4-08 · 4-3 과학은 어떻게 작동하는가
04 철학과 과학 · 교재 p.97

2026년 3월 고2 학평 40번

2026년 3월 시행 · 전국연합학력평가

When self-experimentation and conventional experiments are both possible, the difference between them often resembles the difference between learning and showing: Self-experiments are better for ① discovery but worse for ② convincing others that the solution is helpful or the answer is correct. Of course, most scientists want to do both—discover something and convince others of their discovery. Thus, psychologists should consider doing both self-experiments and conventional ones. The best use of resources may often be self-experiments followed by conventional ones. The researcher begins with self-experiments that, if all goes well, find ③ large effects and/or generate and eliminate many hypotheses. This exploratory and theory-building phase lasts until a convenient solution or large effect is found. Then the researcher uses self-experiments to find the procedural parameters (e.g., duration, time of day, intensity) that ④ weaken the solution or maximize the effect. Only then would the researcher begin ⑤ conventional experiments, using the optimized parameters.

1. 어휘 윗글의 밑줄 친 부분 중, 문맥상 낱말의 쓰임이 적절하지 않은 것은?

① ② ③ ④ ⑤

2. 요약문 완성 윗글의 내용을 한 문장으로 요약하고자 한다. 빈칸 (A), (B)에 들어갈 말로 가장 적절한 것은?

Self-experiments are better for (A) _____, while conventional experiments are better for (B) _____ others, so researchers should use self-experiments first and conventional ones later.

	(A)		(B)
①	discovery	……	confusing
②	proof	……	teaching
③	showing	……	ignoring
④	discovery	……	convincing
⑤	convincing	……	discovering

2025년 10월 고2 학평 22번

2025년 10월 시행 · 전국연합학력평가

Experiments testify to science's embrace of ignorance. (①) The rise of the experimental philosophy coincided with the liberation of curiosity as a valuable rather than a questionable attribute. (②) For all that experimental science today is often assumed to be supported by a philosophical framework and an approved methodology ("state your hypothesis and then test it"), the fact is that, as philosopher of science Ian Hacking says, "One can conduct an experiment simply out of curiosity to see what will happen." (③) Indeed, in the view of Charles Darwin's son, the astronomer George Darwin, once in a while one should do a completely crazy experiment, even if it is most likely to prove fruitless. (④) You never know until you try. (⑤)

1. 문장 삽입 글의 흐름으로 보아, 다음 문장이 들어가기에 가장 적절한 곳은?

Arguably the worst thing a scientist can do is to suppose they know what will happen in a given scenario without bothering to check.

① ② ③ ④ ⑤

2. 제목 윗글의 제목으로 가장 적절한 것은?

① Scientists Already Know the Answers
② Curiosity Drives Experiments: Embrace Not Knowing
③ Crazy Experiments Waste Resources
④ Hypotheses Must Come Before Curiosity
⑤ Why Darwin Avoided Experiments

2025년 10월 고2 학평 23번

2025년 10월 시행 · 전국연합학력평가

We can discard or replace a scientific theory only if we have _____ that supports it. The theories of Newton and Einstein offer great examples. A vast body of evidence supports Newton's theory of gravity, but by the late nineteenth century scientists had begun to discover cases where its predictions did not perfectly match observations. These discrepancies were explained only when Einstein developed his general theory of relativity, which was able to match the observations. Still, the many successes of Newton's theory could not be ignored, and Einstein's theory would not have gained acceptance if it had not been able to explain these successes equally well. It did, and that is why we now view Einstein's theory as a broader theory of gravity than Newton's theory. Some scientists today are seeking a theory of gravity that will go beyond Einstein's. If any new theory ever gains acceptance, it will have to match all the successes of Einstein's theory as well as work in new realms where Einstein's theory does not.

1. 빈칸 추론 윗글의 빈칸에 들어갈 말로 가장 적절한 것은?

① a more popular scientist
② newer equipment
③ a simpler mathematical form
④ a better way of explaining the evidence
⑤ official approval from the government

2. 요지 윗글의 요지로 가장 적절한 것은?

① 뉴턴의 이론은 완전히 폐기되었다.
② 관찰과 맞지 않으면 이론은 즉시 버려진다.
③ 아인슈타인의 이론은 더 이상 발전할 수 없다.
④ 과학 이론은 증거와 무관하게 교체된다.
⑤ 새 과학 이론은 기존 이론의 성공을 모두 설명하면서 그 한계까지 넘어설 때 받아들여진다.

2025년 10월 고2 학평 35번

2025년 10월 시행 · 전국연합학력평가

Consider units of measure, one kind of descriptive device we are familiar with using in physics. Spatial distances can be given in terms of feet or meters or some other unit, and the physics will be the same ① different. We conclude from this that physics does not prefer one unit of length over any other, and we may choose any one we like for reasons of ② convenience. We further conclude that any feature ③ depending on that choice, such as the particular numerical value assigned to the spatial separation between two locations, is not out there in the world apart from a choice of unit. Temperatures can likewise be given in terms of the Fahrenheit or Celsius or Kelvin scale, and nothing in the physics changes when we ④ switch from one scale to another. We conclude that the choice of scale is an ⑤ arbitrary choice in description, and that any feature that depends on that choice is scale-dependent.

1. 어휘 윗글의 밑줄 친 부분 중, 문맥상 낱말의 쓰임이 적절하지 않은 것은?

① ② ③ ④ ⑤

2. 주제 윗글의 주제로 가장 적절한 것은?

① units and scales as arbitrary choices of description in physics
② why meters are better than feet
③ how temperature changes physical laws
④ the history of the Kelvin scale
⑤ why physics prefers one unit of length

2025년 9월 고2 학평 35번

2025년 9월 시행 · 전국연합학력평가

According to Einstein's theory, a large mass like the Sun 'bends' space-time. Newton's theory makes no such prediction. This bending of space-time ① leads to phenomena such as 'gravitational lensing' where the light of distant stars appears to be in different locations when they ② passes by a large mass like the Sun. We don't normally see this lensing because stars aren't visible during the day when the Sun is out, but a solar eclipse in 1919 ③ allowed scientists to observe what the Sun's gravity was doing to the light from distant stars. The stars around the Sun ④ appeared to have moved from their normal positions in the night sky. The shift was much larger than Newton's theory ⑤ predicted, but exactly in the positions predicted by Einstein's theory.

1. 어법 윗글의 밑줄 친 부분 중, 어법상 틀린 것은?

① ② ③ ④ ⑤

2. 제목 윗글의 제목으로 가장 적절한 것은?

① Newton's Theory Predicted Lensing
② Why Stars Disappear During the Day
③ The 1919 Eclipse: Light Bent by the Sun
④ The Sun Stops Moving in an Eclipse
⑤ Gravity Has No Effect on Light

2025년 3월 고2 학평 30번

2025년 3월 시행 · 전국연합학력평가

There are reasons why science is not fully trusted and why healthy skepticism and critical thinking are essential. In spite of professional standards, claims of objectivity, and the peer review process, the conduct of science can be biased. All experts are not the same, nor do they submit their work to the same scrutiny. _____ can be important in evaluating scientific claims. For example, the Harvard researchers who made claims in the late 1960s about the problems with dietary fat, leading the nation away from perceiving sugar as one of the main causes in health problems, were funded in part by the sugar industry. The authors did not reveal their funding source to the New England Journal of Medicine, where their influential article appeared. Their article shaped a generation of changes in eating patterns that appears to have encouraged higher use of sugar, now widely implicated as a source of the rise in obesity and diabetes. Stories such as this one fuel suspicion—but also lead to further safeguards in the scientific process. Funding disclosures, although not required five decades ago, have since been made compulsory.

1. 빈칸 추론 윗글의 빈칸에 들어갈 말로 가장 적절한 것은?

① Counting the number of authors
② Checking the length of the article
③ Knowing the source of funding
④ Reading only the conclusion
⑤ Trusting famous universities

2. 제목 윗글의 제목으로 가장 적절한 것은?

① Sugar Is the Healthiest Food
② Peer Review Guarantees Objectivity
③ Harvard Never Makes Mistakes
④ Follow the Money: Why Funding Sources Matter in Science
⑤ Scientists Should Hide Their Funding

2025년 3월 고2 학평 32번

2025년 3월 시행 · 전국연합학력평가

Great scientists are ① often one-hit wonders. Newton is a prime example: beyond the Newtonian mechanics, he developed the theory of gravitation, calculus, laws of motion, and optimization. In fact, well-known scientists are often involved in ② multiple discoveries, a phenomenon potentially explained by the Matthew effect. Indeed, an initial success may offer a scientist ③ legitimacy, improve peer perception, provide knowledge of how to score and win, enhance social status, and attract resources and quality collaborators, each of these payoffs further increasing her odds of scoring another win. Yet, there is an appealing alternative explanation: Great scientists have multiple hits and consistently succeed in their scientific endeavors simply because they're exceptionally ④ talented. Therefore, future success again goes to those who have had success earlier, not because of advantages offered by the previous success, but because the earlier success was indicative of a ⑤ hidden talent. The Matthew effect posits that success alone increases the future probability of success, raising the question: Does status dictate outcomes, or does it simply reflect an underlying talent or quality? In other words, is there really a Matthew effect after all?

1. 어휘 윗글의 밑줄 친 부분 중, 문맥상 낱말의 쓰임이 적절하지 않은 것은?

① ② ③ ④ ⑤

2. 주제 윗글의 주제로 가장 적절한 것은?

① why Newton invented calculus alone
② two explanations for why great scientists succeed repeatedly
③ how scientists win prizes
④ the dangers of early success
⑤ why talent is unimportant in science

2025년 3월 고2 학평 38번

2025년 3월 시행 · 전국연합학력평가

It is important to recognize that although science is a rule-based procedure, it is very much a creative process. A conjecture is a philosophical invention, ① cooked up rather mystically by the mind through the mental computation we call careful contemplation. However, until the hypothesis is ② testing against reality, it is not yet truly knowledge; it is just information that represents speculation. Knowledge is information that has ③ demonstrated its usefulness. It is what is left over after cycles of experimental testing have ④ eliminated false theories. As scientists continually test their hypotheses and modify their models to account for new and surprising data, a kind of "learning loop" emerges that statisticians call Bayesian updating. Based on Bayes' Rule, ⑤ developed by eighteenth-century English statistician and philosopher Thomas Bayes, Bayesian updating refers to a mathematical process whereby an accepted theory or predictive model gets increasingly accurate through the repetitive testing of competing variants of that theory.

1. 어법 윗글의 밑줄 친 부분 중, 어법상 틀린 것은?

① ② ③ ④ ⑤

2. 요지 윗글의 요지로 가장 적절한 것은?

① 과학은 창의성과 무관한 기계적 절차이다.
② 추측은 검증 없이도 지식이 된다.
③ 베이즈 갱신은 이론을 덜 정확하게 만든다.
④ 지식은 검증 전의 정보를 말한다.
⑤ 과학은 규칙에 기반하면서도 창의적인 과정이며, 반복 검증을 통해 가설이 지식으로 다듬어진다.

2024년 10월 고2 학평 22번

2024년 10월 시행 · 전국연합학력평가

To determine the mass of my bowling ball, I might put it onto a balance and compare it with a known mass, such as a number of metal cubes each weighing 1, 10, or 100 grams. ① Bowling has become a popular sport in many countries. ② Things get much more complicated if I want to know the mass of a distant star. ③ How do I measure it? ④ We can roughly say that measuring the mass of a star involves various theories. ⑤ If we want to measure the mass of a binary star, we first determine a center of mass between the two stars, then their distance from that center which we can then use, together with a value for the period and a certain instance of Kepler's Third Law, to calculate the mass. In other words, in order to "measure" the star mass, we measure other quantities and use those values, together with certain equations, to calculate the mass. Measurement is not a simple and unmediated estimation of independently existing properties, but a determination of certain magnitudes before the background of a number of accepted theories.

1. 무관한 문장 윗글에서 전체 흐름과 관계 없는 문장은?

① ② ③ ④ ⑤

2. 제목 윗글의 제목으로 가장 적절한 것은?

① Measuring a Star: Theory Behind Every Measurement
② Balances Measure Everything Directly
③ Why Bowling Balls Are Heavy
④ Kepler Weighed the Stars by Hand
⑤ Measurement Needs No Theory

2024년 10월 고2 학평 37번

2024년 10월 시행 · 전국연합학력평가

Where scientific research is concerned, explanatory tales are expected to ① adhere closely to experimental data and to illuminate the regular and predictable features of experience. However, this paradigm sometimes ② conceals the fact that theories are deeply loaded with creative elements that shape the construction of research projects and the interpretations of evidence. Scientific explanations do not just relate a chronology of facts. They construct frameworks for ③ randomly chosen data in order to provide a consistent and meaningful explanation of what is observed. Such constructions lead us to imagine specific kinds of subject matter in particular sorts of relations, and the storylines they inspire will prove more effective for analyzing some features of experience over others. When we ④ neglect the creative contributions of such scientific imagination and treat models and interpretive explanations as straightforward facts—even worse, as facts including all of reality—we can blind ourselves to the ⑤ limitations of a given model and fail to note its potential for misunderstanding a situation to which it ill applies.

1. 어휘 윗글의 밑줄 친 부분 중, 문맥상 낱말의 쓰임이 적절하지 않은 것은?

① ② ③ ④ ⑤

2. 요지 윗글의 요지로 가장 적절한 것은?

① 과학적 설명은 사실의 연대기일 뿐이다.
② 모델은 현실 전체를 그대로 반영한다.
③ 과학적 설명에도 창의적 상상력이 담겨 있음을 인식해야 모델의 한계를 볼 수 있다.
④ 과학에는 상상력이 필요 없다.
⑤ 실험 자료는 해석 없이 이해된다.

2024년 9월 고2 학평 23번

2024년 9월 시행 · 전국연합학력평가

People seem to recognize that the arts are cultural activities that draw on (or react against) certain cultural traditions, certain shared understanding, and certain values and ideas that are characteristic of the time and place in which the art is created. (①) In the case of science, however, opinions differ. (②) Some scientists, like the great biologist J. B. S. Haldane, see science in a similar light—as a historical activity that occurs in a particular time and place, and that needs to be understood within that context. (③) In describing this view of science, philosopher Hugh Lacey speaks of the belief that there is an underlying order of the world which is simply there to be discovered— the world of pure "fact" stripped of any link with value. (④) The aim of science according to this view is to represent this world of pure "fact", independently of any relationship it might bear contingently to human practices and experiences. (⑤)

1. 문장 삽입 글의 흐름으로 보아, 다음 문장이 들어가기에 가장 적절한 곳은?

Others, however, see science as a purely "objective" pursuit, uninfluenced by the cultural viewpoint and values of those who create it.

① ② ③ ④ ⑤

2. 주제 윗글의 주제로 가장 적절한 것은?

① why the arts are purely objective
② the life of J. B. S. Haldane
③ how science avoids all values
④ two views on whether science is shaped by culture
⑤ the history of philosophy of art

2024년 9월 고2 학평 29번

2024년 9월 시행 · 전국연합학력평가

One well-known shift took place when the accepted view —that the Earth was the center of the universe—changed to one where we understood that we are only inhabitants on one planet orbiting the Sun. With each person who grasped the solar system view, it became easier for the next person to do so. So it is with the notion that the world revolves around the human economy. This is slowly being replaced by the view that _____ of material flows that connect all living things. When this perspective shifts into place, it will be obvious that our economic well-being requires that we account for, and respond to, factors of ecological health. Unfortunately we do not have a century or two to make the change. By clarifying the nature of the old and new perspectives, and by identifying actions on which we might cooperate to move the process along, we can help accelerate the shift.

1. 빈칸 추론 윗글의 빈칸에 들어갈 말로 가장 적절한 것은?

① the economy controls nature
② humans are the center of the world
③ ecology is less important than wealth
④ the Sun revolves around the Earth
⑤ the economy is a part of the larger system

2. 요지 윗글의 요지로 가장 적절한 것은?

① 세상은 인간의 경제를 중심으로 돈다.
② 경제가 생태계의 일부라는 관점으로 빠르게 전환하도록 노력해야 한다.
③ 관점의 전환은 저절로 빠르게 일어난다.
④ 생태적 건강은 경제적 안녕과 무관하다.
⑤ 천동설은 오늘날에도 받아들여진다.

2024년 6월 고2 학평 23번

2024년 6월 시행 · 전국연합학력평가

If there is little or no diversity of views, and all scientists ① see, think, and question the world in a similar way, then they will not, as a community, be as objective as they ② maintain they are, or at least aspire to be. The solution is that there should be far greater diversity in the practice of science: in gender, ethnicity, and social and cultural backgrounds. Science works because it is ③ carried out by people who pursue their curiosity about the natural world and ④ test their and each other's ideas from as many varied perspectives and angles as possible. When science is done by a diverse group of people, and if consensus ⑤ build up about a particular area of scientific knowledge, then we can have more confidence in its objectivity and truth.

1. 어법 윗글의 밑줄 친 부분 중, 어법상 틀린 것은?

① ② ③ ④ ⑤

2. 제목 윗글의 제목으로 가장 적절한 것은?

① Scientists Should Think Alike
② Consensus Needs No Diversity
③ Curiosity Harms Objectivity
④ Why Science Ignores Culture
⑤ Diversity Makes Science More Objective

정답 및 해설

4-08 **1.**④ **2.**④ · 4-09 **1.**① **2.**② · 4-10 **1.**④ **2.**⑤ · 4-11 **1.**① **2.**① · 4-12 **1.**② **2.**③ · 4-13 **1.**③ **2.**④ · 4-14 **1.**① **2.**② · 4-15 **1.**② **2.**⑤ · 4-16 **1.**① **2.**① · 4-17 **1.**③ **2.**③ · 4-18 **1.**③ **2.**④ · 4-19 **1.**⑤ **2.**② · 4-20 **1.**⑤ **2.**⑤

4-08 · 2026년 3월 고2 학평 40번
1. ④ 자기 실험으로 해결책을 '최적화하거나' 효과를 극대화하는 절차 변수를 찾는다. ④ weaken → optimize.
2. ④ 자기 실험은 '발견'에, 기존 실험은 다른 사람을 '설득하는' 데 유리하므로 자기 실험 후 기존 실험을 하는 것이 좋다.

4-09 · 2025년 10월 고2 학평 22번
1. ① '실험은 무지를 받아들이는 증거'라는 첫 문장 뒤에, 확인하지 않고 안다고 가정하는 것이 최악이라는 설명이 오고, 이어 호기심의 해방 이야기가 나온다.
2. ② 과학은 무지를 인정하고 호기심에서 실험하며, 때로는 엉뚱한 실험도 해 봐야 한다는 글이다. ④는 글과 반대다.

4-10 · 2025년 10월 고2 학평 23번
1. ④ 뉴턴 이론을 대신한 아인슈타인 이론처럼, 과학 이론은 그것을 뒷받침하는 증거를 '더 잘 설명하는 방법'이 있을 때만 대체된다.
2. ⑤ 아인슈타인 이론은 뉴턴 이론의 성공을 똑같이 설명했기에 받아들여졌고, 새 이론도 그래야 한다는 것이 요지다.

4-11 · 2025년 10월 고2 학평 35번
1. ① 거리를 피트로 주든 미터로 주든 물리학은 '상관없이' 같다. 그래서 물리학은 특정 단위를 선호하지 않는다. ① different → regardless.
2. ① 길이 단위나 온도 척도는 편의에 따른 임의적 선택이며, 그에 의존하는 특징은 세계 그 자체에 있는 것이 아니라는 내용이다.

4-12 · 2025년 9월 고2 학평 35번
1. ② 주어가 복수 they(distant stars)이므로 pass가 알맞다. ② passes → pass.
2. ③ 1919년 일식 때 별빛이 태양의 중력으로 휘는 현상이 관측되어 아인슈타인 이론의 예측이 확인되었다는 글이다.

4-13 · 2025년 3월 고2 학평 30번
1. ③ 설탕 업계의 지원을 받은 하버드 연구자들의 예처럼, 과학적 주장을 평가할 때는 '연구 자금의 출처를 아는 것'이 중요하다.
2. ④ 과학도 편향될 수 있으므로 자금 출처 같은 정보를 살피는 건강한 회의가 필요하며, 그 결과 자금 공개가 의무화되었다는 글이다. ②는 글과 반대다.

4-14 · 2025년 3월 고2 학평 32번
1. ① 뉴턴의 예처럼 위대한 과학자들은 한 번만 성공하는 경우가 '드물다'. ① often → seldom.
2. ② 위대한 과학자의 반복된 성공을 초기 성공의 이점(마태 효과)으로 볼지, 숨은 재능으로 볼지 두 설명을 다룬다.

4-15 · 2025년 3월 고2 학평 38번
1. ② 가설이 현실에 비추어 '검증되는' 것이므로 수동태 is tested가 알맞다. ② testing → tested.
2. ⑤ 가설은 창의적으로 만들어지지만 검증을 거쳐야 지식이 되며, 반복 검증으로 모델이 정확해지는 학습 고리가 생긴다는 것이 요지다.

4-16 · 2024년 10월 고2 학평 22번
1. ① 글은 측정이 이론을 배경으로 한 결정이라는 내용이다. ①은 볼링의 인기 이야기로 흐름과 무관하다.
2. ① 별의 질량처럼 측정은 다른 양을 재고 이론과 방정식으로 계산하는 것이므로, 받아들여진 이론을 배경으로 한다는 글이다.

4-17 · 2024년 10월 고2 학평 37번
1. ③ 과학적 설명은 일관되고 의미 있는 설명을 위해 '체계적으로' 선택된 자료에 틀을 세운다. ③ randomly → systematically.
2. ③ 과학 이론에는 창의적 요소가 깊이 담겨 있으므로, 모델을 단순한 사실로 여기면 그 한계를 보지 못한다는 것이 요지다.

4-18 · 2024년 9월 고2 학평 23번
1. ③ Some scientists로 과학을 역사적 활동으로 보는 견해를 말한 뒤 Others, however로 순수 객관적 활동이라는 반대 견해가 오고, 이어 In describing this view가 그 견해를 설명한다.
2. ④ 과학을 시대와 장소 속 문화적 활동으로 보는 견해와, 가치와 무관한 순수 객관적 탐구로 보는 견해를 대조한다.

4-19 · 2024년 9월 고2 학평 29번

1. ⑤ 세상이 인간 경제를 중심으로 돈다는 관점은, 경제가 모든 생명체를 잇는 '더 큰 체계의 일부'라는 관점으로 바뀌고 있다.

2. ② 지동설로의 전환처럼 경제를 생태계의 일부로 보는 관점 전환이 필요하며, 시간이 없으니 이를 가속해야 한다는 것이 요지다.

4-20 · 2024년 6월 고2 학평 23번

1. ⑤ 주어가 단수 consensus이므로 builds가 알맞다. ⑤ build → builds.

2. ⑤ 모든 과학자가 비슷하게 생각하면 객관적일 수 없으므로, 성별·민족·배경이 다양한 사람들이 과학을 해야 한다는 글이다.