令和５年度
前期日程

英　　語

医学部医学科・応用生物科学部共同獣医学科

問題冊子

注意事項

(1) 試験開始の合図があるまで，問題冊子を開かないこと。

(2) 問題冊子は30ページで，解答用紙は5枚である。問題冊子や解答用紙に，落丁，乱丁，印刷不鮮明のものがあった場合は，ただちに試験監督者に申し出ること。

(3) 受験番号は，5枚の解答用紙のそれぞれの指定箇所に**丁寧に**記入すること。

(4) **問題は，** 1 **，** 2 **および** 3 **の3つの大問よりなる。**

(5) 解答は解答用紙の指定箇所に**丁寧に**記入すること。

(6) 解答用紙は，持ち帰らないこと。

(7) 問題冊子は，持ち帰ること。

(8) 各大問の満点に対する配点の比率(%)を次のとおりとする。
1 は31 %，2 は38 %，3 は31 %

(9) 設問は**英文**で書かれている。

1

Part 1

Questions 1–8 :

Read the following text on Japanese stationery goods and fill in the blanks (1)–(8) **to complete the sentences. For each blank, you have four choices given below. Choose the correct word and write A, B, C, or D in boxes** 1–8 **on your answer sheet.**

__(1)__ to a winning combination of practicality, variety and exuberant creativity, the popularity of Japanese stationery goods is growing worldwide, with many visitors from outside Japan buying stationery items as souvenirs and more people abroad purchasing articles for personal __(2)__.

One place that reveals all of this clearly is Bunbougu Café in Tokyo's Omotesando area, a "stationery café" where you can enjoy a cup of coffee and eat while trying out different types of stationery goods __(3)__ purchase. The café's owner, Toru Okuizumi, believes that the reason local writing supplies have gained attention is their __(4)__, creativity and designs.

Plenty of Japanese stationery items have become major sellers worldwide due to functionality alone. In recent years, for example, Pilot Corporation's FriXion, a pen with an eraser on its end, has gained a large fanbase. FriXion was first sold in Europe in 2006, and in Japan from the following year. Since then, over two billion of these pens have been __(5)__ worldwide.

"In Europe, students use ballpoint pens or fountain pens rather than pencils," Okuizumi explains. "__(6)__ time they made a mistake, they would have to use white-out. FriXion was therefore very convenient for European students. The functional properties and convenience led to its __(7)__."

Another trait of Japanese stationery is its wildly creative __(8)__. Non-Japanese who visit the stationery café or take part in stationery-related events regularly talk about how cute and colorful they are. Bunbougu's staff receives plenty of comments about how excited people are about using the innovative stationery.

(Adapted from "The Many Charms of Japanese Stationery Goods," *Highlighting JAPAN*, October, 2018.)

(1)	**A**. As	**B**. Because	**C**. Thanks	**D**. According
(2)	**A**. care	**B**. information	**C**. occupation	**D**. use
(3)	**A**. before	**B**. after	**C**. when	**D**. later
(4)	**A**. erasability	**B**. price	**C**. colorful	**D**. functionality
(5)	**A**. rented	**B**. discarded	**C**. purchased	**D**. abandoned
(6)	**A**. Much	**B**. More	**C**. Every	**D**. Less
(7)	**A**. purpose	**B**. popularity	**C**. population	**D**. persistence
(8)	**A**. potential	**B**. imagination	**C**. ingredients	**D**. design

1

Part 2

Questions 9–15 :

Read the following text on teleworking and choose from A–I the phrase that fits each blank (9)–(15) on your answer sheet. There are two extra phrases that are not used.

There may be no going back to ___(9)___, according to a survey of workers in 25 countries.

Both employees and managers found working from home during the pandemic was ___(10)___, a report by the OECD found. The proportion of staff teleworking at least one day a week is expected to be ___(11)___.

A separate study by OECD researchers of job postings on the website "Indeed" found that the substantial increase in advertised telework in Covid lockdowns was only reversed modestly when the restrictions were eased.

"These results suggest that ___(12)___, especially in countries with high levels of digital preparedness," researchers said.

A fundamental and lasting shift toward teleworking would have significant implications for the structure of economies, from productivity to worker rights and childcare provision.

To adapt, researchers analyzing the survey results said ___(13)___, set regulations to make telework possible and provide training for those at risk of being left behind in a remote working world, including women and employees of smaller companies. They also said workers should be protected from too much working from home, which can harm well-being and productivity.

According to respondents in the survey, ___(14)___ in order to balance benefits, such as less commuting and fewer distractions at home, with costs such as impaired communication and missing serendipitous interactions.

"There is little doubt that ___(15)___ will crucially affect the organization of work in the years to come," the researchers said.

(Adapted from "The Five-Day Office Week Isn't Coming Back. WFH Is Here to Stay," *Bloomberg*, Dec. 18, 2021, https://www.bloomberg.com/news/articles/2021-12-18/the-five-day-office-week-isn-t-coming-back-wfh-is-here-to-stay)

A. the ideal amount of telework is two-to-three days a week

B. the five-day week in the office

C. full-time teleworking from home

D. the experience gained during the pandemic with telework

E. teleworking can lead to feelings of isolation

F. positive for performance and well-being

G. much higher than before the pandemic

H. governments should ensure reliable Internet coverage

I. telework is here to stay

1

Part 3

Questions 16–19 :

Combine three phrases from the table below to complete the conversation. Then, select the option from 1 to 8 that matches your answer.

Example:

Question 0 :

Tyler : How was your weekend?

Sam : Great! I went to see a movie with my friend from high school.

Tyler : _____0_____?

Sam : Yes, I did. It was very exciting!

(A) **Did you**	⇒	(A) **like to see that movie**	⇒	(A) **that is coming out next week**
(B) **Would you**		(B) **see that movie**		(B) **that just came out**

1. (A) → (A) → (A)
2. (A) → (A) → (B)
3. (A) → (B) → (A)
4. (A) → (B) → (B)
5. (B) → (A) → (A)
6. (B) → (A) → (B)
7. (B) → (B) → (A)
8. (B) → (B) → (B)

Answer:

The best combination is:

(A) Did you ⇒ (B) see that movie ⇒ (B) that just came out

Therefore the answer is: 4. **(A) → (B) → (B). So you write:**

0
4

Question 16 :

Jill : I noticed something surprising when I visited the grocery store last night.

Ann : What was that?

Jill : I think some products have recently gotten smaller, but they are still sold for the same price.

Ann : Seriously? Downsized but as expensive as before?

Jill : That's right. _____16_____.

Ann : That's not fair. I think the company should explain.

(A) **They are charging**	(A) **at the lowest costs that**	(A) **have less inside**
(B) **We're paying the same price**	(B) **for products that**	(B) **look more economical**

1. (A) → (A) → (A)
2. (A) → (A) → (B)
3. (A) → (B) → (A)
4. (A) → (B) → (B)
5. (B) → (A) → (A)
6. (B) → (A) → (B)
7. (B) → (B) → (A)
8. (B) → (B) → (B)

Question 17 :

John : I'm feeling a bit nervous at the moment.

Mary : I hear you have to give a presentation in class. Is that why you feel so nervous?

John : Yes. It's next week, but I can't decide my main topic.

Mary : Are there any specific rules for the presentation?

John : Not really. _____17_____. That's it.

Mary : Why don't you talk about environmental issues, such as plastic polution?

(A) **It's supposed to be**	(A) **loudly and clearly and must be**	(A) **on global issues**
(B) **It's ruled to be**	(B) **ten minutes and should be**	(B) **around the world in all**

1. (A) → (A) → (A)
2. (A) → (A) → (B)
3. (A) → (B) → (A)
4. (A) → (B) → (B)
5. (B) → (A) → (A)
6. (B) → (A) → (B)
7. (B) → (B) → (A)
8. (B) → (B) → (B)

Question 18 :

Amanda : Excuse me. Where is the Lost and Found in this theater?

Charlie : We don't have one, but I may be able to help you. What's your problem?

Amanda : I'm afraid my daughter left her coat on her seat last night, when we saw the 8 p.m. movie.

Charlie : That's too bad. Can you describe what the coat looks like?

Amanda : It's dark red and has my daughter's name, Susie, inside of it. _____18_____?

Charlie : No, but I'll check the front desk.

(A) **Have you seen**	(A) **any chance if anyone has**	(A) **found it and turned it in**
(B) **Do you know by**	(B) **some possibility to have**	(B) **been passed on to the staff**

1. (A)→(A)→(A)
2. (A)→(A)→(B)
3. (A)→(B)→(A)
4. (A)→(B)→(B)
5. (B)→(A)→(A)
6. (B)→(A)→(B)
7. (B)→(B)→(A)
8. (B)→(B)→(B)

Question 19 :

Josh : Hello. I would like to rent twenty chairs for a BBQ party at my place.

Billy : I'm sorry. All our chairs were just sent to the large soccer game in the stadium.

Josh : Oh, when are they coming back to you?

Billy : We're expecting them to be here on Wednesday, but we need at least one day to clean them.

Josh : _____19_____.

Billy : OK, then, take a seat and fill in this form.

(A) **My party is on Thursday night,**	(A) **and we just need them a full 24-hours before that,**	(A) **so that wouldn't work, unfortunately**
(B) **My party is on Saturday night,**	(B) **and we have to set the chairs three days before that,**	(B) **so let's make arrangements now**

1. (A)→(A)→(A)
2. (A)→(A)→(B)
3. (A)→(B)→(A)
4. (A)→(B)→(B)
5. (B)→(A)→(A)
6. (B)→(A)→(B)
7. (B)→(B)→(A)
8. (B)→(B)→(B)

Part 4

Questions 20–23 :

Read sentence A, then rearrange the words and phrases in the brackets in B to make a sentence with a similar meaning. In each question, there is ONE word or phrase that is not used. Then, in boxes 20–23 on your answer sheet, write the word or phrase that is not needed to complete the sentence.

Example:

0 . **A** : Last night Peter declared his love for Emily.

B : Peter [that / very / Emily / told / loved / he / last night] her.

The completed sentence B is "Peter told Emily last night that he loved her," and the word "very" in the brackets is unnecessary. So you write:

0
very

Write ONLY the unnecessary word or phrase in the boxes on your answer sheet.

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20. **A** : Mary rose so that the students could spot her immediately.

B : Mary [see / letting / for / in / once / the students / to / stood / her / order / at].

21. **A** : Please remember that we provide the best quality.

B : I would like to [our / to / quality / most / that / is / none / you / second / remind].

22. **A** : John is disappointed because his teachers turned down his idea after reconsideration.

B : John is disappointed because [after / by / his idea / they / it / took / thought / his / teachers / was / rejected / over].

23. **A** : The power lines over the river were pulled up to let the five-story-tall ship pass through.

B : The power lines over the river were [the / was / for / room / ship / which / make / to / widen / raised] five stories tall.

2

Part 1

Questions 24–31 :

Read the following text and choose from A–K the option that fits each blank (24)–(31). Write the correct letter in boxes 24–31 **on your answer sheet. There are three extra options that are not necessary.**

Bathtub Farming: Growing Plants without Soil

"Believe it or not, it is possible to grow plants without any soil being involved. The practice of growing plants in water mixed with certain minerals and nutrients is called hydroponics. This new technique is being posited as an alternative to traditional soil-based farming and gardening."

There are two kinds of "bathroom people"... bathroom singers and bathroom thinkers! If you are of the second kind, you have likely thought about some rather ridiculous things while lying in your bathtub.

However, has it ever crossed your mind to grow plants in there? Obviously, you don't want your bathtub filled with soil and your drains choked with mud, but what if you didn't need any soil? What if you could grow your plants using only water?

This seemingly strange notion is actually an exciting and rapidly developing field of science called hydroponics.

What Is Hydroponics?

Hydroponics is the science of growing plants without soil. The term ___(24)___.

Just like humans, plants need nutrients to grow. These nutrients are absorbed from the soil and circulated to the different parts of the plant. If you have always believed that plants require soil, just know that you're not the first to make that mistake!

For centuries, scientists believed that soil was an essential element of plant growth. However, soil can be just as easily replaced by a nutrient medium. A nutrient medium ___(25)___. Plants grown in this way are called water cultures.

How Can You Implement Hydroponics in Your Home?

Step 1: Creating a Nutrient Medium

First, we would need to create a nutrient medium that can replace the soil. A nutrient medium is basically water with nutrients and minerals that are important for the plants to grow. The most basic nutrient medium must contain nitrogen, phosphorus, potassium, calcium, magnesium and sulphur.

Most nutrient media, in correct proportions, are readily available on the market. There are also many great books that give a detailed explanation of chemicals and their necessary amounts for making the nutrient medium. However, if you're someone who prefers going "natural," there are some natural components you can use.

Substances like gypsum, lime, bone meal or eggshells are rich in calcium, banana peels are high in potassium, baker's yeast adds phosphorus, while beans and lentil water can be used for nitrogen. Be careful, however, as these are not perfectly measured and tested approaches, so you ___(26)___.

Step 2: Making the Physical Setup

The general idea of water cultures is to suspend the plant on some form of support and dangle its roots into the nutrient medium below. In this way, the plant has a never-ending supply of nutrients. Therefore, if you want to be a bathtub farmer, you will need a bit more than a bathtub.

You could secure a piece of mesh above the bathtub edge, elevate your plants over it, and then fill the tub with the nutrient medium.

You could also take a pipe, cut small circles through it and place your plants in the holes. You could then suspend their roots in a bathtub below. If your plants are too small, you could lightly tie the roots with a nylon rope and let the nutritious water gently work its way up!

All you need to do is make sure that the nutrient medium is balanced correctly, the roots are always dipped into the liquid, and the plant is receiving adequate sunlight at all times.

Advantages of Hydroponics: How Is It Better Than Traditional Farming?

For starters, it's a lot less messy. If you hate digging your fingers in the mud or having

creepy crawlies frolic on you, then hydroponics is the choice for you.

Since plants in a hydroponic system have ample access to water and nutrients, they don't spend excess energy developing elaborate root systems. As a result, you get fresher and healthier plants, as well as a greater yield in half the time.

When scientists compared hydroponics and conventional farming, they found that hydroponically-grown plants ___(27)___. In another study, a hydroponically grown potato plant yielded 75 potatoes, whereas one grown in soil yields only 3 to 5. Potatoes grown using hydroponics were also found to be 51% larger than those grown in pots! One can also use hydroponics in places where traditional farming isn't possible.

Furthermore, it increases the green areas in your living space. It requires only about 10% of the water and 25% of the fertilizers/nutrients that soil-based agriculture demands, meaning that it is relatively easy on overhead costs. You ___(28)___.

A paper in the International Journal of Agricultural Extension compared the strawberry yield obtained from hydroponic vs. soil systems. They claimed, "Growing strawberries in hydroponic systems is feasible, at a reasonable cost and more sustainable compared to traditionally soil-grown systems. Future research should investigate various hydroponic growing methods and the feasibility of growing at the commercial level."

Commercial Hydroponics

Scientists have been using water cultures in some form since the early 1930s. However, these cultures were carefully monitored in the laboratory under set conditions. Moreover, they were only implemented to study plant structure and nutrition. The use of this technique for commercial production was far less common. They also didn't have standardized nutrient media that could be ordered off the internet.

But don't worry! If you decide to be a bathtub farmer, you ___(29)___. Currently, hydroponic markets are growing at an incredible rate. According to an article in *Businesswire*, the global hydroponics market is expected to grow from $226.45 million in 2016 to an estimated $724.87 million by 2023.

Disadvantages of Hydroponics: Why Hasn't It Caught up with Traditional Farming?

A primary reason is that the initial cost of installment for commercial use can be high. Apart from such economic constraints, scientists are facing three other issues that hinder large-scale production.

First, all present techniques use complicated apparatus and costly refining materials. Scientists haven't been able to develop a simple procedure that could be used even by unskilled laborers with limited assistance.

Next, all techniques currently in place were originally used to study plant physiology and nutrition. They ___(30)___.

Finally, scientists don't fully understand the water dynamics of hydroponic systems. For example, we can't properly explain why or how plants growing hydroponically have a different root architecture.

A Final Word

In theory, all plants can be grown hydroponically, but we don't know how plants from different species and climatic conditions react to hydroponic systems. We also don't know the significance of differences in the types of roots. Above all, we haven't figured out how a major change to a growing style will affect the evolutionary future of the species.

Even NASA is experimenting with hydroponics, as plants grown in space ___(31)___. This "bio-regenerative life support system" is being experimented with in order to provide a food source for the Moon and Mars colonization missions.

With all this in mind, the next time you find a seed that has just begun to sprout, try throwing it in your bathtub instead. You never know what the future could hold as an aspiring hydroponics farmer... you might even help humanity get a foothold on Mars!

(Adapted from Swanandee Nulkar, "Bathtub Farming: Can You Grow Plants Using Only Water, Without Soil?," *Science ABC*, January 2022, https://www.scienceabc.com/nature/can-you-grow-a-farm-in-your-bathtub.html)

A. might need several tries before you get it right

B. is a combination of soil and other nutrients that plants require to grow

C. do not address issues faced in a large-scale farming setting

D. would not be able to provide sufficient nutrition for astronauts

E. originates from two Greek roots 'hydros,' meaning water, and 'ponos,' meaning work

F. can still have a promising future

G. can provide astronauts with a fresh diet and provide oxygen

H. may never be able to do this by yourself

I. showed about a 17% increase in the yield

J. can grow garden-fresh yields with very little experience or setup

K. is a liquid that contains all the nutrients necessary for growth

The examination continues on the next page.

2

Part 2

Questions 32–42 :

Read the following text and answer the questions that follow. Write the correct option in boxes 32–42 **on your answer sheet.**

Riding the Twitter Wave

(1) In January 2020, some 2 months before the World Health Organization declared the coronavirus pandemic a global emergency, a tweet appeared on virologist Benhur Lee's smartphone. It linked to a website, virological.org, where scientists had just posted the genetic sequence of SARS-CoV-2. Lee, at the Icahn School of Medicine at Mount Sinai, quickly shared the tweet with his followers, along with the words "___(32)___" and an animation of planes taking off. Within days, the pharmaceutical firm Moderna and the U.S. National Institutes of Health had announced plans to develop what just 10 months later proved to be an effective vaccine, based on the sequence that codes for the virus' spike protein.

It was an early sign of how the pandemic prompted many scientists — and the public — to turn to social media to share and learn about hot new findings. COVID-19 "changed the game" because the threat "immediately connects with the public, so there's a much bigger natural audience" for information about pandemic science than for most areas of research, says Michael Thelwall, a data scientist at the University of Wolverhampton, City Campus, who studies social media. In particular, Twitter has become a go-to resource for anyone trying to make sense of the torrent of pandemic studies — and for those intent on quickly pushing back against misinformation.

But the pandemic has also helped demonstrate the limitations of social media. It can be difficult, for example, for scientists to be heard over the cacophony of messages on Twitter — some 500 million each day. And although some scientists have used the platform to elevate their online presence, that has rarely translated into concrete professional rewards. Eventually the sizable Twitter followings some have built during the pandemic may fade. And in the meantime, some have suffered from their digital fame, attracting harsh personal attacks and threats of violence. Despite such challenges, many researchers believe that — like it or not — the pandemic has forever altered how certain scientists communicate with each other and the public.

(2) The marriage of Twitter and science came later than researchers who study scholarly communication expected. A decade ago, many predicted that scientists would flock to social media as a complement to traditional channels such as email alerts, Google searches, and scientific meetings. But at first, many researchers expressed apathy or disdain for Twitter, which debuted in 2006. Some saw little value in the platform's large, nonscientific audience. Others bridled at the initially tight limits on message length — just 140 characters per tweet (later increased to 280). As a result, studies before the pandemic suggested as few as 2% of published scientists, and no more than one in five researchers in the United States and Europe, had Twitter accounts, and scientists who did tweet typically drew little engagement.

But as the pandemic exploded and researchers sought to pump out information to each other and an eager public, many saw advantages to Twitter. Its vast reach became a draw: more than 200 million active daily users, including an estimated one-quarter of U.S. adults, according to the Pew Research Center. This allows scientists to use a single platform to share research findings with both peers and the public and to foster open discussions. Twitter's interactivity and viral features added to its appeal — for example, users can amplify others' tweets by "liking" them or retweeting them to their own followers.

One result is that the platform has carried posts about a majority of the total COVID-19 literature — about 51% of journal articles on pandemic research had been mentioned in at least one tweet through May 2021, according to a report by the Research on Research Institute (RoRI). That exceeds the number cited in scholarly articles or mentioned in several other communications venues, including news stories, Facebook, YouTube, Wikipedia, blogs, and policy documents. And it's well above the level before the pandemic, when studies found that just 10% to 30% of papers on any scientific topic got a mention on Twitter.

(3) One scientist who jumped headlong into tweeting about COVID-19 is Muge Cevik of the University of St. Andrews. Before the pandemic, her tweets about tuberculosis and HIV had attracted only about 2000 followers to her Twitter account. Now, she has more than 170,000, among them members of the U.K. government, scientists, and journalists. "I never thought that I would get this much engagement," she says. But she realized the "privilege ... comes with a lot of responsibility" — for communicating respectfully and "distinguishing opinion versus facts based on data," she says.

Cevik's approach to tweeting is to synthesize the findings of several scientific papers

in a way that researchers can use and nonscientists can understand. She does this by posting long threads — a linked series of tweets, often 20 or more, which Twitter has allowed since 2017. In 2020, for example, Cevik posted a thread about how poorly ventilated rooms increased the risk of transmitting the pandemic coronavirus, highlighting research that was driving government calls to pause many kinds of gatherings.

For Cevik, Twitter threads have paid off. She expanded her thread on poor ventilation into a paper published in *Clinical Infectious Diseases*. Her posts were also retweeted by Harvard University's Marc Lipsitch, who then invited her to collaborate, leading to three co-authored papers about COVID-19. That partnership "would have never happened prior to social media," says Cevik, who also became a pandemic adviser to Scotland's chief medical officer.

Beyond that, it's difficult to quantify the impact of her tweets, Cevik says, but several readers told Cevik the threads helped persuade them to get inoculated. Cevik says she works to build such trust by spelling out what scientists don't yet know about COVID-19 and answering questions from readers. "We can't really deal with misinformation just by sharing facts," she says. "We just need to use facts as the foundation for a strategic conversation."

(4) Even as some users have turned to Twitter to promote clarity, however, others have flooded the platform with misleading or false information, including tweets deliberately intended to confuse readers. Tweeters, including some scientists, have also helped elevate questionable findings, by linking to studies that were done quickly, had problematic designs, or were first published online with no peer review.

This double-edged sword can be seen in Fang's list of the top 50 accounts whose posts about COVID-19 papers have drawn the most retweets. Besides Cevik's account, the list includes others run by scientists who have tried to highlight the best available research, including those of Eric Topol, director of the Scripps Research Translational Institute, and several leading scientific journals, such as *Science* and the Nature family of journals.

But the same list also includes Didier Raoult, the controversial French microbiologist at the Hospital Institute of Marseille Mediterranean Infection who has authored a blizzard of tweets urging the use of hydroxychloroquine to treat COVID-19, despite little evidence that the drug is efficacious.

Some scientists have repeatedly taken to Twitter to challenge Raoult's views in a bid to curb the viral spread of misinformation in real time — a tactic some call "Twitter peer

review." These watchdogs say such rapid response is necessary because some manuscripts published only as preprints never get formally reviewed at all, and journals often take months to publish letters critiquing peer-reviewed papers. "Obviously, in a pandemic that's far, far too long" to wait, says Gideon Meyerowitz-Katz, a Ph.D. candidate in epidemiology at the University of Wollongong. He has used Twitter to rapidly challenge scientific claims he believes are backed by little evidence.

In March 2021, for example, Meyerowitz-Katz used his "Health Nerd" account to challenge a paper that, contradicting the weight of scientific evidence, found no proof that lockdowns reduced COVID-19 deaths. Critics of lockdowns had ballyhooed the article, which was published by *Scientific Reports*. In a long thread published only 3 days after the paper appeared, Meyerowitz-Katz took issue with its mathematical assumptions. Soon after, *Scientific Reports* invited him to submit the critique for publication — but it didn't appear until December 2021, 9 months after the original paper. A week later, after the journal published the critique, it retracted the lockdown study, which has been accessed online by nearly 400,000 people.

(5) Other COVID-19 papers that might have influenced public policy also drew critical peer review on Twitter before they were retracted. One wrongly claimed that the antiparasitic drug ivermectin could treat the disease; another drew the conclusion, contested by many scientists, that cotton face masks did not prevent transmission of the pre-Omicron variants of the virus.

Such instances remain rare. The Retraction Watch blog, for example, lists more than 200 COVID-19 papers and preprints that have been retracted or withdrawn. But *Science* found that only about a dozen of those had received Twitter peer review. And among 673 scientists who posted preprints about COVID-19, more than twice as many (65%) reported receiving colleagues' comments about them via emails than via social media posts (30%), according to a 2021 RoRI survey.

Meyerowitz-Katz says such numbers might reflect the lack of professional rewards for scientists who use social media to critique papers, rather than taking a more traditional route by serving as a journal peer reviewer. Many scientists list their journal service, but not their tweeting, on CVs. Those who publicly challenge findings may also run career risks. Journal peer reviewers typically remain anonymous, he notes, but many academic tweeters list their names on their accounts. "You may be calling into question the results of people who make hiring and firing decisions in your field," he says. That kind of attention could harm a career. But an emerging body of research about tweeting

suggests that, overall, scientists often struggle to be heard on social media. One study, for example, found tweets containing links to scholarly papers typically get little engagement. Of 1.1 million such tweets about papers published before the pandemic, half drew no clicks, and an additional 22% attracted just one or two, according to a 2021 paper in the *Journal of the Association for Information Science and Technology.*

(6) Other research suggests scientists need to attract a critical mass of Twitter followers before their tweets will reach many nonscientists. A 2018 study in Facets that examined the Twitter accounts of 110 academic ecologists and evolutionary biologists found those with fewer than 1000 followers were read mostly by colleagues. But above that tipping point, policymakers, journalists, and other nonscientists made up a majority of followers. And scientists might have more success reaching nonscientists on Twitter if they tweet about news articles that mention a scientific paper, rather than the paper itself, according to forthcoming research by information scientist Stefanie Haustein of the University of Ottawa and colleagues.

Such studies are in the vanguard of nascent scholarly efforts to examine Twitter's role in science communication. For now, Haustein says, "We are really not at the point where we want to get, which is, ideally, seeing the impact of research on the greater good of society."

(Adapted from Jeffrey Brainard, "Riding the Twitter Wave" *Science*, March 24, 2022, https://www.science.org/content/article/twitter-transformed-science-communication-pandemic-will-last)

Question 32 :

Choose the correct words for the blank (32) to complete the idea of the sentence.

A. Finally done

B. Here we go

C. Let's make it clear

D. Screwed up

Question 33 :

According to the article, which of the following are given as reasons why scientists were initially reluctant to use Twitter?

(Ⅰ) Most of the audience were not scientists.

(Ⅱ) The message was too short.

(Ⅲ) They were not able to add charts to their tweets.

(Ⅳ) They were worried about abuse.

A. (Ⅰ) and (Ⅱ)

B. (Ⅰ) and (Ⅲ)

C. (Ⅱ) and (Ⅲ)

D. (Ⅲ) and (Ⅳ)

Question 34 :

Roughly how much of the scientific literature on COVID-19 had been referenced on Twitter by May 2021?

A. A quarter

B. One half

C. One tenth

D. One third

Question 35 :

Based on the information contained in this article, which of the following scientists would other scientists be LEAST LIKELY to trust for information on COVID-19?

A. Didier Raoult

B. Gideon Meyerowitz-Katz

C. Marc Lipsitch

D. Muge Cevik

Question 36 :

According to the article, what is the main advantage of "Twitter peer review" over traditional peer review in journals?

A. People can see who the reviewers are.

B. Questionable research can be challenged immediately.

C. The reviews are accessible to a wider audience.

D. The reviews themselves can be challenged.

Question 37 :

Which of the following scientific papers mentioned in the article was NOT eventually withdrawn?

A. The study about the effectiveness of cotton face masks.

B. The study about the effectiveness of lockdowns.

C. The study about the effects of ivermectin in treating COVID-19.

D. The study about the effects of room ventilation.

Questions 38–42 :

The following table summarizes the content of different sections in the text. Complete the table below by choosing the most appropriate content summary for Questions (38)–(42) from statements A–F below.

Section	Content Summary
(1)	(38)
(2)	(39)
(3)	(40)
(4)	(41)
(5)	(42)

Statements:

A. As a company, Twitter has made great efforts to encourage scientists to create accounts.

B. Many scientists found that the means of disseminating information had changed because of the COVID-19 pandemic.

C. Scientists have to distinguish fact from opinion based on data, while being respectful to the followers.

D. Scientists who had been uninterested in Twitter changed their minds and saw advantages to it.

E. There are still many reasons why Twitter may not be a suitable platform for scientific discussion.

F. Twitter has begun to act as a peer-review system for checking whether misleading or incorrect information is included in research work.

3

Questions 43–55 :

Read the following text and answer the questions below. Write the correct letter in boxes 43–55 on your answer sheet. Names of people are written in bold when they *first* appear in the text.

The School Experiment

By October 2021, **Meg Brydon** could see the terrible toll the pandemic had taken on children at her school. Brydon was a teacher at Ashwood High School, in the suburbs of Melbourne, Australia — the city that has spent more time in COVID-19 lockdowns than any other in the world. The school had been closed, on and off, for about seven months.

Before the pandemic, around 10% of children who joined Ashwood at the age of 12 would be below the expected national standard. But in the latest cohort, Brydon could see that a shocking 30% of them were behind. And the damage ran even deeper. So many children had behavioural or psychological problems after lockdowns that some were getting violent, and the school hired a full-time psychologist to help. "The number of referrals to her was astronomical," Brydon says.

Similar scenarios have played out in classrooms around the world. By February 2022, schools globally had been closed because of COVID-19 for an average of 4.5 months, affecting an estimated 1.6 billion students and creating what the United Nations has called (43) . Even two years into the pandemic, 48 countries had not yet fully reopened their schools, according to the UN cultural organization UNESCO.

Now, governments and schools need to know the best approach to help children catch up — and research could show the way. Over the past 20–30 years, researchers in education, economics and international development have built substantial bodies of evidence, including banks of randomized controlled trials, showing strategies that are effective at boosting school attendance and learning. They reveal, for example, that tutoring is one of the most cost-effective ways to help children to make up lost ground. And some countries are drawing on this evidence in their COVID-19 responses, putting a focus on tutoring and other programmes that educational studies have shown to be effective.

But experts point to a number of concerns. The true extent of learning losses in the pandemic is not yet clear; educational research rarely provides simple answers about what to do; and nations might not use this opportunity to make much-needed systemic change. "Every single time there's been a calamity in the world, we've rushed back to the old normal

fast," says **John Hattie**, an educational researcher at the University of Melbourne. "The biggest travesty of COVID is if we learn nothing."

What's more, the scale of the task ahead is immense. Researchers and education experts are concerned that the amounts being invested are laughably insufficient, given the number of students who need help. "It's a real test for the global community," says **Kenneth Russell**, an education specialist at the UN children's charity UNICEF in New York. "And I don't think the magnitude of the response matches the magnitude of the need."

Even so, the pandemic could eventually drive some transformative changes in education — ones that both improve practices and reach more students, researchers say. "I do think it has thrown into the air many of the assumptions that we make about education," says **Lee Elliot Major**, who studies social mobility at the University of Exeter, UK.

The concept of using research in education has been a long, tough sell. "The fundamental issue is that many practitioners do not believe it will ever be a science," says **Andreas Schleicher**, who heads the directorate for education and skills at the Organisation for Economic Co-operation and Development (OECD) in Paris. Teachers are not expected to browse academic journals, and educational policies are often set by the ideology of bureaucrats rather than by research showing what actually works. "Many of them use evidence to confirm what they want to do," Schleicher says.

Some researchers and educators have been trying to change that view for decades. They want education to operate more like medicine, where a drug typically has to be proven effective in randomized controlled trials before it's used.

In late 2010, evidence-informed education got one of its biggest boosts when the UK government invested £125 million (US$156 million) to raise standards in schools. This gave rise to the Education Endowment Foundation (EEF), a non-profit organization in London that has since become a leader in educational research. It has funded at least 160 randomized controlled trials in education, probably more than any other organization in the world. Around half of English schools have taken part in these trials. The investment in the EEF "had a ripple effect around the world," says **Annette Boaz**, who studies evidence and policy at the London School of Hygiene & Tropical Medicine.

Other databases of educational research have flowered, too. Hattie led an early, pioneering project to synthesize evidence from around the globe on what influences learning. And, the US Department of Education's Institute of Education Sciences in Washington DC maintains the What Works Clearinghouse, a source of information on educational programmes that have been shown to be effective through rigorous research. Hattie argues that with databases such as these, the field doesn't need more evidence — the challenge lies in getting the

information used by governments and schools. "We're hopeless at that," he says.

The pandemic could, in theory, help to bridge that gap. Countries worldwide want to know the best way to invest in educational recovery, and billions of dollars are already pouring into schools. "This moment in time really is a unique one, for changing the conversation about evidence in education," says **Nancy Madden**, a psychologist and researcher at Johns Hopkins University School of Education in Baltimore, Maryland. "People want something that works, they aren't just doing business as usual."

The crown jewel at the EEF is its Teaching and Learning Toolkit, which is based on systematic reviews and meta-analyses of studies, such as randomized controlled trials, that have tested 30 educational approaches. The toolkit translates findings into an easy-to-understand metric: the number of months of additional progress achieved over a year, on average, by children who receive an intervention, compared with similar children who do not. It also displays the strength of the underlying evidence and the intervention's cost.

The toolkit dismantles many common beliefs by showing that modest reductions in class size (from 30 to 20 students, for example), wearing school uniforms and grouping children according to attainment level have little if any effect, on the basis of the evidence so far. The most effective strategies include ones that help children to understand what they read; giving them meaningful feedback; and approaches that improve meta-cognition — the ability of students to think about, plan and evaluate their own learning. These each give children

(44)

.

Long before the pandemic, it was clear that one of the most cost-effective approaches is tutoring, either in small groups or one-to-one. The toolkit says this can buy four to five months of additional progress at relatively low cost. And, unlike some other effective methods, tutoring programmes can be ramped up and implemented quickly. So, in 2020, the EEF rapidly reviewed evidence on the possible impacts of the United Kingdom's nationwide school closures and highlighted that tutoring was likely to be a particularly effective way to help children to catch up. At the time, "tutoring seemed such a plausible response," says **Becky Francis**, an education researcher who is chief executive of the EEF. The recommendation "landed in a void at the time and was seized upon eagerly by policymakers," she says.

In June 2020, the UK government announced a £350-million National Tutoring Programme as part of its wider £1-billion catch-up funding for children. But the tutoring programme has been widely criticized for drastically failing to reach enough children, in particular those who stand to gain most from it. "I think it hasn't targeted the most disadvantaged pupils properly. It hasn't won over teachers," says Elliot Major. "And partly

that's because there's some scepticism about variation in the quality of the tutors."

The United States, too, has put some emphasis on evidence in its recovery plans. In 2021, a giant stimulus bill channelled $122 billion to schools. The law requires that at least 20% of funds received by districts must be used on evidence-based measures to help students' academic, social and emotional needs. In practice, however, it's hard to know how this money is being used, says **Mike Petrilli**, president of the Thomas B. Fordham Institute, an educational foundation in Washington DC. "Based on past experience, we should expect that much of the money will not be spent in the best way."

Another complication is that tutoring comes in many styles: one-to-one or small groups; online or in person; delivered by human teachers or digital ones. There is no guarantee that a particular programme will be effective, or that it will be successful in a particular school or for a certain child. "It's not just hiring some people that call themselves tutors and putting them in the room with some kids — you can waste a lot of money that way," Madden says.

Things are looking even grimmer elsewhere in the world. Even before COVID-19, there was a learning crisis in highly populous Asia Pacific region, because so many children did not achieve expected proficiency levels at school, says **Margarete Sachs-Israel**, who leads the Inclusive Quality Education Section at UNESCO in Bangkok. An estimated 10 million children in the region will not go back to school, and the expectation is that early or forced marriages and child labour are expected to soar.

The scale of this problem is not one that ___(45)___ can address. With many schools still closed, the obvious top priority, say education specialists, is for classes to reopen so that children can return — even if COVID-19 cases start rising again. Sachs-Israel says schools have to be welcoming and safe, and need to overcome any fears that parents, teachers and children might have about infection risks.

Even with all the support for use of evidence in education, there have been some long-standing concerns about how reliable some of that evidence is. In 2019, a pair of researchers examined 141 large randomized controlled trials commissioned by the EEF and the US-based National Center for Educational Evaluation and Regional Assistance. They concluded that 40% of the trials were uninformative because their effects were small or imprecise. "So at the beginning, you didn't know whether the intervention works or not. But at the end, we're still unsure whether it works," says study author **Hugo Lortie-Forgues**, who studies mathematics education at Loughborough University, UK. This could be because early, promising research on an approach turned out to be misleading, a method was hard to scale up or the trial was poorly designed, he says.

This was no big surprise to researchers who conduct such studies. Most bright ideas for

improving learning show little effect when they are put to the test. And whereas in medicine, physicians start with someone who is ill and try to make them measurably better, in education, many countries are starting with a fairly healthy education system — so any new method is likely to produce only marginal gains. "It's perhaps a little naive to assume that teachers haven't discovered, over time, some of the approaches that are more likely to be successful," says **Steve Higgins** at Durham University, UK, who has led work on the EEF's toolkit.

With data still rolling in, there are some suggestions that school closures might have had a smaller impact on some children's achievement than many doom-laden headlines suggest — or that students might bounce back quickly. When Hattie examined the effects of school closures in Victoria, Australia, where schools had been closed for extended periods, he concluded that it was surprising that learning trajectories had only marginally decreased. One possible reason is that some students working alone were able to be more efficient than at school. Schleicher adds that technology also became more accepted, teachers rallied to support children socially and emotionally, and parents became more involved in their children's education. Looking at the overall impacts of the pandemic on education, he says, " (46) ."

(Adapted from Helen Pearson, "The School Experiment" *Nature* 605, 2022, 608-611.)

Questions 43–46 :

Choose from A–D which best fits each blank (43)–(46).

(43)

A. an ecosystem really needed across the world

B. an opportunity to promote independence in childhood

C. the greatest challenge to a decarbonised society

D. the largest disruption to education in history

(44)

A. international aids from industrialised nations

B. over 20% of additional costs for learning

C. six or seven months of progress, on average

D. vague apprehension about future higher education

(45)

A. bad internet connections

B. extra tutoring alone

C. learning crises

D. long-term school closures

(46)

A. evidence-based teaching has proved eventually unworthy of the cost

B. funding has tripled the number of students in the tutoring programme

C. the balance sheet has pluses and minuses

D. the next coronavirus variant could shut learning worldwide

Questions 47–55 :

For each of the opinions below, select the letter of the person who expressed it. (The same person may have expressed more than one opinion.)

(47) A lot of policymakers already have opinions and simply use findings from research to justify them.

A. Andreas Schleicher

B. Becky Francis

C. Nancy Madden

D. Steve Higgins

(48) Helping children to catch up after COVID-19 is a challenge that the whole world will face.

A. Hugo Lortie-Forgues

B. Kenneth Russell

C. Meg Brydon

D. Steve Higgins

(49) It is important that we learn lessons from what happened because of COVID-19.

A. Hugo Lortie-Forgues

B. John Hattie

C. Kenneth Russell

D. Steve Higgins

(50) It is important to ensure high standards and quality control when deciding who to employ as tutors.

A. Andreas Schleicher

B. Annette Boaz

C. Kenneth Russell

D. Nancy Madden

(51) It was amazing how many people in the school needed to see the psychologist.

A. Andreas Schleicher

B. Becky Francis

C. Lee Elliot Major

D. Meg Brydon

(52) Past cases have shown us that when governments direct huge amounts of money to school, a lot of it gets wasted.

A. Annette Boaz

B. Margarete Sachs-Israel

C. Meg Brydon

D. Mike Petrilli

(53) The disruption caused by COVID-19 has provided a good opportunity for us to think about evidence-based education and its outcomes.

A. Becky Francis

B. John Hattie

C. Mike Petrilli

D. Nancy Madden

(54) The pandemic has proved that a lot of what we think we know about education is not necessarily correct.

A. Kenneth Russell

B. Lee Elliot Major

C. Margarete Sachs-Israel

D. Mike Petrilli

(55) We have enough evidence, but we are not good at applying it in educational settings.

A. Annette Boaz

B. Becky Francis

C. John Hattie

D. Margarete Sachs-Israel