think *that* for me just feels like the most perfect way, my perfect way to celebrate what an amazing journey my tennis career has been. As a person, this is what I want. I want to chase after some other dreams that I’ve always wanted to do and I’ve always had that really healthy balance. I’m really, really excited.

Casey Dellacqua: I think it will be hard for a lot of people to understand because, as you said, you're three-time Grand Slam champion. You've just come off winning. You're probably one of the most marketable athletes in the world. How difficult was it to come to this decision?

Ash Barty: There was a perspective shift in me in this second phase of my career that my happiness wasn't dependent on the results. And success for me is knowing that I've given absolutely everything I can. I'm fulfilled, I'm happy and I know how much work it takes to bring the best out of myself and I've said it to my team multiple times. It's just I don't have that in me anymore. I don't have the physical drive. The emotional one and kind of everything it takes to challenge yourself at the very top of the level anymore. And I think I just know that I'm absolutely spent. I just know physically I have nothing more to give and that for me is success. I've given absolutely everything I can to this beautiful sport of tennis and I'm really happy with that. And for me, that is my success and I know that people may not understand it and that's OK. I'm OK with that because I know that for me, Ash Barty the person, has so many dreams that she wants to chase after that don't necessarily involve travelling the world, being away from my family, being away from my home, which is where I've always wanted to be. It's where I've grown up and I'll never ever stop loving tennis. It'll always be a massive part of my life, but now I think it's important that I get to enjoy the next phase of my life as Ash Barty the person, not as Ash Barty the athlete.

Casey Dellacqua: Well, I know I speak for so many people, Ash, and I know your family are gonna love having you around more. I'm gonna love having you around more and having more time with you but I know I speak for so many people when I say 'thank you' – thank you for everything that you've given to our sport. Having known you for so long, one thing I know is that you make decisions that are right for you and they've always worked out and you've done it your way, and I think that's really brave. I think that's really incredible, and so thank you for everything that you've done for our sport. Thank you for giving us you, Ash Barty. Enjoy retirement!

2 d Aspect: rules and laws

Track 12

You are going to listen to a recording about two homeless men in San Francisco. First you will have 45 seconds to study the task below, then you will hear the recording twice. While listening, fill in the blanks (1–9) using a maximum of four words. Write your answers in the spaces provided. The first one (0) has been done for you.

After the second listening, you will have 45 seconds to check your answers.

Sarah Gardner: Reporter Julia Scott spent some time with homeless people in San Francisco to find out how they got there and how they survive day to day. And as Scott discovered, losing a job often triggers that downward spiral onto the streets.

Julia Scott: Joseph Luna woke up this morning in a sleeping bag under the Harrison Street on-ramp to Highway 101. He sleeps here when he needs to get out of the rain. I arrive at 7:30. He's still asleep, curled up on a bed of cardboard and wood chips. Luna doesn't sleep past eight because he'll get rousted by police. His sleeping spot is near a five-way intersection, in back of a city tow lot. Not exactly camouflaged. He gets up, stacks the cardboard and starts shoving his stuff into a big black duffel bag, the only bag he owns.

Luna's 38. He's sleeping on the street because shelters remind him too much of his time in prison. He hasn't showered in a couple of weeks. He's medium build, scruffy, with black wavy hair. He fell asleep last night reading a historical novel. Breakfast is the same as dinner last night: a bag of Pepperidge Farm cookies.

Here in San Francisco, I spent time with people who lost their homes and everything else. Everyone you'll hear in this story went to college. They're sober, they're smart – yet they're still homeless.

Luna comes to the public library to regroup. He spends a lot of time sitting and waiting and reading. Losing a job is the biggest cause of homelessness in San Francisco.

The main reason the homeless stay unemployed is lack of job training. There are other reasons, too. One of them seems obvious: No permanent address. No address, no ID. No ID, no job.

Luna needs an ID, but he also needs job training. He has a degree in hotel and restaurant management, but that career didn't pan out. He says it's hard to see how much his life will actually change.

Luna: I'm a felon without a driver's license, and so even if I did have an address, that would put a pretty big damper on a lot of jobs.

Julia Scott: Luna used to be addicted to heroin, but now he's in treatment. He has a caseworker, but no housing. A disability put Luna in the hospital ten years ago, nerve damage from a construction job. He couldn't work, so he started selling drugs. He's been in and out of prison since he was 13. But he says he's never going back to jail because of his son, who lives with his mom. The 10-year-old boy doesn't know his dad is homeless.

David LaFleur also spent years on the street after losing his job, waiting for something to happen. I meet LaFleur in an alley off Sixth Street in San Francisco. It's a place you wouldn't really want to walk through, at least not at night. It's full of trash. There's some empty, fenced-in parking lots. This is where LaFleur slept and did drugs, on and off, for six years. He doesn't really like to come here now that he doesn't have a reason to. For him, a walk down memory lane isn't bittersweet. It's just bitter.

A few homeless folks sit in the alley today, next to some garbage bags. They'd probably find it hard to believe this tall, well-groomed man used to live here. The truth is, LaFleur is still technically homeless. He lives in a clean and sober program house. He's been out of work for half a decade. Today, LaFleur is focused on finding work. His launch pad is the San Francisco Public Library, main branch, just two blocks from the alleyway. He's here at the library every day, surfing job sites and faxing his resume.

LaFleur is 51. He hasn't had regular work since he was laid off six years ago from a job installing metal roll-up doors. His backpack is stuffed with notes and copies of his resume. He's answered more than 350 job ads in the past year. LaFleur struggles with computer skills and he has trouble getting interviews.

LaFleur went to community college. He grew up near San Francisco. He was paying rent on a nice house where he lived with his girlfriend. Even when he lost his job, he never thought he'd end up homeless. He started using drugs and went to prison for a while. When he got out, he found out he was manic-depressive.

Today, things are looking up. LaFleur just found out that he was approved to move into a residential hotel. It's been a long time since he had four walls that belonged just to him.

Textnachweis Listening tracks (MP3s)

Track 1: based on: Farrell Evans – www.history.com/news/lawn-mower-grass-american-dream (abridged and adapted), Track 2: based on: Morgan Gold – youtu.be/S3Uea6DNiSo (abridged and adapted), Track 3: based on: Kashmir Hill – <https://www.forbes.com/sites/kashmirhill/2012/02/16/how-target-figured-out-a-teen-girl-was-pregnant-before-her-father-did/> (abridged and adapted), Track 4: based on: Carol Dweck – www.ted.com/talks/carol_dweck_the_power_of_believing_that_you_can_improve/ (abridged and adapted), Track 5: based on: Peel District School Board – youtu.be/vM7lhg15210 (abridged and adapted), Track 6: Sandra Cisneros: *The House on Mango Street* (Knopf Doubleday Publishing Group, 2009) (abridged), Track 7: based on: Ari Shapiro, David Miliband – www.npr.org/transcripts/1099244621 (abridged and adapted), Track 8: based on: Meghan Miner Murray – ideas.ted.com/history-overlooked-these-women-scientists-but-not-anymore/ (abridged and adapted), Track 9: based on: Lizzie O'Leary, Drew Harwell – slate.com/podcasts/what-next-tbd/2022/09/can-a-i-make-great-art (abridged and adapted), Track 10: based on: Max Miller – <https://youtu.be/LIBS-BgqN4E> (abridged and adapted), Track 11: Ash Barty, Casey Dellacqua – youtu.be/CgptwIUHBRI (abridged and adapted), Track 12: based on: Sarah Gardner, Julia Scott – www.marketplace.org/2012/07/06/downward-spiral-homeless-san-francisco/ (abridged and adapted)

Alle übrigen Texte stammen vom Autor:innenteam.