



# SYNTHETIC DNA. REAL SUSTAINABILITY.

**2023 ESG REPORT** TWIST BIOSCIENCE

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The background is a vibrant green with abstract white shapes. A large, dark green circle on the left contains a white number '1'. A large, white, teardrop-shaped area on the right contains the word 'INTRODUCTION'. Thin white lines curve across the green background.

# 1

## **INTRODUCTION**

# A letter from our CEO, Emily Leproust, Ph.D.

At Twist Bioscience, our mission is to make synthetic DNA to improve health and sustainability. Over the course of the last year, we have continued to work in service of our customers who are changing the world for the better in multiple industries, while shining a light internally to continuously improve.

The power of our silicon-based platform drives our ability to make synthetic DNA at a scale otherwise unavailable to our customers. We leverage this bold, innovative technology to improve environmental sustainability, as our proprietary DNA manufacturing process reduces waste generated as well as the volume of chemical reagents used by 99.8%. This year, we quantified how our proprietary miniaturization of the oligo synthesis process impacts our comparative carbon footprint of creating a single gene using our silicon-chip based DNA manufacturing process, versus legacy 96-well plate-based DNA manufacturing. We confirmed that plate-based approaches can emit up to 23 kilograms of carbon dioxide equivalent (CO<sub>2</sub>e) per gene, while Twist processes emit a minuscule 36 grams of CO<sub>2</sub>e (0.036 kilograms) per gene.

By comparison, for 96-well plate-based methods, this is the equivalent to GHG emitted from driving a gasoline-powered car for 59 miles (95 kilometers) compared to 0.09 miles (0.15 kilometers) for the Twist-based approach.

*Calculated Twist internal data using Dr. Oligo benchmark January 2021*





Consulting firms Silinnov and SRI Quality System Registrar validated Twist's carbon footprint reduction, which carries through to all of our customers who use our DNA for their diverse needs. We provide them with a more sustainable way to conduct research and build the constructs needed as they develop and commercialize new therapies, diagnostic tests, materials, biobased chemicals, and so much more.

We understand our unique position in bringing innovation and strategic direction to a field that benefits from our sustainable inputs. Our long-term planning focuses on meaningful value creation for all of our stakeholders, both internal and external.

Our commitment to best practices in governance begins with our Board of Directors, where our ESG program is overseen by Nelson Chan, our lead ESG Board member. Our governance is reviewed by the Nominating and Governance committee. It's at this level that the overarching strategy is confirmed.

***“Our investment in continued innovation empowers our customers to conduct groundbreaking science across many industries.”***

EMILY LEPROUST, PH.D.  
CEO AND CO-FOUNDER, TWIST BIOSCIENCE

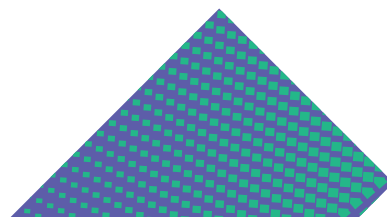
## 01. INTRODUCTION



We continue to engage with our customers as a key supplier, and for our own vendors, we uphold our Supplier Code of Conduct. We received a bronze medal from Ecovadis in 2023 validating our commitment to sustainability for our customers and suppliers.

And, we joined the United Nations Global Compact (UNGC), highlighting our pledge to support the Ten Principles of the UNGC on human rights, labor, environment, and anti-corruption. We have committed to advancing these Sustainable Development Goals (SDGs):

- Zero Hunger
- Good Health and Well-being
- Gender Equality
- Responsible Consumption and Production



***“We believe that diversity of thought and experience drive us to challenge assumptions and biases to work toward the best business outcome.”***

EMILY LEPROUST, PH.D.  
CEO AND CO-FOUNDER, TWIST BIOSCIENCE

As a company, in 2023 we took action to streamline our operations, removing duplication in our manufacturing processes between two sites. This resulted in Twist saying goodbye to talented and committed Twisters, who we are helping to find their next opportunity. We believe this sets the stage to enable us to best serve our customers globally.

Our integrity and ethics guide our business practices as we expand our product and corporate footprint. We actively protect our tangible and intangible assets, and invest in the development of our employees while we evaluate and mitigate risks across our operations and our products.

Our investment in continued innovation empowers our customers to conduct groundbreaking science across many industries. We embrace sustainable business practices and socially conscious operations. Our employees bring expertise across wide ranging disciplines and importantly are inspired by our mission to serve our customers who are changing the world for the better. Our globally diverse employee base embodies our guiding principles of Grit, Impact, Service and Trust, working to fulfill our steadfast focus to provide the highest-quality products to improve health and sustainability.

And at Twist, we often say that Diversity is in our DNA — a play on words, of course, as we sell a variety of products that stem from our proprietary silicon-based synthetic DNA platform. But we also mean that we value diversity of all kinds — race, geography, gender identification, sexual orientation, and so much more.

We believe that diversity of thought, and experience drive us to challenge assumptions and biases to work toward the best business outcome, driving market adoption for our products and services while focusing on long-term financial and business success metrics for all of our stakeholders.

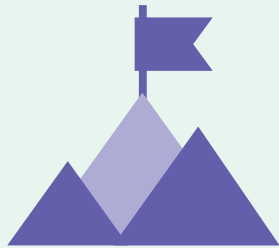
Together, we are #WritingTheFuture.

Sincerely,

A stylized, handwritten signature in dark ink, consisting of several overlapping loops and a long horizontal stroke at the bottom.

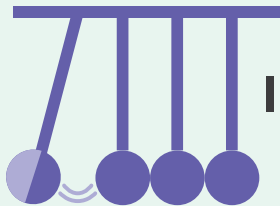
Emily M. Leproust, Ph.D.,  
CEO and co-founder of Twist Bioscience

# Guiding principles



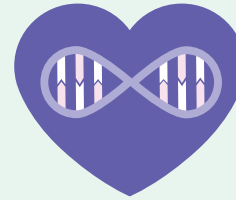
## Grit

- Passionate drive, fierce determination
- Always strive for excellence and persevere
- Adapt resiliently and learn from each attempt
- Drive strategic and sustainable outcomes
- Take ego-less ownership and focus on resolution



## Impact

- Bold ideas, daily incremental contributions
- Skillfully deliver on ambitious goals and stay humble
- Collaborate and share knowledge to create value
- Diligently improve quality, velocity and cost
- Voice your ideas, commit the time, find new ways



## Service

- Always ask, what can I do for you?
- Listen, hear and dialogue empathetically
- Relentlessly focus on internal and external customer needs
- Communicate to deliver outstanding service
- Build mutually beneficial, long-lasting relationships



## Trust

- Vigilant stewardship, transparent interactions
- Provide products designed and intended for public benefit
- Protect the well-being of people and our planet
- Demonstrate integrity and ethical behavior
- Interact in an accountable, respectful and transparent manner



## Our business

At Twist Bioscience, we enable our customers who are the real heroes, making a positive impact on the world. With our synthetic DNA tools, our customers in various fields, including healthcare, food/agriculture, industrial chemicals, academic research, and data storage, are developing innovative solutions to enhance people's lives and promote sustainability. We strongly believe that our customers' successes benefit us all, and we are committed to leveraging our position to accelerate their progress.

*Calculated Twist internal data using Dr. Oligo benchmark January 2021*

We have created an innovative DNA synthesis platform that is transforming the field of biological engineering by making DNA available for diverse applications and markets. At the heart of our platform lies a cutting-edge technology that revolutionizes the manufacturing of synthetic DNA through a process known as synthesizing, or “writing” DNA on a silicon chip. This proprietary method is the backbone of our platform, enabling us to industrialize the production of synthetic DNA in a game-changing way.

Our team has successfully miniaturized conventional chemical DNA synthesis reactions, allowing us to “write” over one million short pieces of DNA on each silicon chip, which is about the size of a large mobile phone. This breakthrough has resulted in our core platform technology reducing waste and chemical reagent consumption by an impressive 99.8%, making our process substantially more sustainable and eco-friendly than traditional methods. By utilizing our synthetic DNA and DNA products, our customers can integrate more sustainable inputs into their product development process.

As a result of our highly efficient proprietary process, for just our clonal genes manufactured, where plate-based DNA manufacturing methods would have generated 12,834,000 kg of CO<sub>2</sub>e, Twist Bioscience generated 20,088 kg of CO<sub>2</sub>e emissions by manufacturing 558,000 genes in fiscal year 2022 for our customers, a more than 600-fold reduction in carbon emissions.



We have integrated our silicon-based DNA writing technology with proprietary software, scalable commercial infrastructure, and an e-commerce platform to create a comprehensive technology platform. This has enabled us to achieve high levels of quality, precision, automation, and manufacturing throughput at a significantly lower cost than our competitors. We offer the industry's lowest cost of DNA, making synthetic DNA accessible and fostering responsible research across various industries.

Our unique technology allows us to manufacture a diverse range of synthetic DNA-based products, including synthetic genes, next-generation sequencing tools, and antibody libraries for drug discovery and development. Our products are designed to enable our customers to conduct research more efficiently and effectively. In fiscal year 2022, we shipped our products to approximately 3,300 customers worldwide, spanning a broad range of industries.

Moreover, we are expanding our capabilities by utilizing our proprietary platform to disrupt and innovate within larger market opportunities and develop new applications for synthetic DNA. We offer antibody discovery services using in vitro, in vivo and in silico methods and we are developing solutions for storing digital data in DNA.

# Background on synthetic DNA and how it fuels product development

As the fundamental building block of biology, DNA is a crucial element in the field of genetic engineering. The ability to design and engineer DNA is expanding at an unprecedented rate, and we consider this field to be one of the most dynamic areas of growth and technological innovation in the 21st century. Through synthetic biology, our customers can leverage DNA to build their products and applications, often replacing fossil fuels as the primary material. This approach offers a promising avenue to create sustainable products that are not only environmentally friendly but also more cost-effective.





# Synthetic DNA applications

## MEDICINE

Synthetic DNA is a crucial component in the development and production of the next generation of therapeutics, such as cell, gene, and nucleic acid therapies. Furthermore, the development of biologics and antibody drugs is dependent on reliable sources of synthetic DNA. Synthetic DNA also plays a pivotal role in the development of Next Generation Sequencing (NGS)-based molecular diagnostic tools, which are instrumental in the personalized treatment of diseases like cancer. The realization of personalized medicine hinges on the availability of individualized synthetic DNA, which may be utilized to correct genetic mutations detected through NGS-based diagnostics using technologies like CRISPR or other genome editing tools.

In addition, liquid biopsy, a blood test that may detect cancer at an early stage, and tests for minimal residual disease (MRD) that can detect small amounts of circulating tumor DNA (ctDNA) in the blood, have advanced in development and several are now sold commercially. This exciting advancement in detection and monitoring of cancer is made possible through the input of synthetic DNA within the workflow. Synthetic DNA can also be used to develop cell and gene therapies specific to genetic mutations, offering the potential for differentiated and possibly more efficacious treatments.

Apart from personalized medicine, synthetic DNA is also crucial to the discovery of new products by deep sequencing environmental microbiomes. Furthermore, synthetic DNA is essential to the cost-effective manufacturing of enzymes for chemical entities. These emerging applications of synthetic DNA demonstrate its criticality in numerous scientific fields, underscoring its potential to drive significant advances in biotechnology, medicine, and beyond.



## INDUSTRIAL CHEMICALS

The production of chemicals is undergoing a transformation towards bioprocesses that utilize corn, soybean, and other biomass instead of petroleum as the source of carbon. Synthetic DNA is introduced into the genes of yeast, bacteria, and algae to enable the natural process of sugar fermentation to produce a wide range of chemicals, such as nylon for carpet, rubber for tires, and plastics for daily use. This approach not only promotes sustainability by reducing atmospheric carbon, but also leads to a decrease in production costs compared to oil-based products. Moreover, the utilization of synthetic DNA enables the production of new high-value chemicals that are not accessible through petroleum-based chemistry, such as synthetic silk, cosmetics (e.g. squalene), and advanced materials.

## AGRICULTURAL-BIOTECHNOLOGY AND ANIMAL HEALTH

To ensure the security of the world's food supply, it is necessary to engineer crops that can resist evolving pests, adapt to extreme drought and flood conditions, and be grown more economically by eliminating the need for fertilizers. Current and emerging genetic modification technologies use synthetic DNA to add traits to plants and their synergistic microbes. These technologies also enable the addition of multiple traits at once, which is known as trait stacking. Sustainable maintenance and optimization of production animals and livestock are also crucial for supporting local and global economies.

Synthetic DNA is facilitating the development of robust and cost-effective diagnostic tests that can screen for diseases and assist with livestock health management. Furthermore, NGS-based genetic tests make it possible to screen for favorable traits, enabling producers to selectively breed their populations for the most resilient and valuable traits.





# Pursuing vertical market opportunities

## DRUG DISCOVERY AND DEVELOPMENT

There is an opportunity to enhance the process of discovery and optimization to advance drug discovery by finding the best antibodies for specific targets. The current approach involves creating and screening randomly generated antibody libraries that do not adhere to the rules of the human repertoire and do not systematically explore the sequence space. This approach is akin to searching for a needle in a haystack, resulting in lengthy and costly timelines. However, by designing and constructing precise libraries of libraries that conform to the rules of the human repertoire along with our in vivo antibody discovery approach and AI/machine learning, Twist is expediting the process of antibody identification, optimization and humanization. The Twist approach is akin to searching for a stack of needles, minimizing time and maximizing the discovery output, and we are working with a large number of customers to identify antibody leads to biological targets.



## STORING DIGITAL DATA IN DNA: NATURE'S WAY

The exponential growth of digital data worldwide is outpacing the scaling of mainstream data storage media technologies, and experts predict they will not be able to keep up with demand. As a result, the industry is searching for alternative storage media technologies.

Archival storage, which is data that is stored and accessed infrequently, is projected to account for 60–80% of data storage because the data temperature (access frequency) is decreasing overall, making archival storage the fastest growing storage tier. However, all current mainstream storage technologies have limited longevity and require data migration, as well as substantial maintenance and energy when active. DNA is the only storage solution with the potential to scale and meet the expected demand while also enabling sustainable data storage solutions.

Compared to current storage methods, DNA has several advantages:

- Density: Solutions that can scale from data lakes to data oceans
- Longevity: Capable of enabling archival storage for centuries or even millennia
- Immutability: Providing a stable form where the data is the medium (DNA can always be read)
- Sustainability: Lowest energy carbon footprint among all media

***DNA is the only storage solution with the potential to scale and meet the expected demand while also enabling sustainable data storage solutions.***

# Who leads ESG at Twist Bioscience

As a company, we are committed to ESG goals and have established an internal ESG Team. Nelson Chan is our Board of Directors representative overseeing our ESG efforts. Angela Bitting is our senior vice president of corporate affairs and chief ESG officer, with executive objectives and compensation tied to achieving ESG goals. Carlos Zapata is our senior staff ESG specialist.



**NELSON CHAN**  
BOARD OF DIRECTORS  
REPRESENTATIVE



**ANGELA BITTING**  
CHIEF ESG OFFICER,  
SVP, CORPORATE AFFAIRS



**CARLOS ZAPATA**  
SENIOR STAFF  
ESG SPECIALIST



## Our ESG Ambassadors represent diverse areas of the company and meet at least quarterly.



**PATRICK FINN**  
PRESIDENT &  
CHIEF OPERATING  
OFFICER



**JIM THORBURN**  
CHIEF FINANCIAL  
OFFICER



**PAULA GREEN**  
SVP, HUMAN RESOURCES



**SHANI MAMAN**  
VP, SUPPLY CHAIN



**MAITE GORRINO**  
DIRECTOR,  
SUPPLY CHAIN



**JAMES DIGGANS**  
DISTINGUISHED SCIENTIST,  
BIOINFORMATICS &  
BIOSECURITY



**SHAKIL AHMED**  
SR. DIRECTOR,  
REGULATORY AFFAIRS AND  
QUALITY ASSURANCE



**JIMMY JIN**  
VP, MARKETING



**KRISTIN BUTCHER**  
STAFF SCIENTIST



**SIYUAN CHEN**  
CHIEF TECHNOLOGY  
OFFICER



**DENNIS CHO**  
SVP GENERAL COUNSEL  
& CHIEF ETHICS AND  
COMPLIANCE OFFICER



**WILL SOLIS**  
DEPUTY GENERAL  
COUNSEL



**JUDY YAN**  
ASSISTANT GENERAL  
COUNSEL, INTERNATIONAL  
& REGULATORY



**BILL BANYAI**  
SVP, ADVANCED  
TECHNOLOGY & GM  
DATA STORAGE



**JENNIFER WALKER**  
GM, IN VIVO ANTIBODY  
DISCOVERY OPS



**QUINNE ANDERSON**  
DIRECTOR, CUSTOMER  
SUCCESS & EXPERIENCE



**ROD WALSTON**  
MANAGER,  
FACILITIES

# Twist Bioscience joins the UN Global Compact

In October 2022, Twist Bioscience joined the United Nations Global Compact (UNGC) as part of our ongoing commitment to sustainability. Our company is committed to advancing support for the following Sustainable Development Goals (SDGs):

## 2 ZERO HUNGER



The zero hunger SDG focuses on achieving food security, improving nutrition and promoting sustainable agriculture. Using synthetic DNA, Twist's customers engineer crops to be resistant to pests, adapt to extreme weather conditions and grow independent of fertilizer. Making plants more durable and reducing the need for pollutants enables sustainability and could provide greater and continued access to nutritious foods by reducing the number of crops lost to disease and weather conditions.

## 3 GOOD HEALTH AND WELL-BEING



Limiting reliance on pesticides reduces the amount of pollutants that enter into the environment, making communities healthier places to live. Synthetic DNA can also be used to replace plastic with proteins, further reducing pollutants. Scientists can use synthetic DNA to develop therapeutics as well as in next-generation sequencing applications to detect and monitor diseases. When threats to public health such as COVID and monkeypox arose, Twist designed and manufactured positive controls used to validate and confirm that tests for these diseases work as intended.

## 5 GENDER EQUALITY



At Twist, we're building a company without a glass ceiling where we empower employees of all gender identities. 39% of our executive team identify as women and 41% of our total workforce is made up of women. 61% of Twist employees in the US identify as people of color.

## 12 RESPONSIBLE CONSUMPTION AND PRODUCTION



At Twist, we are increasingly focused on sustainable operations. We reduce waste wherever possible, and recycle gloves and plastic tips. Through our glove recycling program we received the Kimberly-Clark Greenovation Award multiple years in a row for our glove recycling. Our platform itself miniaturizes the chemical reaction to create DNA, reducing the amount of reagents used by 99.8% compared to legacy 96-well plate approaches. We also produce exactly the amount of DNA needed, diverging from standard industry practices of discarding excess oligonucleotides in the gene synthesis process.

The background is a vibrant green with abstract white shapes. A large white circle on the left contains the number '2'. Another large white circle is positioned in the center-right, containing the text 'ENVIRONMENTAL COMMITMENT'. Thin white lines curve across the green background.

# 2

**ENVIRONMENTAL  
COMMITMENT**

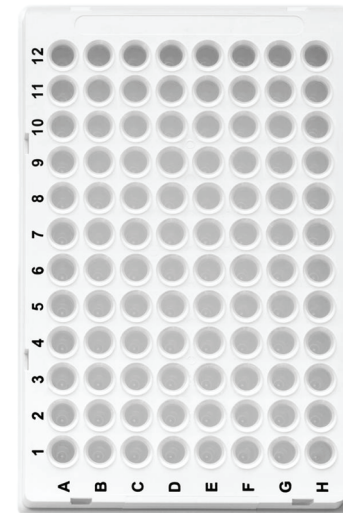
# Sustainability is in our DNA

Starting with our initial corporate vision to provide synthetic DNA to improve and enhance health and sustainability, Twist acknowledges our crucial role in shaping a positive and prosperous future for our world and its inhabitants.

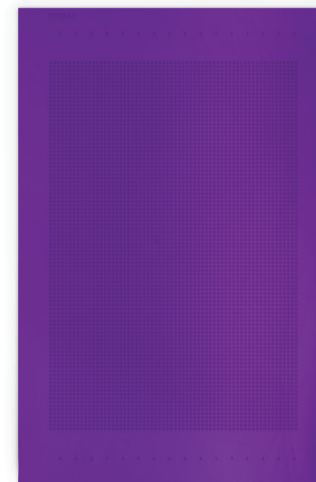
Aligned with our mission and vision, we calculated the total carbon footprint of making a single gene using our silicon plate. What we found was that one gene manufactured at Twist emits 36 grams (0.036 kilograms) of CO<sub>2</sub>e compared to up to 23,000 grams for 96-well plate approaches. This means that our proprietary process and the significant investment we have made in our technology has allowed us to be the sustainable choice for our customers. Twist's calculations were validated by SRI Quality System Registrar in the United States, and Silinnov Consulting in France.

Based on the number of genes Twist Bioscience manufactured in fiscal year 2022 (558,000 genes) our carbon footprint is the equivalent of 51,336 miles (82,617 kilometers) driven by an average gasoline-powered passenger vehicle in one year, or 2,232 gallons of gasoline consumed in one year. In contrast, the industry standard 96-well plate approach would have been the equivalent of 1,444,132 gallons of gasoline consumed in one year, or 32,900,585 miles (52,948,359 kilometers) driven by an average gasoline-powered passenger vehicle in one year. That would be the equivalent of driving around the globe more than 1,300 times.

*Calculated Twist internal data using Dr. Oligo benchmark January 2021*

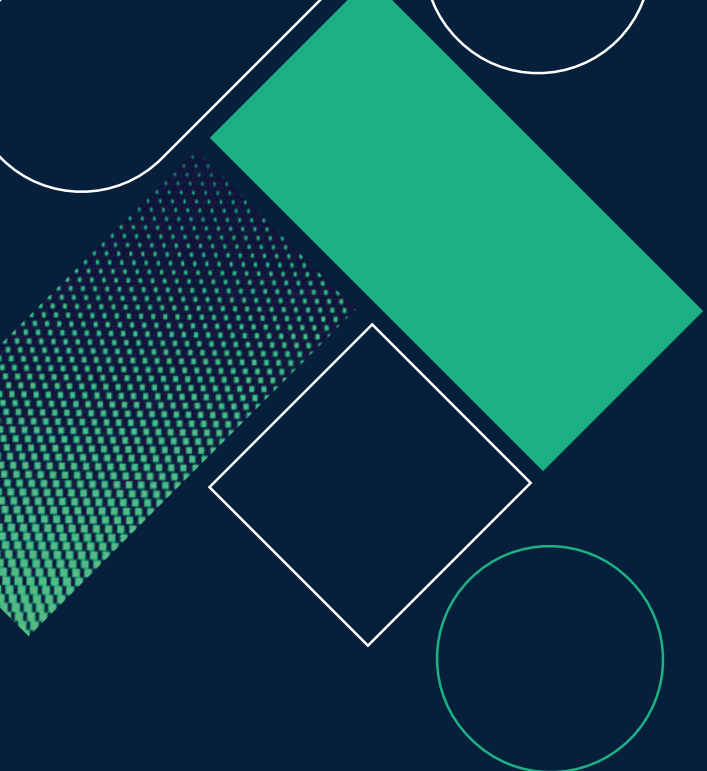


**96-WELL PLATE**  
MAKES 1 GENE



**TWIST SILICON PLATFORM**  
MAKES 9,600 GENES





***“Nature is telling us that we are on an unsustainable path, and it’s time to course-correct to reconcile the creature comforts of human civilization with the natural world.”***

EMILY LEPROUST, PH.D.  
CEO AND CO-FOUNDER, TWIST BIOSCIENCE

## **What is a carbon footprint?**

A carbon footprint is the total amount of greenhouse gases that are emitted into the atmosphere by a specific person, organization, or company, according to the [United States Environmental Protection Agency](#). There are a lot of activities that can contribute to a carbon footprint, such as using electricity, every manufacturing process, commuting to and from work and so much more.

## **What is a chemical footprint?**

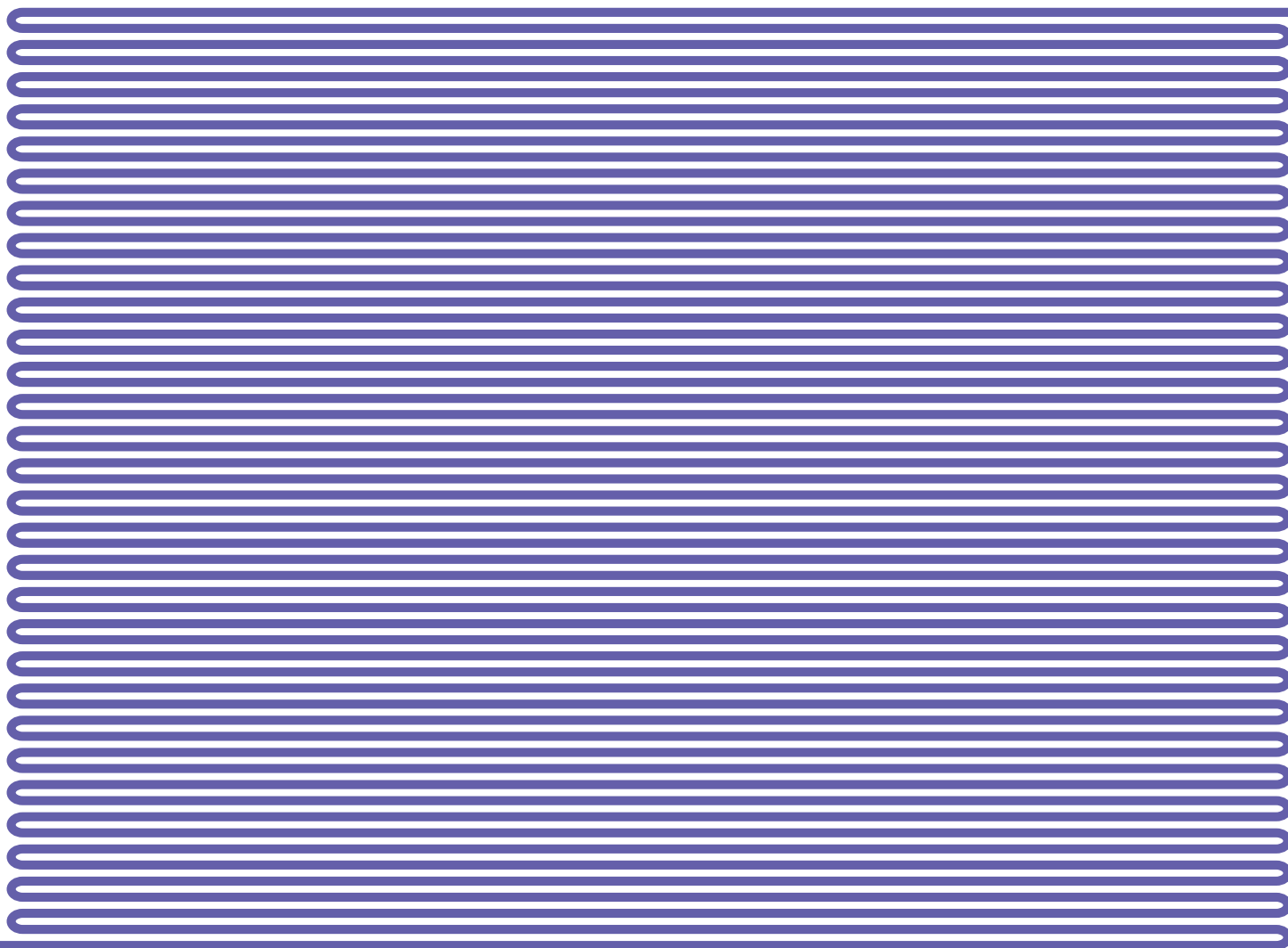
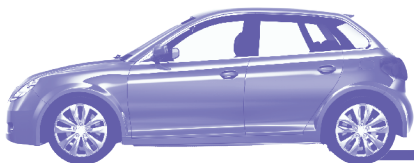
Each company has a chemical footprint, which refers to the overall amount of chemicals used by an event, organization, service, building, or product. Reducing the usage of toxic or environmentally harmful chemicals across supply chains decreases potentially harmful waste, creates a safer workplace for employees, and promotes a cleaner environment for the planet.

Manufacturing **one gene** is equivalent to driving:

TWIST BIOSCIENCE  
**0.092 miles**  
(0.15 km)



STANDARD 96-WELL  
PLATE APPROACH  
**59 miles**  
(95 km)



Each horizontal line = 1 mile

From the EPA Greenhouse Gas Equivalencies Calculator EPA 2023

Manufacturing **one gene**  
is equivalent to burning:

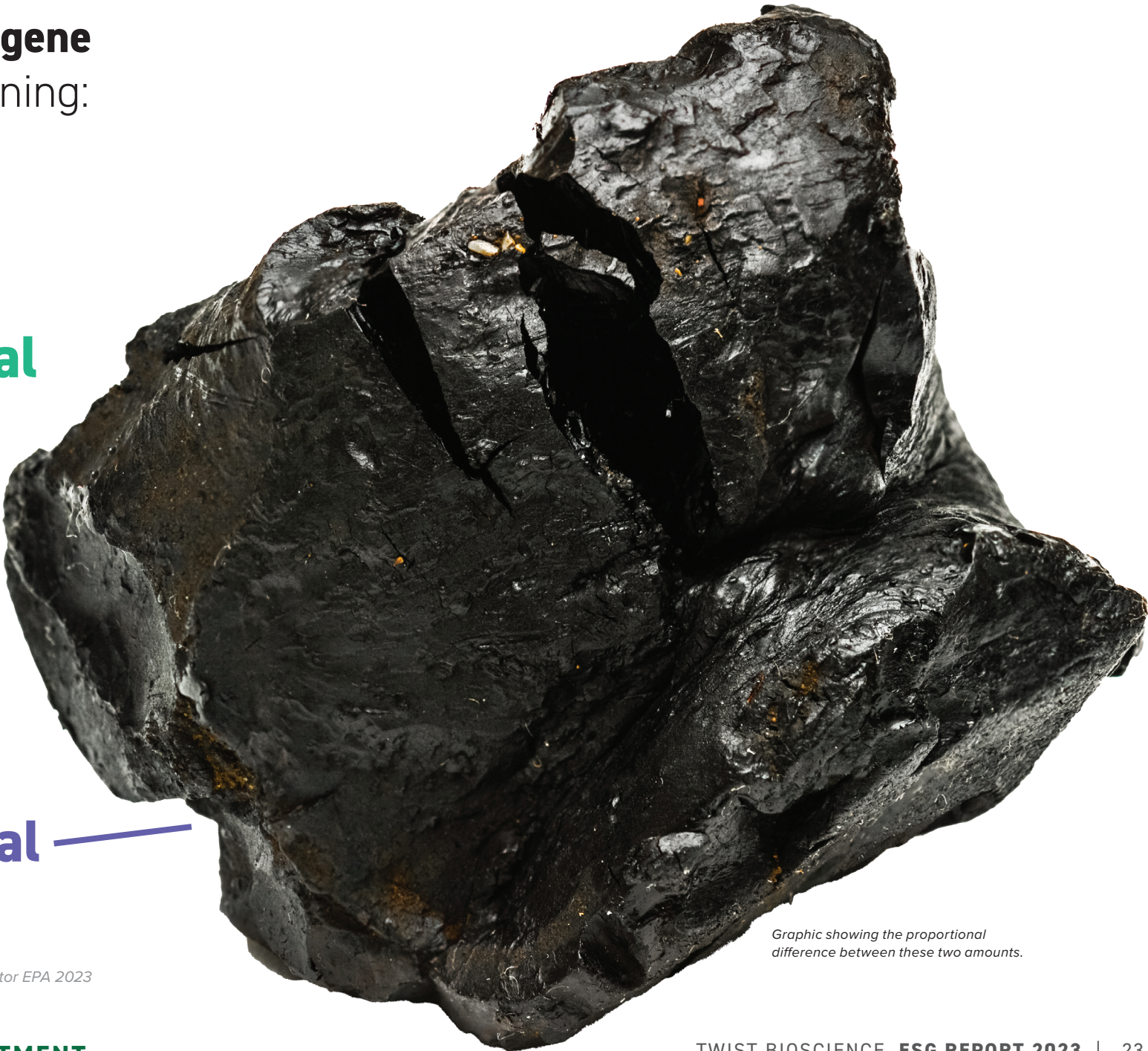
TWIST BIOSCIENCE

**0.04 lbs of coal**  
(0.018 kg)



STANDARD 96-WELL  
PLATE APPROACH

**25.8 lbs of coal**  
(11.7 kg)



Graphic showing the proportional  
difference between these two amounts.

From the EPA Greenhouse Gas Equivalencies Calculator EPA 2023



# Chemicals used in our workflow

At Twist Bioscience, we specialize in DNA synthesis. To generate synthetic DNA, we use phosphoramidite chemistry. You can read an in-depth description of phosphoramidite chemistry [on our blog](#).

## THERE ARE SIX MAIN COMPONENTS TO THIS WORKFLOW

Phosphoramidites	The building blocks of synthetic DNA
Activator	Activates the new phosphoramidite for addition to the growing DNA strand
Capping Reagents	Blocks off any DNA molecules that did not react as intended in the previous cycle
Oxidizer	Forms a more stable chemical linkage between the newly added base and the growing DNA strand
Deblock	Removes protective chemical groups on the end of growing DNA strand to enable next cycle
Wash	Removes active chemicals from the surface between steps, minimizing unintended reactions



# Recycling programs at Twist

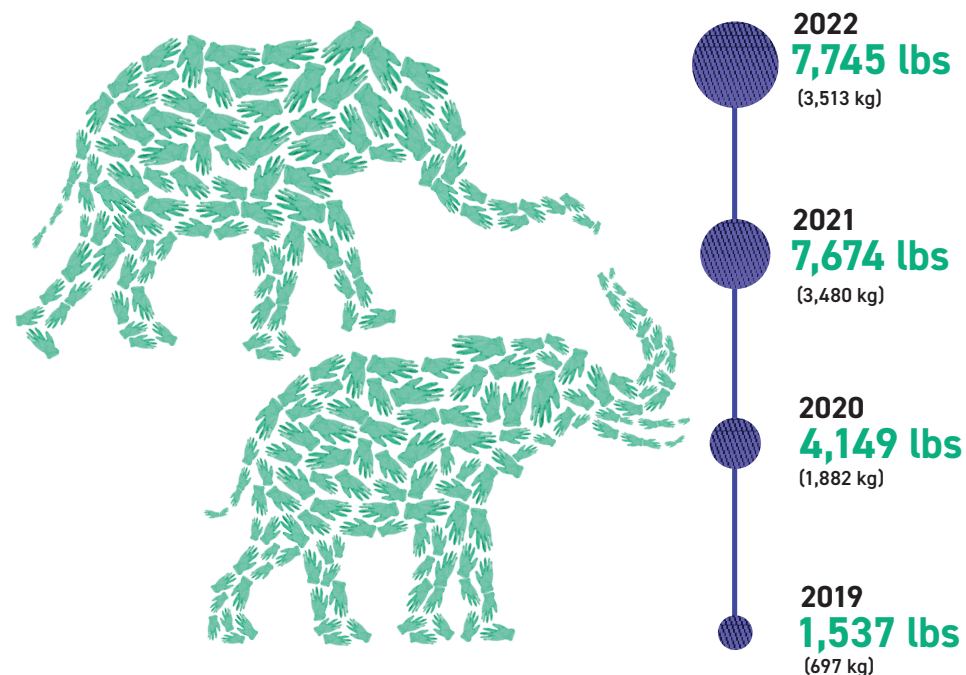
## Oversight

Twist is committed to sustainability beyond its DNA synthesis platform, understanding the importance of minimizing waste throughout the supply chain. This includes reducing the company's chemical footprint by using miniaturized chemistry to greatly scale the DNA synthesis process. However, Twist believes that to achieve a sustainable future, we must go beyond our products and address the challenge of sustainable science. One of the ways Twist is doing this is by recycling plastic gloves to reduce plastic waste in labs.

## The RightCycle™ Program

Since 2019, Twist has been recycling nitrile gloves in partnership with The RightCycle™ Program from Kimberly-Clark Professional. The gloves are collected in designated, reusable bins and shipped in recycled boxes to processing facilities, where they are turned into new pellets that can be used to produce other consumer products. This program has been so successful that as of February 2023, Twist diverted more than 21,760 pounds of plastic waste from landfills and plans to expand the program's scope to include other forms of personal protective equipment.

The **amount of waste** we divert by recycling gloves is equivalent to two elephants.



Thanks to these efforts, Twist has been recognized by Kimberly-Clark Professional and awarded the 2020, 2021 and 2022 Greenovation Award, which honors waste diversion efforts in The RightCycle™ Program. Twist is proud of this program and hopes to inspire others to adopt similar initiatives for a more sustainable future.

*Elephant weight from [www.elephant-world.com/elephant-weight](http://www.elephant-world.com/elephant-weight)*



**4.79**

metric tons of CO<sub>2</sub>  
emission equivalents  
reduced



**224**

gigajoules of energy  
conserved



**539**

gallons of gasoline  
not burned

## Partnership with Polycarbin

In September 2022, Twist Bioscience began a partnership with Polycarbin to recycle plastic tip boxes used in our R&D labs. As of June 15, 2023 we have diverted 7,635 pounds of single-use scientific plastic from landfills, circularized 5,730 pounds of plastic into next generation laboratory consumables, and recycled 1,904 pounds of plastic that were turned into pallets that are used in the transportation sector.

Twist's efforts with Polycarbin to date can be represented by the following metrics:

- 4.79 metric tons of CO<sub>2</sub> emission equivalents reduced
- 13,489 liters of water conserved
- 224 gigajoules of energy conserved
- 5.84 acres of U.S. forest protected
- 539 gallons of gasoline not burned
- 5,293 pounds of coal not burned

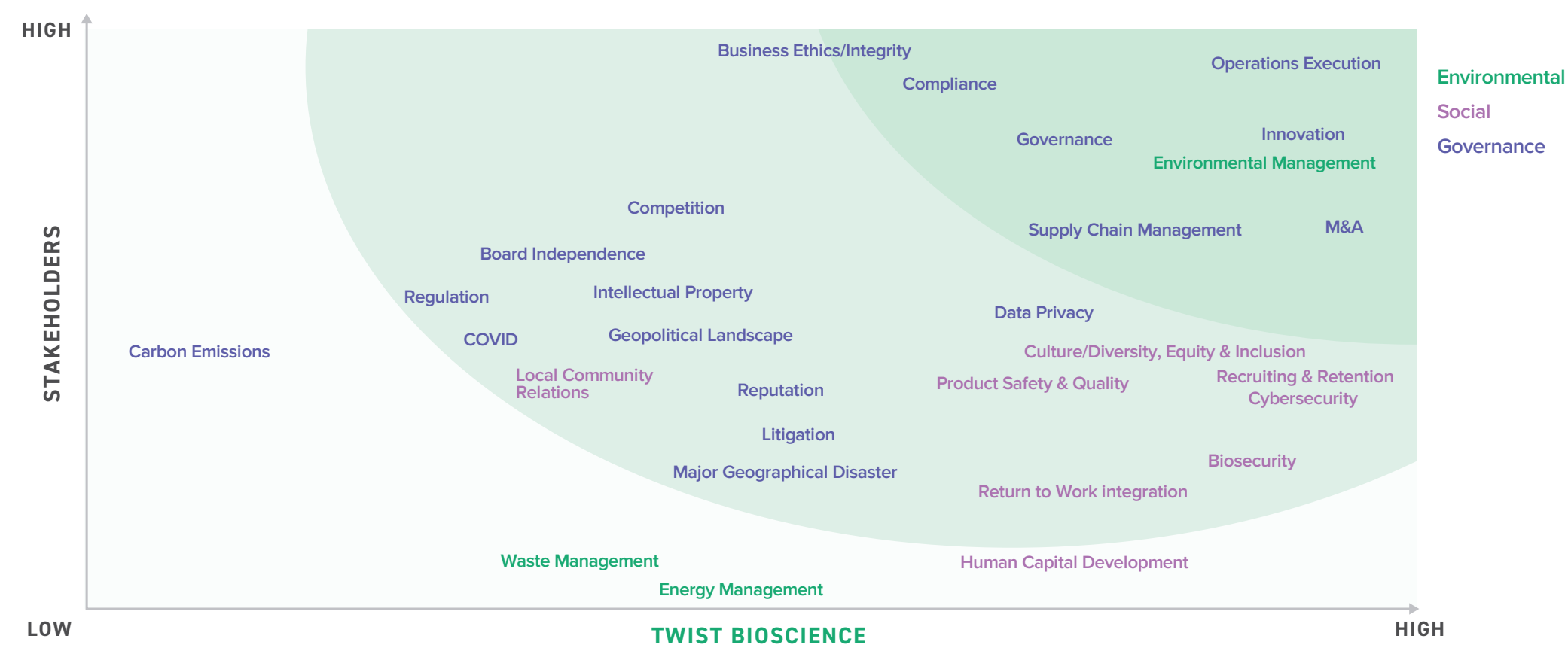
Furthermore, by participating in Polycarbin's circular economy, Twist Bioscience has reduced emissions by an additional 0.27 metric tons through sustainable procurement. We will continue to explore additional opportunities where our operations can make a positive impact for the environment.

## Sustainable Packaging

In January 2023 Twist Bioscience partnered with Veritiv to implement more sustainable packaging to ship our products. We are now using coolers that are substantially more efficient, allowing us to use less dry ice, while also being recyclable. We use boxes that are made from 50% recycled material and are also recyclable.

# Materiality assessment

As a crucial aspect of our ESG initiatives, we carried out a materiality analysis in 2021 to identify significant environmental, social, and governance risks that could impact Twist and our stakeholders. While we continually review our first materiality assessment for relevance, we intend to conduct a second process in 2024, along with our on-going stakeholder engagement practices. To construct our first materiality matrix, we interviewed executive members and various departments throughout the company. We then assessed the outcomes with the executive leadership team to determine the prioritization of risks and shared the findings with the Board of Directors. For each risk identified, we have established plans to mitigate them.



# Supply chain management

## Oversight

Our dedication to social and environmental responsibility and ethical business practices extends throughout our supply chain. We have implemented a [Supplier Code of Conduct](#) to identify and engage with businesses that adhere to principles consistent with the code.

## Strategy

Specifically, we are committed to addressing various issues, such as human rights, forced labor and human trafficking, child labor, working hours, wages and benefits, health and safety, environmental practices, among others, as outlined in our code of conduct. In addition, we received a bronze medal from Ecovadis in a recent assessment, validating our commitment to improving sustainability in the supply chain and our role in supplying our customers sustainably.



***“Modern global sustainability is the integration of the environment, people, and the economy, each of them is needed to thrive.”***

EMILY LEPROUST, PH.D.  
CEO AND CO-FOUNDER, TWIST BIOSCIENCE



# Product quality and management

## Oversight

At Twist Bioscience, we are dedicated to providing and promoting quality across our entire organization. Our Quality Policy underlines our commitment to customer satisfaction, legal and regulatory compliance, and delivering exceptional products and services. We consider this commitment to be a fundamental aspect of our organizational culture and values. As a collective, we hold ourselves accountable for achieving our quality objectives, continuously improving our practices, and maintaining an efficient quality management system.

In January 2023, Twist Bioscience earned its first Seal of Quality award from SelectScience® for Twist Gene Fragments, and in April we received the Bronze Seal of Quality for our Clonal Genes, receiving over 50 reviews and an impressive average star rating of 4.9 out of 5. Commenting on Twist Clonal Genes, Brittany Cooke from the University of Toronto, remarked, “Based on my experience with their customer service team, it is evident that Twist truly cares about their customers and the quality of their products/services. Would strongly recommend choosing Twist for all your gene synthesis and cloning needs.”

Seals of Quality recognize the top 0.1% of products that consistently receive the highest customer review ratings on SelectScience® and are designed to help scientists and healthcare professionals worldwide immediately recognize the instruments and services their peers rate the highest.



## Strategy

To align with our Quality Policy, we obtained ISO 13485:2016 which is the industry's gold standard for medical devices, certification for the Quality Management System (QMS) of our Target Enrichment Panels. ISO is a globally recognized network of international standards with over 18,000 standards that cover nearly every aspect of technology and business.

During our annual recertification in April 2023, we expanded our certification to include several additional products:

- NGS Kits (catalog products)
- Synthetic RNA and Respiratory Virus Controls
- Synthetic DNA Controls
- Next Generation Sequencing Target Enrichment Panels





3

**SOCIAL  
COMMITMENT**



## Diversity is in our DNA

At Twist, we prioritize investing our financial and personnel resources to attract, train, develop, and retain a diverse global workforce.

Our commitment to fostering a diverse, inclusive, and safe work environment remains steadfast, where all our employees feel respected, valued, and able to bring their best selves to work every day, regardless of their gender, age, race, ethnicity, national origin, sexual orientation or identity, disability, education, or any other distinguishing characteristic.

We provide equal employment opportunities and advancement to all our employees, recognizing the unique perspectives and experiences that diverse backgrounds bring to our Board, leadership, and workforce.

## Human capital management

### Oversight

We employ a team of twenty individuals who work full-time to manage all aspects of our human resources processes, including employee attraction, retention, and motivation. We continuously seek out new opportunities and methods to recruit talented individuals to join our organization.

At the Board level, our Compensation Committee is responsible for overseeing human capital management and receives quarterly reports from our senior vice president of human resources. Additionally, our senior vice presidents are regularly provided with reports on our human capital resources.

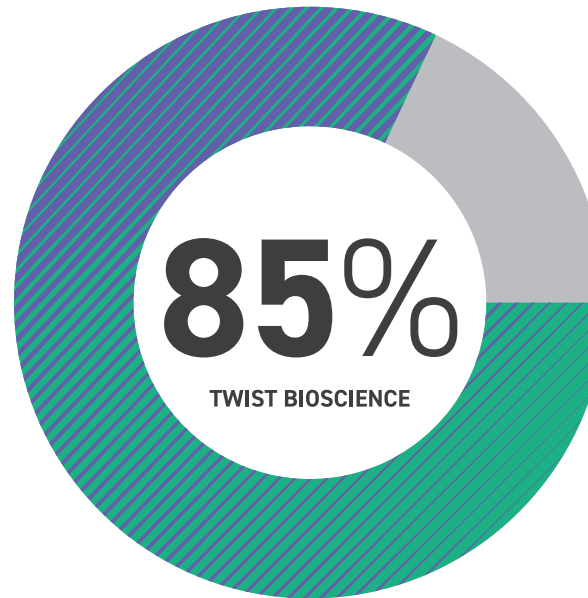
### A great place to work

To emphasize diversity in our recruitment efforts, we have partnered with California, Oregon and Massachusetts community colleges. Our collaborations include hiring students from their programs, supporting the Bioscience Development Hub project, and serving on the Advising Committee to provide input for the biotech curriculum.

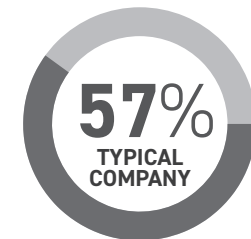
Moreover, we are an active participant in the BioMADE Manufacturing Innovation Initiative (MII). This initiative will introduce an after-school program that aims to train students for biomanufacturing careers. The program will be credit-bearing, industry-informed, and based on the successful Innovation Pathways framework developed by Worcester Public Schools. The curriculum will be developed by BioBuilder and will feed into relevant certificate and credentialing programs at Quinsigamond Community College (QCC). The curriculum will be informed by Twist, along with Worcester Polytechnic Institute's (WPI) Biomanufacturing Education and Training, to ensure that the program meets the technical and hiring needs of the industry.

This project not only aims to develop an industry-responsive biomanufacturing curriculum but also to build relationships with local industries for work-based learning opportunities and inspire high school students to pursue biomanufacturing as a career path. Ultimately, this training model could serve as a template for nationwide implementation.

In our commitment to ensuring diversity in our recruiting strategy, we have recently joined Partnerships in Diversity, an organization in Portland, OR, to build relationships with local organizations and maintain diversity recruiting efforts for Twist's Wilsonville, OR location. These are just a few examples of our continuous efforts to prioritize diversity in our recruitment initiatives.



**85% of employees at Twist Bioscience say it is a great place to work** compared to 57% of a typical US-based company



**91%**

I'm proud to tell others I work here

**89%**

People here are given a lot of responsibility

**86%**

I feel I make a difference here

**87%**

When I look at what we accomplish, I feel a sense of pride

**84%**

People here are willing to give extra to get the job done



# Leadership and development

## Oversight

Our diverse workforce is a key advantage that enables us to attract a wide range of candidates. We believe that our people and their diversity are our greatest strengths, fueling our innovation and engagement. Once an employee joins our team, we continue to prioritize their growth and development. When possible, we promote from within, focusing on building cultural agility and effective communication.

## Strategy

At Twist Bioscience, we invest heavily in developing the talent we need to maintain our position as a leader in innovation and to be an employer of choice. Recently, we launched a new performance management system that aligns with our guiding principles and emphasizes continuous learning and development during our annual formal performance reviews. We encourage cross-team communication and integrated departmental collaboration to broaden our employees' skill sets and provide opportunities for growth and advancement. We also offer a one-year leadership program for mid-level managers to invest in our next generation of leaders.

We offer tuition reimbursement of up to \$5,250 per year to support employee growth and career development.

Additionally, we invested in an online learning platform with on-demand, video-based content for employees to refine or develop their professional skills and explore new software to plan their career growth. Twist has also implemented a platform that facilitates managers and employees creating development plans as part of the performance review process.

Twist Bioscience is dedicated to professional development, leadership development, and learning. We invested over \$315,000 in employee learning, training, and development in the last fiscal year. All employees received access to self-directed learning and development, and 195 leaders received leadership development coaching. We aim to continue to build on our commitment to the professional development of our colleagues, setting measurable targets to increase our expenditure by 10% by 2025.

# Diversity, equity, inclusion and belonging

## Oversight

At Twist, we embrace diversity as a fundamental part of who we are. We define diversity as encompassing gender, race, culture, sexual orientation, physical and mental abilities, and more. Over 25 countries are represented amongst Twist employees, bringing with them a range of experiences and perspectives that enrich our company. We firmly believe that diverse teams lead to better business decisions by challenging each other and drawing from a wider range of possibilities to come to the best solutions.

## Strategy

We are committed to fostering an inclusive work environment that values individual differences and promotes equitable practices to advance underrepresented groups. Our focus on diversity extends across all aspects of our company, including recruitment, retention, learning, engagement, and community partnerships.

To promote conversation and learning across different backgrounds, we host monthly Culture Conversations that explore topics such as disability, LGBTQIA+ identity, ageism, and Hispanic/Latino identity. We aim to appreciate each other's unique lived experiences and break down stereotypes based on a single trait.



***We firmly believe that diverse teams lead to better business decisions by challenging each other and drawing from a wider range of possibilities to come to the best solutions.***

Our goal each month in our Culture Conversations is to deepen our understanding of intersectionality through our speakers and discussions and work to better understand how social identities work on multiple levels, resulting in unique experiences, opportunities and barriers for each person. We are committed to preventing workplace harassment and require all employees and managers to complete annual training on identifying and addressing unwelcome conduct in a respectful and non-adversarial manner. We also engage with underrepresented populations through targeted recruitment and collaboration with local community colleges.

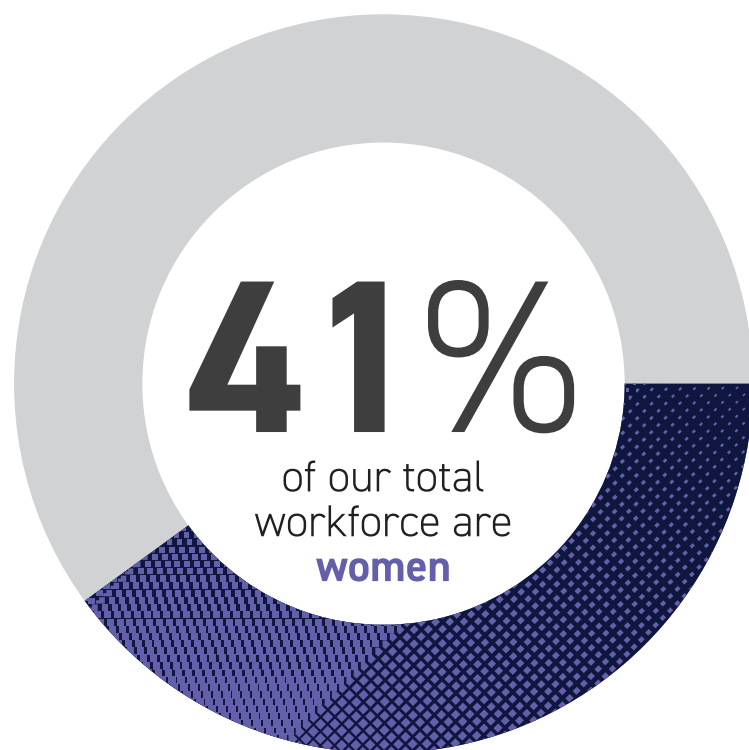
Furthermore, we invest in STEM education for people of all ages and backgrounds to encourage career pathways within the synthetic biology field. Twist Bioscience remains committed to our efforts to support diversity and inclusion by providing opportunities for career advancement for our female and underrepresented employees. At the same time, we continue to focus on recruiting diverse talent for senior positions.





## Women at Twist by the numbers

We take pride in our commitment to gender equality at Twist, where there are no limits to the advancement of women in our organization. Women are well-represented at every level of our company, including our leadership positions. Our Board of Directors consists of 33% women, while our executive team is made up of 39% women. Women also hold many of our revenue-generating positions, demonstrating our dedication to ensuring gender parity throughout our organization.



Global employee data as of September 30, 2022

Women at Twist are:

**38%** of management positions

**36%** of mid-level positions  
(Supervisor to Senior Manager)

**38%** of senior management positions  
(Director and Senior Director)

**39%** of executive level positions  
(VP, Senior VP, and Executive)

**37%** of revenue-generating positions

**47%** of sales and marketing

**38%** of operations

**38%** of research and development

**47%** of G&A

**40%** of total STEM positions

## Race and ethnicity at Twist

Creating a diverse culture has been a top priority for Twist's leadership team since its founding. We recognize the value of different cultural experiences in our work and strive to build impactful and innovative teams. As of the end of fiscal year 2022, 61% of our organization was made up of people of color, with women of color representing 25% of our STEM organization. Our commitment to diversity education for all members of the company allows underrepresented communities to find belonging within Twist and empowers our employees to become allies.

We are proud of our outstanding diversity, with 10% Hispanic/Latino, 3% Black or African American, 2% Native Hawaiian/Pacific Islander, 39% Asian, 6% Two or More Races, and several American Indian/Alaskan Native individuals. Racial representation can be found across all levels and departments, and our executives come from diverse backgrounds, many of whom were born outside of the United States. We will continue to monitor our engagement in leadership development programs and promote diversity in our leadership ranks.

### NOTES

1. There are limitations in the way the federal government collects race/ethnicity data. For example, individuals may identify as Hispanic/Latino and an additional race/ethnicity, but may only be reflected as Hispanic/Latino in the data.
2. People of color includes Hispanic/Latino, Black or African American, Native Hawaiian or Pacific Islander, Asian, American Indian or Alaskan Native, and Two or More Races
3. Data on this page for US employee base only



	TOTAL EMPLOYEES	MID-LEVEL MANAGERS	SENIOR/EXECUTIVE POSITIONS	VP AND HIGHER POSITIONS	REVENUE GENERATING POSITIONS
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## RACE AND ETHNICITY AT TWIST BY THE NUMBERS

Hispanic/Latino <sup>1</sup>	10%	7%	3%	0%	7%
White	39%	44%	64%	65%	67%
Two or More Races	6%	6%	2%	0%	7%
Black or African American	3%	2%	2%	4%	4%
Native Hawaiian or Pacific Islander	2%	5%	3%	0%	0%
Asian	39%	37%	26%	26%	15%
American Indian or Alaskan Native	0.20%	1%	0%	4%	0%

## PEOPLE OF COLOR AT TWIST

Women of Color	25%	19%	16%	13%	15%
Men of Color	35%	37%	21%	22%	18%
Total People of Color <sup>2</sup>	61%	56%	36%	36%	33%

Data as of September 30, 2022

### NOTES

1. There are limitations in the way the federal government collects race/ethnicity data. For example, individuals may identify as Hispanic/Latino and an additional race/ethnicity, but may only be reflected as Hispanic/Latino in the data.

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3. Data on this page for US employee base only

# Employee engagement

## Oversight

Twist Bioscience administers a yearly survey to measure employee engagement and assess cultural coherence. The survey is designed to evaluate the consistency between the company's culture and its employees' behaviors, as well as to gauge how these behaviors contribute to the organization's achievements. In the latest survey, 87% of Twist employees participated.

- 93% of employees understand Twist's mission
- 92% understand how they contribute to the mission of the company
- 94% understand how their goals contribute to Twist

## Strategy

Our executive leadership team has identified specific initiatives for each department based on feedback from our annual employee engagement survey. Each executive is responsible for achieving one key objective that aligns with their department's goals and supports our efforts to improve employee engagement. To foster open communication and engagement, Twist hosts all-company meetings twice a month and monthly managers meetings, where the CEO facilitates Q&A sessions with employees.

We also maintain a robust intranet platform that provides regular updates about company activities and events. "The Strand" is where Twisters frequently visit to stay informed about everything that is happening.



# Compensation and benefits, health and wellness

## Oversight

We are committed to offering a comprehensive total rewards package that caters to the diverse needs of our employees. Our package includes pay rates that are well above living wages, fully covered healthcare benefits for employees with 90% coverage for family members, a fully-funded health savings account for employees and their families, approximately four weeks of paid vacation, a minimum of four months of parental leave for all global employees, flexible work schedules, commuter benefits, and onsite services. Additionally, we provide every full-time employee, both exempt and non-exempt, with the opportunity to own equity in the company through Restricted Stock Units (RSUs) and our employee stock purchase plan.

To support our employees' fertility and family-building needs, we offer an educational platform that is expert-built and provides resources for treatment, fostering, adopting, egg freezing, egg donation, and supporting LGBTQ+ families and solo parents. We invest significantly in our employees' well-being benefits, including programs to help them monitor and reduce their stress levels, and apps to support sleep and relaxation. We also prioritize our employees' emotional health by offering meditation sessions and telehealth programs for mental health counseling.

In January 2022, we launched a matching contribution program into 401(k) retirement plans, and in countries where possible, we also provide pension opportunities. Our executive leadership team has made it a priority to continuously assess and improve our benefits to ensure we are providing the best possible support for our employees.



# Health and safety

## Oversight

At Twist Bioscience, we prioritize the well-being and safety of our employees above all else. To ensure their safety, we provide comprehensive workplace safety training annually, which includes emergency procedures and accident prevention measures.

## Strategy

Over the past four years, we have taken significant strides to enhance our work environment safety program. As a result, we are pleased to share the following data with our stakeholders:

LOST TIME INJURY FREQUENCY RATE	FY 2019	FY 2020	FY 2021	FY 2022
Employees	1.44	1.41	0	0

FATALITIES	FY 2019	FY 2020	FY 2021	FY 2022
Employees	0	0	0	0

## Employee Health and Safety Committee

To ensure workplace safety and adherence to safety policies, our Employee Health and Safety Committee meets quarterly and includes members from different departments. We also provide workplace harassment and sexual harassment training for all employees and managers, which includes information on reporting any violations of these policies.

# Our community/philanthropy

## Employee volunteer time off

As a company committed to social responsibility and supporting our employees' philanthropic pursuits, we are pleased to announce that in the fiscal year 2022, Twist employees collectively volunteered 592 hours for various causes and organizations that they are passionate about. This was made possible through our Volunteer Time Off program, which grants each employee eight paid hours per year for volunteering. With our recent community partnerships, we are determined to increase the number of employee-volunteered hours each year in the communities where we operate.



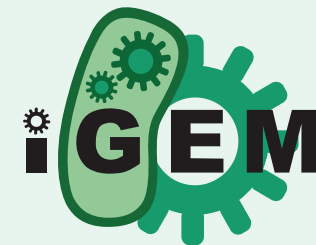
## Life Science Cares

Twist is a part of the Life Science Cares (LS Cares) initiative, a group of companies in the life science industry aiming to tackle poverty and inequality in the San Francisco Bay Area, Boston, Philadelphia, and San Diego regions. As a part of our commitment, our employees have the opportunity to engage with impactful partner organizations. Moving forward, we will continue to partner with LS Cares to identify opportunities to get involved with partner organizations throughout their network. LS Cares focuses on addressing three fundamental gaps: survival, education, and sustainability.



## International Genetically Engineered Machine (iGEM) Foundation

Twist Bioscience has been a strong supporter of iGEM, a global synthetic biology competition that initially focused on undergraduate students but has since expanded to include divisions for high school students, entrepreneurs, community laboratories, and beyond. As a supporter, Twist has revolutionized the way iGEM competition teams contribute to the Registry of Standard Biological Parts, a free online database for synthetic biologists. Now, teams can simply submit their part sequences and documentation to the Registry, and Twist will synthesize samples of these parts for the upcoming year's competition. In addition to synthesizing the parts, Twist generously offers all iGEM teams 10,000 bases of DNA to support their projects.



## STEMconnector and BioMADE

### BIOINDUSTRIAL MANUFACTURING (MADE IN THE USA)

Twist was featured in STEMconnector's new ebook. This ebook explores the people and companies driving innovations with the potential to feed, fuel, and build a more sustainable eco-friendly world. Advancements in biotechnology and bioindustrial manufacturing are driving improvements in manufacturing efficiency and reducing the use and reliance of petrochemicals for producing fuel and consumer products.

The bioeconomy is poised for enormous growth over the coming decades, driving increased demand for a diverse STEM-skilled workforce. Career opportunities abound in bioindustrial manufacturing to create new products that will reduce our carbon footprint, expand U.S. manufacturing, and accelerate our economy.



## BioBuilder Program: Worcester, MA

We had a wonderful group of Twisters participate in career conversations with high school students enrolled in the Innovation Career Pathways Program in Worcester, MA. The Innovation Pathways Program is a Massachusetts Department of Elementary and Secondary Education funded program to expand career exploration for high school students in Worcester public schools.

“In partnership with Worcester Public Schools in Worcester, MA, BioBuilder’s Innovation Pathway curricula promoted development of career- and technical-skill readiness in Biotechnology and Biomanufacturing. The students applied their growing understanding and technical skills to a semester-long lab experiment, integrating industry-standard professional practices and ways of thinking into their research.”

## Partnership with Eastside.org

We are proud partners with Eastside.org for the Eastside Internship Program which resulted in access to a diverse, deep talent pool and successful hire of a talented HR intern. Eastside is a college preparatory program focused on working with historically underrepresented populations offering a rigorous curriculum while providing extensive educational coaching, career development opportunities, and support for students throughout their high school and college careers. 98% of the students are first generation college students.

**EASTSIDE**  
**COLLEGE PREPARATORY SCHOOL**

## InnovATEBIO National Biotechnology Summit

Two Twisters participated in the Oregon state task force team at InnovATEBIO's Envisioning the Next Bioscience Workforce Summit on Industry Trends and Needs in Washington D.C. The state task force teams brought together government, education, and industry representatives across the nation to collaboratively address industry diversity and equity challenges, employment gaps, community college program needs, and develop a state workforce ecosystem map to propel the work to drive biotechnology education forward.

The InnovATEBIO National Biotechnology Education Center is focused on advancing education to train highly skilled biotechnicians to meet the critical demands of the nation's biotechnology workforce by providing curricula, sharing resources, and monitoring and addressing industry workforce trends.



## Supporting effective educational programs through volunteer and mentoring opportunities

We have expanded our work and partnerships with community colleges to encompass career technical programs nationally. Twist commits to sharing insightful industry perspectives with community college advisory boards to help shape and inform curricula and the development of career technical education programs. Twisters provide mentorship for students by participating in mock interviews, critiquing student resumes and cover letters, hosting career panel discussions, and providing industry presentations.



# Company and leadership awards

## **Deloitte Technology Fast 500**

Deloitte has been recognizing the most innovative technology companies from various cities across North America for 26 years through the Technology Fast 500 awards. The purpose of this award is to acknowledge the effort and commitment required to be a game changer in the industry. The selection process involves evaluation of submitted applications and research from public company databases, with winners chosen based on the growth percentage over a three-year period. We are delighted to have received this recognition for our outstanding growth rate in 2020, 2021 and 2022.

## **California Life Sciences Pantheon Awards**

In November 2022, Twist Bioscience was awarded the Pantheon Award in the Synthetic & Ag Bio category granted to the company that made the greatest advancement in, and/or the greatest overall contribution to, the California life sciences sector in the prior year. Our Chief Scientific Officer, Aaron Sato, Ph.D. received the award on behalf of the company.



## ***San Francisco Business Times* 40 Under 40**

Our Chief Technology Officer, Siyuan Chen, Ph.D. received the 40 Under 40 award, and described his mission to focus on what our customers want and to leverage our DNA synthesis platform to enable our customers to solve real world problems. “One great example is that we rapidly developed synthetic SARS-CoV-2 RNA controls during the early days of the pandemic to enable labs around the world to develop diagnostic assays for COVID detection,” said Siyuan Chen, Ph.D.

## ***Boston Business Journal* 40 Under 40**

Tracey Mullen, Twist Bioscience’s SVP, Biopharma, received the 40 Under 40 award from the *Boston Business Journal* in recognition of her impact and contributions to our industry.

The background is a solid teal-green color. It features several white geometric shapes: a large circle on the left containing the number '4', and a large, irregular white shape on the right that contains the text. Thin white curved lines also sweep across the background.

# 4

**COMMITMENT  
TO ETHICS**

## Guiding principles and business ethics

At the heart of our culture are our guiding principles, which include Grit, Impact, Service and Trust. They inform our approach to teamwork, facilitate feedback, and reinforce our brand identity. Service is central to our operations, as well as our relationships with colleagues and customers. We are committed to surpassing the expectations of both internal and external stakeholders.

## Government affairs

Twist Bioscience refrains from providing financial support to political campaigns, parties, or organizations.

***“I believe that biology has the power to balance the competing needs of an expanding population while improving the world we live in today.”***

EMILY LEPROUST, PH.D.  
CEO AND CO-FOUNDER, TWIST BIOSCIENCE



# Data privacy and cybersecurity

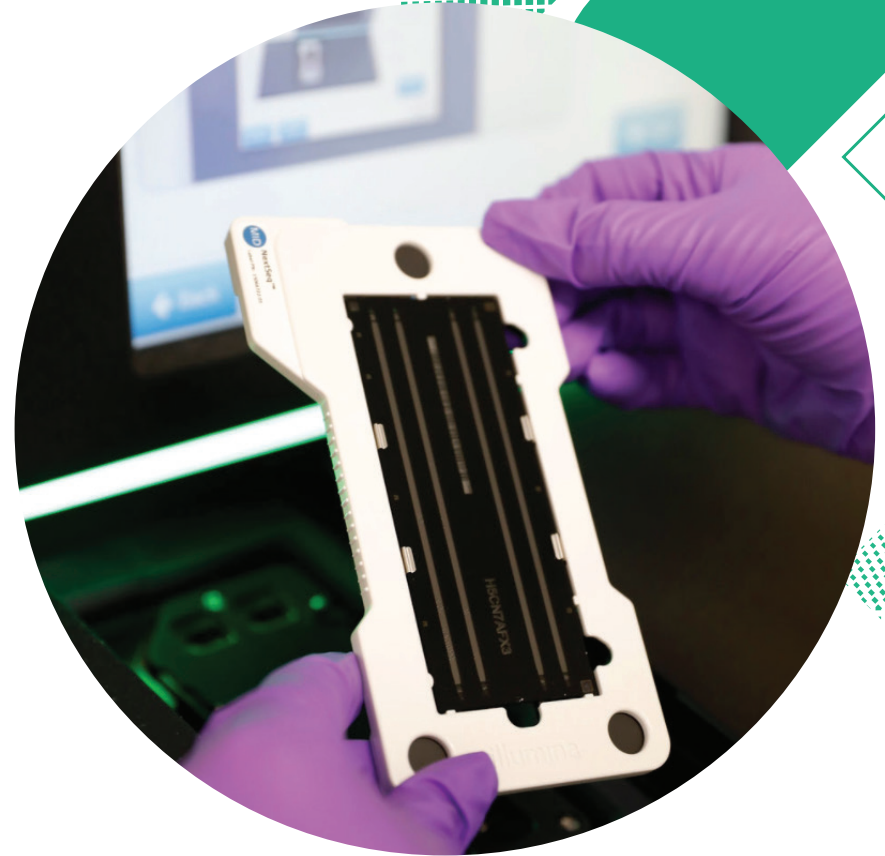
## Oversight

We believe that Twist has a significant responsibility to protect the digital information of our customers and employees. Twist Bioscience follows the guidance of national and international agencies in making cybersecurity an important tenet of our overarching operations.

Our cybersecurity program, like our Quality and Biosecurity programs, is built upon the foundation of international standards and is overseen by experts in the field and rigorously and continuously scrutinized.

## Strategy

The core of our cybersecurity program is our Information Security Management System (ISMS). As a ISO 27001-certified company, Twist Bioscience is audited by an accredited, independent certification body each year to make sure that all working parts of our ISMS—our People, our Processes, and our Technology—comply with the standard. Our Board of Directors oversees all cybersecurity efforts at the highest level of the company.







## PEOPLE

- All company employees, whether full-time, part-time, consultant, or contractor, are trained in our Cybersecurity Awareness program. The program includes yearly training, quarterly testing, and a weekly informational campaign to keep digital safety high in our team's consciousness.
- Our Executive Leadership Team (ELT), Audit Committee (AC), and Product Approval Committee (PAC) are all regularly briefed on the company's cybersecurity posture and provide guidance on strategy and priorities.
- Employee background checks are performed, roles and responsibilities are clearly delineated, a strict philosophy of least privilege governs access control, and segregation of duties is built into our policies.
- External partnerships with compliance experts, penetration testers, security operation center teams, law firms specializing in cybersecurity, and national and global agencies including the Center for Internet Security (CIS), MITRE, United States Computer Emergency Readiness Team (US-CERT), Cybersecurity and Infrastructure Security Agency (CISA), and the FBI.

## PROCESS

- Annual audits and re-certification for ISO 27001 to ensure data protection practices comply with applicable laws and cybersecurity best practices.
- Annual risk assessment run by ISMS team and sponsored by an ELT representative.
- Annual penetration testing performed by an accredited, third-party agency.
- Continuous vulnerability scanning and mitigation both in our code and in our services.
- Regular access control reviews for all critical systems.
- Incident Response, Business Continuity, and Disaster Recovery policies and procedures to deal with cybersecurity incidents or natural disasters.
- Supply chain management with vendor selection security assessments and vendor assessments.
- Company privacy policy and privacy practices which align with applicable data protection laws and regulations, including General Data Protection Regulation (GDPR) and California Consumer Privacy Act (CCPA).

# Biosecurity

## Oversight

Twist Bioscience is a leading provider of synthetic DNA on a global scale and is committed to promoting responsible use of its products. To that end, the company has invested significant resources in developing and improving a comprehensive biosecurity program. This program includes participation in national and international initiatives to enhance algorithms, metadata, and tools used by researchers to assess potential biological risks posed by specific DNA and protein sequences.

Twist understands the importance of advancing biosecurity as a core technology provider and strives to contribute to a safe biotechnology environment. The company has engaged and collaborated with governments, academic institutions, international non-governmental organizations and other DNA synthesis providers to develop a set of consistent biosecurity best practices. As the field of synthetic biology continues to evolve, Twist remains active in writing the biosecurity playbook, to ensure that appropriate safeguards are in place.

## Strategy

### NATIONAL AND INTERNATIONAL REGULATIONS

To comply with all U.S. government guidance and regulations, Twist Bioscience implements strict biosecurity and export control screening measures to ensure that all orders are fulfilled appropriately. These measures include adhering to the Screening Framework Guidance for Providers of Synthetic Double-Stranded DNA published in 2010 by the U.S. government and the Harmonized Screening Protocol established by the International Gene Synthesis Consortium (IGSC). The U.S. Federal Select Agent Program (FSAP) is the primary regulatory framework governing the control of certain synthetic DNA sequences within the United States. In addition, as Twist Bioscience is a U.S. manufacturer of DNA, the sale of synthetic DNA to customers outside of the U.S. is subject to compliance with the Export Administration Regulations (EAR) by the U.S. Department of Commerce, which dictates that certain biological sequences require a license prior to export.

By adhering to these regulatory frameworks, Twist Bioscience ensures that DNA sequences that pose a significant risk if misused are not synthesized or shipped to unlicensed organizations.

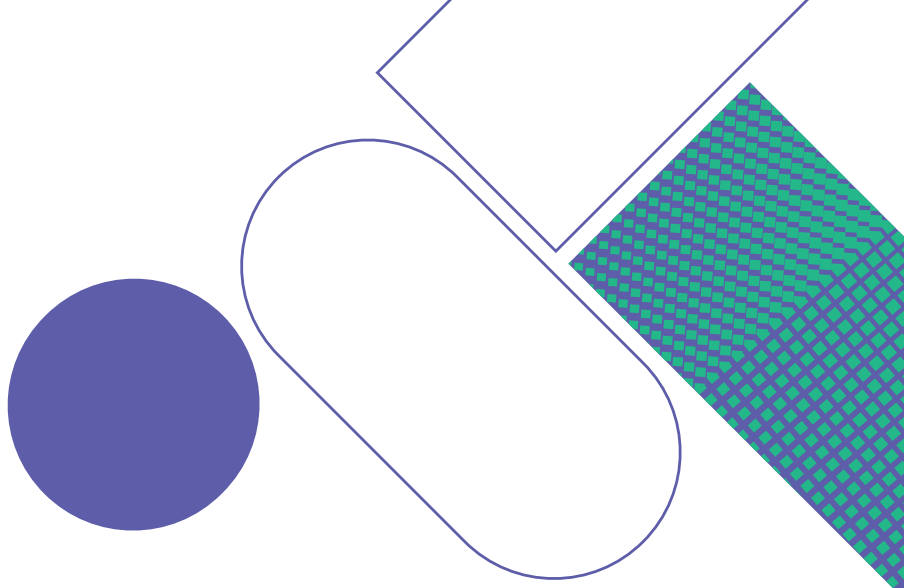
## SCREENING OF SEQUENCES AND CUSTOMERS

In order to avoid synthesis of potentially dangerous sequences, Twist Bioscience has implemented a comprehensive screening program. All double-stranded DNA sequences ordered are screened to identify whether they originate from an organism or toxin that is domestically or internationally controlled for possession. These controlled organisms or toxins include smallpox, dangerous strains of avian influenza, and other pathogens that pose a significant threat to animal, plant, or human health. Controlled organisms and toxins are highly regulated, and possession is restricted.

If a controlled sequence (or a portion thereof) is detected during screening, Twist Bioscience contacts the customer to verify customer identity, their intended use for the sequences, past publication record on similar research, and ensure that any required licenses are issued before shipment.

Moreover, Twist Bioscience uses various government lists, such as the U.S. Treasury Specially Designated Nationals list, the U.S. State Department Denied Parties List, and the Department of Commerce Entity List, to screen each customer, ensuring that synthetic DNA is not sold to potentially dangerous individuals or organizations. Additionally, Twist confirms the validity of each organization to which they sell and requires that customers agree not to resell synthetic DNA produced by Twist Bioscience unless they have been licensed to do so under a specific contract.

Lastly, Twist Bioscience only ships synthetic DNA to valid commercial addresses and will not ship to a residential address or a P.O. Box.



***Twist engages and collaborates with national and international governments, academic institutions, international non-governmental organizations and other DNA synthesis providers to guide a set of consistent biosecurity best practices.***

## ***Twist supports responsible research through comprehensive biosecurity.***

### **STAFFING**

Twist Bioscience assigns human resources to ensure that its employees adhere to all the policies and procedures that are part of its biosecurity program and to address any concerns that may emerge. This team includes a Trade Compliance Manager, a Screening Manager, and a Biosecurity Response Team.

### **REPORTING**

Twist Bioscience collaborates with various governing and industry organizations to address biosecurity concerns. These organizations include the Federal Bureau of Investigation, the Centers for Disease Control and Prevention, the U.S. Commerce Department Bureau of Industry and Security, and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service. Additionally, Twist is a member of and currently chairs the International Gene Synthesis Consortium (IGSC), an industry trade group consisting of several synthetic DNA manufacturers. IGSC members may use an existing mechanism to notify each other of suspicious orders received to prevent the ordering of dangerous DNA sequences from other vendors.

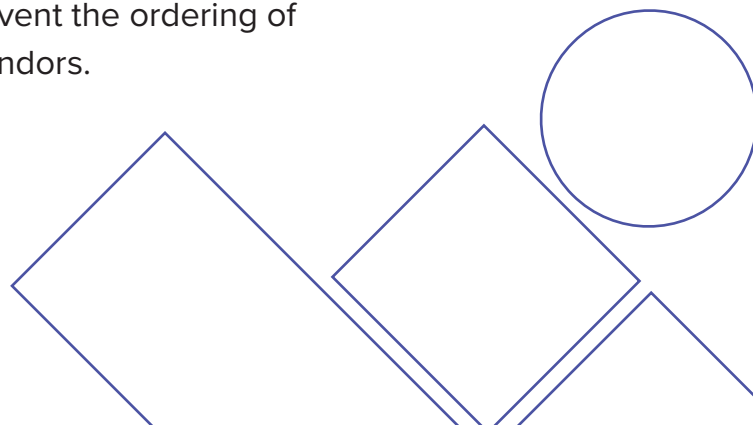
### **RECORD KEEPING**

At Twist Bioscience, we have implemented internal policies that mandate the retention of documentation for each biosecurity screening of a DNA sequence that has been ordered. This documentation must be kept for a period of eight years.

### **RED TEAMING**

Twist Bioscience has challenged the effectiveness of its biosecurity program by engaging skilled consultants to attempt to breach its security measures, a practice commonly known as red teaming in cybersecurity. The consultants place real orders that are intended to deceive the screening process.

Despite these attempts, none of the experts' obfuscation methods have succeeded, indicating that the biosecurity program implemented by Twist Bioscience is highly robust.



## BIOSECURITY NEXT STEPS

We recognize that biosecurity is an ever-evolving field, and we strive to keep up with best practices and adapt to emerging concerns. We believe that life sciences research has the potential to improve public health and emergency preparedness, and we encourage flexible governance to address new information and changing dynamics.

To ensure that our screening protocols meet or exceed best practices, we actively engage with leading experts and participate in programs such as the Intelligence Advanced Research Projects Activity Functional Genomic and Computational Assessment of Threats program and supporting the International Biosecurity & Biosafety Initiative for Science (IBBIS).

While implementing these policies and procedures requires investment in both time and resources, we remain committed to advancing scientific research to benefit society. Synthetic biology has the potential to improve human health and the environment, and we are proud to provide high-quality synthetic DNA while maintaining disciplined biosecurity screening to ensure public safety.






## In conclusion

At Twist, we believe that our ESG efforts should be aligned with our business strategy. From our founding technology that miniaturizes the chemical reaction used to make synthetic DNA by 99.8%, we understood the need for a more sustainable, scalable approach to DNA product development. We strive for excellence in everything we do, including offering our customers more sustainable synthetic DNA and RNA products.

Moving forward, we will continue #WritingTheFuture.



The background features a solid blue field with large, white, organic, and curved shapes. A prominent white circle is on the left, and a larger, more complex white shape is on the right. Thin white lines curve across the blue background, separating the white shapes.

# **APPENDIX**

# Reporting frameworks

## United Nations Sustainable Development Goals

SUSTAINABLE DEVELOPMENT GOAL	RESPONSE
SDG 2: Zero Hunger	<b>Working in service of our customers:</b> Twist's customers are making plants more durable and reducing the need for pollutants, which enables sustainability and could provide greater and continued access to nutritious foods. Our customers are also engineering pests-resistant crops.
SDG 3: Good Health and Well-Being	<b>Working in service of our customers:</b> Twist Bioscience manufactures synthetic DNA for our customers to develop therapeutics and next-generation sequencing applications to detect and monitor diseases, as well as significant advances in research. <b>Our products:</b> 10-K, pgs. 5–7
SDG 5: Gender Equality	<b><u>Board of Directors Diversity Policy</u></b> <b>Diversity is in our DNA:</b> ESG Report, pgs. 37–41
SDG 12: Responsible Consumption and Production	<b>Sustainability is in our DNA:</b> ESG Report, pgs. 20–28 <b>Kimberly-Clark Greenovation Award 2020, 2021, and 2022 for nitrile glove recycling.</b> <b><u>Supplier Code of Conduct</u></b>



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