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TOEFL TEST 4

Internet-based test

Reading
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Reading Set 1

Scientific Method

The springboard to every scientific investigation is a question. Once the question is posed, there is a whole host of ways to arrive at a theory or solution. A very convincing argument can be made that the scientific method is the most efficient and effective way to arrive at the answer by whittling away all of the lies, delusional theories and speculation in order to reach the bare sharp point of the truth. In order to successfully accomplish stripping away all of the needless information, one needs a step-by-step process that combines experimentation and observation to reach definitive answers. The scientific method gives us that process.

Experimental scientific methods are of course not a new phenomenon. In 1021, an Iraqi physicist named Ibn al-Haytham (Alhazen) is credited with pioneering the scientific method by utilizing mathematics and experimentation when compiling his massive, seven-volume oeuvre, "Book of Optics." One of the major accomplishments of Ibn Al-Haytham's book was his use of experiments mixed with observations and rational arguments to **shore up** his vision theory: that light rays are emitted from objects, not the eyes. The scientific method's step-by-step **procedure** has not changed much since al-Haytham's day. His method consisted of the following four steps: 1) Detailed assertion of a problem (or question), which was ultimately joined with an observation to be proven through experimentation. 2) Test and examine suppositions through experimentation. 3) Thorough reading and analysis of data produced by experiments and formulation of a conclusion via mathematics. 4) Once complete, publish findings to support conclusions.

Today the version used by most scientists usually looks something like this: 1) Raise a question based on observation and description of a phenomenon or group of phenomena in the universe. 2) Reach a **tentative** hypothesis to explain the phenomenon observed. 3) Formulate predictions based on your hypothesis. 4) Use experimentation and observation to test your predictions and/or amend your hypothesis based on your results. 5) Duplicate steps 3 and 4 so that there are no inconsistencies between your hypothesis and your experiments and observations.

When constancy is reached the hypothesis turns into a theory, when then offers a **viable** group of suggestions to explain a class of phenomena. The theory becomes the outline from which annotations are explained and calculations are made. As you can see, the basic elements of question, hypothesis, predictions, experimentation and observation have remained intact since the year 1021, proving the theory that the scientific method itself has withstood the most difficult test of all: the test of time. Perhaps the best reason for using the scientific method is the fact that it removes prejudicial opinion from the process. Although it is humanly impossible to be 100 percent objective and non-prejudicial, when this method is applied step-by-step, the results will remain steady regardless of the researcher's state of mind or religious beliefs. No matter how much or how little esteem the researcher or advocate has earned, the resulting theory can be accepted or rejected according to the conclusions reached through experimentation and observation, which are reproducible by anyone. The fact of the matter is that many experiments are gone over again and again, either independently or as an element of another experiment. Any discrepancies between the original theory and new discoveries on the same experiment are examined as thoroughly as possible.

♦ In order for a scientific theory to be considered in a different light than religious faith, for example, one must be able to prove **it** is also falsifiable. In other words, there has to exist an experiment or breakthrough that could disprove the theory. □ Those who criticize the scientific method will sometimes say that it doesn't have merit because of all of the things once thought unattainable, which are now part of our daily lives. **Δ** Scientists explain away this argument by saying that once a theory is adopted, it provides one explanation for an array of phenomena that can be disproven, or falsified, upon the discovery of new evidence. When scientists set out to examine a new group or range of

phenomena, they will still utilize existing theories. ○ However, because they are opening up a new realm of exploration, they will attempt to remember that the prior theories might not be able to fully elucidate the new observations and experiments. When this happens, they generally will develop fresh hypotheses and test them until a new theory comes into view.

1. The phrase **shore up** in the passage is closest in meaning to
   (A) prove
   (B) falsify
   (C) create
   (D) strengthen

2. What did Ibn al-Haytham want to prove about vision?
   (A) the power of the eyes
   (B) the source of light rays
   (C) the opacity of objects
   (D) the distortion of light

3. The word **procedure** in paragraph 2 is closest in meaning to
   (A) process
   (B) display
   (C) habit
   (D) code

4. All of the following are mentioned as steps in Ibn al-Haytham's scientific method EXCEPT
   (A) assertion of a problem
   (B) prediction
   (C) experimentation
   (D) publishing

5. The word **tentative** in paragraph 3 is closest in meaning to
   (A) untested
   (B) impractical
   (C) indefinite
   (D) illogical

6. When does an hypothesis become a theory?
   (A) after a scientist publishes his or her findings
   (B) as soon as step 3 has been completed
   (C) when an hypothesis is proved unfalsifiable
   (D) when experiments produce consistent results

7. The word **viable** in paragraph 4 is closest in meaning to
   (A) reasonable
   (B) flexible
   (C) indomitable
   (D) standard

8. Which of the following best expresses the essential information in the highlighted sentence? Incorrect choices change the meaning in important ways or leave out essential information.
   (A) The researcher's state of mind and religion must be factored into the results he or she attains through the scientific method.
   (B) Applied correctly, the scientific method eliminates error and bias on the part of the scientific researcher.

(C) The scientific method, while not infallible, will yield objective results if the steps are followed and applied correctly.
(D) Following the steps of the scientific method will ensure prejudicial and non-objective experimental results.

9. Look at the four symbols [♦, □, **Δ** , ○] that indicate where the following sentence can be added to the passage.

Theories which cannot be tested, because, for example, they have no observable ramifications, do not qualify as scientific theories.

Where would this sentence best fit?

10. The word **it** in paragraph 5 refers to
(A) theory
(B) light
(C) faith
(D) one

11. The author of the passage implies that a scientific theory
(A) is congruous with religious belief
(B) is consistently reliable
(C) is synonymous with fact
(D) is a foolproof method

12. Complete the table below to summarize information about the scientific method used by Ibn al-Haytham in 1021 and the scientific method as used today. Put the statement in the appropriate column. Some answer choices will not be used. ***This question is worth three points.***

1021	**Today**

(A) use hypothesis to formulate predictions
(B) use mathematics to formulate a conclusion
(C) use hypothesis to test experiments
(D) reach a tentative hypothesis
(E) join a question and analysis of data
(F) duplicate two previous steps
(G) publish findings

LISTENING SECTION

Lecture

Narrator: *Listen to part of a lecture from an arts class. (Listening 1)*

1. What aspect of arts and crafts does the professor mainly discuss?
   (A) Retail sales
   (B) Internet marketing
   (C) Demise of stores
   (D) Etsy policies

2. Why does the professor mention Etsy?
   (A) To bemoan the demise of specialized crafts stores
   (B) To exemplify the new direction of arts-and-crafts sales
   (C) To illustrate a point about listing fees
   (D) To reinforce an earlier point about Internet fraud

3. Listen again to part of the lecture. Then answer the question. (Listening 2)

What does the professor mean when she says this:

But, I'm getting…I'm getting a little off track here.

   (A) She is having trouble steering the train.
   (B) She has forgotten what she wants to say.
   (C) She is not talking about the subject she intended.
   (D) She is running out of time.

4. According to the professor, how does Etsy make a profit?
   (A) It charges a fee for buyers.
   (B) It marks up seller's prices.
   (C) It depends on advertising revenues.
   (D) It takes a sales commission.

5. Listen again to part of the lecture. Then answer the question. (Listening 3)

What can be inferred about the professor when she says this:

I'll admit I don't know the going rate for these types of goods.

   (A) She does not buy many art supplies.
   (B) She does not like arts and crafts.
   (C) She is financially frugal.
   (D) She is not accustomed to using the Internet.

6. What main advantages of Etsy does the professor mention?
   (A) price and quality
   (B) selection and price
   (C) selection and supplies
   (D) quality and uniqueness

Conversation

Narrator: *Listen to a conversation between a student and a university employee. (*Listening 4*)*

7. What does the student want to do?

(A) Report a theft
(B) Get a picture
(C) Find his check
(D) Replace a card

8. How much does it cost the student for a new ASB card?
(A) $20
(B) $30
(C) $40
(D) $50

9. What will the woman do after the student fills out a form?
(A) Stamp it for him.
(B) Take his picture.
(C) Collect his money.
(D) Give him a temporary card.

10. What does the woman advise the student to do with his old ASB card?
(A) Find it
(B) Use it
(C) Discard it
(D) Sell it

11. **Narrator:** Listen again to part of the conversation and answer the question. (Listening 5)

What does the woman imply when she says this:

Just cut it up and throw it away, honey!

(A) She is in love with the student.
(B) She has affection for the student.
(C) She does not like the student's attitude.
(D) She doubts the student's integrity.