STRATEGY 1

TOPICS COVERED

- The Kaplan DAT Course
- The DAT
- Kaplan DAT Strategies
- Your DAT Study Plan

The Kaplan DAT Course

Goal: Earn a higher score on your DAT and get the results you want.

What will this course include?

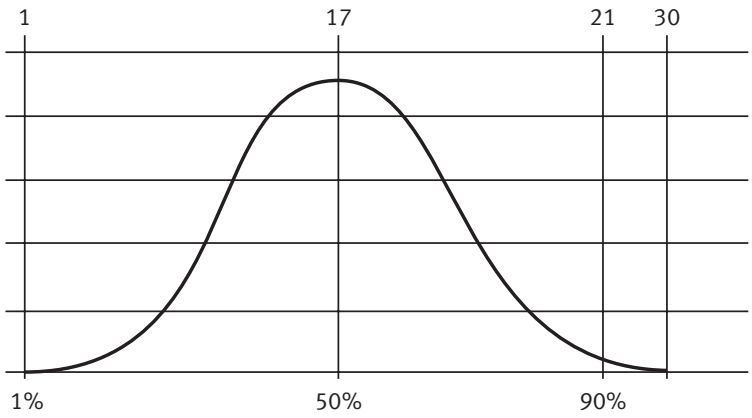
- Content
- Strategies
- Study Planning
- Crisis Prevention

The DAT

Scoring

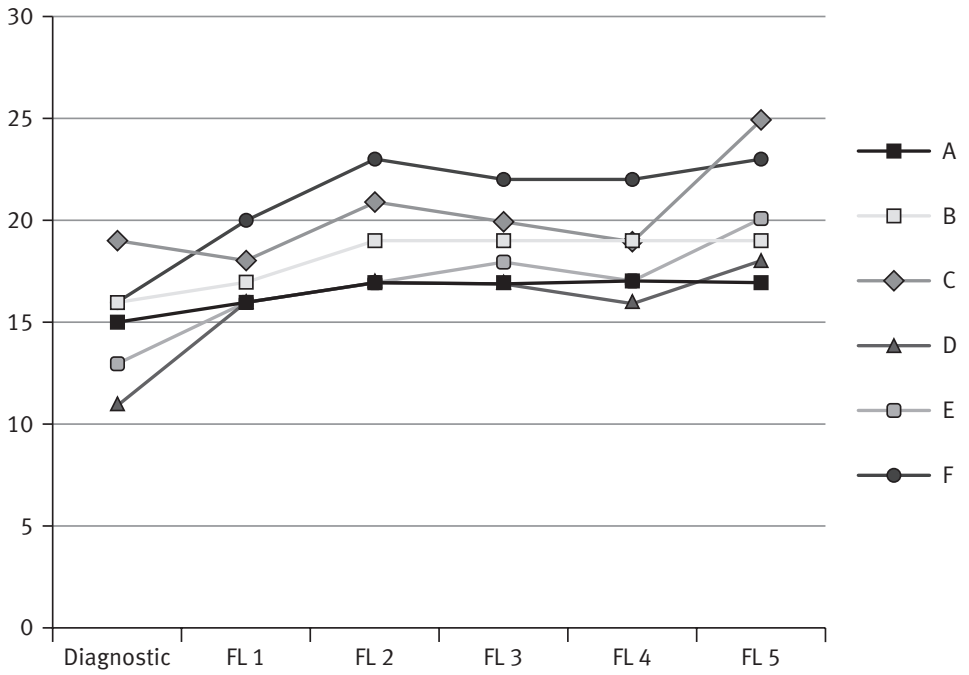
Score	Basis
Biology	performance on questions 1–40 of the Survey of the Natural Sciences section
General Chemistry	performance on questions 41–70 of the Survey of the Natural Sciences section
Organic Chemistry	performance on questions 71–100 of the Survey of the Natural Sciences section
Total Science	performance on all questions (1–100) in the Survey of the Natural Sciences section; not simply an average of the three subsection scores
Reading Comprehension	performance on all questions in the Reading Comprehension section
Quantitative Reasoning	performance on all questions in the Quantitative Reasoning section
Academic Average	the simple arithmetic average of the following five standard scores, rounded to the nearest whole number: Biology, General Chemistry, Organic Chemistry, Reading Comprehension, and Quantitative Reasoning
Perceptual Ability	performance on all questions in the Perceptual Ability section; does not constitute any component of any other reported score

Distribution of Scores by Percentile



Setting Expectations

Student	Diagnostic	FL 1	FL 2	FL 3	FL 4	FL 5	Δ
A	15	16	17	17	17	17	2
B	16	17	19	19	19	19	3
C	19	18	21	20	19	25	6
D	11	16	17	17	16	18	7
E	13	16	17	18	17	20	7
F	16	20	23	22	22	23	7



Your Goal Score

My target score is _____

The reason this is my target score is because _____

The three biggest obstacles to me achieving this score are:

1. _____

2. _____

3. _____

I can overcome these obstacles by:

1. _____

2. _____

3. _____

Test Day Outline

Section Name	Time	Questions	Topics
Survey of the Natural Sciences	90 min.	100	Biology, General Chemistry, Organic Chemistry
Perceptual Ability	60 min.	90	Keyholes, Top-Front-End, Angle Ranking, Hole Punching, Cube Counting, Pattern Folding
BREAK	15 min.	-----	-----
Reading Comprehension	60 min.	50 (3 passages, 16–18 questions each)	Passages from medical and natural sciences
Quantitative Reasoning	45 min.	40	Algebra, Numerical Calculations, Conversions, Probability & Statistics, Geometry, Trigonometry, Word Problems

Kaplan DAT Strategies

Pacing

Triaging

Get your easy points first.

Complete Every Section

Answer every question.

Pacing by Section

Use Kaplan's Strategies for pacing yourself on each individual section of the test.

The Kaplan Question Strategy

STOP

➜ Triage: Should you do this question now, later, or never?

THINK

➜ What is the question really asking?

PREDICT

➜ Formulate a framework or prediction for your answer.

MATCH

➜ Select the answer that truly meets the requirements of the prediction.

A Worked Example

1. Fifteen movie theaters average 600 customers per day. If 6 are shut down, but the same number of people still attend the movies, what is the new average attendance for the movie theaters that remain open?

   A. 100
   B. 500
   C. 900
   D. 1,000
   E. 1,500

Expert Thinking

STOP

Answers are numbers that are far apart. This question requires rough calculation where estimation could be sufficient.

THINK

The question is asking for the new average attendance given a smaller number of open theaters but the same number of customers.

PREDICT

First, find the total number of customers. Before any closures, there were 15 theaters with 600 customers each. When multiplied, this comes to 9,000 customers. Now there are only 9 theaters open. 9,000 divided by 9 gives an average of 1,000 customers per day for each theater.

MATCH

The final answer should be 1,000 customers, which matches answer choice (D).

Kaplan Answer Choice Strategy

Wrong Answer Choice Pathologies

Pathology	Why It's Wrong	Why It's Seductive
Faulty Use of Detail		
Opposite		
Distortion		
Out of Scope		
Miscalculation		

Kaplan Computer-Based Test Strategy

Overview

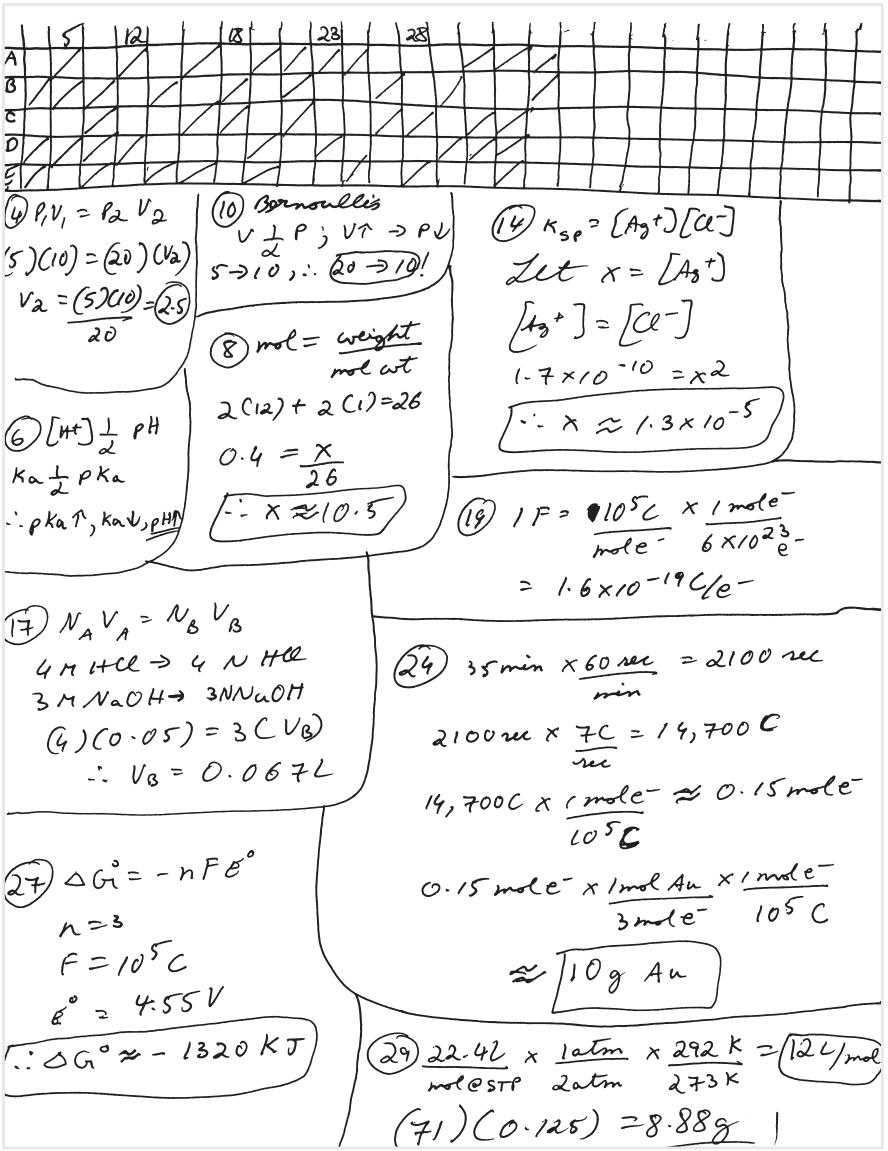
Scratch Work Strategy

Marking and Skipping Strategy

- Non-Reading Comprehension
- Reading Comprehension

Maximizing Area for Scratch Work

Non-Writing Hand and the Mouse



Your DAT Study Plan

Using Your Kaplan Resources Effectively

Diagnostic

Your Diagnostic is critical to establish a baseline and guide your prep.

Preview Homework

Complete the assigned Preview Homework prior to each session.

Class Sessions

Attend all required sessions or view as Lessons On Demand. Have your Lesson Book on hand for every class and use it to take notes.

Review Homework

Complete your Review Homework within 24 hours of your lesson if at all possible.

Full-Length Exams

Use full-length practice tests to mimic Test Day.

Additional Resources

Several additional resources are available on your Online Syllabus and in your Home Study Kit to help you maximize your DAT score.

Building a Study Plan

Register for Your DAT

Create a Study Calendar

The Dirty Dozen

#12: Doing the same thing as everybody else.

#11: Letting stress get in the way.

#10: Timing yourself in the beginning.

#9: Focusing on difficulty levels.

#8: Testing under nontest conditions.

#7: Not committing to your study schedule.

#6: Listening now but studying later.

#5: Only studying the right answers.

#4: Ignoring your strengths.

#3: Forgoing explanations and mistakes.

#2: Making it about the number, not the process.

#1: Taking test after test after test after test.

READING COMPREHENSION 1

TOPICS COVERED

- The Reading Comprehension Section
- Kaplan Method for Reading Comprehension
- Reading Strategically
- The Kaplan Question Strategy
- Question Types

The Reading Comprehension Section

Overview

- 50 questions across 3 passages in 60 minutes
  - Each passage is 9–14 paragraphs long
  - Each passage has 16–18 questions
- Familiarity with the subject matter is not required
  - Subject areas: natural and medical sciences
- Every operational question within Reading Comprehension counts equally toward your score

Pacing

- Spend approximately 20 minutes per passage.
  - Use 7–8 minutes reading and mapping the passage.
  - Save 12–13 minutes for the questions, giving yourself about 45 seconds per question.

Kaplan Method for Reading Comprehension

READ STRATEGICALLY

- ➜ Preview the passage for Topic.
- ➜ Anticipate while reading using Keywords.
- ➜ Map each paragraph's Scope.
- ➜ Determine the author's Tone.
- ➜ Identify the author's overall Purpose.

Reading Strategically

Preview the Passage for Topic

Topic is the author's basic subject matter.

The passages on the test will be titled according to the Topic.

Telescopes: Refractors Versus Reflectors

(1). The earliest telescopes were refractors, in that they used lenses to bend incoming light. By using refractive lenses, early astronomers were able to gather light and view images with greater resolution and magnification than possible with the naked eye. But because pioneer telescope makers knew relatively little about optics, their lenses exhibited two serious defects. The first problem, spherical aberration, is a distortion that occurs when a lens with round surfaces fails to focus light from a point object to a point image. The second problem, chromatic aberration, stems from the fact that an ordinary lens refracts different wavelengths of light to slightly different degrees, resulting in a different focal length for each color and, therefore, an out-of-focus image with a colorful halo.

(2). A number of scientists, among them Johannes Kepler, realized that spherical aberration could be corrected simply by using a differently shaped lens. A solution to chromatic aberration, however, proved more difficult. When Sir Isaac Newton announced that it seemed impossible to correct chromatic aberration, scientists turned their attention to reflecting telescopes. Like refractors, these telescopes also increased light, resolution, and magnification of an image, but reflectors use curved mirrors in lieu of clear lenses in order to avoid the chromatic distortion of refraction. However, early reflecting telescopes had their problems too: the mirrors they utilized were made of metal alloys, which absorbed light and thus obscured images. One solution to this problem was to build larger telescopes, since bigger mirrors mean greater light reception and brighter images. Unfortunately, the opticians and foundries of the day were not yet up to the challenge. Mirror technology progressed slowly, as did the development of better reflector telescopes.

(3). Chromatic aberration remained a problem in refractors until Englishman Peter Hall discovered that a compound lens (i.e., one that combined different surfaces) could compensate for the dispersion of different colors by focusing them back together. Unfortunately, his findings were little known. Later, mathematician Leonhard Euler hit upon a similar solution using two lenses with water between them. Soon after, noted optician John Dolland followed Euler's lead and sandwiched a piece of flint glass between two pieces of crown glass, an arrangement that corrected both chromatic and spherical aberration. As a result of this advancement and subsequent modifications, the refractor once again became the telescopic instrument of choice and remained so for about 100 years.

(4). But the refractor continued to have one inescapable limitation—a constraint on the maximum effective lens diameter, which limits the light-gathering property of the telescope. For this reason, as well as because of technical advances in mirror making, the reflector would once again assume prominence. At the Great Exposition of 1851, Varnish and Mellish presented the first chemical technique for layering silver onto glass. The mirrors that ultimately resulted from this breakthrough were silvered on the front and represented a double advantage. First, the silver surface (financially feasible because of the small amount of silver required) increased reflectivity of mirrors some 50 percent. Second, using glass in place of metal eliminated problems of shrinkage and cracking.

(5). The refractor never again surpassed the reflector. With further advances in the development of heat-resistant glass and casting techniques, larger and larger mirrors became possible, and astronomers saw farther and farther into the universe.

Anticipate While Reading Using Keywords

Keywords are structural clues that every author uses to organize and shape the text.

The best critical readers pick up on these structural clues and are thus able to anticipate while reading.

Keywords in Context

Astronomers noted more than 150 years ago that sunspots wax and wane in number in an 11-year cycle. Ever since, people have speculated that the solar cycle might exert some influence on the earth's weather. In the 20th century, for example, workers linked the solar cycle to droughts in the American Midwest. Until recently, however, none of these correlations has held up under closer scrutiny.

Types of Keywords

1. Continuation

Continuation keywords indicate that more of the same idea or argument will follow. A subtype of Continuation keywords is Illustration keywords, which introduce examples the author uses to elaborate on a point.

Examples: _____

_____

2. Sequence

Sequence keywords denote an order of ideas, points, or events.

Examples: _____

_____

3. Evidence

Evidence keywords are clues that the author is about to provide support for a point.

Examples: _____

_____

4. Contrast

Contrast keywords indicate that something different is coming next or that the author is making a shift in focus.

Examples: _____

_____

5. Emphasis

Emphasis keywords highlight the elements of the passage that the author finds most important.

Examples: _____

_____

6. Conclusion

Conclusion keywords signal the sum of an argument.

Examples: _____

_____

TAKEAWAY

Identifying Keywords on Test Day can help you to not only anticipate what will come next in the passage, but also to anticipate what the DAT will ask about in the questions.

Map Each Paragraph's Scope

Scope is the specific aspect of the Topic on which the author focuses.

e.g., chromatic aberration problems

Practice

Genetic engineering may offer the best hope of improving yields of *Oryza sativa* (cultivated rice) and perhaps, in time, other important U.S. crops. The insertion of foreign genetic material into the DNA of cultivars appears to confer an herbicidal protection on the resultant plants, enabling them to compete successfully for nutrients with uncultivated grasses.

Topic: _____

Scope: _____

Media coverage of Alzheimer's disease, an ultimately fatal form of dementia that primarily afflicts the elderly, generally focuses on the disease itself: the difficulty of establishing a diagnosis and the lack of any effective treatment. Far less attention is paid to the tremendous physical, psychological, and financial toll that the disease takes on family members who live with and care for Alzheimer's patients 24 hours a day.

Topic: _____

Scope: _____

Creating a Roadmap

The key to success on the Reading Comprehension section is structured, targeted mapping.

The Roadmap is a diagram of the passage noting the Scope of each paragraph. A good Roadmap helps you find information in the passage quickly.

Sample Roadmap

P1 Q1–16

¶1 *1st telescopes = refractors; 2 probs*

¶2 *try reflectors; also probs*

¶3 *fix refractor chromatic aberration prob*

¶4 *refractor still limited*
mirrors ↑ reflectors

¶5 *reflector › refractor*

Using Your Roadmap

1. Of the following, the author is most interested in discussing

   A. how different shapes of lenses influence resolution and magnification in telescopes.
   B. why refractors have become more popular than reflectors.
   C. how two basic telescope designs alternately succeeded each other in importance and popularity.
   D. the ways in which technological constraints have shaped the course of science.
   E. the ways dispersion impacts the resolution in telescopes.

2. The author mentions the views of Sir Isaac Newton (paragraph 2) in order to

   A. explain why scientists initially turned toward reflecting telescopes.
   B. emphasize the severity of the problem of spherical aberration.
   C. show that early scientists often reached erroneous conclusions.
   D. tacitly challenge the view that Sir Isaac Newton was a brilliant scientist.
   E. give the history of the first refractor telescopes used.

3. According to the passage, chromatic aberration can be corrected by

   A. a lens with rounded surfaces.
   B. using glass in place of metal alloys.
   C. building larger telescopes for greater light reception.
   D. an arrangement of two lenses separated by water.
   E. rotating the lenses between 15° and 30°.

Determine the Author's Tone

Tone is the author's attitude.

Positive, Negative, Neutral

Practice

Animal behavior was formerly thought to consist of simple responses, some of them innate and some of them learned, to incoming stimuli. Complex behavior, if it was considered at all, was assumed to be the result of complex stimuli. However, a group of ethologists, notably Konrad Lorenz, Nikolaas Tinbergen, and Karl von Frisch, established a new view of animal behavior.

Tone: _____

Astronomers and astrophysicists who believe that intelligence exists only on Earth base their claim on an argument taken from the field of evolutionary biology. Intelligent life does not exist anywhere else in the galaxy, they contend, because the process that culminated in the development of life on Earth was so complex and so dependent on chance events (e.g., the extinction of the dinosaurs) that it could not have occurred twice. What this argument fails to take into account, however, is a crucial distinction made by evolutionary biologists: the distinction between the evolution of a specific species and the evolution of a specific trait. According to evolutionary biologists, it is indeed extremely unlikely that a species similar to *Homo sapiens* exists elsewhere; the probability of the same sequence of events occurring under the same environmental conditions is so small that it can be discounted. However, this does not imply that intelligent life very different in form from *Homo sapiens* could not have developed on other planets.

Tone: _____

Identify the Author's Overall Purpose

Purpose is why the author is writing. Identifying the Purpose will help you to understand the passage as a whole. All of the details in the passage are meant to support the author's overall Purpose.

The Purpose should always be given in verb form.

Explain, Evaluate, Argue, Compare

Before moving on to the questions, you should create a Purpose sentence in your mind to solidify your understanding of the passage.

Crisis Prevention

What if I don't know what to map?

What if I am running out of time?

What if I don't know the meaning of a word?

TAKEAWAY

Reading strategically can help you not only to anticipate what will come next in a passage but also to anticipate what the DAT will ask about in the questions.

Passage 1

The Harbor Seal

(1). The harbor seal, *Phoca vitulina*, is a member of the order Pinnepedia and lives amphibiously along the northern Atlantic and Pacific coasts. This extraordinary mammal, which does most of its fishing at night when visibility is low and where noise levels are high, has developed several unique adaptations that have sharpened its visual and acoustic acuity. The need for such adaptations has been compounded by the varying behavior of sound and light in each of the two habitats of the harbor seal—land and water.

(2). While the seal is on land, its ear operates much like that of a human, with sound waves traveling through air and entering the inner ear through the auditory canal. The directions from which sounds originate are distinguishable because the sound waves arrive at each inner ear at different times. In water, however, where sound waves travel faster than they do in air, the ability of the brain to differentiate arrival times between each ear is severely reduced. Yet it is crucial for the seal to be able to pinpoint the exact origins of sound in order to locate both its offspring and prey. Therefore, through processes of adaptation to the demands of its environment, the seal has developed an extremely sensitive quadraphonic hearing system, composed of a specialized band of tissue that extends down from the outer ear to the inner ear. In water, sound is conducted to the seal's inner ear by this special band of tissue, making it possible for the seal to identify the exact origins of sounds.

Scratch Work

Paragraph 1

Paragraph 2

(3). The eye of the seal is also uniquely adapted to operate in both air and water. The human eye, adapted to function primarily in air, is equipped with a cornea, which aids in the refraction and focusing of light onto the retina. As a result, when a human eye is submerged in water, light rays are further refracted and the image is blurry. The seal's cornea, however, has a refractive index similar to that of water. Therefore, in water, light rays are transmitted by the cornea without distortion and are clearly focused on the retina. In air, however, the cornea is astigmatic. The result is a distortion of incoming light rays. The seal compensates for this by having a stenopaic pupil, which constricts into a vertical slit. Since the astigmatism is most pronounced in the horizontal plane of the eye, the vertical nature of the pupil serves to minimize its effect on the seal's vision.

(4). Since the harbor seal procures its food under conditions of low visibility, some scientists hypothesize that harbor seals have an echolocation system akin to the sensory capabilities of bats, porpoises, and dolphins. This kind of natural and instinctual radar involves the emission of high frequency sound pulses that reflect off of obstacles such as predators, prey, or natural barriers. The reflections are received as sensory signals by the brain, which interprets them and processes them into an image. The animal, blinded by unfavorable surroundings or lighting conditions, is thus able to perceive its surroundings. Scientists believe that echolocation in the harbor seal is suggested by the fact that these seals emit "clicks," i.e., high-frequency sounds produced in short, fast bursts that occur mostly at night, when visual acuity is low.

Scratch Work

Paragraph 3

Paragraph 4

(5). Finally, there is speculation that the seal's vibrissae, or whiskers, act as sensory receptors. Evidence for this is found in the fact that vibrissae are unusually well developed in Pinnepedia and are highly sensitive to movement. Scientists hypothesize that the vibrissae may be instrumental in catching prey and, because they are sensitive to vibrations, may sense wave disturbances produced by nearby moving fish, allowing the seal to home in on and capture prey.

(6). Having met the sensory demands of dual habitats, the harbor seal is one of the most interesting animals on earth. Its amphibious existence has demanded a sensory acuity and flexibility matched by few other mammals.

Scratch Work

Paragraph 5

Paragraph 6

Purpose

The Kaplan Question Strategy

STOP

➜ Characterize the question type.

THINK

➜ What is the question really asking?

➜ Where is the relevant information you need?

PREDICT

➜ Formulate a framework or prediction for your answer.

MATCH

➜ Select the answer that truly meets the requirements of the prediction.

Question Types

There are seven main question types on the DAT.

If you understand how to approach each question type, you can more easily attack questions on Test Day.

Global Questions

Global questions ask for the general purpose or main idea of the passage. Predict the answer using your Purpose sentence.

Examples of question stems:

- *The main purpose of the passage is to . . .*
- *Which one of the following best states the main idea of the passage?*
- *Which one of the following best describes the organization of the passage?*
- *The passage can best be described as . . .*

Practice

4. The main purpose of the passage is to

   A. discuss how the harbor seal fishes at night.
   B. explain the adaptations of the harbor seal in its two habitats.
   C. evaluate the effectiveness of the harbor seal's hearing on land.
   D. compare the way a harbor seal uses echolocation on land and in water.
   E. argue that the harbor seal is the mammal with the best night vision.

Detail Questions

Detail questions are the most common question type on the DAT. The answer to a Detail question can be found directly in the passage. Refer back to the passage to see what was stated in order to formulate your prediction.

Examples of question stems:

- *According to the passage* . . .
- *As stated in the passage* . . .

Practice

5. According to the passage, the sensitivity of the harbor seal's whiskers to vibrations is most beneficial for

   A. triggering fish in surrounding areas to move about.
   B. improving the seal's ability to smell nearby predators.
   C. enhancing the seal's balance on land.
   D. perceiving wave disturbances produced by prey.
   E. sensing echolocation waves produced by other seals.

Detail EXCEPT Questions

These questions are similar to Detail questions, but they will use words like *EXCEPT* or *NOT*. More research in the passage will be required to get these questions right. The questions are not necessarily difficult, but can be more time-consuming.

Examples of question stems:

- *Each of the following statements is used as evidence in the passage EXCEPT one. Which one is the EXCEPTION?*
- *According to the passage, which of the following is NOT true . . .*

Practice

6. According to the passage, all of the following are true about the harbor seal's quadraphonic hearing system EXCEPT one. Which is the EXCEPTION?

   A. It is composed of a specialized band of tissue.
   B. It extends from the outer ear to the inner ear.
   C. It is used to conduct sound in water to the seal's inner ear.
   D. It is used mostly on land, where sound waves travel more slowly.
   E. It helps the seal to pinpoint the exact origins of sounds originating from its offspring.

Tone Questions

By tracking the author's attitude while you make your Roadmap, you will be able to answer Tone questions, which ask how the author feels about something. Check to see if the author is positive, negative, or neutral.

Examples of question stems:

- *The tone of this passage is . . .*
- *Which phrase from the fifth paragraph reflects a negative bias?*

Practice

7. The author's tone is one of

   A. astonishment that the seal has developed capabilities to live in dual habitats.
   B. accusation toward skeptics of the theory of evolution.
   C. ambivalence regarding the seal's amphibious adaptations.
   D. condemnation of the seal's predators.
   E. admiration of the harbor seal's sensory acuity and flexibility.

Function Questions

Function questions will ask you why or how the author used certain tools to build the argument. These questions may also ask you about the purpose of an individual paragraph. Use your Roadmap and refer back to the passage to find the answer.

Examples of question stems:

- *The author of the passage refers to X in order to . . .*
- *In the second paragraph, the author of the passage is primarily concerned with . . .*

Practice

8. The author mentions other mammals such as bats, porpoises, and dolphins in paragraph 4 in order to

   A. provide examples of other animals that use echolocation.
   B. substantiate the claim that seals use a stenopaic pupil.
   C. explain a type of instinctual radar used by seals.
   D. contrast the harbor seal's "clicks" with the high-frequency sounds of other animals.
   E. support the scientific hypothesis that adaptations are most important at night.

Inference Questions

To answer an Inference question correctly, you must make a small logical leap from the passage. Be careful—the correct answer will be extremely similar to what you actually read. Only the answer that must be true based on the passage is correct.

Examples of question stems:

- *It can be inferred from the passage that the author would be most likely to agree with which one of the following?*
- *The passage suggests which one of the following about . . . ?*
- *Based on the passage . . .*
- *The passage implies that . . .*

Practice

9. Based on the passage, it can be inferred that

   A. humans also have a stenopaic pupil.
   B. bats, porpoises, and dolphins have an astigmatic cornea.
   C. the refractive index of a seal's cornea differs from that of a human's.
   D. light rays are distorted when a seal is in water.
   E. the seal's retina is more effective than a human's retina.

Strengthen/Weaken Questions

Strengthen/Weaken questions, though rare, can appear on the DAT. They will ask you to apply new information to what you've read and determine what effect the new information has on the passage. Your job is to consider the argument made in the passage and how the new information either makes it more likely (strengthen) or less likely (weaken) to be true.

Examples of question stems:

- *Which of the following statements, if true, would most strengthen the theory put forth in paragraph 3?*
- *Suppose that [new information] is found to be true. What effect would this have on the author's conclusion?*

Practice

10. Suppose that the walrus, *Odobenus rosmarus*, also from the order Pinnepedia, is found to use its vibrissae to sense differences in shapes while grazing along the seafloor, thereby enabling it to detect mollusks and other organisms that comprise the walrus's diet. How would this new information impact the author's argument about the harbor seal?

    A. This would provide evidence against the author's claims about the way the harbor seals use their vibrissae for sensory receptors in water.
    B. This would support the author's theory that the walrus developed before the harbor seal.
    C. This would conflict with the author's claim that the vibrissae in harbor seals are unusually well developed.
    D. This would offer a supporting illustration of how other pinnepeds use vibrissae to home in on prey.
    E. This would present a case substantiating the author's hypothesis that pinnepeds are the only animals to use their whiskers as sensory receptors.

TAKEAWAY
Determining what type of question is being asked helps you to think only about the most relevant material and to make an informed prediction.

Passage 2

Dental Caries

(1). The development of dental caries is characterized by bacteria-induced destruction of the mineral and organic components of the tooth's enamel and underlying dentin. It is a progressive process. The initial lesion can, if untreated, expand to involve the tooth's pulp, which consists of connective tissue supplied with nerve fibers and blood vessels. Pulpal involvement can lead to inflammation and a variety of symptoms, including pain after the consumption of sugar and a throbbing sensation associated with thermal hypersensitivity. If still untreated, the oral infection eventually can affect systemic health. The initiation of dental caries is highly dependent on the microenvironment of the host's oral cavity and involves complex interactions between the host, bacteria and their metabolic products, and the calcified tissues of the teeth.

(2). In the 19th century, Louis Pasteur showed that certain microorganisms convert sugars to lactic acid and that a resulting acidic environment can cause the dissolution of tooth surfaces. In experiments conducted with three groups of young rats in the 1950s, researchers fed one group a cariogenic diet under germfree conditions; no caries developed. A second group, which included the first group's littermates, was also fed a cariogenic diet but was infected with a specific bacterial strain; caries developed. A control group was raised in a normal environment and fed a cariogenic diet; caries also developed in this group.

(3). Experts generally now agree that dental caries is caused by specific bacteria indigenous to the human oral cavity, such as *Streptococcus mutans*. The preliminary event in the development of caries is deposition on the tooth's surface of plaque, a complex aggregation of salivary proteins, bacteria, dietary nutrients, and minerals. Such deposition is initiated by a thin film of salivary proteins that coats a tooth's surface. The proteins attach to the tooth by ionic interactions between their polar sulfate and ammonium groups and the calcium ions contained in the organic matrix of the tooth's enamel. In turn, the sticky dextrans that are part of the bacteria's extracellular coats enable the microorganisms to attach to the salivary proteins.

(4). The bacteria, which thrive in acidic conditions, convert carbohydrates to organic acids, such as lactic acid, and produce proteolytic enzymes. The organic acids lower the pH at the plaque-enamel interface, and calcium salts in the enamel are slowly dissolved due to the acidic conditions. Once the salts in the tooth's enamel have dissolved, proteolytic enzymes can attack and digest the organic matrix of the enamel. Nevertheless, enamel is the primary barrier to the development of dental caries and is far more resistant to demineralization than is the underlying dentin.

(5). The replication and degree of metabolic activity of oral bacteria are strongly dependent on the availability of carbohydrates. The diets of many people in industrialized nations—high in sucrose and other sugars—supply the bacteria with a preferential metabolic substrate, strongly activating their metabolic systems and facilitating the carious process. Other host factors that affect the incidence of dental caries are salivary composition and flow rate, the physiochemical nature of the tooth's surface, and the type and form of teeth. Individuals with xerostomia (a failure to form saliva) often exhibit rampant dental caries. In most people, however, a flow of saliva bathes tooth surfaces and clears carbohydrates from the oral cavity.

(6). The chemical nature of the tooth's surface also plays a key role in determining susceptibility to dental caries and the ultimate course of the disease. Surface application of fluoride, for example, can reduce the solubility of the enamel. The fluoride ion inhibits the progress of caries by replacing hydroxyl ions in the hydroxylapatite to form fluorapatite, aiding in the remineralization of the carious lesion by promoting the deposition of calcium phosphate.

(7). The frequency of dental caries varies with the different types and positions of teeth. Interproximal surfaces (the tooth's surfaces that oppose neighboring teeth) are prime sites for the initiation of caries, especially in the contact areas. The teeth that are least susceptible to dental caries are the mandibular central and lateral incisors.

11. The main point of this passage is that

    A. a dietary intake high in refined carbohydrates causes dental caries.
    B. the mouth represents a complex microenvironment affected by a variety of physiochemical processes.
    C. the development of dental caries is a complex process involving bacteria and the host's oral cavity and teeth.
    D. dental caries should be clinically recognized during early biochemical stages.
    E. there are mechanisms by which dental caries can be prevented.

12. The initial event leading to the development of dental caries is

    A. invasion of the oral cavity by pathogenic bacteria.
    B. the direct adherence of bacterial dextrans to the tooth's enamel.
    C. the dissolution of inorganic ions.
    D. the formation of plaque on enamel.
    E. the production of proteolytic enzymes.

13. Dental caries is least likely to occur in

    A. interproximal surfaces.
    B. areas in which teeth contact each other.
    C. lateral incisors.
    D. individuals with no salivary flow.
    E. between the bicuspids.

14. A throbbing pain associated with the eating of ice cream most likely indicates that a carious lesion has begun to

    A. involve a tooth's pulp.
    B. affect the individual's systemic health.
    C. inflame a tooth's dentin.
    D. dissolve the inorganic structure of a tooth's enamel.
    E. destroy the minerals in tooth enamel.

15. A recent immigrant from a third-world country visits the dentist. Based on the information in the passage, the dentist would most likely NOT see

    A. damage to enamel caused by carbohydrate consumption.
    B. a high incidence of dental caries.
    C. a failure to form saliva.
    D. tooth damage caused by lack of fluoride in the diet.
    E. mandibular central incisors particularly susceptible to dental caries.

16. The author of the passage refers to Louis Pasteur (paragraph 2) primarily in order to

    A. give historical perspective to a scientific study.
    B. give an example of an opposing argument.
    C. give historical context to dental caries experiments.
    D. explain how bacteria form dental caries.
    E. explain how scientific research may be inconclusive.

17. The author clearly believes that

    A. scientific experiments involving dental caries largely have been unsuccessful.
    B. patients with poor hygiene deserve to have dental caries.
    C. national fluoridation programs have largely been successful.
    D. a number of complex factors influence the frequency and course of dental caries.
    E. understanding dental caries helps patients to prevent them from forming.

18. The author describes the "diets of many people in industrialized nations" as being "high in sucrose and other sugars" (paragraph 5) in order to

    A. suggest that people in industrialized nations eat more calories than people in underdeveloped nations.
    B. provide evidence for the smaller percentage of cases of dental caries in industrialized nations as compared to other nations.
    C. present a case for the correlation between the incidence of dental caries and diabetes.
    D. explain why these diets cultivate ideal conditions for the formation of dental caries.
    E. indicate that factors such as diet are irrelevant to salivary composition.

Homework

Required Assignments*	Location
Complete Remaining Lesson Questions	Lesson Book
Reading Comprehension 1 Review	kaptest.com
Biology 1 Preview	Review Notes Book
Biology 1 Preview	kaptest.com

Personalized Assignments
Refer to your online resources for additional practice assignments and tools.

*These assignments must be completed in order to fulfill the requirements of the Higher Score Guarantee.