

LESSON 1

運動の「やる気スイッチ」は意外な場所にある

語数: 1023語

- ① Some mice are more inclined to run on an exercise wheel than others. That's because, according to a recent study, these mice have bacterial species in their guts that send signals to their brains helping increase their desire to exercise. Could the same be true for humans?
- ② It's long been known that regular exercise is good for health and decreases the risk of many diseases. Yet more than 80 percent of adults don't manage the recommended 150-minutes per week even though lack of physical activity causes between 6 and 10 percent of premature deaths, coronary heart disease, type 2 diabetes, breast cancer, and colon cancer globally. In fact, sedentary lifestyle is considered to be the fourth leading cause of death worldwide.
- ③ But the factors that motivate some to exercise more than others are not well understood. Exercise affects the gut microbiome, but how the microbiome directly affects exercise behavior is not clear. There have been hints that the two are linked. A study published in 2019 found that after the Boston Marathon, runners had more of a particular bacterial species in their stool than sedentary volunteers; these species of bacteria could trigger better athletic performance when transplanted into mice. Building on such studies, new research published in the journal Nature, shows that at least in mice, some species of bacteria that dwell in the gut can drive the production of dopamine, the feel-good neurotransmitter, to reward exercising for a longer time. A large increase in dopamine is just one of many neurochemical changes that happen both in human and mouse brains after exercise.
- ④ "The study shows very conclusively that in mice, the desire to exercise is influenced by the microbiome," says Anthony Komaroff, a professor of medicine at Harvard Medical School. "[This study] provides a mechanistic explanation about how the microbiome could influence the desire of the animals to exercise."
- ⑤ Christoph Thaiss, a microbiologist at the University of Pennsylvania, who led the new study wanted to know what prevents most people from wanting to exercise. Since it's not easy to do experiments in humans, his team gathered eight types of genetically diverse mice.
- ⑥ "We took a very unbiased look by studying mice, because there is a lot of natural variability among how much mice exercise," says Thaiss.
- ⑦ Some of this variability in motivation or ability to do hard exercise is related to genetics. For example, Theodore Garland, Jr., an evolution biologist at the University of California, Irvine, wanted to understand how complex traits — like marathon running — evolve at multiple levels of organization, ranging from behavior to DNA. He has shown in an ongoing experiment started in 1993 that a type of super-runner mice — bred over more than one hundred generations — evolved specific changes in their DNA and ran over three times longer than average. These mice also have different microbiomes than their less active counterparts.
- ⑧ To test whether removing the gut microbiome would affect the motivation to exercise Garland gave the athletic mice antibiotics. It drastically and irreversibly reduced the voluntary exercise behavior of super runners. The mice with depleted gut bacteria ran about 21 percent less every day, even though they continued to eat well and were otherwise unaffected.
- ⑨ "The gut microbiome is obviously one of the factors that can influence ability to run and exercise," says Garland, but his study did not directly explain how gut bacteria could affect motivation for physical activity.
- ⑩ Thaiss' new study in Nature explored the connection between the gut and brain of mice. Thaiss' team measured how long 199 untrained mice would voluntarily run on exercise wheels and how long they could sustain a particular speed. Not knowing what specific factors might explain their desire to exercise, the scientists also collected 10,500 other data points such as the complete genome sequences for all 199 mice, gut bacterial species, and metabolites present in the bloodstream of each mouse. This resulted in nearly 2.1 million total data points.
- ⑪ "It's a huge amount of data," says Matthew Raymond Olm, a computational microbiologist at Stanford University.
- ⑫ Rather than trying to understand the effect of variables one by one, the scientists used a machine learning approach in which they plugged all the data into a computer program and let it identify the most critical factors that explained the endurance of high performing mice.
- ⑬ "This study is a really great example of big data working well to focus on something important and fundamental about the microbiome," says Olm.
- ⑭ What Thaiss found surprised him because genetics accounted for only a small portion of the performance differences between mice, whereas differences in gut bacterial populations appeared to be substantially more important.
- ⑮ "We do see certain inherited traits of exercise performance," says Thaiss. "But it's just relatively small."
- ⑯ To confirm that gut bacteria was indeed responsible for the observed difference, the researchers removed the gut bacteria of mice by giving a wide variety of antibiotics. This reduced the running endurance of high performing mice by about half. Conversely, when scientists transplanted the microbiome from a top performing mouse, it increased the exercise capacity of the recipient mouse.
- ⑰ In a years-long scientific investigation in a dozen laboratories in the United States and Germany, Thaiss' team identified two bacterial species Eubacterium rectale and Coprococcus eutactus, which were responsible for helping increase the motivation to exercise in high-performing mice.
- ⑱ "This study in animals raises the question whether humans who love to exercise and humans who avoid exercise are being influenced by their microbiomes," says Komaroff.
- ⑲ But the new study cannot yet directly draw conclusions for humans, warns Thaiss.
- ⑳ However, similar pathways are active in humans. The bacterial species identified in the gut flora that drive exercise capacity in mice are also present in the human microbiome. Similarly, the fatty acid amides found to drive exercise performance in mice and trigger the gut brain pathway that drives motivation for exercise are also found in the human gut.
- ㉑ "Does this mean that the pathway will look one to one the same? We don't know," says Thaiss. "There are many differences between mice and human physiology. But we're starting a human study that will answer this question."

音読回数チェック (1日5回×6日間=計30回)

8/28(金)	1	2	3	4	5	8/31(月)	16	17	18	19	20
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重要語句

sedentary 座りがちな
microbiome 微生物叢
endurance 持久力

voluntary 自発的な
irreversibly 不可逆的に
coronary 冠状動脈の

LESSON 2

子ども向けの本を男女別表示にするのをやめよう

語数: 682語

- ① Why do we give books to children? Common answers to that question involve the use of words like "expand," "open" or "broaden," followed by "minds," "hearts," "horizons" or "imagination." It is sad then, that many books for children do just the opposite: they peddle stereotypes, close minds to new experiences and offer limited horizons. The Let Toys Be Toys campaign, which last year persuaded 13 retailers to remove "Boys" and "Girls" signs from their stores, is working with other not-for-profit organizations including Letterbox Library, Inclusive Minds and For Books' Sake, to persuade the publishing industry to drop these labels from books. The Let Books Be Books campaign asks children's publishers to stop labelling children's activity books, story books, and colouring books as "for boys" or "for girls."
- ② Children are individuals. They should feel free to choose their own interests, not feel that they're supposed to like or reject certain things. Anyone who chooses a gift based only on a child's gender is making some massive, and quite likely wrong, assumptions about what that child may like. Campaign supporters regularly complain about "boy" and "girl" books that have predictably lazy stereotypes on the cover. These books are usually colouring books, sticker books and activity books. "Stories for Boys" and "Stories for Girls" are also common. Classic novels, great for all children to read, are put together with the words "girls" or "boys" slapped on the box. Separate cookery books seem particularly ridiculous, the suggestion being that boys eat pizza and burgers, while girls prefer pink iced cupcakes. We've even seen versions of The Bible "for girls" and "for boys."
- ③ Typical themes for boys include robots, dinosaurs, astronauts, vehicles, football and pirates, whereas typical themes for girls are princesses, fairies, make-up, flowers, butterflies, fashion and cute animals. There's nothing wrong with these things, but it is wrong when they are repeatedly presented as only for one gender. Girls can like pirates and adventure; boys can like magic and dressing up. Why tell them otherwise? Why tell them that boys' and girls' interests never overlap, that there are greater differences between genders than between individuals? It is accepted practice to target products at one segment of the population, but when it comes to children's books it is morally questionable to promote gender stereotypes. Children take messages about what's "for girls" or "for boys" seriously.
- ④ "Books should give children the chance to explore new things and ideas, and labelling books, and certain subjects, as only for one gender prevents them from doing this," says Alexandra Strick, of children's literature project, Inclusive Minds. Her co-founder, Beth Cox, adds, "These books reinforce stereotypes about what it means to be a boy or a girl, and therefore make children who don't follow these stereotypes more vulnerable to bullying and at risk of low self-esteem."
- ⑤ The campaign also aims to raise discussion on wider issues concerned with gender and children's books, such as the fact that male characters still exceed female characters by two to one in children's picture books, or the belief, often expressed by publishers, that boys won't read books with girl leads. These issues are connected to a wider culture of inequality. The creator of For Books' Sake, Jane Bradley, says, "From gendered children's colouring books to book covers with illustrations of handbags and cupcakes, the publishing industry aggressively reinforces conventional gender roles to its readers from childhood onwards. This gendered marketing establishes and sustains limiting, old-fashioned stereotypes, and we believe it's time for the publishing industry to put it where it belongs: in the past."
- ⑥ Kerry Mason, co-director of the not-for-profit social enterprise Letterbox Library, agrees. "At Letterbox Library, we have spent the last thirty years selecting books which give children the widest possible choices in what they read. Our selection is increasingly being threatened by a type of marketing which uses book labelling and covers which restrict a book's readership. We simply cannot stock books marketed in this way. Gendered marketing is anti-choice and, for us at least, there really is no profit in it. Nor is there much respect for the children in it!"

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重要語句

stereotype 固定観念
peddle 広める、売り歩く
reinforce 強化する

vulnerable 傷つきやすい
gendered 性別による
aggressively 積極的に

LESSON 3

「週4日勤務」でハッピーになれるのか？

語数: 1099語

- ① Americans are overworked. According to the Organization for Economic Co-operation and Development, U.S. employees work an average of 1,791 hours per year versus an OECD country average of 1,716 — the sixth highest in the world.
- ② To give workers in their state an extra day off to recharge, Maryland lawmakers are introducing a new bill "promoting, incentivizing and supporting the experimentation and study" of a four-day workweek for private companies and government agencies.
- ③ Let's take a look at how employees and employers could thrive with a four-day workweek and whether such a schedule could become the new norm.
- ④ What is a four-day workweek? It is exactly what it sounds like: a workweek during which employees work for four days and take the other three off.
- ⑤ Here's how it works: Instead of working 40 hours a week, four-day workweeks allow you to work only 32 hours while receiving the same pay and benefits. Depending on the company or the industry, you might work Mondays through Thursdays and get Fridays off. Or, you may have the freedom to choose your extra day off.
- ⑥ The idea of a four-day workweek has been gaining popularity in recent years, with companies like Microsoft and Amazon adopting it in some form or another. But why are businesses making the switch? What are the benefits of a four-day workweek?
- ⑦ Despite common misconceptions, longer working hours don't always translate to better productivity and quality of work. Research from Stanford University found that worker performance declines sharply once employees are asked to work more than 50 hours a week. In fact, the additional output created by those extended working hours is so minute that the extra hours are often not worth the effort.
- ⑧ Rather than forcing employees through hours of unproductive labor, the four-day workweek model allows them to rest so that they can reemerge with a refreshed outlook and optimism for their jobs. Most important, when employees can work without sacrificing physical health or mental well-being, it fosters an environment of productivity and innovation as they become more engaged with their work.
- ⑨ Moving to a four-day workweek doesn't just benefit employees, it also offers employers a significant cost advantage. Variable overhead expenses like electricity, office supplies and cleaning services can add up quickly. By shifting to a four-day workweek, employers could save up to 20% on those costs and use the funds in other business areas.
- ⑩ Plus, when employees have a manageable workload and reasonable working hours, companies are more likely to retain their top talent, which keeps employee replacement costs down.
- ⑪ Overall, a four-day workweek could be a win-win situation for everyone involved because employers save money on business expenses and employees are happier and more productive.
- ⑫ According to the International Journal of Environmental Research and Public Health, not having a work-life balance could increase burnout and lead to lower career satisfaction. What's worse, burnout could often be long-lasting and affect your mental and physical health.
- ⑬ So, it's no surprise that many people want to spend less time at work, as indicated in Joblist's survey showing that more than 94% of full-time salaried U.S. employees would prefer a four-day workweek.
- ⑭ Introducing a four-day workweek could be an excellent solution to help employees achieve an improved work-life balance. By permitting them to devote more time to activities outside of work, employees are more likely to come back to work with increased focus and motivation.
- ⑮ Jack Darracott, web app developer at Marketing Signals, wrote in an email, "Not only has a four-day workweek helped with my home life, but my work has also improved. My day off serves as a 'reset day,' so when I'm back in the office, I can look at work with a fresh pair of eyes. You couldn't pay me enough to return to five-day workweeks."
- ⑯ While working less may sound like a dream come true for many, there are some downsides you should consider before interviewing at a company offering a four-day workweek.
- ⑰ If your company expects you to complete the same number of tasks with fewer hours available each day, you must remain productive or you could risk falling behind. This compressed schedule can make you feel overwhelmed and anxious as you try to stay afloat while juggling multiple projects.
- ⑱ Jenn Lim, global workplace expert, says, "Doing the same amount of work in less time can set unrealistic expectations, leading to increased burnout and stress." To make a four-day workweek successful, "organizations and their teams will have to be very diligent about setting time (and honoring that time) for deep work."
- ⑲ For some positions, such as customer service, it may not be practical to limit employee hours to a shorter work week as employees may need to be available five days a week to provide customer support.
- ⑳ "Businesses must realize that the four-day workweek is yet another one-size-fits-all approach to workplace flexibility that will serve some employees and hurt others," says Gabriela Mauch, vice president of the ActivTrak Productivity Lab. For example, "employees who must take customer calls and fulfill external commitments across five days may feel resentful or short-changed compared to their four-day-a-week co-workers."
- ㉑ Adriana Herrera, founder of PayDestiny, wrote in an email, "Four-day workweeks could attract less motivated talent — people who are rather disengaged and want to do the bare minimum at work."
- ㉒ In positions that require rigorous effort to be successful, passive individuals could lower the team's productivity and diminish output. However, Herrera says this problem is usually preventable by clearly "communicating the duties a position is measured by in the job description."
- ㉓ The pandemic has shown that we can reimagine the workplace and make drastic changes to how we work. Lim says, "For so long, the U.S. has been a work-first culture, and we have seen the rejection of that in recent work trends" after COVID-19. "A four-day workweek is just another layer of the increased demand for flexibility and less work."
- ㉔ And while it's difficult to predict whether we'll see an increase in the number of states recommending or incentivizing shorter workweeks this year, Lim says, "We'll likely see more organizations test and adopt this model soon."
- ㉕ While the idea of a four-day workweek could be attractive, don't let that be the sole reason you apply to work for an employer. Remember, a four-day workweek at the wrong company could negatively impact your mental health and career growth — especially if the company lacks support or opportunities for career progression.
- ㉖ So, before submitting your application for a position, thoroughly research the company to see if its mission and corporate culture align with your goals and values.

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重要語句

burnout 燃え尽き症候群
overwhelmed 圧倒された
diligent 勤勉な

compressed 圧縮された
disengaged 意欲を失った
incentivize 奨励する

LESSON 4

ジェスチャーと言葉は脳の同じ領域を使っている

語数: 465語

- ① Words themselves do not communicate all the essential elements of what we need and want to convey to others. The expressions we make with our faces, the tone we use when we speak, and the gestures we make with our body are also key to communicating effectively. In fact, your brain needs to integrate both the sounds and body movements of the person who is speaking to accurately perceive what is meant. Furthermore, gestures actually help orchestrate the brain's language comprehension centers.
- ② Paul Ekman, the world's foremost expert on human nonverbal communication, has identified more than ten thousand discrete human facial expressions, and it turns out that the neural networks that control language are the same ones we use for gesturing. Gesturing enhances our memory and comprehension skills, and, depending on which hand you use, your gestures may be conveying information that will influence how the listener responds. For example, when researchers at the Max Planck Institute studied the communication styles of American presidential candidates during the final debates of the 2004 and 2008 elections, they made some fascinating discoveries. In right-handed politicians, positive messages were associated with right-hand gestures, while negative messages were conveyed with gestures by the left hand. For left-handed politicians, the findings were reversed.
- ③ A recent Stanford University study confirmed this finding: we tend to express positive ideas with our dominant hand and negative ideas with the other hand. But don't try to second-guess someone by looking at their hand movements alone; there's often a mismatch between speech and gestures, especially when a person is trying to communicate something difficult or new. As Ekman points out, facial expressions and body gestures only give us clues about what the person may actually be trying to convey.
- ④ Biologists who study the evolution of human speech have demonstrated that spoken language emerges from our use of hand and facial gestures, and a recent neuroimaging study showed that hand gestures and speech originate in the same language-related area of the brain. This overlap between words and gestures appears to be associated with a rare cluster of brain cells called "mirror neurons." The neurons that fire in someone's brain when they make a specific gesture also fire in your brain as you observe them. Many of these mirror neurons are located in the brain's language centers, and they may be crucial for governing our ability to empathize and cooperate with others.
- ⑤ These neuroscientific studies teach us how important it is to pay close attention to the nonverbal messages given to us by others and to train ourselves to communicate more fully by consciously using our facial expressions, tone of voice, and body language. If our words and gestures are incongruent, a form of neural dissonance occurs that will confuse the person who is listening and watching.

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重要語句

nonverbal 非言語の
orchestrate まとめ上げる
empathize 共感する

incongruent 不一致の
dissonance 不協和
discrete 個別の

LESSON 5

本を所有することによる魔法の効果

語数: 572語

- ① In 2010, my feelings about books got a major boost from science, as two major studies published that year confirmed things that I have believed for years: that children (like all other people) should own books, that libraries are wonderful things for children but cannot substitute for book ownership, and that books owned impact children's lives much more than books borrowed. The first study was conducted in low-income school districts across the United States. Researchers found that students who received free books each summer for three years performed substantially better on reading tests than students from the same districts who did not receive books. The researchers in this study made no attempt to determine whether or not the students actually read the books they were given. Book ownership was the only variable under consideration and the only variable that correlated with higher achievements in reading.
- ② The second study, a very thorough one that examined more than 70,000 subjects in twenty-seven countries, found that students who grow up in homes with books stay in school an average of three years longer than students who grow up in homes without books. The large sample size in this study allowed researchers to control carefully for other factors that could influence school longevity; they found that the students received the same advantage “independent of their parents' education, occupation, and class” and that the results “hold equally in rich nations and poor; in the past and in the present; under Communism, capitalism, and Apartheid; and, most strongly, in China.”
- ③ These studies, and others over the past twenty years, suggest that book ownership can enhance literacy in ways that cannot be attributed to any other factor, including book readership. This does not mean that reading books is unimportant, of course, or that children must own every book that they read. It does mean that something happens to a child's self-perception when he or she is a book owner that does not happen to those who read books without owning them. “It's not the physical presence of the books that produces the biggest impact,” David Brooks writes in the New York Times, commenting on the first study and paraphrasing an anonymous book donor, “it's the change in the way the students see themselves as they build a home library. They see themselves as readers, as members of a different group.” Salon columnist Laura Miller agrees: “As much as we love libraries, there is something in possessing a book that is significantly different from borrowing it, especially for a child. You can write your name in it and keep it always. It transforms you into the kind of person who owns books, a member of the club, as well as part of a family that has them around the house. You're no longer just a visitor to the realm of the written word: you've got a passport.”
- ④ And this is my experience exactly. In a very real way, books changed my life — ultimately because I read them, but initially because I owned them. Having my own library of classic books made me a different kind of person — namely, the kind of person who owns a library of classic books. Reading them, loving them, and learning from them followed naturally from this ontological position. Though I still own more books than I have read, the number has been shrinking for years. But will never, I hope, get to zero.

音読回数チェック (1日5回×6日間＝計30回)

9/1(火)

1

2

3

4

5

9/4(金)

16

17

18

19

20

9/2(水)

6

7

8

9

10

9/5(土)

21

22

23

24

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9/3(木)

11

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14

15

9/6(日)

26

27

28

29

30

重要語句

correlate 関連する

longevity 継続期間

paraphrase 言い換える

ontological 存在論的な

substantially かなり

LESSON 6

「創造性あふれる人の特徴」

語数: 742語

- ① Creativity is effective novelty. That is to say, it is doing or making something new that solves a problem or usefully changes how we act, think, or feel. To be creative, then, can be as simple as seeing something everyone else sees, but thinking what no one else thinks about it. Other times, it requires taking ideas or processes that people usually view as being unrelated and finding some fruitful connection between them.
- ② Recently, we gave an interview to a Brazilian journalist about creativity. Here are our answers — in English!
- ③ Creative people tend to use a wide range of thinking skills. In our book, Sparks of Genius, we have identified thirteen “thinking tools” common to creative people across many disciplines and endeavors. These are observing, abstracting, imaging, pattern recognition, pattern forming, guessing, body thinking, empathizing, dimensional thinking, modeling, playing, transforming, and synthesizing. It may seem odd, but scientists and artists of all kinds abstract and simplify complex things and processes, play with their ideas, and empathize with the objects of their study in similar ways.
- ④ We have another book in the works that will describe additional strategies for thinking that are shared among creative people. One is that creative people practice creating. They pursue multiple hobbies such as painting, music-making, writing, dancing, cooking, modeling, making clothes, and so forth, in which they can play around with and get comfortable with the creative process. Because the creative process is largely transferable from one discipline or endeavor to another, this creative play can have beneficial effects on professional work.
- ⑤ In fact, a by-product of having many creative hobbies is that creative people have a wider range of knowledge, experience, skills, and techniques to mix and match in novel, interesting and unexpectedly useful ways. So creativity breeds more creativity.
- ⑥ Do creative people think differently from ordinary people? Not, really. They just think more effectively — and persistently. Everyone goes through an identical learning process that begins with copying what other people have done. That’s how we all learn to read, write, make music, dance, perform experiments, and everything else. The next stage is to start to make variations on what we’ve learned. Instead of just playing the notes on the page or dancing the steps we’ve memorized, we begin improvising. This requires taking risks and being willing to fail. Many people don’t want to do that, and here’s where creative thinkers begin to part company. They don’t give up easily when things get difficult. Eventually, they improve the skills necessary to make their own unique things up from scratch: a whole new dance, a new composition, an experiment never tried before. But what really makes the great creators great is combining such improvised materials from two or more unrelated fields: composers who look at a computer as a new kind of instrument; biologists who use their art to discover camouflage.
- ⑦ Intelligence and creativity are not the same thing. There have been many studies of the relationship of IQ (the intelligence quotient) and creativity. These generally find that people with very high IQs are often not very creative. And very creative people are often not the most intelligent but, rather, of average intelligence. In fact, most Nobel Prize winners in science have IQs in the 120 to 140 range, which is below the average often used to define “genius”!
- ⑧ So high test scores and great grades do not necessarily set creative people apart, especially when young. Far better to look for evidence of a playful imagination and a habit of making and exploring. We have convincing evidence that adolescents and young adults who have several well-developed talents or hobbies are more likely to become creative adults than those who have a single talent or interest.
- ⑨ The best thing for promoting your creative potential is creative practice. Learn some new skills: writing, photography, cooking, dancing, computer programming, chess ... you name it! But while you are learning, pay attention to HOW you are learning. Use your thirteen “thinking tools” to play around. Experiment. Explore. Break the rules. See what happens if you do the opposite of what you are supposed to do. Make mistakes on purpose to see if something interesting happens. Make up your own rules. By playing such games, learn what strategies work for you. And then apply your own successful strategies in other parts of your life and work. As long as you keep trying to make and invent, you build creative muscle.

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重要語句

novelty 目新しさ
fruitful 実り多い
transferable 応用できる

improvise 即興で行う
camouflage 擬態

LESSON 7

「私たちは『ブランドのラベル』にお金を払っているのか!」

語数: 997語

- [1] The television show Penn & Teller took on the bottled water industry. They hired an actor to play a “water sommelier” at a first-class restaurant. His job was to present unsuspecting diners with a leather-bound menu of bottled waters with names like Mount Fuji and L'eau du Robinet, which cost up to \$7 a bottle. He described the benefits of the various brands. If diners decided to buy any of the water, he poured it into their glasses, then set the rest of the bottle in an ice-filled wine bucket next to their table. He asked their opinions about the taste, and the diners agreed that their water had been clearly superior to tap water, describing them as “fresher” and “smoother.” In fact, rather than having been bottled in exotic locations around the globe, all the apparently high-end water came from an outdoor tap behind the restaurant. L'eau du Robinet is just French for “tap water.”
- [2] If you prefer bottled water because you believe it is cleaner than tap water, you wouldn't be alone. Nearly half of bottled water drinkers buy the product partly or only because of concerns about tap-water safety. They are motivated by images like the one on the bottles of Crystal Geyser Natural Alpine Spring Water. One side shows the unspoiled Ossipee Mountains while the other side says “Always bottled at the spring to ensure quality, taste, and freshness. THERE IS A DIFFERENCE.” Nearly every bottled water label boasts of a product that is “pure,” “fresh,” or “natural,” which is illustrated with images of mountains, springs, and other natural water sources in the wild. The implication is that any water not packaged in such a bottle is probably impure and unnatural, perhaps dangerously so. This advertising strategy has been enormously successful. In 1987, Americans drank 5.7 gallons of bottled water per year on average; 20 years later, that number soared to 27.6 gallons, which is higher than their average consumption of milk or beer.
- [3] Bottled water customers pay 1,000 times more on a per-gallon basis for the bottled water than they do for tap water. It turns out, however, that a quarter of bottled water brands are tap water, drawn from the same water sources that supply homes and public water taps. As for the rest, their labels are technically correct, but the products often fail to live up to implied promises. Poland Spring, for example, draws its water from man-made water sources, including one beneath a parking lot. Though these are “springs” by definition, they sure aren't found in the natural locations called to mind by the labels on the bottles.
- [4] We like to think that the free market functions in a way that protects us from inferior or unnecessary products. After all, if the individual brands are all competing with one another, then it seems logical that they must develop superior products that people need in order to succeed. And wouldn't you expect false or misleading advertising by one brand to be pointed out and challenged by a rival brand? Not when overlooking the “enemy” is more profitable than objecting to the whole idea behind the product that you are also selling. Different brands may even actively cooperate with one another when they are owned by the same megacorporation.
- [5] It turns out that San Pellegrino and Perrier are both owned by Nestlé, along with 28 other brands of bottled water. As a result, you won't see the same level of advertising competition between them as you do between Coke and Pepsi. This phenomenon is by no means limited to bottled water; the majority of the cereals in the supermarket are produced by either Kellogg's or General Mills, and the majority of beauty products can be traced back to either L'Oréal or Estée Lauder.
- [6] In almost every commercial arena, producers are combining, being taken over, or selling their brand names. The result is that these few megacorporations decide exactly how much variety their brands will offer, and it is not in their interest to create true variety. Rather, they aim to maximize differences in image, thereby creating the illusion of variety. A \$1.30 bottle of Crystal Geyser contains water that comes from the same source as the water in a \$1 bottle of Whole Foods' 365 Organic Water brand, and in fact many store brands at the supermarket can be distinguished only by label. Generic drugs are cheaper than the name brands, even though they are sometimes made by the same company. For example, the drug Simvastatin is branded as Zocor by Merck, but the generic pills that are also made in Merck laboratories may feature the Merck logo and are sold in generic form through Dr. Reddy's Laboratories.
- [7] Even when the producers are not identical, they may still be more similar than we would expect. The Lancôme and Maybelline brands of cosmetics both belong to L'Oréal, despite having very different images and targeting different consumers. Their matte foundations, which are made in the same factories, are nearly identical in their composition, and there is no detectable difference in performance. When you buy Lancôme Magique Matte Soft-Matte Perfecting Mousse Makeup at \$37 instead of Maybelline New York's Dream Matte Mousse Foundation at \$8.99, you're paying for something other than quality.
- [8] Companies get away with this because they control not just a particular product but also its competing brands, making it very difficult for us to determine which differences are real and which are manufactured. We tend to assume that more expensive products are of higher quality; if a cheap product were just as effective, its makers wouldn't miss the chance to advertise this fact, would they? But when both brands are made by one company, it is more profitable to sell the same product under two different brands at different prices, fooling those with thicker wallets into paying more. Even though we may feel we have a wide variety of choices, we actually have far fewer qualitatively different options than we realize.

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重要語句

unsuspecting 疑わない
boast 誇る
megacorporation 巨大企業

implication 暗示
detectable 検知できる

LESSON 8

地球に似た系外惑星「ケプラー186f」を発見

語数: 543語

- [1] Using NASA's Kepler Space Telescope, astronomers have discovered the first Earth-size planet orbiting in the "habitable zone" of another star. The planet, named "Kepler-186f," orbits an M dwarf, or red dwarf, a class of stars that makes up 70 percent of the stars in the Milky Way galaxy. The discovery of Kepler-186f confirms that planets the size of Earth exist in the habitable zone of stars other than our sun.
- [2] The "habitable zone" is defined as the range of distances from a star where liquid water might pool on the surface of an orbiting planet. While planets have previously been found in the habitable zone, these are all at least 40 percent larger in size than Earth and understanding their makeup is challenging. Kepler-186f seems to be more similar to Earth.
- [3] Kepler-186f orbits its parent M dwarf star once every 130 days and receives one-third the energy that Earth gets from the sun, placing it nearer the outer edge of the habitable zone. On the surface of Kepler-186f, the brightness of its star at high noon is only as bright as our sun appears to us about an hour before sunset.
- [4] "M dwarfs are the most numerous stars," said Elisa Quintana, research scientist at the Search for Extra-Terrestrial Intelligence Institute at NASA's Ames Research Center in Moffett Field, California, and lead author of the paper published today in the journal Science. "The first signs of other life in the galaxy may well come from planets orbiting an M dwarf."
- [5] However, "being in the habitable zone does not mean that we know that this planet is habitable," cautions Thomas Barclay, research scientist at the Bay Area Environmental Research Institute at Ames, and co-author of the paper. "The temperature on the planet is strongly dependent on what kind of atmosphere the planet has. Kepler-186f can be thought of as an Earth-cousin rather than an Earth-twin. It has many properties that resemble Earth."
- [6] Kepler-186f resides in the Kepler-186 system, about 500 light-years from Earth in the constellation Cygnus. The system is also home to four companion planets: Kepler-186b, Kepler-186c, Kepler-186d, and Kepler-186e race around their sun every four, seven, 13, and 22 days, respectively, making them too hot for life as we know it. These four inner planets all measure less than 1.5 times the size of Earth.
- [7] Although the size of Kepler-186f is known, its mass and composition are not. Previous research, however, suggests that a planet the size of Kepler-186f is likely to be rocky.
- [8] "The discovery of Kepler-186f is a significant step toward finding worlds like our planet Earth," said Paul Hertz, NASA's Astrophysics Division director at the agency's headquarters in Washington.
- [9] The next steps in the search for distant life include looking for Earth-twins — Earth-size planets orbiting within the habitable zone of a sun-like star — and measuring their chemical compositions. The Kepler Space Telescope, which simultaneously and continuously measured the brightness of more than 150,000 stars, is NASA's first mission capable of detecting Earth-size planets around stars like our sun.
- [10] Looking ahead, Hertz said, "Future NASA missions, like the Transiting Exoplanet Survey Satellite and the James Webb Space Telescope, will discover the nearest rocky exoplanets and determine their composition and atmospheric conditions, continuing humankind's quest to find truly Earth-like worlds."

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重要語句

habitable 生存可能な
constellation 星座
composition 組成

exoplanet 系外惑星
rocky 岩石質の

LESSON 9

恐竜は鳥か爬虫類か、それとも……

語数: 511語

- ① Dinosaurs weren't quite like cold-blooded reptiles, but they weren't like warm-blooded birds either. Instead, they fell right in the middle. Comparisons with modern animals reveal that dinosaurs' metabolisms probably resembled those of great white sharks, researchers report in the June 13 Science.
- ② The findings offer new clues into how the animals lived and also rekindle a long-standing debate. "This paper will make us go back to the drawing board," says paleobiologist Martin Sander of the University of Bonn in Germany.
- ③ For years, paleontologists assumed that dinosaurs most resembled modern reptiles and other cold-blooded creatures, or ectotherms: slow-growing, low-energy sluggards that bask in sunlight for heat and don't need much food. "When I was a kid, dinosaurs were just scaled-up, tail-dragging reptilian brutes," says Gregory Erickson, a paleobiologist at Florida State University in Tallahassee.
- ④ The field took a U-turn in the 1960s, he says, when researchers started to find similarities between dinosaurs and modern birds. Over the next few decades, most paleontologists came to think of dinosaurs as more birdlike: warm-blooded animals, or endotherms, that grew quickly, expended lots of energy and regulated their body heat internally. That thinking inspired popular depictions such as the speedy beasts of Jurassic Park.
- ⑤ But trying to fit dinosaurs into one of two categories might be too simplistic, says John Grady, a paleoecologist at the University of New Mexico in Albuquerque.
- ⑥ Previous work had hinted that the animals might not sort so cleanly into either group. So Grady and colleagues designed a massive study to pinpoint dinosaurs' place on the spectrum of cold-and warm-blooded life.
- ⑦ His team tabulated the growth rates and energy use, or metabolism, of 353 modern animal species. The census included everything from slow-growing, low-metabolism crocodiles to fast-growing, high-metabolism ostriches. Then the researchers capitalized on other paleontologists' careful analyses of dinosaur bones to collect the growth rates of 21 dinosaurs, including Tyrannosaurus and Apatosaurus.
- ⑧ Grady and his team couldn't determine the metabolic rates of creatures that have been extinct for at least 65 million years, but they could make estimates based on data from living animals. When Grady plotted the animals' growth rates against their metabolisms, he found a clear link: Those with high growth rates tended to have high metabolisms and vice versa. This strong correlation allowed him to chart the 21 dinosaurs on the same graph.
- ⑨ The animals fell right between cold-blooded animals and warm-blooded ones. "I was a little surprised to see dinosaurs in the middle," Grady says. "If they're not like reptiles and they're not like mammals, then what the heck are they?"
- ⑩ Dinosaurs did match up with a few living animals. T-Rex and other dinosaurs may have had metabolisms similar to those of great white sharks, tuna and leatherback sea turtles, Grady says. These animals, called mesotherms, eat more than cold-blooded fish and reptiles do, but they don't stick tightly to a set body temperature like warm-blooded birds and mammals.
- ⑪ Understanding dinosaurs' metabolic peculiarities could offer clues into other debated aspects of the animals' lives, such as how they hunted and why they grew so large, Grady says.

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重要語句

metabolism 代謝
ectotherm 外温動物
endotherm 内温動物

paleontologist 古生物学者
sluggard のろまな生き物

LESSON 10

遺伝子検査の問題点

語数: 507語

- ① More and more companies from fields other than medical services are entering the market for genetic testing, which makes it possible for people to easily find out the risks of their developing certain types of diseases such as cancer and diabetes.
- ② It is necessary for people to correctly understand the nature of genetic testing available, including its accuracy, before they decide to undergo the tests.
- ③ Recent entrants into the market include Internet firms like Yahoo! and DeNA. The number of companies offering genetic testing services more than doubled from 340 in 2009 to around 740 in 2012. Many more companies are planning to enter the business because genetic testing services are not a medical activity and do not require a license.
- ④ The companies, which are providing what is considered to be an information service, entrust the job of actual examination of genes to testing institutes.
- ⑤ Still, commercialization of the services carries some problems. The selling point of commercial genetic testing is that by sending a mouth swab sample to a testing institute, one can know his or her risks of developing various diseases. The biggest issue is the accuracy of such tests.
- ⑥ A genetic testing venture 23andMe, in which Google has invested, has started offering the Personal Genome Service to “provide health reports on 254 diseases and conditions” for slightly less than \$100. But the U.S. Food and Drug Administration in November 2013 ordered the company to halt the sales of its saliva collection kit due to concerns over the accuracy of its genetic examinations.
- ⑦ People need to be aware that the results of genetic testing only have a high degree of correlation with the risks for certain diseases. In addition to genes, acquired factors such as diet, smoking, drinking, stress, lack of sleep and lack of exercise are also responsible for some diseases, including cancer.
- ⑧ Users of genetic testing services should know that the discovery in genetic examinations of the presence of irregularities that raise the risk of developing certain diseases does not necessarily mean that they will develop them.
- ⑨ So, it is not wise to rely solely on genetic testing. The results of testing may cause some people to be unduly pessimistic about their future. The providers of genetic testing services must be careful when explaining test results to people.
- ⑩ The providers also should handle data on individual examinees’ genes with utmost care because they are personal information. Leakage of such data must be prevented at any cost. There are moves among testing institutes to use data from genetic testing for research purposes. There must be no lapses in the management of data.
- ⑪ The government needs to quickly set down rules to ensure the reliability of commercial genetic testing. At the very least, providers of such services should be required to make clear to users the purpose and limits of tests, their possible disadvantages and the scientific grounds of their clinical usefulness, as well as company policy on handling personal information including genetic data acquired from the test and the relevant information on testing institutes.

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重要語句

commercialization 商業化
irregularity 異常
pessimistic 悲観的な

leakage 漏洩
disadvantage 不利益

LESSON 11

高齢化社会のメリットとは？

語数: 566語

- ① Is a nation's destiny set by its birthrates? The announcement that Japan's population fell by almost a quarter of a million in 2013 — the fifth consecutive annual fall — brought warnings that the country may be in terminal decline. "The economic decline that occurred during Japan's so-called 'lost decades' is a symptom of problems brought on by demographic change," wrote Reiko Aoki, an economist at Hitotsubashi University in Tokyo, last year.
- ② Japan has the world's oldest population, with a median age of 46 years, an average lifespan of 84, and a quarter of the population over 65. But this doesn't have to mean a gloomy future. What happens in the coming years might even point the way for other countries. Japanese longevity can't compensate for its ultra-low fertility rate — just 1.4 children per woman. Hard-working Japanese society has "embraced voluntary mass childlessness," says Nicholas Eberstadt, a demographer at the American Enterprise Institute in Washington DC. One in four don't have children. Some European countries also have low fertility rates, but they have migrants who move in and make up for the loss. Japan doesn't.
- ③ The conventional view is that this is bad news for two reasons: shrinking numbers slow down economic growth and the aging population is a major financial burden. But Eberstadt says there is another side. "The proportion of Japan's population that is dependent on those of working age isn't unusual," he says, "it's just that it has almost twice as many people over 65 as children." Consequently Japan spends less on education. And because the Japanese are the world's healthiest, medical bills are also lower than in other nations.
- ④ Japan's economy has been growing slowly for two decades now. But this is not necessarily bad news for its workforce, says William Cline of the Peterson Institute for International Economics in Washington DC. Thanks to the falling population, individual income has been rising strongly — outperforming most US citizens'. With 127 million people, Japan is hardly empty. But fewer people in the future will mean that it will have more living space, more land per head for growing crops, and a higher quality of life, says Eberstadt. Its demands on the environment for food and other resources will also lessen.
- ⑤ Japan isn't alone in its demographic decline: Russia, Romania and Hungary all follow the trend. For many more, it is being delayed by immigration. But the global population bomb is not likely to explode due to growing numbers of people. As Swedish statistician Hans Rosling first noted, the world recently reached peak child — the point where the number of children aged 0 to 14 around the globe has reached a steady level and is therefore no longer rising. Global birthrates have halved in 40 years — they are now below 2.5 children per woman — meaning that global population may also 'peak' soon.
- ⑥ So, far from being a demographic exception, Japan is "the world leader in demographic change," says Aoki. For some, this sounds like a disaster. China last year relaxed its one-child policy fearing that predicted population decline in the 2030s would cause its impressive economic growth to come to a sudden stop. But others believe that peak population is a necessary first step to reducing our attack on the earth's life-support systems. In that case, following Japan's example may be the right answer for many countries around the world.

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重要語句

demographic 人口統計上の
fertility 出生率
compensate 埋め合わせる

longevity 長寿
workforce 労働力

LESSON 12

子どもが移民となる理由

語数: 1055語

- ① Migration is a growing global phenomenon that impacts individuals, families, and communities. Although migration is often thought of as an adult activity, migration by children and youth is quite common throughout the world and is on the rise. The United Nations estimates that approximately 16 percent of all international migrants are under the age of 20, although this ranges considerably from a low of 11 percent in North America to just over 40 percent in Africa. One study comparing Argentina, Chile, and South Africa estimated that over one-quarter of all migrants are children under the age of 18. Children migrate for many of the same reasons that adults migrate; they move toward jobs or better education and away from poverty and conflict. In some cases, children are taken along as families migrate. Other children are in the lead of this migration, while still others follow subsequent to family members' migration. (中略)
- ② Traditionally, research on migration focused primarily on adults. When children were considered, it was as passive members of their guardians' journeys. Increasingly, scholars are recognizing the role of children in the migration process itself. This includes recognizing children's agency in the migration process rather than viewing them as incidentally impacted by the migration decisions of others. Children may be part of migration through several avenues. They may migrate with their parents. They may migrate alone. Children may be left behind when parents migrate or may live in an area impacted by the in-migration of others. The extent to which child migration is problematic may depend on the context and the age at migration. One important distinction may be made between young children's migration (up to age 15) and youth migration (16-24 years). Youth migration is often motivated by expected changes associated with the entrance to adulthood. Adolescents and young adults, for example, may move to assume adult roles such as spouse or breadwinner. Young children, on the other hand, are normatively viewed as dependents in need of care and are expected to remain under adult custody, supervision, and protection. The entry of young children into labor migration, for example, is inconsistent with international laws and policies enacted to prevent child labor.
- ③ Another important distinction when considering the effects of migration on children is the type of migration under investigation: internal migration (moves within national borders) or international migration (moves across national borders). Both types of migration have been on the rise across the globe and may be motivated by similar factors. Internal migration is often typified by moves from rural to urban areas, particularly in the case of labor migration. Similarly, international migration is often typified by moves from less economically developed regions to areas of growth and ongoing development. However, migration across international borders is more likely to involve multiple legal and political entities. This may complicate the ease of movement between communities of origin and communities of settlement and have implications for prolonged family separation or the opportunity for family reconstitution.
- ④ Finally, the consequences of migration for children also depend on the forces that encourage such moves. The decision to migrate may be prompted by many factors but an additional distinction may be made between voluntary and involuntary migration. Voluntary migration is undertaken for family formation, to find employment, to attend school, and for many other reasons. Voluntary international migration is often spurred by economic needs. Labor migrants leave their origin communities in search of better work opportunities. Children participate in this form of migration not only as the dependent family members of adult labor migrants but as labor migrants themselves, particularly in the case of adolescents. Unaccompanied minors account for an increasingly large component of the migrant population. These children may be labor migrants or seeking reunification with family members who migrated ahead of them. (中略)
- ⑤ Migration may also be motivated by conflict or natural disaster. Scholars typically define such movement as "forced migration" or "involuntary migration." In this case, depending on the political circumstances, the migrants may be identified as political refugees. Note that involuntary migration may also include internally displaced people who do not cross national boundaries. Involuntary migration is more likely to involve multiple generations as entire families and communities are uprooted. But there is regional variation in this case. Many lone child refugees are located in parts of Asia and Africa. For example, more than half of the 15,500 unaccompanied children seeking asylum in 2010 came from Afghanistan and Somalia combined. (中略)
- ⑥ Children may benefit from migration in several ways. For child migrants, moving away from conflict, scarcity of natural resources, or poverty can improve safety and living standards. And children are often active participants in the migration decision as they seek to gain access to education or employment or to reunite with family members. Children also play an active role in the settlement process. They serve as language brokers for their immigrant households, translating and interpreting with service providers, teachers, and others in the receiving community. For many children, migration leads to greater opportunities and socioeconomic mobility than would have been possible if they had remained in the community of origin. (中略)
- ⑦ Research on the well-being of children following voluntary migration, however, yields mixed results. Children moving from rural areas to more urban or developed areas are likely to see improved access to health care and education. Yet, even if they migrate with parents, children may experience housing instability, discrimination, lack of state recognition, and other barriers that limit access to education and full participation in the receiving community. Research focused on the educational success of immigrant children, for example, points to great variation across settlement countries, which makes it difficult to generalize the extent to which immigration improves or disadvantages children's educational outcomes. (中略)
- ⑧ Overall then, children become migrants for a variety of reasons and the consequences of this migration also vary depending on the age and family circumstances of the child, the motivation for migrating, the resources available, and the geopolitical context in which the migration is occurring. There have been several international calls to recognize the rights and vulnerabilities of migrant children and youths, although many are still vulnerable to exploitation and danger on their journeys. However, children's migration may also bring greater opportunity and the hope of a better life continues to propel children, youths, and their families to undertake their journeys.

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重要語句

phenomenon 現象
unaccompanied 同伴者のいない
internally displaced 国内避難した

reunification 再統合
vulnerability 脆弱性