

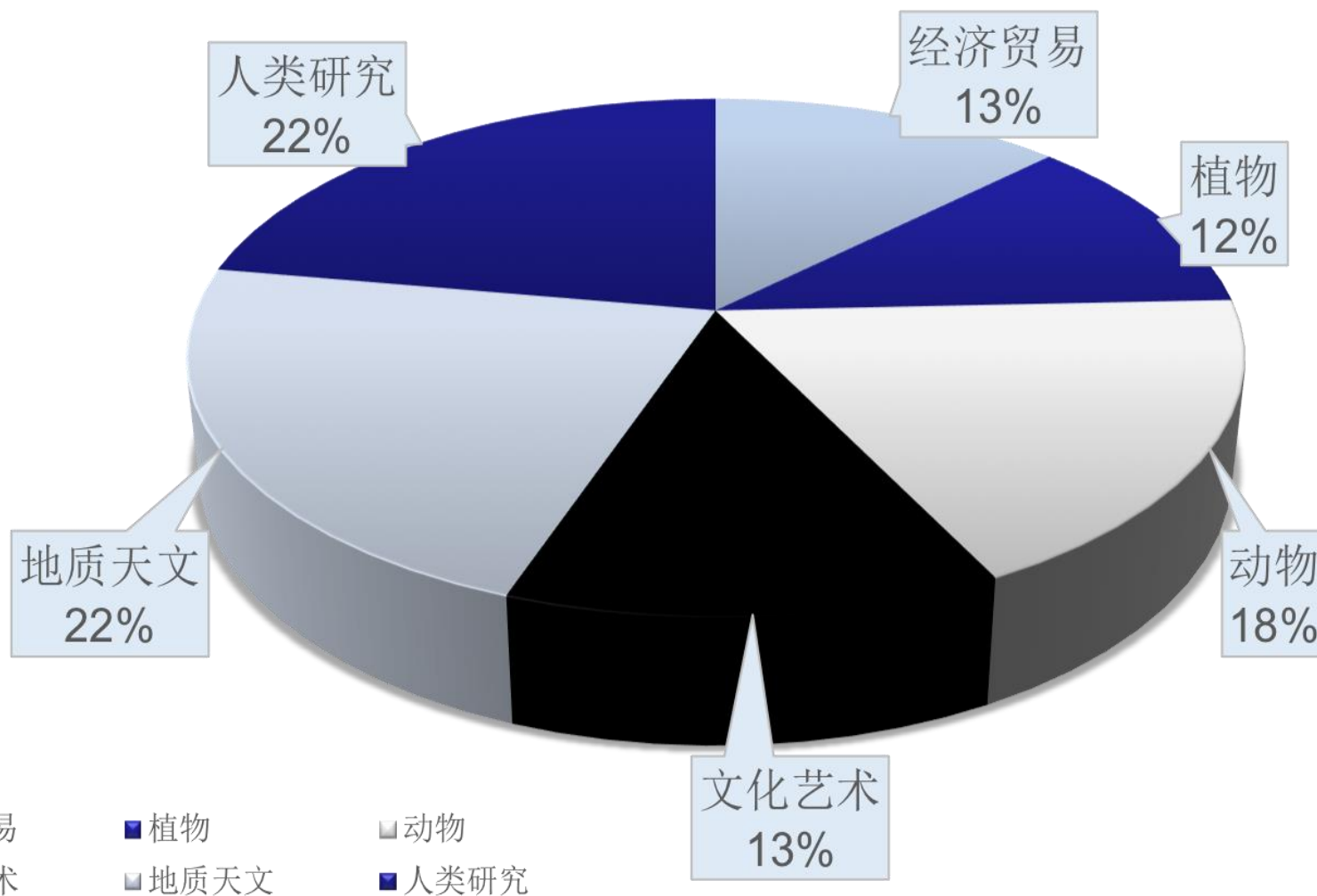


阅读基础段L2

地质天文类

课程安排

1. 经济贸易类
2. 地质天文类
3. 动物类
4. 植物类
5. 文化艺术类
6. 人类研究类



1. 地质类词汇、背景知识补充及文章演练
2. 天文类词汇、背景知识补充及文章演练



1. 地质类 geology

TPO1 Groundwater (地下水)

TPO2 Desert Formation (沙漠的形成)

TPO3 Depletion of the Ogallala Aquifer
(地下蓄水层的消失)

TPO7 The Geologic History of the Mediterranean
(地中海的地理)

TPO8 Extinction of the Dinosaurs (恐龙的灭绝)

TPO12 Water in the Desert (沙漠中的水)

TPO15 Glacier Formation (冰川的形成)

TPO15 Mass Extinctions (大灭绝)

TPO19 Discovering the Ice Ages (冰河时期)

TPO24 Lake Water (湖水)

TPO27 The Formation of Volcanic Islands
(火山岛的形成)

TPO31 Savanna Formation (无树平原的形成)

TPO37 Geology and Landscape (地理和地貌)

TPO38 Green Icebergs (冰山)

TPO42 Explaining Dinosaur Extinction (恐龙灭绝)

TPO43 The Origin of Petroleum (石油的形成)

TPO43 El Nino (厄尔尼诺现象)

TPO45 Microscopes--The Beringia Landscape (白令葛地貌)

根据官考情况，地质高频考点为：

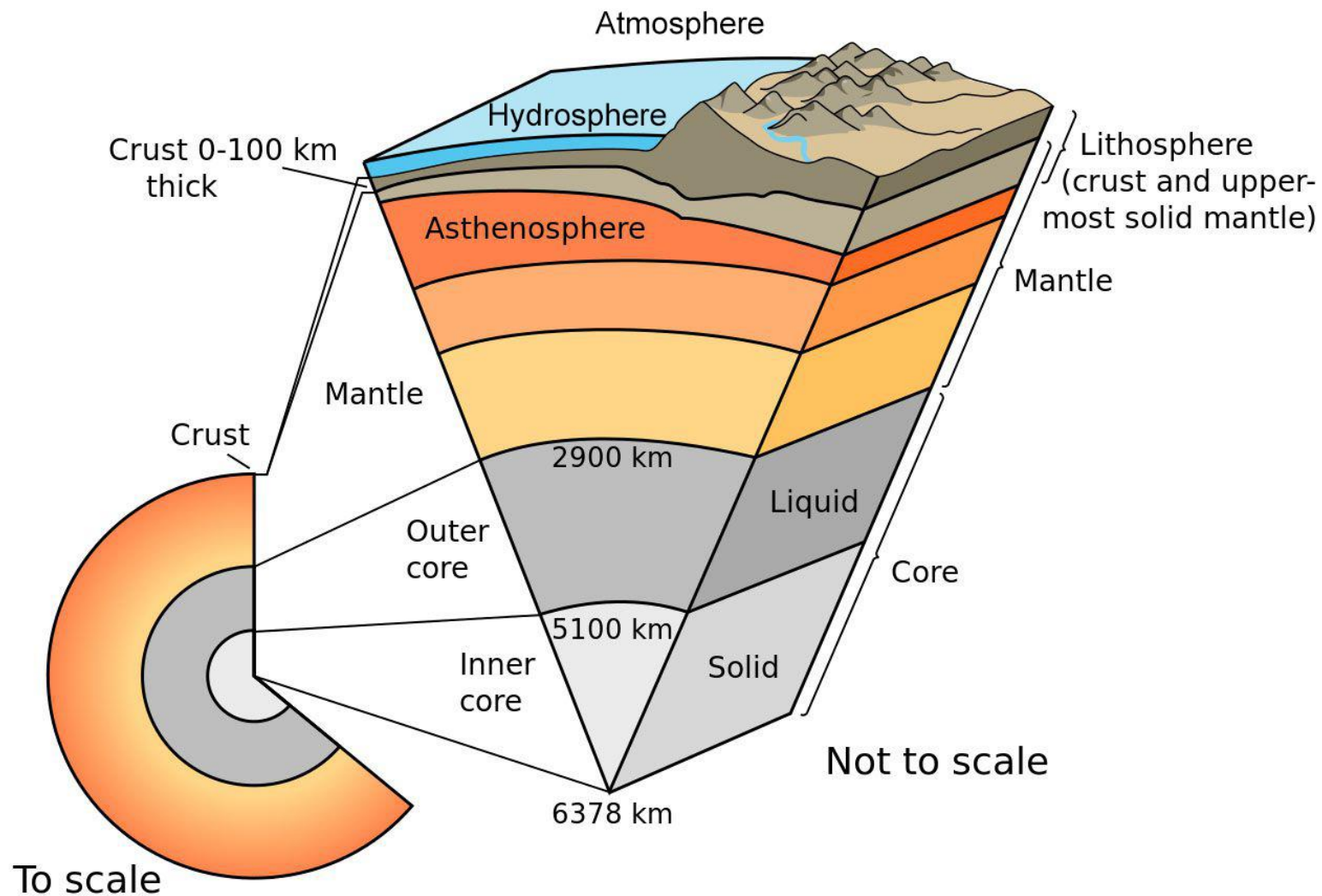
1. 板块构造

2. 物种灭绝

3. 流水、冰川地质作用

1. 板块构造

Layers of earth 地球的圈层



crust

地壳

mantle

地幔

lithosphere

岩石圈

atmosphere

大气圈

hydrosphere

水圈

asthenosphere

软流圈

/æs'thi:nə,sfɪr/

outer core

外核

inner core

内核



igneous rock
basalt
granite
weathering
erosion
canyon

火成岩
玄武岩
花岗岩
风化
侵蚀
峡谷

tectonic plate

earthquake

lava /'lɑ:və/

volcano

volcanism /'vɒlkənɪzəm/

continent

构造板块

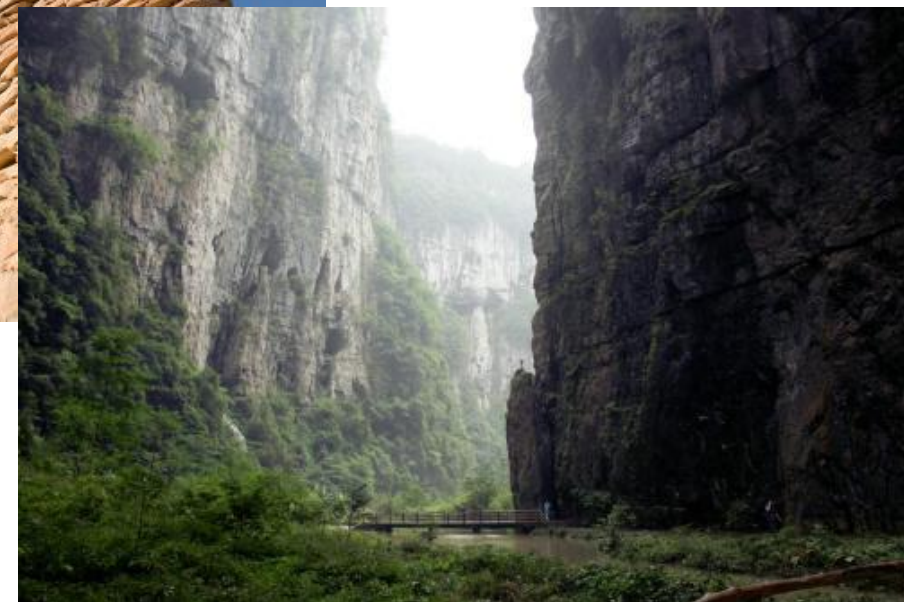
地震

岩浆

火山

火山作用

大陆





Exercises

1. TPO27-2

crust core mantle

All are slowly moving because the plates float on a denser semi-liquid _____, the layer between the _____ and Earth's _____.

2. It is at the boundaries between **plates** that most of earth's **volcanism** and earthquake activity occur.

大部分地球上火山作用和地震发生在板块边界.



2. 物种灭绝

生命发展时期

Paleozoic [pæliə'zəuɪk] 古生代

- ian 纪
- Cambrian /'kæmbriən/ 寒武纪
- Ordovician /,ɔ:dəv'vɪʃiən/ 奥陶纪
- Devonian [de'vəʊnjən] 泥盆纪
- Permian /'pɜ:mɪən/ 二叠纪

Mesozoic [mesəʊ'zəʊɪk] 中生代

- assic 纪
- Triassic [traɪ'æsi:k] 三叠纪
- Jurassic [dʒʊ'ræsi:k] 侏罗纪
- Cretaceous [kri'teɪʃəs] 白垩纪

Cenozoic [sinə'zəʊɪk] 新生代

- ocene 世
- Paleogene [peɪli:əʊdʒi:n] 古近纪
- Neogene [ni(:)əʊdʒi:n] 新近纪
- Quaternary [kwɔtər,nəri] 第四纪
- Eocene /'i:əʊ,sɪ:n/ 始新世
- Pleistocene /'plaɪstə,sɪ:n/ 更新世



恐龙灭绝两种假说

hypothesis 假说

hypotheses(复)

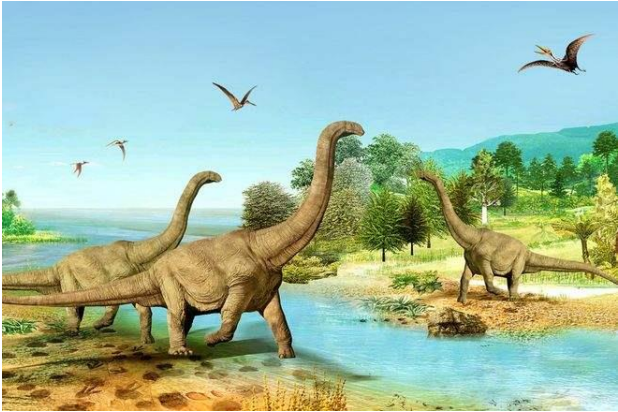
A. 气候变迁说

地球气候突变，恐龙无法适应

B. 小行星撞击说

地层中发现高浓度的Ir铱 (Iridium)元素 只有太空中存在





cataclysm
/'kætəˌklɪzəm/
大灾难

extinction
灭绝

paleontologist
[peɪlɪənˈtɒlədʒɪst]
古生物学家



fossil 化石

geologic process
地质作用

Fossil Fuel



fossil fuel 化石能源

oil + natural gas
petroleum
drill v./n.
drilling platform

石油+天然气
石油
钻井
钻井平台



TPO 8-2 Extinction of Dinosaurs

Extinction of the Dinosaurs

Paleozoic Era: 334 to 248 million years ago

Mesozoic Era: 245 to 65 million years ago

—Triassic Period

—Jurassic Period

—Cretaceous Period

Cenozoic Era: 65 million years ago to the present

Paleozoic Era: [ˌpeili:əu'zəuɪk] 古生代

Mesozoic Era: /ˌmɛsəʊ'zəʊɪk/ 中生代

—Triassic Period /traɪ'æsiɪk/ 三叠纪

—Jurassic Period /dʒʊ'ræsiɪk/ 侏罗纪

—Cretaceous Period /kri'teɪʃəs/ 白垩纪

Cenozoic Era /ˌsɛnə'zəʊɪk / 新生代

Paragraph 1



长难句

Paleontologists have argued for a long time that the demise of the dinosaurs was caused by climatic alterations associated with slow changes in the positions of continents and seas resulting from plate tectonics.

复合句

主句：Paleontologists have argued for a long time

从句：that the demise of the dinosaurs was caused by climatic alterations (that are) associated with slow changes in the positions of continents and seas (resulting from plate tectonics).

Paleontologists have argued for a long time that the **demise** of the dinosaurs was caused by climatic **alterations** associated with slow changes in the positions of continents and seas resulting from plate tectonics. **Off and on** throughout the Cretaceous (the last period of the Mesozoic era, during which dinosaurs flourished), large shallow seas covered extensive areas of the continents. Data from diverse sources, including geochemical evidence preserved in seafloor sediments, indicate that the Late Cretaceous climate was milder than today's. The days were not too hot, nor the nights too cold. The summers were not too warm, nor the winters too **frigid**. The shallow seas on the continents probably **buffered** the temperature of the nearby air, keeping it relatively constant.

paleontologists

古生物学者

demise [dɪˈmaɪz]

n. 死亡

alteration [ˌɒltəˈreɪʃən]

n. 变更 改变

off and on

断断续续地，不时

frigid [ˈfrɪdʒɪd]

adj. 寒冷的 严寒的

buffer [bʌfə(r)]

vt. 缓解，减轻

- 1. 因果论证
- 2. 问题解释
- 3. 举例论证
- 4. 对比论证
- 5. 分类描述

Paleontologists have argued for a long time that the demise of the dinosaurs was caused by climatic alterations associated with slow changes in the positions of continents and seas resulting from plate tectonics. Off and on throughout the Cretaceous (the last period of the Mesozoic era, during which dinosaurs flourished), large shallow seas covered extensive areas of the continents. Data from diverse sources, including geochemical evidence preserved in seafloor sediments, indicate that the Late Cretaceous climate was milder than today's. The days were not too hot, nor the nights too cold. The summers were not too warm, nor the winters too frigid. The shallow seas on the continents probably buffered the temperature of the nearby air, keeping it relatively constant.

Main idea:

demise of dinosaurs was caused
by climatic alterations

1. According to paragraph 1, which of the following is true of the Late Cretaceous climate?

☐ Summers were very warm and winters were very cold.

☐ Shallow seas on the continents caused frequent temperature changes.

☐ The climate was very similar to today's climate.

☐ The climate did not change dramatically from season to season.

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Paragraph 2

At the end of the Cretaceous, the geological record shows that these **seaways retreated** from the continents back into the major ocean **basins**. No one knows why. Over a period of about 100,000 years, while the seas **pulled back**, climates around the world became dramatically more extreme: warmer days, cooler nights; hotter summers, colder winters. Perhaps dinosaurs could not tolerate these extreme temperature changes and became extinct.

seaways

海上航道，海面

retreat

撤退，后退

basin ['beisən]

盆地

pull back

中止，撤退

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

At the end of the Cretaceous, the geological record shows that these seaways retreated from the continents back into the major ocean basins. No one knows why. Over a period of about 100,000 years, while the seas pulled back, climates around the world became dramatically more extreme: warmer days, cooler nights; hotter summers, colder winters. Perhaps dinosaurs could not tolerate these extreme temperature changes and became extinct.

Main idea:

dinosaurs could not tolerate extreme temperature changes

论证方法?

因果论证

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

2. Which of the following reasons is suggested in paragraph 2 for the extinction of the dinosaurs?

- Changes in the lengths of the days and nights during the late Cretaceous period
- Droughts caused by the movement of seaways back into the oceans
- The change from mild to severe climates during the Late Cretaceous period
- An extreme decrease in the average yearly temperature over 10, 000 years

At the end of the Cretaceous, the geological record shows that these seaways retreated from the continents back into the major ocean basins. No one knows why. Over a period of about 100,000 years, while the seas pulled back, climates around the world became dramatically more extreme: warmer days, cooler nights; hotter summers, colder winters. Perhaps dinosaurs could not tolerate these extreme temperature changes and became extinct.

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Paragraph 3

If true, though, why did cold-blooded animals such as snakes, lizards, **turtles**, and **crocodiles** survive the freezing winters and **torrid** summers? These animals are **at the mercy of** the climate to maintain a livable body temperature. It's hard to understand why they would not be affected, whereas dinosaurs were left too **crippled** to cope, especially if, as some scientists believe, dinosaurs were warm-blooded. Critics also point out that the shallow seaways had retreated from and advanced on the continents numerous times during the Mesozoic, so why did the dinosaurs survive the climatic changes associated with the earlier fluctuations but not with this one? Although initially appealing, the hypothesis of a simple climatic change related to sea levels is insufficient to explain all the data.

turtles
龟
crocodile /'krɔ:kədəɪl/
鳄鱼
torrid
炎热干燥的
at the mercy of
受...的支配
crippled
严重受损的

- 1. 因果论证
- 2. 问题解释
- 3. 举例论证
- 4. 对比论证
- 5. 分类描述

If true, though, why did cold-blooded animals such as snakes, lizards, turtles, and crocodiles survive the freezing winters and torrid summers? These animals are at the mercy of the climate to maintain a livable body temperature. It's hard to understand why they would not be affected, whereas dinosaurs were left too crippled to cope, especially if, as some scientists believe, dinosaurs were warm-blooded. Critics **also** point out that the shallow seaways had retreated from and advanced on the continents numerous times during the Mesozoic, so why did the dinosaurs survive the climatic changes associated with the earlier fluctuations but not with this one? Although initially appealing, the hypothesis of a simple climatic change related to sea levels is insufficient to explain all the data.

Main idea:

climatic change insufficient to explain all the data:

- 1.cold-blooded animals
- 2.seaways retreated numerous times

论证方法:

因果论证

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

3. Why does the author mention the survival of “snakes, lizards, turtles, and crocodiles” in paragraph 3?

○To argue that dinosaurs may have become extinct because they were not cold-blooded animals

○To question the adequacy of the hypothesis that climatic change related to sea levels caused the extinction of the dinosaurs

○To present examples of animals that could maintain a livable body temperature more easily than dinosaurs

○To support a hypothesis that these animals were not as sensitive to climate changes in the Cretaceous period as they are today

If true, though, why did cold-blooded animals such as snakes, lizards, turtles, and crocodiles survive the freezing winters and torrid summers? These animals are at the mercy of the climate to maintain a livable body temperature. It's hard to understand why they would not be affected, whereas dinosaurs were left too crippled to cope, especially if, as some scientists believe, dinosaurs were warm-blooded. Critics also point out that the shallow seaways had retreated from and advanced on the continents numerous times during the Mesozoic, so why did the dinosaurs survive the climatic changes associated with the earlier fluctuations but not with this one? Although initially appealing, the hypothesis of a simple climatic change related to sea levels is insufficient to explain all the data.

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4. The word cope in the passage is closest in meaning to

- ☒ adapt
- ☐ move
- ☐ continue
- ☐ compete

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5. According to paragraph 3, which of the following is true of changes in climate before the Cretaceous period and the effect of these changes on dinosaurs?

○Climate changes associated with the movement of seaways before the Cretaceous period did not cause dinosaurs to become extinct.

○Changes in climate before the Cretaceous period caused severe fluctuations in sea level, resulting in the extinction of the dinosaurs.

○Frequent changes in climate before the Cretaceous period made dinosaurs better able to maintain a livable body temperature.

○Before the Cretaceous period there were few changes in climate, and dinosaurs flourished.

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6. The word fluctuations in the passage is closest in meaning to

- ☐ extremes
- ☐ retreats
- ☐ periods
- ☒ variations

If true, though, why did cold-blooded animals such as snakes, lizards, turtles, and crocodiles survive the freezing winters and torrid summers? These animals are at the mercy of the climate to maintain a livable body temperature. It's hard to understand why they would not be affected, whereas dinosaurs were left too crippled to cope, especially if, as some scientists believe, dinosaurs were warm-blooded. Critics also point out that the shallow seaways had retreated from and advanced on the continents numerous times during the Mesozoic, so why did the dinosaurs survive the climatic changes associated with the earlier **fluctuations** but not with this one? Although initially appealing, the hypothesis of a simple climatic change related to sea levels is insufficient to explain all the data.

Paragraph 4



Many plants and animals disappear abruptly from the fossil record as one moves from layers of rock documenting the end of the Cretaceous up into rocks representing the beginning of the Cenozoic (the era after the Mesozoic).

复合句

主句: Many plants and animals **disappear** abruptly **from** the fossil record

从句: as one moves from layers of rock (documenting the end of the Cretaceous)
up into rocks (representing the beginning of the) .

Scientists felt that they could get an idea of how long the extinctions took by determining how long it took to deposit this one centimeter of clay and they thought they could determine the time it took to deposit the clay by determining the amount of the element iridium (Ir) it contained.

并列句

句子1 and 句子2

句子1: **Scientists felt** that they could get an idea of how long the extinctions took (宾语从句)

方式状语: by determining how long it took to deposit this one centimeter of clay

句子2: **they thought** (that) they could determine the time 宾语从句

定语从句: (that) it took to deposit the clay

方式状语: by determining the amount of the element iridium (Ir) it contained.

Dissatisfaction with **conventional** explanations for dinosaur extinctions led to a surprising observation that, in turn, has suggested a new hypothesis. Many plants and animals disappear **abruptly** from the fossil record as one moves from layers of rock **documenting** the end of the Cretaceous up into rocks representing the beginning of the Cenozoic (the era after the Mesozoic). Between the last layer of Cretaceous rock and the first layer of Cenozoic rock, there is often a thin layer of **clay**. Scientists felt that they could get an idea of how long the extinctions took by determining how long it took to deposit this one centimeter of clay and they thought they could determine the time it took to deposit the clay by determining the amount of the element **iridium** (Ir) it contained.

conventional

传统的

abruptly

突然地

document

n.文件, v.记录

clay

黏土

iridium (Ir)

铱

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

Dissatisfaction with conventional explanations for dinosaur extinctions led to a surprising observation that, in turn, has suggested a new hypothesis. Many plants and animals disappear abruptly from the fossil record as one moves from layers of rock documenting the end of the Cretaceous up into rocks representing the beginning of the Cenozoic (the era after the Mesozoic). Between the last layer of Cretaceous rock and the first layer of Cenozoic rock, there is often a thin layer of clay. Scientists felt that they could get an idea of how long the extinctions took by determining how long it took to deposit this one centimeter of clay and they thought they could determine the time it took to deposit the clay by determining the amount of the element iridium (Ir) it contained.

Main idea:
最后一句

论证方法:
本段不明确, 问题解释。

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

7. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? In correct choices change the meaning in important ways or leave out essential information.

- ☐ The fossil record suggests that there was an abrupt extinction of many plants and animals at the end of the Mesozoic era.
- ☐ Few fossils of the Mesozoic era have survived in the rocks that mark the end of the Cretaceous.
- ☐ Fossils from the Cretaceous period of the Mesozoic up to the beginning of the Cenozoic era have been removed from the layers of rock that surrounded them.
- ☐ Plants and animals from the Mesozoic era were unable to survive in the Cenozoic era.

Dissatisfaction with conventional explanations for dinosaur extinctions led to a surprising observation that, in turn, has suggested a new hypothesis. Many plants and animals disappear abruptly from the fossil record as one moves from layers of rock documenting the end of the Cretaceous up into rocks representing the beginning of the Cenozoic (the era after the Mesozoic). Between the last layer of Cretaceous rock and the first layer of Cenozoic rock, there is often a thin layer of clay. Scientists felt that they could get an idea of how long the extinctions took by determining how long it took to deposit this one centimeter of clay and they thought they could determine the time it took to deposit the clay by determining the amount of the element iridium (Ir) it contained.

8. In paragraph 4, all the following questions are answered EXCEPT:

○Why is there a layer of clay between the rocks of the Cretaceous and Cenozoic?

○Why were scientists interested in determining how long it took to deposit the layer of clay at the end of the Cretaceous?

○What was the effect of the surprising observation scientists made?

○Why did scientists want more information about the dinosaur extinctions at the end of the Cretaceous?

Dissatisfaction with conventional explanations for dinosaur extinctions led to a surprising observation that, in turn, has suggested a new hypothesis. Many plants and animals disappear abruptly from the fossil record as one moves from layers of rock documenting the end of the Cretaceous up into rocks representing the beginning of the Cenozoic (the era after the Mesozoic). Between the last layer of Cretaceous rock and the first layer of Cenozoic rock, there is often a thin layer of clay. Scientists felt that they could get an idea of how long the extinctions took by determining how long it took to deposit this one centimeter of clay and they thought they could determine the time it took to deposit the clay by determining the amount of the element iridium (Ir) it contained.

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○ What was the effect of the surprising observation scientists made?

○ Why did scientists want more information about the dinosaur extinctions at the end of the Cretaceous?

Dissatisfaction with conventional explanations for dinosaur extinctions led to a surprising observation that, in turn, has suggested a new hypothesis. Many plants and animals disappear abruptly from the fossil record as one moves from layers of rock documenting the end of the Cretaceous up into rocks representing the beginning of the Cenozoic (the era after the Mesozoic). Between the last layer of Cretaceous rock and the first layer of Cenozoic rock, there is often a thin layer of clay. Scientists felt that they could get an idea of how long the extinctions took by determining how long it took to deposit this one centimeter of clay and they thought they could determine the time it took to deposit the clay by determining the amount of the element iridium (Ir) it contained.

Paragraph 5

Ir has not been common at Earth's since the very beginning of the planet's history. Because it usually exists in a **metallic** state, it was **preferentially incorporated** in Earth's core as the planet cooled and **consolidated**. Ir is found in high concentrations in some meteorites, in which the solar system's original chemical composition is preserved. Even today, **microscopic meteorites** continually bombard Earth, falling on both land and sea. By measuring how many of these meteorites fall to Earth over a given period of time, scientists can estimate how long it might have taken to deposit the observed amount of Ir in the boundary clay. These calculations suggest that a period of about one million years would have been required. However, other reliable evidence suggests that the deposition of the boundary clay could not have taken one million years. So the unusually high concentration of Ir seems to require a special explanation.

metallic /mə'tælik/
金属的
preferentially
优先地
incorporate
包含，合并
consolidate
巩固，合并
microscopic meteorite
'mi:tɪə,raɪt/
微小的陨石

- 1. 因果论证
- 2. 问题解释
- 3. 举例论证
- 4. 对比论证
- 5. 分类描述

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Main idea:

unusually high concentration of Ir requires a special explanation.

论证方法:

因果论证

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

9. The word bombard in the passage is closest in meaning to

- ☐ approach
- ☒ strike
- ☐ pass
- ☐ circle

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10. Paragraph 5 implies that a special explanation of Ir in the boundary clay is needed because

○the Ir in microscopic meteorites reaching Earth during the Cretaceous period would have been incorporated into Earth's core

○the Ir in the boundary clay was deposited much more than a million years ago

○the concentration of Ir in the boundary clay is higher than in microscopic meteorites

○the amount of Ir in the boundary clay is too great to have come from microscopic meteorites during the time the boundary clay was deposited

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Paragraph 6

In view of these facts, scientists hypothesized that a single large asteroid, about 10 to 15 kilometers across, collided with Earth, and the resulting fallout created the boundary clay. Their calculations show that the impact kicked up a dust cloud that cut off sunlight for several months, inhibiting photosynthesis in plants; decreased surface temperatures on continents to below freezing; caused extreme episodes of acid rain; and significantly raised long-term global temperatures through the greenhouse effect. This disruption of food chain and climate would have eradicated the dinosaurs and other organisms in less than fifty years.

in view of

鉴于

hypothesize 假设

asteroid 小行星

fallout 污染性坠尘, 后果

kick up 激起

photosynthesis /ˌfəʊtəʊ'sɪnθɪsɪs/

光合作用

episode 事件, 集, 节

eradicate 根除

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

In view of these facts, scientists hypothesized that a single large asteroid, about 10 to 15 kilometers across, collided with Earth, and the resulting fallout created the boundary clay. Their calculations show that the impact kicked up a dust cloud that cut off sunlight for several months, inhibiting photosynthesis in plants; decreased surface temperatures on continents to below freezing; caused extreme episodes of acid rain; and significantly raised long-term global temperatures through the greenhouse effect. This disruption of food chain and climate would have eradicated the dinosaurs and other organisms in less than fifty years.

Main idea:

Asteroid collided with Earth,
extinction

论证方法:

分类描述

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

11. The word disruption in the passage is closest in meaning to

- ☐ exhaustion
- ☒ disturbance
- ☐ modification
- ☐ disappearance

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12. Paragraph 6 mentions all of the following effects of the hypothesized asteroid collision EXCEPT

- a large dust cloud that blocked sunlight
- an immediate drop in the surface temperatures of the continents
- an extreme decrease in rainfall on the continents
- a long-term increase in global temperatures

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13. Look at the four squares [] that indicate where the following sentence could be added to the passage.

Consequently, the idea that the Ir in the boundary clay came from microscopic meteorites cannot be accepted.

Where would the sentence best fit?



summary

1. demise of dinosaurs was caused by climatic alterations
2. dinosaurs could not tolerate extreme temperature changes
3. climatic change insufficient to explain all the data
4. a surprising observation has suggested a new hypothesis
5. unusually high concentration of Ir requires a special explanation.
6. Asteroid collided with Earth, extinction

14. For a long time scientists have argued that the extinction of The dinosaurs was related to climate change.

A.A simple climate change does not explain some important data related to the extinction of the dinosaurs at the end of the Cretaceous.

B.The retreat of the seaways at the end of the Cretaceous has not been fully explained.

C.The abruptness of extinctions at the end of the Cretaceous and the high concentration of Ir found in clay deposited at that time have fueled the development of a new hypothesis.

D.Extreme changes in daily and seasonal climates preceded the retreat of the seas back into the major ocean basins.

E.Some scientists hypothesize that the extinction of the dinosaurs resulted from the effects of an asteroid collision with Earth.

F.Boundary clay layers like the one between the Mesozoic and Cenozoic are used by scientists to determine the rate at which an extinct species declined.

14. For a long time scientists have argued that the extinction of The dinosaurs was related to climate change.

A.A simple climate change does not explain some important data related to the extinction of the dinosaurs at the end of the Cretaceous. 第二段

B.The retreat of the seaways at the end of the Cretaceous has not been fully explained. 细节

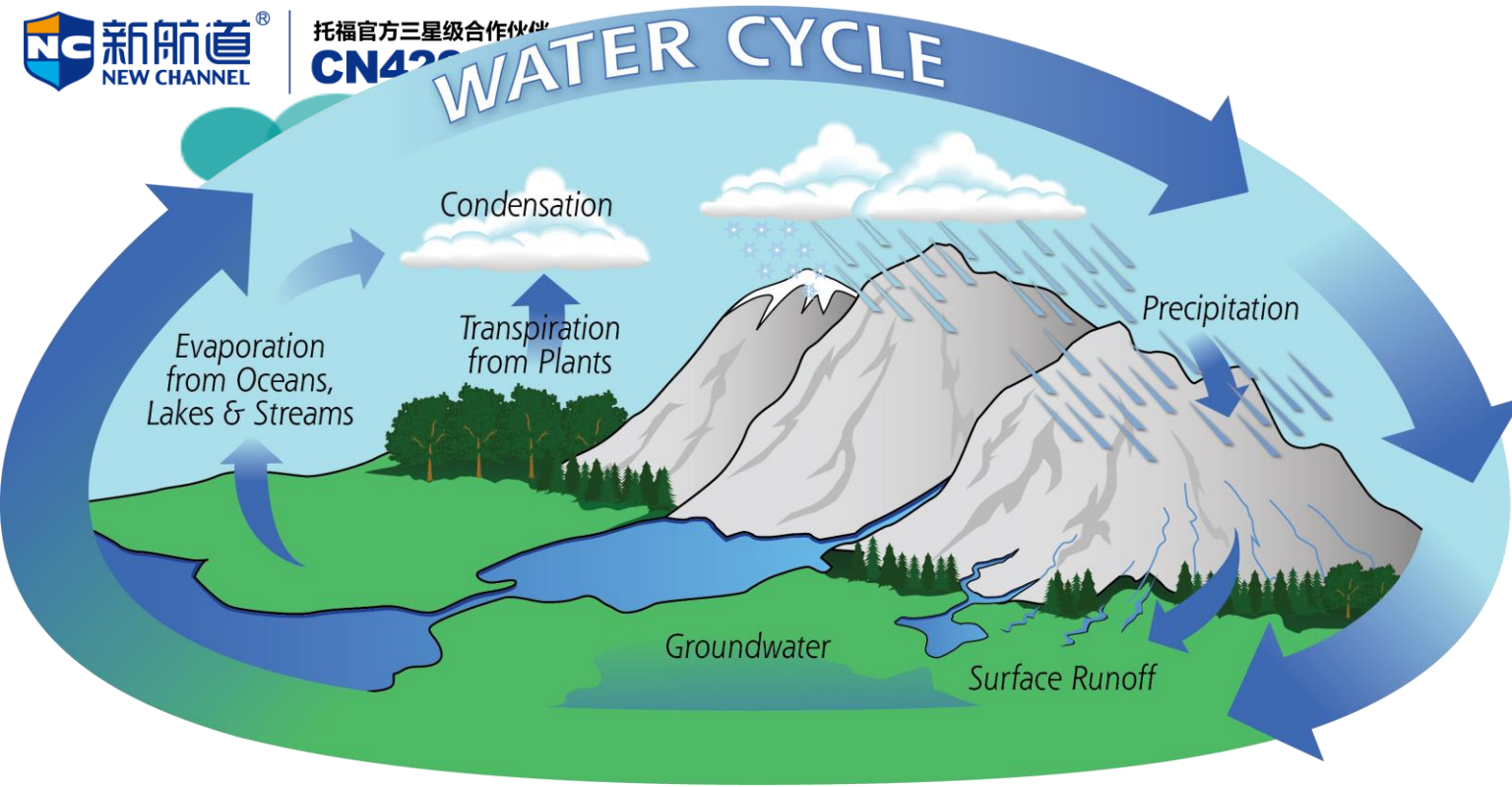
C.The abruptness of extinctions at the end of the Cretaceous and the high concentration of Ir found in clay deposited at that time have fueled the development of a new hypothesis. 第四段

D.Extreme changes in daily and seasonal climates preceded the retreat of the seas back into the major ocean basins. 细节

E.Some scientists hypothesize that the extinction of the dinosaurs resulted from the effects of an asteroid collision with Earth. 第六段

F.Boundary clay layers like the one between the Mesozoic and Cenozoic are used by scientists to determine the rate at which an extinct species declined. 错，第四段。

3. 流水、冰川地质作用



water cycle 水循环

evaporation
condensation
precipitation

蒸发
凝结
降水

surface runoff
soak
saturate/steep
groundwater
aquifer

地表径流
浸泡
浸泡
地下水
地下蓄水层

gas 气态
liquid 液态
solid 固态

hydrology 水文
hydrologic 水文的

pebble
gravel

卵石
沙砾



glacier
melting
deform

冰川
融化
使变形

carve
debris
sedimentation
sediment
deposit
landform

切开
碎片
沉淀
沉淀物
存储，沉淀物
地貌



desert
arid
desertification
vegetation

沙漠
干燥的
沙漠化
植被

Several skeletons of another early whale, Basilosaurus (龙王鲸), were found in **sediment** left by the Tethys Sea and now exposed in the Sahara desert. (TPO1)

在特提斯海留下的沉积物中发现了另一种早期鲸鱼（龙王鲸）的骨骼，现在暴露在撒哈拉沙漠中。

The water was always laden with **pebbles**, **gravel**, and sand that was **deposited** as the flow slowed down. (TPO1)

水总是满载着鹅卵石，砾石和沙子，它们随着水流减慢而沉积。

Glacier may form in permanently cold areas, and these slowly moving masses of ice cut out valleys, carrying with them huge quantities of **eroded** rock **debris**. (TPO15)

冰川可能在永久寒冷的地区形成，这些缓慢移动的冰块切割出山谷，随之携带着大量被侵蚀的岩石碎片

2. 天文类 Astronomy



TPO8 Running water on Mars （火星上的流水）

TPO16 Plants in Our Solar System （太阳系的行星）

TPO22 The Allendes Meteorite （阿连德的陨石）

TPO25 The Surface of Mars （火星的表面）

TPO41 Climate of Venus （金星的气候）

TPO42 Calisto and Ganymede （木卫四和木卫三）



Astronomy

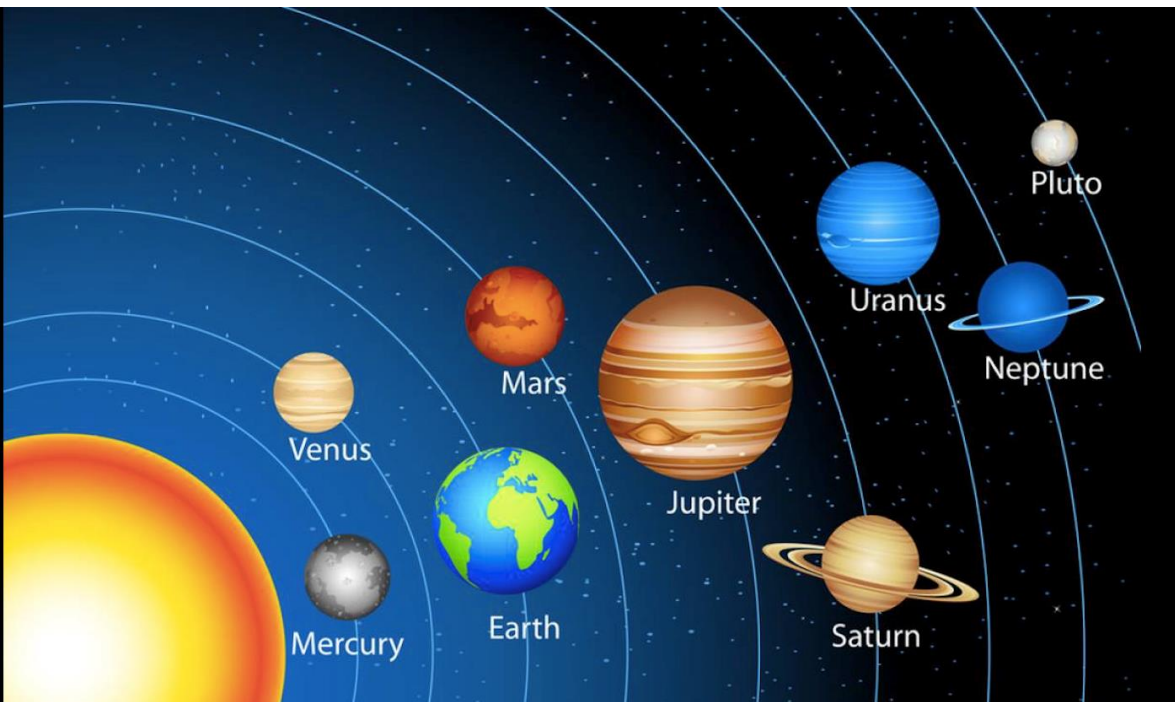
universe/cosmos	宇宙
galaxy	星系
star	恒星
stellar	恒星的
interstellar	星际的
solar System	太阳系

planet	行星
satellite	卫星
moon	月亮，卫星
meteoroid	流星体
comet	彗星
asteroid	小行星



图片来源：拍信 Paixin.com





9 Planets

- | | |
|------------------------|--------|
| 1. Mercury /'mɜ:kjʊrɪ/ | 1. 水星 |
| 2. Venus /'vi:nəs/ | 2. 金星 |
| 3. Earth | 3. 地球 |
| 4. Mars | 4. 火星 |
| 5. Jupiter /'dʒu:pɪtə/ | 5. 木星 |
| 6. Saturn /'sætɜ:n/ | 6. 土星 |
| 7. Uranus /'jʊrənəs/ | 7. 天王星 |
| 8. Neptune /'neptju:n/ | 8. 海王星 |
| 9. Pluto /'plu:təʊ/ | 9. 冥王星 |

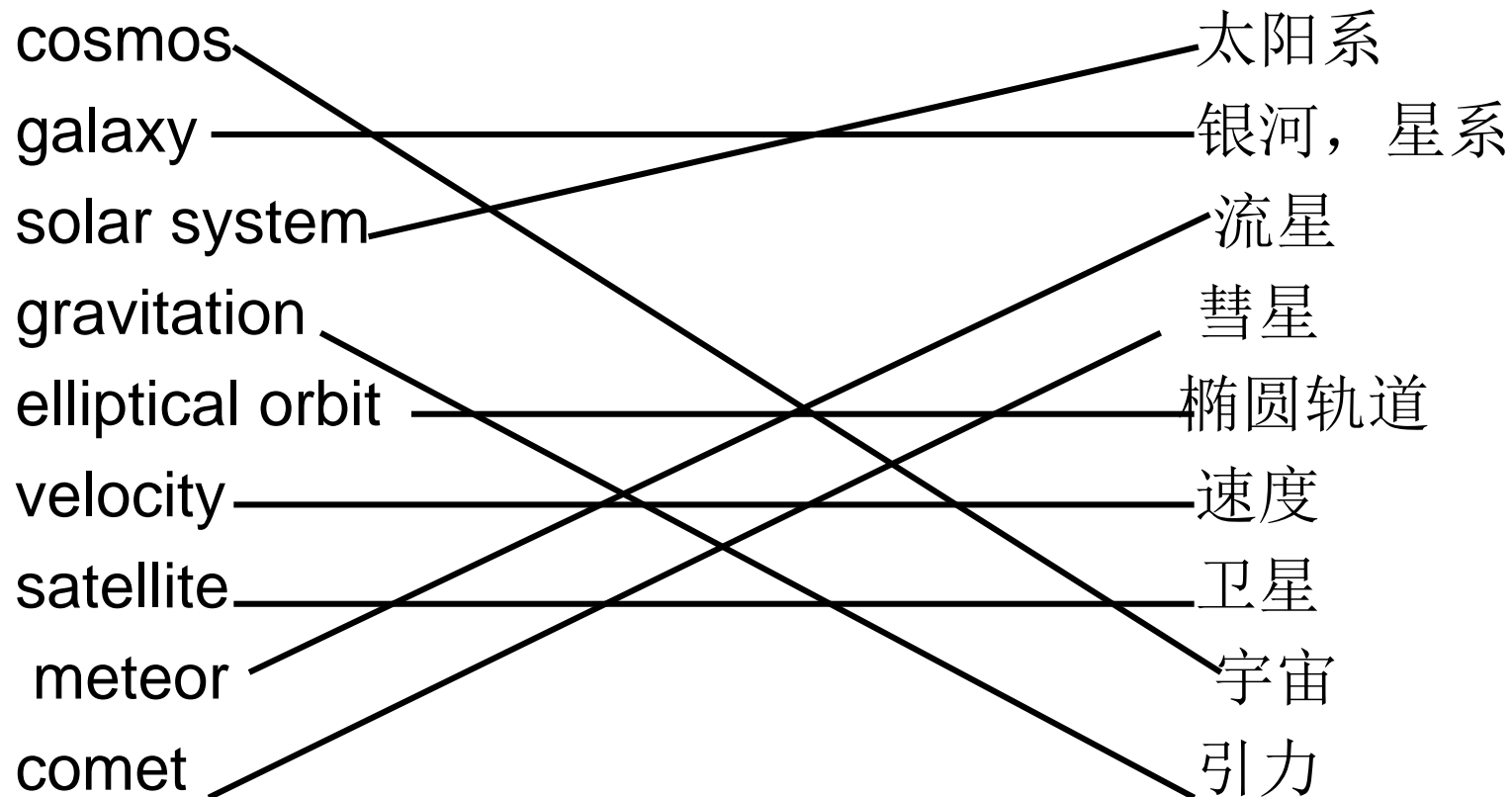


meteor	流星
meteor shower	流星雨
meteorite	陨石
crater	陨石坑、火山口
meteoroid	流星体

gravitation	引力
gravity	重力
orbit	轨道
elliptical	<i>/ɪ'liptɪkəl/</i> 椭圆形的
mass	质量
radius	半径/辐射范围
velocity	<i>/və'laɪ.sə.ti/</i> 速度



exercise



Exercises

《托福阅读真经4》 P.205

1. **Jupiter** has more **moons** than every other **planet** in the **solar system**.

木星比太阳系中的其他行星拥有更多的卫星。

2. The volcanic activity on Io (木卫一) accounts for its large number of **craters** and partly for its unique **orbit** around Jupiter.

木卫一的火山活动造就了大量的火山口并在一定程度上造成了它在木星周围的独特轨道。

TPO 16-3

Planets in Our Solar System

Paragraph 1

The Sun is the **hub** of a huge **rotating** system consisting of nine planets, their satellites, and numerous small **bodies**, including asteroids, comets, and meteoroids. An estimated 99.85 percent of the **mass** of our solar system is contained within the Sun, while the planets collectively make up most of the remaining 0.15 percent. The planets, in order of their distance from the Sun, are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. Under the control of the Sun's **gravitational** force, each planet maintains an **elliptical orbit** and all of them travel in the same direction.

hub n. 中心

rotate v. 旋转

body n. 物体

mass n. 质量

gravitational adj. 重力的，引力的

elliptical [ɪˈlɪptɪkl] adj. 椭圆的

orbit n. 轨道；v. 沿轨道运行

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

The Sun is the hub of a huge rotating system consisting of nine planets, their satellites, and numerous small bodies, including asteroids, comets, and meteoroids. An estimated 99.85 percent of the mass of our solar system is contained within the Sun, while the planets collectively make up most of the remaining 0.15 percent. The planets, in order of their distance from the Sun, are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. Under the control of the Sun's gravitational force, each planet maintains an elliptical orbit and all of them travel in the same direction.

Main idea:

1.rotating system

2.Mass

3.Planets

论证方法:

分类描述

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

Paragraph 2



长难句

The largest terrestrial planet, Earth has a diameter only one quarter as great as the diameter of the smallest Jovian planet (类木行星), Neptune, and its mass is only one seventeenth as great.

并列句

句子1 and 句子2

句子1: The largest terrestrial planet, Earth has a diameter (that is) only one quarter as great as the diameter of the smallest Jovian planet, Neptune

句子2: its mass is only one seventeenth as great.



The planets in our solar system fall into two groups: **the terrestrial (Earth-like) planets** (Mercury, Venus, Earth, and Mars) and the **Jovian (Jupiter-like) planets** (Jupiter, Saturn, Uranus, and Neptune). Pluto is not included in either category, because its great distance from Earth and its small size make this planet's true **nature** a mystery. The most obvious difference between the terrestrial and the Jovian planets is their size. The largest terrestrial planet, Earth has a **diameter** only one quarter as great as the diameter of the smallest Jovian planet, Neptune, and its mass is only one seventeenth as great. Hence, the Jovian planets are often called giants. Also, because of their relative locations, the four Jovian planets are known as the outer planets, while the terrestrial planets are known as the inner planets. There appears to be a correlation between the positions of these planets and their sizes.

terrestrial planets

类地行星

Jovian planets

/'dʒəʊvɪən/

类木行星

nature

n. 本质

diameter

直径

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

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Main idea:
2 groups
Difference in size,
Locations

论证方法:
对比论证

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

Paragraph 3



长难句

The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water.

复合句

主句: The densities of the terrestrial planets **average** about 5 times the density of water

从句: whereas the Jovian planets have densities (that average only 1.5 times the density of water).

Other **dimensions** along which the two groups differ markedly are density and composition. The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water. Variations in the composition of the planets are largely responsible for the density differences. The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. The terrestrial planets are mostly rocks: dense **rocky** and **metallic** material, with **minor** amounts of gases. The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and **helium**, with varying amounts of ices: mostly water, **ammonia**, and **methane ices**.

dimension

方面

rocky 多岩石的

metallic 金属的

minor

较少的

helium ['hiliəm]

氦

ammonia [ə'mouniə]

氨

methane ice

甲烷冰

1. 因果论证

2. 问题解释

3. 举例论证

4. 对比论证

5. 分类描述

Other dimensions along which the two groups differ markedly are density and composition. The **densities** of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water. Variations in the **composition** of the planets are largely responsible for the density differences. The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. The terrestrial planets are mostly rocks: dense rocky and metallic material, with minor amounts of gases. The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and helium, with varying amounts of ices: mostly water, ammonia, and methane ices.

Main idea:

Difference:

density + composition.

论证方法:

对比论证

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

2. The word **markedly** in the passage is closest in meaning to

- A. Essentially
- B. Typically
- C. Consistently
- D. Noticeably**

Other dimensions along which the two groups differ **markedly** are density and composition. The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water. Variations in the composition of the planets are largely responsible for the density differences. The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. The terrestrial planets are mostly rocks: dense rocky and metallic material, with minor amounts of gases. The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and helium, with varying amounts of ices: mostly water, ammonia, and methane ices.

3. Paragraph 3 mentions which of the following as a reason why terrestrial planets are dense?

A. They are made up of three groups of substances.

B. They are composed mainly of rocky and metallic materials.

C. They contain more ice than Jovian planets.

D. They contain relatively small amounts of water.

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4. Paragraph 3 supports each of the following statements about Saturn EXCEPT:

- A. It is less dense than any of the terrestrial planets.
- B. It contains no rocky material.
- C. It contains ices.
- D. It contains a large percentage of gases.

Other dimensions along which the two groups differ markedly are density and composition. The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water. Variations in the composition of the planets are largely responsible for the density differences. The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. The terrestrial planets are mostly rocks: dense rocky and metallic material, with minor amounts of gases. The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and helium, with varying amounts of ices: mostly water, ammonia, and methane ices.

4. Paragraph 3 supports each of the following statements about Saturn EXCEPT:

- A. It is less dense than any of the terrestrial planets.
- B. It contains no rocky material.**
- C. It contains ices.
- D. It contains a large percentage of gases.

Other dimensions along which the two groups differ markedly are density and composition. The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. **One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water.** Variations in the composition of the planets are largely responsible for the density differences. The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. The terrestrial planets are mostly rocks: dense rocky and metallic material, with minor amounts of gases. **The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and helium, with varying amounts of ices:** mostly water, ammonia, and methane ices.

Paragraph 4

meager
少量的
escape velocity
逃逸速度
molecular motion
分子的运动
infinitesimally
/infini'tesiməli/
极小地

- 1. 因果论证
- 2. 问题解释
- 3. 举例论证
- 4. 对比论证
- 5. 分类描述

The Jovian planets have very thick atmospheres consisting of varying amounts of hydrogen, helium, methane, and ammonia. By comparison, the terrestrial planets have **meager** atmospheres at best. A planet's ability to retain an atmosphere depends on its temperature and mass. Simply stated, a gas molecule can "evaporate" from a planet if it reaches a speed known as the **escape velocity**. For Earth, this velocity is 11 kilometers per second. Any material, including a rocket, must reach this speed before it can leave Earth and go into space. The Jovian planets, because of their greater masses and thus higher surface gravities, have higher escape velocities (21-60 kilometers per second) than the terrestrial planets. Consequently, it is more difficult for gases to "evaporate" from them. Also, because the **molecular motion** of a gas depends on temperature, at the low temperatures of the Jovian planets even the lightest gases are unlikely to acquire the speed needed to escape. On the other hand, a comparatively warm body with a small surface gravity, like Earth's moon, is unable to hold even the heaviest gas and thus lacks an atmosphere. The slightly larger terrestrial planets Earth, Venus, and Mars retain some heavy gases like carbon dioxide, but even their atmospheres make up only an **infinitesimally** small portion of their total mass.

Main idea:
atmosphere
depends on
temperature and
mass

论证方法:
对比论证

1. 因果论证
2. 问题解释
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5. The word
meager in the
passage is closest
in meaning to

- A. rich
- B. thin**
- C. unique
- D. complex

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6. According to paragraph 4, which of the following statements is true of both Jovian and terrestrial planets?

A. The thicker the atmosphere, the smaller the planet's mass

B. The more varied the gases in the atmosphere, the higher the temperature

C. The higher the surface gravity, the higher the escape velocity

D. The less the atmosphere contributes to the total mass, the lower the temperature

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7. According to paragraph 4, what is a major reason that Jovian planets have much thicker atmospheres than terrestrial planets do?

- A. Jovian planets have lower surface gravities
- B. Jovian planets have lower temperatures
- C. Jovian planets have lower escape velocities
- D. Jovian planets' gas molecules have higher average speeds


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8. Paragraph 4 supports which of the following statements about the ability of planets to retain gases?


A. More-massive planets are less able to retain gases than less-massive ones.

B. Planets are more likely to retain heavy gases than light gases.

C. Jovian planets are unlikely to retain the lightest gases.

D. Only terrestrial planets have been able to retain carbon dioxide.

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Paragraph 5



长难句

It is hypothesized that the primordial cloud of dust and gas from which all the planets are thought to have condensed had a composition somewhat similar to that of Jupiter.

复合句

主句: It is hypothesized

从句: that the primordial cloud of dust and gas (from which all the planets are thought to have condensed) had a composition (that is somewhat similar to that of Jupiter) .



长难句

The explanation may be that the terrestrial planets were once much larger and richer in these materials but eventually lost them because of these bodies' relative closeness to the Sun, which meant that their temperatures were relatively high.

并列句

句子1 but 句子2

句子1: **The explanation may be** that the terrestrial planets were once much larger and richer in these materials

句子2: but (**the terrestrial planets**) eventually **lost** them
because of these bodies' relative closeness to the Sun (原因状语), (**which meant that their temperatures were relatively high**) .

The **orderly** nature of our solar system leads most astronomers to conclude that the planets formed at essentially the same time and from the same material as the Sun. It is hypothesized that the **primordial** cloud of dust and gas from which all the planets are thought to have **condensed** had a composition somewhat similar to that of Jupiter. However, unlike Jupiter, the terrestrial planets today **are nearly void of** light gases and ices. The explanation may be that the terrestrial planets were once much larger and richer in these materials but eventually lost them because of these bodies' relative closeness to the Sun, which meant that their temperatures were relatively high.

orderly

有序的

primordial /praɪ'mɔːdiəl/

原始的

condense

使...浓缩

are void of

缺乏；没有

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

The orderly nature of our solar system leads most astronomers to conclude that the planets formed at essentially the same time and from the same material as the Sun. It is hypothesized that the primordial cloud of dust and gas from which all the planets are thought to have condensed had a composition somewhat similar to that of Jupiter. **However**, unlike Jupiter, the terrestrial planets today are nearly void of light gases and ices. The **explanation** may be that the terrestrial planets were once much larger and richer in these materials but eventually lost them because of these bodies' relative closeness to the Sun, which meant that their temperatures were relatively high.

Main idea:

composition somewhat
similar to that of Jupiter
terrestrial planets, void of
light gases and ices

论证方法:

对比论证

问题解释

1. 因果论证
2. 问题解释
3. 举例论证
4. 对比论证
5. 分类描述

9. In calling the cloud of gas and dust from which the Sun and all the planets are thought to have condensed "primordial", the author means that the cloud was

- A. immense in size
- B. composed of similar particles
- C. present at the very beginning of our solar system's formation
- D. created from a great variety of different materials

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10. The word eventually in the passage is closest in meaning to

- A. over time
- B. long ago
- C. simply
- D. certainly

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11. According to paragraph 6, what is a possible explanation for the lack of light gases and ices on terrestrial planets?

A. The location of terrestrial planets caused them to lose some of the materials they once contained.

B. Terrestrial planets were formed much later than Jovian planets.

C. The composition of terrestrial planets was different from that of Jupiter.

D. Terrestrial planets were formed out of different material than the Sun was.

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12. Look at the four squares [■] that indicate where the following sentence could be added to the passage. Where would the sentence best fit?

This explains their relatively low densities.

Paragraph 4: Other dimensions along which the two groups differ markedly are density and composition. The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water. Variations in the composition of the planets are largely responsible for the density differences. ■ 【A】 The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. ■ 【B】 The terrestrial planets are mostly rocks: dense rocky and metallic material, with minor amounts of gases. ■ 【C】 The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and helium, with varying amounts of ices: mostly water, ammonia, and methane ices. ■ 【D】

P1: The Sun is the hub of a huge rotating system consisting of nine planets, their satellites, and numerous small bodies, including asteroids, comets, and meteoroids. An estimated 99.85 percent of the mass of our solar system is contained within the Sun, while the planets collectively make up most of the remaining 0.15 percent. The planets, in order of their distance from the Sun, are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. Under the control of the Sun's gravitational force, each planet maintains an elliptical orbit and all of them travel in the same direction.

1. According to the passage, each of the following statements comparing terrestrial planets with Jovian planets is true EXCEPT:
 - A. Terrestrial planets are closer to the Sun than Jovian planets.
 - B. Terrestrial planets have smaller diameters than Jovian planets.
 - C. Terrestrial planets have smaller masses than Jovian planets.
 - D. Terrestrial planets travel in a different direction than Jovian planets do.

Directions: From the seven answer choices below, select the two phrases that correctly characterize the terrestrial planets and the three phrases that correctly characterize the Jovian planets. Drag each phrase you select into the appropriate column of the table. Two of the phrases will NOT be used. This question is worth 3 points.

- A. Have relatively small sizes
- B. Are grouped in the same category as Pluto
- C. Contain relatively high proportions of ices
- D. Have relatively high temperatures
- E. Have densities that are generally lower than the density of water
- F. Have relatively high escape velocities
- G. Have a composition closer to that of the cloud from which they condensed

Jovian planets:
选3个

Terrestrial planets:
选2个



Homework

1. 复习课件中地质天文类高频词。

2. 文章练习：

阅读真经五

P70 Early theories of continental drift

P148 Surface fluids on Venus and Earth

做题+精读+在书上划出/写出每段主旨。

Thanks!