토플 적중 90 READING DAY 03.

Pre-Study

1. 배경 지식 (Peppered moth)

1. Natural Selection (자연선택 by Darwin)

: 생물의 종은 환경에 적합한 방향으로 진화

2. peppered moth :

(1) 대다수가 흰 색 바탕에 검은색 점 무늬

2. peppered moth :

(1) Industrial Revolution in England : Pollutant ➔ 나무 색 변화

most of light-coloured moth / Dark-coloured (Melanic moths)

(2) Industrial melanism : 오염으로 인한 genetic darkening of species

2. 한 눈 쏙쏙 지문 정리

Act 1-2 Industrial Melanism in Peppered Moths

P1. natural selection 을 통한 종의 진화와 그 예시 : peppered moth
P2. peppered moth의 typical two morph와 환경 변화로 인한
common morph의 변화
P3. 산업혁명 시기 공기 오염이 peppered moth에 미친 영향
P4. 도시와 시골 각기 다른 morph가 dominant 하게 된 현상에 대한 가설과 실험
P5. Kettlewell의 실험 내용 : 2morphs를 polluted area에 풀어줌
P6. Kettlewell 결론 :
peppered moths의 coloration은 natural selection에 의한 진화.

Lecture Actual Test 01-2 Industrial Melanism in Peppered Moths

학습목표

- **주어진 지문을 미리 풀어보고, 정답 / 오답의 단서를 정확히 파악한다.**
- **특히, 오답률이 높은 문제를 철저히 분석한다.**
  (2,3, 6, 7, 14번)

1. Actual Test 01-2 Industrial Melanism in Peppered Moths

P1. According to the theory of evolution, organisms evolve through a process called natural selection. [~~~ 자세한 설명 ~~~]

Charles Darwin famously illustrated this theory through his studies of the finches living on the Galapagos Islands. However, this process was also happening in his home country, England, at the same time and at a much faster pace. The organism involved in this rapid adaptation was the peppered moth.

P2. While evolution usually occurs over thousands of years, sometimes the environmental pressure is so extreme that the rate speeds up. For the peppered moths, their motivation to adapt was increased predation. Peppered moths in England typically come in two different morphs or types that are determined by their genes. The more commonly seen morph was grey, often with speckled patterns that helped it blend in with light colored tree bark and lichens.

1. Why does the author mention natural selection in paragraph 1?

(A) To demonstrate that Darwin had a thorough insight concerning evolution

(B) To question the veracity of Darwin's theory of evolution

(C) To introduce various hypotheses about the evolution of species

(D) To explain the concept of natural selection and give examples of it

P2. While evolution usually occurs over thousands of years, sometimes the environmental pressure is so extreme that the rate speeds up. For the peppered moths, their motivation to adapt was increased predation. Peppered moths in England typically come in two different morphs or types that are determined by their genes. The more commonly seen morph was grey, often with **speckled** patterns that helped it blend in with light colored tree bark and lichens.

2. The word **speckled** in paragraph 2 is closest in meaning to

(A) naked

(B) striped

(C) lessened

(D) spotted

3. According to paragraph 2, which of the following is mentioned as the factor that accelerated the pace of evolution?

(A) Introduction of a new predator

(B) A sudden change in the environment

(C) Genetic diseases and mutations

(D) Competition for resources

P2. While evolution usually occurs over thousands of years, sometimes the environmental pressure is so extreme that the rate speeds up. For the peppered moths, their motivation to adapt was increased predation. Peppered moths in England typically come in two different morphs or types that are determined by their genes. The more commonly seen morph was grey, often with speckled patterns that helped **it** blend in with light colored tree bark and lichens.

4. The word **it** in paragraph 2 refers to

(A) morph

(B) bark

(C) content

(D) color

P3. During the Industrial Revolution in England, air pollution in the form of soot from burned coal increased dramatically. This pollution eventually became so severe that thousands of people in London died from breathing it. This pollution also affected the peppered moths. Throughout England, but particularly in cities, the rocks and trees that the moths rested on became covered in a layer of soot, killing much of the lichen and making everything darker. Prior to industrialization, the melanic morph only accounted for about .01 % of the moth population, by the middle of the 19th century it had increased noticeably, and by 1895 it had reached a staggering 98% in some areas, which **puzzled** many naturalists.

5. All of the following are mentioned in paragraph 3 EXCEPT

(A) the influence of air pollution on human lives

(B) how the pollution changed the natural environment

(C) the number of peppered moths which died from air pollution

(D) the radical change in population of the melanic morph

6. The word **puzzled** in paragraph 3 is closest in meaning to

(A) shocked

(B) blocked

(C) baffled

(D) pressured

P3. Prior to industrialization, the melanic morph only accounted for about .01 % of the moth population, by the middle of the 19th century it had increased noticeably, and by 1895 it had reached a staggering 98% in some areas, which puzzled many naturalists.

단락 내용 정리

IR : pollution (pollution affect moth 전제조건)

→ 환경 변화 (darker tree)

(Before IR) melanic morph (dark moth) 0.1%

by the middle of 19th : dark morph increase

7. Based on paragraph 3, what can be inferred about the peppered moths in the middle of the 19th century?

(A) Light colored moths were less resistant to air pollution than darker ones.
(B) The Industrial Revolution threatened their survival and reproduction.
(C) There was a rapid increase in the moth population due to industrialization.
(D) Their color had changed so that they could blend in with the surroundings.

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

(A) Lighter moths in rural areas were stronger than the melanistic moths in urban areas.
(B) In contrast to urban areas where the melanistic moths were prevalent, lighter moths were still dominant in rural areas.
(C) It was the melanistic moths that occupied urban areas, and they eventually spread to rural areas.
(D) Lighter moths in rural areas had smaller populations than the melanistic ones in urban areas due to some regional differences.

P4. [In urban areas, the melanistic moths became overwhelmingly dominant, but in rural areas, the lighter moths continued to have the advantage.] In an attempt to explain such a dramatic shift, J. W. Tutt offered a hypothesis in 1896 that birds were eating one morph in the city and the other morph in the country.

핵심 정보 1.. urban : melanic m. dominant
2. ↔ rural : lighter advant.

P5. In his first experiment, Kettlewell captured both light and dark moths and released them into an aviary to observe the results. The birds that ate the most moths were Great Tits, and <u>they usually took the moths that were resting on a contrastingly colored surface</u>. When the moths sat on matching surfaces, he had trouble seeing them, and the birds clearly did as well. In his following experiments, Kettlewell raised his own population of both morphs and marked the **concealed** underside of their wings with paint.

9. The word **concealed** in paragraph 5 is closest in meaning to

(A) hidden

(B) worn

(C) covered

(D) exposed

10. According to paragraph 5, why were only few of the lighter moths recovered in Kettlewell's experiment?

(A) Because their color made it easy for their predators to find and eat them

(B) Because Great Tits had difficulty in discovering them on matching surfaces

(C) Because Kettlewell marked the underside of their wings

(D) Because all of the darker moths were eaten by birds

11. The word **vital** in paragraph 6 is closest in meaning to

(A) notable

(B) tangible

(C) essential

(D) trivial

12. According to paragraphs 5 and 6, all of the following are true about Kettlewell's experiment EXCEPT

(A) the purpose of the experiment was to verify the hypothesis about the moths' rapid adaptation

(B) he marked the moths he used for his experiment in order to identify them easily

(C) his initial attempt was not successful due to the markings he placed on moths' wings

(D) after the experiment, he concluded that the color change was a response to pollution

13. Where would the sentence best fit?

→ The dark moths did better in polluted woods, and the lighter ones did better in cleaner woods.

P6. He later repeated this experiment, but he chose an unpolluted forest near Dorset. Again, he observed that the moths' coloring was vital to their survival. [A■] Kettlewell concluded that factories like those in Birmingham were responsible for causing industrial melanism, which is when animals evolve darker coloration to survive in a habitat darkened by pollution. [B■] In the

decades since his experiments, study has continued and provided further support for the theory that melanism in moths is a response to natural selection based on camouflage and predation. [C■] In particular, researchers have found that since stricter pollution laws were imposed, the population of lighter morphs near urban areas has rebounded. [D■]

14.

The melanism of peppered moths in the 19th century in England was the result of adaptation to environmental changes, which exemplified Darwin's theory of evolution by natural selection.

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P2 p.moth의 2 morph와 환경 변화로 인한 common morph의 변화
P3 산업혁명, air poll.로 인한 환경변화와 melanic morph 의 증가
P4 지배morph→ 증명실험
P5 Ket.실험 : 2morph in 오염지역 →lighter적어 (mel.생존에필요)
P6 결론: 환경변화 생존 위해 melanin.

(A) Darwin claimed that evolution occurs over a long period of time.
(B) Rapid industrialization increased the pollutants in the air, which covered trees and rocks and brought about changes in the moths' color.
(C) The patterns which peppered moths have on their bodies help them blend in with light colored objects such as tree bark and lichens.
(D) Kettlewell carried out a test by releasing both light moths and melanistic ones into a specific area, recapturing them, and counting the survivors.
(E) Kettlewell concluded that the increased risk of predation caused the melanism of the peppered moths.
(F) Kettlewell's experiment demonstrated that melanism strengthened moths' biological resistance to the polluted air.

Tip!
복습
1. 단어: 단어 정리(분야/지문 제목) → 단어 암기
2. 해석→ 단락 요약 (주제 파악!)
3. 정답/오답의 단서