

Science and Methods

Vocabulary and collocation

1 Read the information on suffixes and do the exercises.

The suffix *-able / -ible* can combine with verbs to form adjectives describing someone or something that is affected by the action or process described by the verb. For example, *reliable* means worthy of reliance or trust; *visible* means capable of being seen. If we further add a prefix *in-* / *im-* / *il-* / *ir-* / *un-* to the adjective, we will get a word with the opposite meaning.

The suffix *-ish* can combine with adjectives to form new ones indicating that someone or something has a quality to some extent. It can also combine with nouns to form adjectives indicating that someone or something is typical of or is like some particular type of person or thing. For example, *reddish* means being slightly red, and *childish* means being like a child, or typical of a child.

Now give definitions to the words.

- 1 invisible _____
- 2 irrevocable _____
- 3 incredible _____
- 4 impenetrable _____
- 5 hellish _____
- 6 whitish _____
- 7 youngish _____
- 8 girlish _____

Complete the sentences with the words involved above. Each word can be used only once.

- 9 Biodiversity is declining globally, and many scientists warn that it is reaching a critical point at which harm will become _____.
- 10 The wind had dropped and a cold _____ mist from the river lingered in patches.

- 11 When you make every effort and fight for your dream, you will find your potential is _____.
- 12 Her face is still glowing with _____ beauty, though she is already over 50.
- 13 It's hard working with germs that are _____ to the human eye, experts note.
- 14 Rounding up the elephants and trying to count them was a(n) _____ job, much more difficult than anyone had foreseen because of the vast area and the confusing vegetation and terrain.
- 15 After several days' march, they found themselves at the edge of a forest which seemed thick and _____.
- 16 You could find a nice Jewish man ... maybe a(n) _____ widower, in his late thirties or forties.

2 Complete the sentences with appropriate prepositions.

- 1 Your punishment on your child is _____ vain for you cannot make yourself convincing in this way.
- 2 We looked through many books _____ the hope of getting further information.
- 3 This magazine is trying to popularize science among children _____ a comprehensible manner.
- 4 Now that we have a new member in our family, we would like to convert the loft _____ another bedroom.
- 5 If we look at the problem _____ a different perspective, we may find a more effective solution.
- 6 The whole dispute comes down _____ a power struggle between the management and trade unions.
- 7 Teachers should not frequently interfere _____ children's freedom unless necessary.
- 8 It is scientists' business to accumulate knowledge about the universe and account _____ the phenomena.

3 Replace the underlined parts with the correct form of the words in the box.

migrate	vanish	hypothesis	rational
manipulate	scatter	virtually	reluctant

- 1 Ministers have shown hesitation to explain their position to the media.
- 2 Bad memories disappear each morning when I walk into my son's bedroom to wake him up — his smile gives me all I need to face whatever is happening in my life.
- 3 They know how to take control of your fear and uncertainty for their own benefit.
- 4 When sunlight hits water, smooth areas reflect light like mirrored surfaces while rough regions reflect light in all directions and appear darker.
- 5 This research enabled us to test and confirm three tentative proposals about consumer behaviors in the digital age.

- 6 The birds make a huge movement from the north to the south of the US, mostly starting in August and the other way around in the spring.
- 7 He is asking you to look at both sides of the case and conclude based on reason.
- 8 The earthquake in effect destroyed the village which used to be beautiful and prosperous.

4 Complete the sentences with the correct word in each group.

1 **exclusive** **inclusive**

A Science education must be _____ and should recognize how teachers, scientists and families work together to achieve learning goals.

B He told the magazine in an _____ interview that all his problems stem from drink.

2 **external** **internal**

A Many people fail in life not because of _____ forces that are beyond their control, but because of the views they hold about themselves.

B The _____ set of beliefs, motivations and principles can be manifested by behaviors.

3 **distinctive** **distinct**

A Every room has its _____ decoration which shows the owner's preference.

B I had a _____ impression that I was being watched.

4 **characteristic** **character**

A Mutuality rather than independence is the chief _____ of human life.

B She resembles her sister in appearance but not in _____.

5 **intelligible** **intelligent**

A The letters reveal an _____ and lively young man, full of ideas and able to express them vividly.

B It's hard for me to find any _____ information in this obscure article.

6 **wander** **wonder**

A He was _____ around aimlessly, reflecting on what had happened to him recently.

B I _____ if maybe you could pass this information onto Joe.

5 Complete the paragraphs with the correct form of the words in the box.

suspend	uniform	account	contact	interfere
evaporate	tiny	strike	reveal	miniature

The convection "cells" are the areas where warm fluid rises and cold sinks. If you have a cup of hot, black coffee in front of you, you can see the same thing in 1) _____. When the surface layer cools from 2) _____ with the air, it becomes denser and sinks, forcing warmer, less dense coffee up to the surface. If light 3) _____ the coffee at an angle, you will see a whitish sheen on the surface, which is actually a thin layer of 4) _____ water droplets. The droplets form because when water 5) _____, it cools suddenly, condenses and coalesces. They will not fall back onto the surface of the coffee, but will be 6) _____ above the surface to form minute clouds which can only be 7) _____ by careful lighting.

Another common phenomenon is the dark ring left behind when coffee spills. Why does a drop of coffee when it spills form a ring instead of leaving a(n) 8) _____ beige stain? Sid Nagel and his colleagues conducted a couple of experiments to test this by 9) _____ with the normal evaporative process. He found that evaporation, the surface, the streaming are the elements which 10) _____ for the ring.

Structure and grammar

1 Read the example and rewrite the sentences using the comment and viewpoint adverb.

Example:

It is ideal that they are also both honest and humble.

You can rewrite it like this:

Ideally, they are also both honest and humble.

Tips

In the sentence *Funnily enough, when the puzzle was solved, the processes involved turned out to be ...* from the text “Coffee stains”, the comment and viewpoint adverb *funnily* shows the speaker’s attitude to or evaluation of what he says in the rest of the sentence. When used in this way, adverbs are always separated from the sentence with a comma.

- 1 It is clear that long before children are able to speak or understand a language, they communicate through facial expressions and by making noises.

- 2 It is hoped that the next wave of wireless will be getting things to talk to each other, with no humans in between.

- 3 It is unfortunate that Dr. M. Caputo couldn’t predict the exact time and date of the earthquake, though he warned that a large quake would soon strike the east of Naples.

- 4 I will say frankly that space exploration is necessary in this age, even when we consider the enormous dangers it involves.

- 5 It is presumed that machines also have an origin and a process of evolution.

- 6 It is essential that a theory is an abstract, symbolic representation of what is conceived to be reality.

2 Read the example and rewrite the sentences using the past participle as adverbial.

Example:

They are held there and suspended above the surface.

They are clouds on a scale so minute that only careful lighting reveals them.

You can rewrite them like this:

Held there, suspended above the surface, they are clouds on a scale so minute that only careful lighting reveals them.

Tips

The past participle (*v.-ed*) can be used as adverbial in a sentence, indicating reason, time, condition, manner, concession, etc. When they function as adverbial, their logical subject should be the same as the subject of the main clause.

- 1 He was immersed in his experiment.
He did not notice that it was already midnight.

- 2 The ancient art of letter writing is weakened if not killed.
The ancient art of letter writing is almost replaced by phone calls and emails.

- 3 Automation is designed to make possible the manufacture of more goods with fewer workers.
Automation reduces the human factors, mental and physical, in production.

- 4 A projectile (抛射体) is drawn by its gravity.
A projectile will deviate toward the Earth.

- 5 Some scientists are distracted by financial benefits.
Some scientists are at a loss as to where they are going and how they will get there.

- 6 The girl was asked about her future plans.
The girl said that she wanted to be a teacher.

- 7 His parents encouraged him to overcome the difficulties.
He still has no confidence in overcoming the difficulties.

3 Read the example and rewrite the sentences using *turn out (to be) / to do*.

Example:

It turned out that the process involved was the same as seen in coffee when it was still in the cup.

You can rewrite it like this:

The processes involved *turned out (to be)* the same as seen in coffee when it was still in the cup.

- 1 It turns out that the new biofuel is much better than any previously in existence.

- 2 It turns out that the probability of an event's occurring is equal to the probability that it will not occur.

- 3 It turns out that the cloned organ would work better than a transplant organ.

- 4 It turns out that the magnetic field fluctuates in strength and drifts from its axis.

- 5 It turned out that the only solid piece of scientific truth is that we are profoundly ignorant about nature.

- 6 It turned out that this research was much harder than they expected.

Reading

1 Read the text "Characteristics of science" and choose the best answer to the questions.

- 1 According to the text, how do scientists deal with their research findings?
 - A They discuss them with poets.
 - B They prove their correctness again and again.
 - C They share them with others.
 - D They control their use carefully in laboratories.
- 2 The author takes the example of the solar system and the universe to _____.
 - A illustrate the fields of scientific studies
 - B distinguish the body from the soul
 - C show the importance of the external world
 - D present the basic conditions of nature
- 3 A testable hypothesis is tested in a controlled environment to _____.
 - A invalidate the experiment
 - B quicken the experiment process
 - C arrive at expected experiment results
 - D ensure the reliability of the experiment
- 4 Mathematics is of vital importance to scientists in that _____.
 - A it is the ultimate goal of scientists' life-long research
 - B it is an effective tool to work out many science problems

- C it is a universal language for all scientists around the globe
 - D it is the only way for scientists to present their research results
- 5 Psychology, economics and literary criticism may be labeled as science once _____.
- A people can discover their natural truths
 - B they can attract more researchers
 - C they can justify their existence
 - D people can measure them

2 Read the text “Coffee stains” and choose the best answer to the questions.

- 1 The sheen in the coffee forms as a result of _____.
- A the heat of the coffee
 - B the rise of cold coffee
 - C the cooling of coffee surface
 - D the sinking of hot coffee
- 2 The sheen can suspend above the coffee surface because _____.
- A it is lighter than air
 - B numerous water molecules support it
 - C hot air condenses underneath it
 - D sunlight reflects from the surface of it
- 3 What is said about the space between the droplets and the liquid coffee?
- A It can hardly form again once it scatters.
 - B It can be easily seen with enough light.
 - C The temperature there is extremely high.
 - D The temperature there changes frequently.
- 4 Experiments by Sid Nagel and his colleagues illustrate that the dark ring in coffee cups _____.
- A forms from the drop center
 - B has much to do with evaporation
 - C only appears in special circumstances
 - D changes in different gravity conditions
- 5 According to the author, the significance of thinking about coffee issues lies in that _____.
- A it can teach people to enjoy life in a scientific way
 - B it can help cultivate great scientists like Newton
 - C it can facilitate our control of this magic world
 - D it can remind us of the everyday science around

3 Read the passage and choose the best answer to the questions.

We take for granted that soda cans are cylindrical (圆柱形的) — the shape is easy to hold and the cans stack well on top of each other. But how did today’s can design become standard? After all, cylindrical cans don’t pack together as well as cube-shaped cans would, and they use more metal than spherical (球形的) cans would.

A new video from Bill Hammack, a professor of chemical engineering at the University of Illinois who has a YouTube channel called “EngineerGuy,” explains the science of how the modern soda can came to be.

A spherical can may use the smallest amount of packaging, but of course it would roll off the table — so that’s out. A cube-shaped can wouldn’t work because the edges are weak points, and the walls would have to be made much thicker to withstand the pressure of the carbonated beverage within. (It’s not particularly easy to hold or drink from, either.)

A cylindrical can combines the best qualities of a sphere and a cube. When packed in a box, cylinders take up about 90 percent of the available space, and their round shape is able to withstand a good amount of pressurization. Modern aluminum cans are less than a tenth of a millimeter thick, yet hold liquid at up to 90 pounds per square inch (about six times regular atmospheric pressure).

The aluminum or tin-plated can begins life as a flat disk a few inches across, and is mechanically pressed into a shallow cup shape and then into a taller cup that’s the same diameter as the final can. The bottom of the cup is then pressed into a concave dome shape, which allows the can to withstand greater pressures than if it were flat. The whole process takes only a seventh of a second, allowing a single machine to produce about 100 million cans in a sixth-month period.

Finally, the outside of the can is decorated, and the inside is sprayed with a coating that keeps the soda from taking on a metallic taste. The still-open top of the can is tapered in, and once the can is filled with soda or juice, a separate machine immediately puts the top on the can and seals it to the body. Soda, Dr. Hammack explains, is pressurized with carbon dioxide, while juice is pressurized with nitrogen. That internal pressure allows the can to be relatively strong in spite of its thin walls — think about how easy it is to crush an empty can with your hand versus how hard it would be to do the same to an unopened can.

The modern soda can also incorporates a small tab that opens the top of the can without detaching itself. Today this feature is ubiquitous (普遍的), but until the 1970s, cans featured a pull-tab that came off of the can, and beaches were often littered with discarded pull-tabs.

Most of us interact with modern beverage cans every day, but it’s easy to forget that they’re carefully designed and manufactured with an incredible degree of precision. The beverage industry makes about 100 billion cans each year, thanks to a design that results in strong, reliable, efficient cans.

- 1 What is said about the shape of soda cans in the passage?
 - A The general public has considered making it more durable.
 - B The general public has seldom given much thought to it.
 - C It has urged people to explore the science behind it.
 - D It has aroused people’s worry over its safety.

- 2 The cube shape is not applied to soda cans because _____.
- A a cube-shaped can may bring about problems in transportation
 - B a cube-shaped can may take up too much packing room
 - C a cube-shaped can may pose a threat to soda's storage
 - D a cube-shaped can may consume more aluminum
- 3 One advantage of a cylindrical can over other can shapes lies in that _____.
- A it can hold the most liquid with the same amount of aluminum
 - B it can take up the most space available in packing
 - C it can withstand a considerable amount of pressure
 - D it can evoke people's desire to drink the liquid in it
- 4 It is much easier to crush an empty can than to crush an unopened one mainly because _____.
- A an empty can has fairly thin walls
 - B an unopened can tends to roll around
 - C the interior pressure in an empty can is low
 - D the drink in an unopened can makes it unbreakable
- 5 In the modern soda can, an attached tab has replaced a pull-tab _____.
- A for environmental concerns
 - B for safety reasons
 - C to save costs
 - D to make it stronger

4 Read the passage and judge whether the following statements reflect the views of the author. Write YES if the statement reflects the author's view, NO if the statement contradicts the author's view, and NOT GIVEN if there is no information about this in the passage.

When it comes to concussions (脑震荡), the biggest question, especially on the minds of parents of student-athletes, is whether and when their child should get back in the game. But researchers at the Children's National Health System say that there's potentially bigger question that parents and educators aren't asking: how concussions affect children's performance in the classroom.

In a study published in the journal *Pediatrics*, Danielle Ransom, a postdoctoral fellow in neuropsychology, and her colleagues found that children who had concussions may experience more problems concentrating, keeping up and paying attention in school. The symptoms are worse for students who have recently been injured, but remain significant even for those who have recovered.

"My colleagues and I have been hearing for years that kids with concussions have problems in school, but there was no evidence to show what the problems are, and how frequently they are occurring," she says.

So she focused on 349 students aged 5 to 18 years old who had all been diagnosed with

concussion. Some were still recovering and experiencing symptoms, while others were no longer feeling any effects from their injury. Of the students who were still recovering, 88 percent reported more than one symptom including headaches, fatigue, difficulty understanding lessons or problems concentrating. And 77 percent said they had more trouble taking notes and spent more time completing homework assignments.

Students who experienced more severe head injuries were also more likely to have the most trouble in school. But Ransom admits that diagnosing the severity of concussions is still a challenge. “At this point we really don’t have tools to clinically say, this is what you can expect in your kid’s recovery,” she says.

Still the results highlight the need to pay attention to the extra support that children with concussions need in order to recover. That may include, at least in the first days back from a head injury, a shorter school day, since students may feel more tired and overwhelmed by a full day, and even breaks throughout the day so they can rest when they feel headaches or symptoms occurring.

“Instead of trying to get the kid back to school doing things 100 percent as they usually would, we need to allow the symptoms to ebb and flow in a more natural way,” says Ransom. “Kids should be paying attention to their bodies, and teachers need to be familiar with their symptoms.”

Such strategies could not only help to ease the transition back to school, and but also potentially lessen the effects of the concussion, says Ransom. There is evidence that children who push themselves to return too quickly to their normal workload can slow recovery and even make symptoms worse.

Unfortunately, she says, there is no magic threshold (入口) for when students can handle working at their full capacity; it varies with each child and with the injury. But recognizing that concussions can affect how children do in school could lead to better ways of helping them to return to their normal workload sooner. “We really think the findings in our study highlight the importance of targeting specific problems, and can ease the transition back for kids,” says Ransom.

- _____ 1 Some experts claim that closer attention should be paid to the potential influence of concussions on children’s academic performances.
- _____ 2 Symptoms of concussions are not evident among children who have recovered.
- _____ 3 Most subjects Danielle Ransom studied experienced severe symptoms of concussion.
- _____ 4 There is easy access to the diagnosis of the severity of concussions.
- _____ 5 Less workload for children with concussions may facilitate their recovery.
- _____ 6 Children with no concussions generally performs better than those with the problems.
- _____ 7 The significance of Danielle Ransom’s research lies in the fact that it has found a way for all children with concussions to restore their full academic abilities.

5 Read the passage and choose the best answer to the question(s) after each paragraph.

[1] Liquid H₂O is the sine qua non (必要条件) of life. Making up about 66 percent of the human body, water runs through the blood, inhabits the cells, and lurks in the spaces between. At every moment water escapes the body through sweat, urination, defecation or exhaled breath, among other routes. Replacing these lost stores is essential but rehydration can be overdone. There is such a thing as a fatal water overdose.

[2] Earlier this year, a 28-year-old California woman died after competing in a radio station's on-air water-drinking contest. After downing some six liters of water in three hours in the "Hold Your Wee for a Wii" contest, Jennifer Strange vomited, went home with a splitting headache, and died from so-called water intoxication.

1 What does the underlined word "intoxication" in Paragraph 2 mean?

- A Drinking.
- B Poisoning.
- C Disease.
- D In-take.

[3] There are many other tragic examples of death by water. In 2005 a fraternity hazing at California State University, Chico, left a 21-year-old man dead after he was forced to drink excessive amounts of water between rounds of push-ups in a cold basement. Club-goers taking MDMA (Ecstasy) have died after consuming copious amounts of water trying to rehydrate following long nights of dancing and sweating. Going overboard in attempts to rehydrate is also common among endurance athletes. A 2005 study in *The New England Journal of Medicine* found that close to one sixth of marathon runners develop some degree of hyponatremia, or dilution of the blood caused by drinking too much water.

2 What does the underlined word "copious" in Paragraph 3 mean?

- A Sustainable.
- B Affordable.
- C Abundant.
- D Respectful.

3 The 2005 study in *The New England Journal of Medicine* indicates that _____.

- A even some professional athletes lack the knowledge on how to drink water
- B endurance athletes are at a higher risk of death from drinking too much water than others
- C marathon runners need to drink much water to compensate for their water loss
- D athletes are less likely to suffer from symptoms of excessive water in-take



[4] Hyponatremia, a word cobbled together from Latin and Greek roots, translates as “insufficient salt in the blood.” Quantitatively speaking, it means having a blood sodium concentration below 135 millimoles per liter, or approximately 0.4 ounce per gallon, the normal concentration lying somewhere between 135 and 145 millimoles per liter. Severe cases of hyponatremia can lead to water intoxication, an illness whose symptoms include headache, fatigue, nausea, vomiting, frequent urination and mental disorientation.

[5] In humans the kidneys control the amount of water, salts and other solutes leaving the body by sieving (筛) blood through their millions of twisted tubules (细管). When a person drinks too much water in a short period of time, the kidneys cannot flush it out fast enough and the blood becomes waterlogged. Drawn to regions where the concentration of salt and other dissolved substances is higher, excess water leaves the blood and ultimately enters the cells, which swell like balloons to accommodate it.

- 4 What will happen if people drink too much water in a short time according to Paragraph 5?
- A Their blood sodium concentration will undergo frequent changes.
 - B Their blood sodium concentration will become lower than normal.
 - C Their kidneys will be damaged.
 - D Their kidneys will stop working.

[6] [A] Most cells have room to stretch because they are embedded in flexible tissues such as fat and muscle, but this is not the case for neurons. [B] Brain cells are tightly packaged inside a rigid bony cage, the skull, and they have to share this space with blood and cerebrospinal fluid, explains Wolfgang Liedtke, a clinical neuroscientist at Duke University Medical Center. [C] “Inside the skull there is almost zero room to expand and swell,” he says. [D] “Rapid and severe hyponatremia causes entry of water into brain cells leading to brain swelling, which manifests as seizure, coma, respiratory arrest, brain stem herniation and death,” explains M. Amin Arnaout, chief of nephrology at Massachusetts General Hospital and Harvard Medical School.

- 5 According to Paragraph 6, neurons differ from other cells mainly in that _____.
- A they get better protection from the skull
 - B they have little to do with internal organs
 - C they need water and blood to function normally
 - D they fail to expand to make room for excess water
- 6 Look at the four square brackets marked [A], [B], [C], and [D], which indicate where the following sentence could be added in Paragraph 6. Where would the sentence fit best?

Thus, brain edema, or swelling, can be disastrous.

[7] Where did people get the idea that guzzling enormous quantities of water is healthful? A few years ago Heinz Valtin, a kidney specialist from Dartmouth Medical School, decided to determine if the common advice to drink eight eight-

ounce glasses of water per day could hold up to scientific scrutiny. After scouring the peer-reviewed literature, Valtin concluded that no scientific studies support the “eight × eight” dictum (for healthy adults living in temperate climates and doing mild exercise). In fact, drinking this much or more “could be harmful, both in precipitating potentially dangerous hyponatremia and exposure to pollutants, and also in making many people feel guilty for not drinking enough,” he wrote in his 2002 review for the *American Journal of Physiology — Regulatory, Integrative and Comparative Physiology*. And since he published his findings, Valtin says, “not a single scientific report published in a peer-reviewed publication has proven the contrary.”

- 7 Heinz Valtin read considerable literature to _____.
- A examine a common belief
 - B justify his own research findings
 - C support previous scientific studies
 - D look for healthy ways to drink water
- 8 What does the underlined expression “the contrary” in Paragraph 7 refer to ?
- A Drinking too much is harmful.
 - B The “eight × eight” dictum is plausible.
 - C People feel guilty for not drinking enough.
 - D Pollutant in the water poses threat to people.

[8] Most cases of water poisoning do not result from simply drinking too much water, says Joseph Verbalis, chairman of medicine at Georgetown University Medical Center. It is usually a combination of excessive fluid intake and increased secretion (分泌物) of vasopressin (抗利尿激素) (also called antidiuretic hormone), he explains. Produced by the hypothalamus and secreted into the bloodstream by the posterior pituitary gland, vasopressin instructs the kidneys to conserve water. Its secretion increases in periods of physical stress — during a marathon, for example — and may cause the body to conserve water even if a person is drinking excessive quantities.

[9] Every hour, a healthy kidney at rest can excrete 800 to 1,000 milliliters, or 0.21 to 0.26 gallon, of water and therefore a person can drink water at a rate of 800 to 1,000 milliliters per hour without experiencing a net gain in water, Verbalis explains. If that same person is running a marathon, however, the stress of the situation will increase vasopressin levels, reducing the kidney’s excretion capacity to as low as 100 milliliters per hour. Drinking 800 to 1,000 milliliters of water per hour under these conditions can potentially lead a net gain in water, even with considerable sweating, he says.

- 9 What happens to their kidneys while a person is running a marathon?
- A They deteriorate in the ability to excrete water.
 - B They need considerable water to keep a balance.
 - C They conserve water to make for the person’s sweat.
 - D They keep a stable demand for water consumption.



[10] While exercising, “you should balance what you’re drinking with what you’re sweating,” and that includes sports drinks, which can also cause hyponatremia when consumed in excess, Verbalis advises. “If you’re sweating 500 milliliters per hour, that is what you should be drinking.”

[11] But measuring sweat output is not easy. How can a marathon runner, or any person, determine how much water to consume? As long as you are healthy and equipped with a thirst barometer unimpaired by old age or mind-altering drugs, follow Verbalis’s advice, “Drink to your thirst. It’s the best indicator.”

10 What is Joseph Verbalis’ final suggestion on how much water to drink?

- A Drink at the rate of 800 to 1,000 milliliters per hour.
- B Learn water-drinking techniques from professionals.
- C Measure how much one is drinking and how much one is sweating.
- D Enjoy water at any time when the body needs it.

Translation

1 Translate the sentences into Chinese.

1 But this does not trouble them, as they believe they can deal effectively with the elementary particles that they cannot see and according to the uncertainty principle never can see, but not with angels, which will probably never appear to scientists because scientists do not believe in them.

2 It is also important that the work itself is done mathematically, which means that the observations being studied must be transformed into — or reduced to — numbers in the first instance, so they can be studied in a rational manner.

3 Funnily enough, when the puzzle was solved, the processes involved turned out to be the same as seen in coffee when it was still in the cup: the flagstone pattern and the clouds, the movement of fluid from one place to another, and evaporation.

4 Add to these the fact that if you use a microscope to watch the behavior of tiny particles in the drop as it is drying, you’ll see that the particles are streaming headlong out to the edge of the drop.

2 Translate the sentences into English.

1 调查和研究使人们的知识不断扩展，因此几个世纪以来，医学和科学手稿开始包含更多的细节。

2 我们没有解决社会问题的妙方，因为社会问题比科学问题棘手得多。

3 具有讽刺意味的是，孩子天生就是科学家，渴望探索身边的世界。

4 只有当科学的缺失由于某种原因影响到人们的生活质量时，人们才会开始意识到科学对我们的幸福感起着多么重要的作用。

3 Translate the paragraph into Chinese.

In the ten years since its publication in 1988, Stephen Hawking's classic work *A Brief History of Time* has become a landmark volume in scientific writing, with more than nine million copies in forty languages sold worldwide. That edition was on the cutting edge of what was then known about the origins and nature of the universe. But the intervening years have seen extraordinary advances in the technology of observing both the micro- and the macrocosmic worlds. These observations have confirmed many of Professor Hawking's theoretical predictions in the first edition of his book, including the recent discoveries of the Cosmic Background Explorer satellite (COBE). Eager to bring to his original text the new knowledge revealed by these observations, as well as his own recent research, Professor Hawking has prepared a new introduction to the book and written an entirely new chapter on wormholes and time travel.

4 Translate the paragraph into English.

去年，中国的很多考古发现进一步揭开了丝绸之路的历史，并很有可能引起教科书的改写。几百年前，中国商人常常利用陆路和水路进行丝绸和瓷器交易。2014年在浙江省上虞市发现的瓷窑表明，人们通常认为在宋朝（公元960—1279年）达到鼎盛的海上丝绸之路，可能实际上发展地更早些——在东汉时期（公元25—220年）。上周在北京由国家文物局揭晓的2014年度全国十大考古新发现中，上虞瓷窑位列其中。

