

TPO 24 – 1 Lake Water [水文] 湖水

Where does the water in a lake come from, and how does water leave it? Water enters a lake from inflowing rivers, from underwater seeps and springs, from overland flow off the surrounding land, and from rain falling directly on the lake surface. Water leaves a lake via outflowing rivers, by soaking into the bed of the lake, and by evaporation. **So much** is obvious.

问题 1: 询问 **So much** 指的是什么;

湖水的水从哪里来, 又怎么流出的呢? 湖中的水来自于河流的水, 地下渗入的水和泉水, 从四周地面流进来的水, 还有直接降到湖面的雨水。湖中的水通过向外流的河流, 渗透进河床以及蒸发离开湖泊。这些都是显而易见的。

The questions become more complicated when actual volumes of water are considered: how much water enters and leaves by each route? Discovering the inputs and outputs of rivers is a matter of measuring the discharges of every inflowing and outflowing stream and river. Then exchanges with the atmosphere are calculated by finding the difference between the **gains** from rain, as measured (rather roughly) by rain gauges, and the losses by evaporation, measured with models that correct for the other sources of water loss. For the majority of lakes, certainly those surrounded by forests, input from overland flow is too small to have a noticeable effect. Changes in lake level not explained by river flows plus exchanges with the atmosphere must be due to the net difference between what seeps into the lake from the groundwater and what leaks into the groundwater. **Note the word "net"**: measuring the actual amounts of groundwater seepage into the lake and out of the lake is a much more complicated matter than merely inferring their difference.

问题 2: 询问单词意思 (**gains**);

问题 3: 询问 infer 到什么从 **movement of water into a lake**;

问题 4: 询问作者为什么提这个 (**Note the word "net"**);

当考虑到实际的水流量时就会变得更加复杂: 水通过每种方式流进和流出的量是多少? 了解河流的流进量和流出量是一件测量每一条流入和流出的河流及其流量的事情。和大气的交换是通过发现雨水中得到的水(通过雨量器大致测得)和蒸发损失的水(通过准确测量其他水损失方式的模型来测得)的差别来计算的。对于大多数的湖来说, 特别是那些被森林环绕的湖, 地面流入的水太少了以至于几乎没有能够感觉到的影响。河水和大气水量变化不能解释的湖中水平面的变化一定是因为渗入湖中的地下水和渗出的地下水的净值不同。注意一下“净值”这个词: 测量真正渗入和渗出湖中的地下水比仅仅推断它们的不同要复杂的多。

前半部分&后半部分【多选题】

多选题选项解析: By measuring the water quantities at **each** of a lake's inputs and outputs, it can be determined whether water enters the lake mainly from **surface** or **groundwater** sources.

Once all this information has been gathered, it becomes possible to judge whether a lake's flow is mainly due to its surface inputs and outputs or to its underground inputs and outputs. If the former are greater, the lake is a surface-water-dominated lake; **【】** if the latter, it is a

seepage-dominated lake. 【】 Occasionally, common sense tells you which of these two possibilities applies. 【】 For example, a pond in hilly country that maintains a steady water level all through a dry summer in spite of having no streams flowing into it must obviously be seepage dominated. **Conversely**, a pond with a stream flowing in one end and out the other, which dries up when the stream dries up, is clearly surface water dominated. 【】

问题 5: 询问单词意思 (**Conversely**); on the other hand

问题 6: 询问 best description 关于单词意思 (**seepage-dominated lake**);

问题 13: 插入语的位置 → 【】;

conversely

英 ['kɒnvɜːsli] 美 ['kɑːnvɜːrslɪ]

adv. 相反地

一旦所有的这些信息都收集到了,那么判断一个湖的流量是由表面输入或输出决定的还是由地下水进出量决定的就变得可能了。如果主要是前者决定,那么湖泊就是一个表面水主导的湖,如果是后者,那么它就是一个渗透水主导的湖。有时候,常识会告诉你这两种可能性哪一种在起作用。比如说一个丘陵地区的池塘在整个干燥的夏天尽管没有溪水注入仍能保持稳定的水位,那么显然它是一个渗透水主导的池塘。相反,一个池塘有河流流进和流出,随喝水的干枯而干枯,那么这就是一个渗透水主导的池塘。

By whatever means, a lake is constantly gaining water and losing water: its water does not just sit there, or, anyway, not for long. This raises the matter of a lake's residence time. The residence time is the average length of time that any particular molecule of water remains in the lake, and it is calculated by dividing the volume of water in the lake by the rate at which water leaves the lake. The residence time is an average; **the time spent in the lake by a given molecule** (if we could follow its fate) would depend on the route it took: it might flow through as part of the fastest, most direct current, or it might circle in a backwater for an indefinitely long time.

问题 7: 询问可以 infer 出 what (**the time spent in the lake by a given molecule**);

不管怎么说,湖泊是在不停地流进和流出水;它的水不会停留在湖里,或者说不会长久的停留。这就关系到湖泊的停留时间问题。停留时间指的是特定水分子在湖中停留的平均时间长度,是通过计算湖水总量除以湖水流量流出湖泊的速率计算出来的。停留时间是一个平均数;湖中特定分子(如果我们可以追踪它的路线的话)花费的时间取决于它的路线:它可能是最快最直接的水流的一部分,也可能在死水中无限长时间地打转。

首句【多选题】

Residence times vary enormously. They range from a few days for small lakes up to several hundred years for large ones; Lake Tahoe, in California, has a residence time of 700 years. The residence times for the **Great Lakes** of North America, namely, Lakes Superior, Michigan, Huron, Erie, and Ontario, are, respectively, 190, 100, 22, 2.5, and 6 years. **Lake Erie's is the lowest: although its area is larger than Lake Ontario's**, its volume is less than one-third as great because it is so shallow-less than 20 meters on average.

问题 8: 询问 Erie's residence time **lower than** Ontario's 的原因;

问题 9: 询问作者讨论 (**Great Lakes**) 的原因;

停留时间变化非常的大，从小型湖的几天到大型湖泊的几百年。加利福尼亚州的塔霍湖的停留时间就长达 700 年。北美五大湖也就是苏必利尔湖、密歇根湖、休伦湖、伊利湖和安大略湖的停留时间分别是 190 年、100 年、22 年、2.5 年和 6 年。伊利湖是最短的：尽管它的面积比安大略湖要大，它的容量不及后者的三分之一，因为它的平均深度还不到 20 米。

整段【多选题】

A given lake's residence time is by no means a fixed quantity. It depends on the rate at which water enters the lake, and that depends on the rainfall and the evaporation rate. Climatic change (the result of global warming?) is dramatically affecting the residence times of some lakes in northwestern Ontario, Canada. In the period 1970 to 1986, rainfall in the area decreased from 1,000 millimeters to 650 millimeters per annum, while above-average temperatures speeded up the evapotranspiration rate (the rate at which water is lost to the atmosphere through evaporation and the processes of plant life).

The result has been that the residence time of one of the lakes increased from 5 to 18 years during the study period. The slowing down of water renewal leads to a chain of **further** consequences; it causes dissolved chemicals to become increasingly concentrated, and this, in turn, has a marked effect on all living things in the lake.

问题 10: 询问单词意思 (**further**); additional

问题 11: 询问解释的 northwestern Ontario, Canada lake residence time 增加的原因;

问题 12: 询问影响 residence time 的原因; 【Except】

further

英 ['fɜːðə(r)] 美 ['fɜːrðər]

adv. 更远地; 远非(如此); 进一步地; 而且; 处于更高阶段

adj. 更多的, 附加的; 更远的; 进一步的, 深一层的

v. 促进, 增进, 助长

给定的湖泊的停留时间绝不是一个确定的值。它取决于水流进湖的速度，而这个速度取决于降雨量和蒸发速度。气候变化(全球变暖的结果?)严重影响着加拿大安大略湖西北部一些湖泊的停留时间。在 1970 年到 1986 年间，这个地区的降雨量由每年 1 000 毫米降到了 650 毫米，而同时平均温度的上升加快了蒸散率(这个速率指的是水通过蒸发和植物生命过程流失到大气的速率)。结果是，在研究期间其中一个湖的停留时间从 5 年增加到 18 年。湖水的更新变慢导致了一系列后果；它使得溶解的化学物质不断变浓，这样反过来会对湖中的生物造成显著的影响。

TPO 24 – 2 Breathing During Sleep 在睡眠中呼吸

Of all the physiological differences in human sleep compared with wakefulness that have been discovered in the last decade, changes in respiratory control are most dramatic. Not only are there differences in the level of the functioning of respiratory systems, there are even changes in how they function. Movements of the rib cage for breathing are reduced **during sleep**, making the contractions of the **diaphragm** more important. 【】 Yet because of the physics of lying down, the stomach applies weight against the diaphragm and makes it more difficult for the diaphragm to do its job. 【】 However, there are many other changes that affect respiration when asleep.

问题 1: 询问 (**during sleep, diaphragm**) 可以推断什么;

关于人类睡觉和清醒时生理状态的差异在过去的十年里已被发现, 在所有的这些差异中, 呼吸系统控制方面的变化尤其引人注目。 不仅是呼吸系统运作水平有差异, 在如何运作方面也出现了变化。 胸腔所做的呼吸运动在睡觉时会减少, 使得横膈膜的收缩变得更为重要。 然而由于躺下来的物理作用, 胃部压迫横膈膜使得横膈膜难以工作。 不管怎样, 睡眠时还有很多其他的变化影响着呼吸。

【】 During wakefulness, breathing is controlled by two interacting systems. 【】 The first is an automatic, metabolic system whose control is centered in the brain stem. It subconsciously adjusts breathing rate and depth in order to regulate the levels of carbon dioxide CO₂ and oxygen O₂, and the acid-base ratio in the blood. The second system is the **voluntary, behavioral system**. Its control center is based in the forebrain, and it regulates breathing for use in speech, singing, sighing, and so on. It is capable of ignoring or overriding the automatic, metabolic system and produces an irregular pattern of breathing.

问题 2: 询问 (**voluntary, behavioral system**) 相关的正确叙述: 【Except】

问题 12: 插入语的位置 → 【】:

清醒的时候, 呼吸受到两个互相影响的系统的控制。 第一个是自动的新陈代谢系统, 它的控制中心在脑干。 它会潜意识地调整呼吸频率和深度来控制二氧化碳和氧气的浓度以及血液中的酸碱比。 第二套系统是有意识的行为系统。 它的控制中心在前脑, 调节说话、唱歌、叹息等行为时的呼吸。 它能忽略或主导自动新陈代谢系统并且产生无规律的呼吸模式。

During NREM(the phase of sleep in which there is no rapid eye movement) breathing becomes deeper and more regular, but there is also a decrease in the breathing rate, resulting in less air being exchanged overall. This occurs because during NREM sleep the automatic, metabolic system has **exclusive** control over breathing and the body uses less oxygen and produces less carbon dioxide. Also, during sleep the automatic metabolic system is less responsive to carbon dioxide levels and oxygen levels in the blood. Two things result from these changes in breathing control that occur during sleep. First, there may be a brief cessation or reduction of breathing when falling asleep as the sleeper **waxes and wanes** between sleep and wakefulness and their differing control mechanisms. Second, once sleep is fully obtained, there is an increase of carbon dioxide and a decrease of oxygen in the blood

that persists during NREM.

问题 3: 询问单词意思 (**exclusive**);

问题 4: 询问会发生什么 **just before the NREM begins**;

在 NREM (睡觉时没有快速眼部活动的阶段) 中, 呼吸会变得更深更有规律, 但是呼吸频率会降低, 导致总体空气交换减少。发生这个是因为在 NREM 睡眠阶段中, 自动的新陈代谢系统会独自控制呼吸, 身体会利用更少的氧气产生更少的二氧化碳。同时, 睡眠中自动的新陈代谢系统对血液中二氧化碳和氧气的含量反应并不灵敏。在睡眠中呼吸控制的变化会导致两个结果。第一, 睡着时呼吸可能会有短暂的停止或减少, 因为睡眠者在睡眠和清醒之间徘徊, 而这两种状态的控制系统不一样。第二, 一旦得到了充足的睡眠, 血液中二氧化碳含量升高而氧气含量降低, 在 NREM 阶段也会持续这样。

But that is not all that changes. During all phases of sleep, several changes in the air passages have been observed. It takes twice as much effort to **breathe during sleep** because of greater resistance to airflow in the airways and changes in the efficiency of the muscles used for breathing. Some of the muscles that help keep the upper airway open when breathing tend to become more relaxed during sleep, especially during REM (the phase of sleep in which there is rapid eye movement). Without this muscular action, **inhaling is like sucking air out of a balloon**-the narrow passages tend to collapse. Also there is a regular cycle of change in resistance between the two sides of the nose. If something blocks the "good" side, such as congestion from allergies or a cold, then resistance increases dramatically. Coupled with these factors is the loss of the complex interactions among the muscles that can change the route of airflow from nose to mouth.

问题 5: 询问作者陈述的目的 (**inhaling is like sucking air out of a balloon**);

To **refute** the argument...

问题 6: 询问 (**breathe during sleep**) 的 characteristic; **【Except】**

但这并不是全部的变化。在睡眠的所有阶段中, 气道的一些变化已经被观察到了。睡眠时需要付出两倍的努力去呼吸, 因为呼吸道气流的阻力会比较强并且用来呼吸的肌肉的效率会有变化。一些在呼吸时帮助保持上呼吸道通畅的肌肉在睡觉的时候会变得松弛, 特别是在 REM 阶段(就是有快速眼部运动的睡眠阶段)。没有这种肌肉运动, 呼吸空气就像从气球里吸气一样, 狭窄的通道会面临崩溃。而且鼻子两侧的阻力也会周期性改变。如果有时候堵塞了“好”的一边, 比如过敏和感冒引起的堵塞, 阻力就会大大增加。与这些因素一起发生的是, 那些能够改变从鼻子到嘴巴的气流路径的肌肉之间的复杂互动消失了。

Other respiratory regulating mechanisms apparently cease functioning during sleep. For example, during wakefulness there is an immediate, automatic, adaptive increase in breathing effort when **inhaling is made more difficult** (such as breathing through a restrictive face mask). This reflexive adjustment is totally absent during NREM sleep. Only after several inadequate breaths under such conditions, resulting in the **considerable** elevation of carbon dioxide and reduction of oxygen in the blood, is breathing effort adjusted. Finally, the coughing reflex in reaction to **irritants** in the airway produces not a cough during sleep but a cessation of breathing. If the irritation is severe enough, a sleeping person will arouse, clear the airway, then **resume** breathing and likely return to sleep.

问题 7: 询问 (inhaling is made more difficult during NREM) 会发生什么;

问题 8: 询问 mild irritants 会让 sleeping person 干嘛;

问题 9: 询问单词意思 (considerable);

问题 10: 询问单词意思 (resume);

其他呼吸调节机制在睡眠时显然停止了运作。比如说,在清醒时如果呼吸变得困难的话就会有一个立即自动适应性的呼吸增强(比如戴上面具呼吸)。但在 NREM 状态时完全不存在这样反射性的调节。在这种情况下,只有几次不充分的呼吸后使得血液中二氧化碳的含量显著提升以及氧气的含量降低,呼吸才会被调整过来。最后,咳嗽反应在应对呼吸道中刺激物时产生的不是睡觉时咳嗽而是呼吸停止。如果刺激物足够严重,睡着的人会醒来清理气道,然后继续呼吸,很可能再度入睡。

Additional breathing changes occur during REM sleep that are even more dramatic than the changes that occur during NREM. The amount of air exchanged is even lower in REM than NREM because, although breathing is more rapid in REM, it is also more irregular, with brief episodes of shallow breathing or absence of breathing. In addition, breathing during REM depends much more on the action of the diaphragm and much less on rib cage action.

问题 11: 等价替换语句 (Sentences = which of the CHOICES)

发生在 REM 时期的其他的呼吸变化比发生在 NREM 时期的呼吸变化更显著。REM 的空气交换量要比 NREM 低,因为尽管 REM 中呼吸更加急促,但也更加没有规律,包括一些简短的浅呼吸或呼吸暂停。另外,REM 时期的呼吸更多取决于横膈膜而不是胸腔的作用。

TPO 24 – 3 Moving into Pueblos
进入普韦布洛人

第 2 句&最后一句【多选题】

In the Mesa Verde area of the ancient North American Southwest, living patterns changed in **the thirteenth century**, with large numbers of people moving into large communal dwellings called pueblos, often constructed at the edges of canyons, especially on the sides of cliffs. Abandoning small extended-family households to move into these large pueblos with dozens if not hundreds of other people was probably **traumatic**. Few of the cultural traditions and rules that today allow us to deal with dense populations existed for these people accustomed to household autonomy and the ability to move around the landscape almost at will. 【】 And besides the awkwardness of having to share walls with neighbors, living in aggregated pueblos introduced other problems. 【】 For people in cliff dwellings, hauling water, wood, and food to their homes was a major chore. 【】 The stress on local resources, especially in the firewood needed for daily cooking and warmth, was particularly **intense**, and conditions in aggregated pueblos were not very hygienic. 【】

- 问题 1:** 询问单词意思 (**traumatic**); stressful
- 问题 2:** 询问单词意思 (**intense**); strong
- 问题 3:** 询问 before (**the thirteenth century**), 生活情况;
- 问题 4:** 询问 best indication about the organization of paragraph 1;
- 问题 12:** 插入语的位置 → 【】:

traumatic 英 [trɔ:ˈmætɪk] 美 [trəˈmætɪk] adj. (心理) 创伤的 adj. (生理) 外伤的	intense 英 [ɪnˈtens] 美 [ɪnˈtens] adj. 强烈的; 紧张的; 非常的; 热情的
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在古代北美西南部的梅萨维德地区，生活模式在十三世纪发生了变化，大量人群移居到大型公社居住地，这种地方被称为普韦布洛，通常建造在峡谷边缘，尤其是在悬崖边上。这些住户放弃小的扩展型家庭，进入到没有上百也有几十人的大的普韦布洛住所可能会感到不舒服。现在帮助我们处理密集人口的文化传统与规则几乎不存在于这些习惯了家庭自治和有能力随意搬迁的人。除了必须和邻居共居一室的尴尬外，住在人口聚集的普韦布洛地区产生了其他的问题。对于那些住在悬崖上的人，拉水、木头和食物到家里是主要的家务。本地资源的压力尤其是用于日常做饭和取暖的柴火特别紧张，在人口聚集的普韦布洛的环境也不是很卫生。

Given all the disadvantages of living in aggregated towns, why did people in the thirteenth century move into these closely packed quarters? For transitions of such suddenness, archaeologists consider either pull factors (benefits that drew families together or push factors) (some external threat or crisis that forced people to aggregate). In this case, push explanations dominate.

考虑到住在人口密集地区的种种不利条件，为什么人们会在十三世纪搬进这一如此密集的地区呢？对于这些突然的转变，考古学家考虑到了拉力因素（吸引家庭聚在一起的好处）和推力因素（迫使人们聚在一起的外部威胁或危机）。对于普韦布洛的搬迁来说，推力的解释更加占上风。

首句【多选题】

Population growth is considered a particularly influential push. After several generations of population growth, people packed the landscape in **densities** so **high** that communal **pueblos** may have been a necessary outcome. Around Sand Canyon, for example, populations grew from 5–12 people per square kilometer in the tenth century to as many as 30–50 by the 1200s. As densities increased, domestic architecture became larger, culminating in crowded pueblos. Some scholars expand on this idea by emphasizing a corresponding need for arable land to feed growing numbers of people: construction of small dams, reservoirs, terraces, and field houses indicates that farmers were intensifying their efforts during the 1200s. Competition for good farmland may also have prompted people to bond together to assert rights over the best fields.

问题 4: 询问人口密度增加的结果;

问题 5: 等价替换语句 (Sentences = which of the CHOICES)

人口增长被认为是一个特别有影响力的推力。在经历几代的人口增长之后，人们使得这一地区的人口密度达到了如此高的程度以至于普韦布洛社区成为一个必需的结果。比如在砂峡谷，十世纪时每平方公里 5 到 12 人，到十三世纪时增加到了每平方公里 30 到 50 人。随着人口密度的增加，民房建筑变得更大，在拥挤的普韦布洛地区达到顶峰。一些学者通过强调养活越来越多的人口需要相应的耕地扩展了这一看法：小型水坝、水库、梯田以及田地房屋的建设表明十三世纪的农民一直在加紧努力（开垦土地）。对于良田的竞争也会促使人们团结起来争取最好土地的权利。

首句&最后一句【多选题】

Another important push was the onset of the Little Ice Age, a climatic phenomenon that led to cooler temperatures in the Northern Hemisphere. Although the height of the Little Ice Age was still **around the corner**, some evidence suggests that temperatures were falling during the thirteenth century. The environmental changes associated with this **transition** are not fully understood, but people living closest to the San Juan Mountains, to the northeast of Mesa Verde, were affected first. Growing food at these elevations is always difficult because of the short growing season. As the **Little Ice Age progressed**, farmers probably moved their fields to lower elevations, infringing on the lands of other farmers and pushing people together, thus contributing to the aggregations. Archaeologists identify a corresponding shift in populations toward the south and west toward Mesa Verde and **away from** higher elevations.

问题 6: 询问单词意思 (**transition**);

问题 7: 询问为什么陈述 (Growing food at these elevations is always difficult...);

问题 8: 询问 farmer do what in response to the **falling temperatures**;

另外一个推动力量是小冰河时代的到来，这种气候现象导致了北半球气温的降低。尽管尚未到达小冰河时代的巅峰时期，一些证据仍表明十三世纪当时温度正在降低。与这种转变相关的环境变化并未受到充分认识，但是住在圣胡安山脉和普韦布洛地区的人们首先受到了影响。由于生长季节短，在这些海拔种植食物总是很困难。随着小冰河时代的到来，农民们可能将他们的耕地迁到更低的海拔地区去，侵入其他农民的土地并使人口聚集在一起，因而促进了群居。考古学家确认了与气候相应逃离更高海拔地区的向梅萨维德地区南部和西部人口迁移。

倒数第 4 句&最后一句【多选题】

In the face of all these pushes, people in the Mesa Verde area had yet another reason to move into communal villages: the need for greater cooperation. Sharing and cooperation were almost certainly part of early Puebloan life, even for people living in largely independent single-household residences scattered across the landscape. Archaeologists find that even the most isolated residences during the eleventh and twelfth centuries obtained some pottery, and probably food, from some distance away, while major ceremonial events were opportunities for sharing food and crafts. Scholars believe that this cooperation allowed people to contend with a patchy environment in which precipitation and other resources varied across the landscape: if you produce a lot of food one year, you might trade it for pottery made by a distant ally who is having difficulty with crops-and the next year, the flow of goods might go in the opposite direction. But all of this appears to have changed in the thirteenth century. Although the climate remained as unpredictable as ever between one year and the next, it became much less locally diverse. In a bad year for farming, everyone was equally affected. No longer was it helpful to share widely. Instead, the most sensible thing would be for neighbors to combine efforts to produce as much food as possible, and thus aggregated towns were a sensible arrangement.

问题 9: 询问 (major ceremonial events) 是一个用来干嘛的 occasions;

问题 10: 询问 (move into communal villages) 的原因;

问题 11: 询问段落支持哪一个陈述 (这些人之间会合作);

在所有这些推动力之外，梅萨维德地区的人们还有一个搬进公共村庄的理由：对更多合作的需求。分享和合作几乎可以肯定是早期普韦布洛人生活的一部分，即使是那些分散在这一地区独立性比较强的单一家庭住宅也是这样。考古学家发现在十一世纪和十二世纪期间，即使是最与世隔绝的居民也能从很远的地方获得陶器，可能还有食物，而重大的宗教活动为这种分享食物和手工艺品提供了机会。学者们相信这种合作让人们适应这种降水和其他资源区别变化的零散环境：如果在某一年，你收获了很多粮食作物，你可能会与远方一个不太容易获得农作物的盟友交换陶器，下一年货物可能会流向相反的方向。但是在十三世纪，所有这一切似乎已经改变了。尽管气候在一到两年间仍无法预测，但是在局部之间的差异大大降低。在收成差的年份里，每个人都会受影响。广泛共享已经不再有益了。取而代之，最明智的选择是一个地区的人们齐心协力生产尽可能多的食物，这样人口聚集的城市就成为一个合理的安排。