


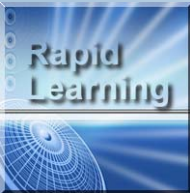
 **Rapid Learning Center**  
Chemistry :: Biology :: Physics :: Math 

Rapid Learning Center Presents ...

Teach Yourself  
**MCAT Biology** Visually in 24 Hours





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 **MCAT Biology**  
**Introduction to  
Biology in the MCAT**

**MCAT Rapid Learning Series**


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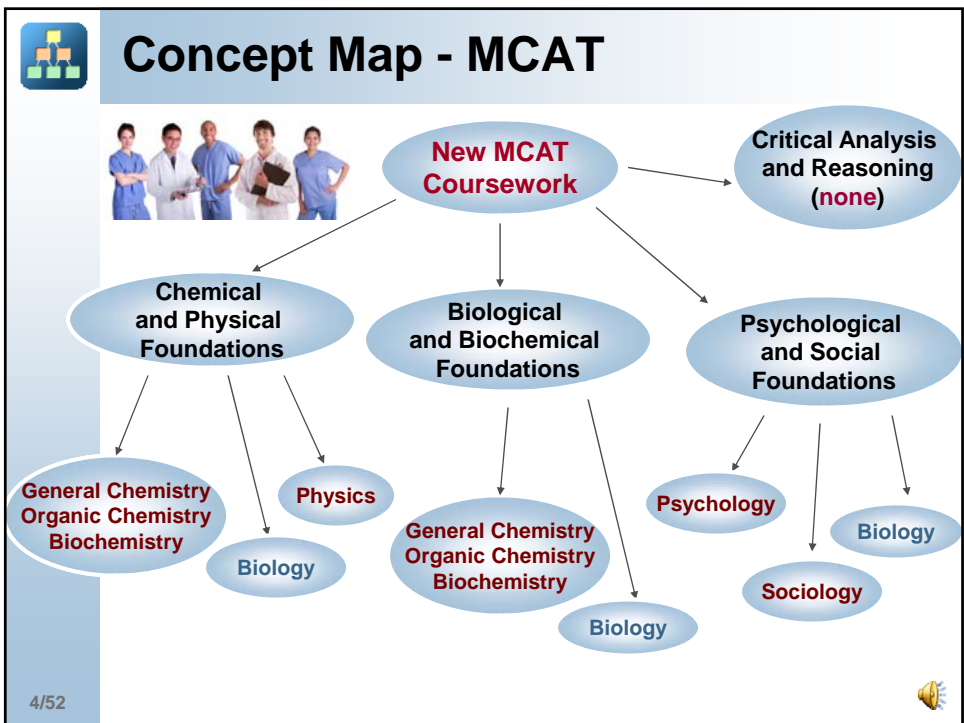
## Learning Objectives

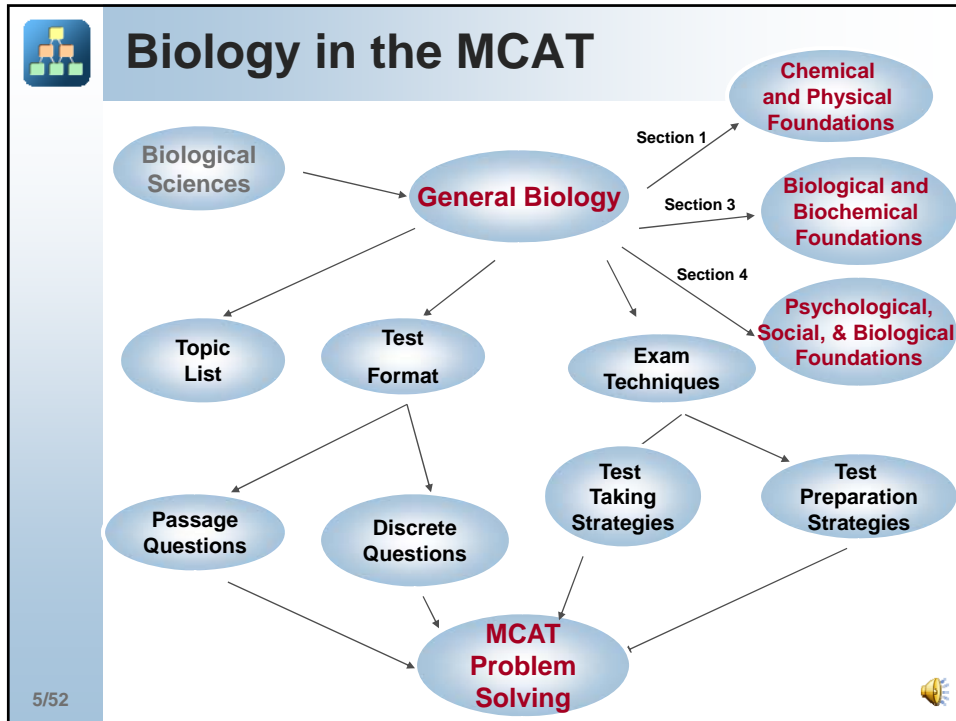
**By completing this tutorial, you will learn about:**



- The MCAT
- The MCAT test format and score
- Rapid Learning for the MCAT
- MCAT Biology test topics
- MCAT question types and examples
- Test-preparation strategies
- Test-taking strategies

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**Introduction to the "New" MCAT**

The slide features a blue header with the title. On the left is a caduceus symbol, and on the right is a photograph of a woman looking at a laptop. A small lightbulb icon is in the bottom right corner.



## What is the MCAT?

# Medical College Admission Test

The MCAT is a standardized exam that most prospective students must take in order to gain admission to medical schools in the US and Canada.



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## When Can I Take The MCAT?

The MCAT is offered throughout the year in: January, April, May, June, July, August and September.

To register visit the MCAT official site:  
<http://www.aamc.org/mcat/>

The ideal time to take the MCAT is when you have completed the basic science courses and between 12-18 months before entry into medical school.

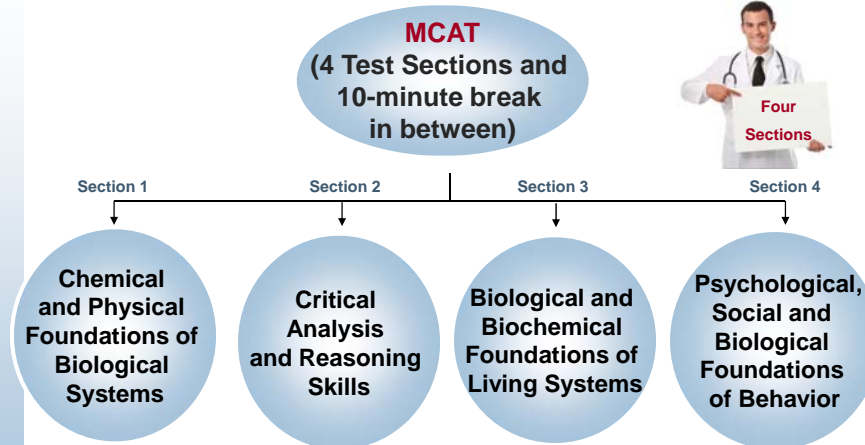
A good approach, is to plan ahead about **six months** before taking the exam.




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## ➤ MCAT Exam Structure



The diagram shows the MCAT exam structure. At the top, a blue oval contains the text "MCAT (4 Test Sections and 10-minute break in between)". Below this, a horizontal line is labeled "Section 1", "Section 2", "Section 3", and "Section 4" from left to right. Arrows point from each section label to a corresponding blue circle below. The circles contain the following text: Section 1: "Chemical and Physical Foundations of Biological Systems"; Section 2: "Critical Analysis and Reasoning Skills"; Section 3: "Biological and Biochemical Foundations of Living Systems"; Section 4: "Psychological, Social and Biological Foundations of Behavior". To the right of the diagram, there is an illustration of a doctor in a white coat holding a sign that says "Four Sections".

Note: Biology is by far the most important subject in MCAT mix. It is covered in 3 out of 4 test sections. In-depth study is required. 


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## ➤ MCAT Scores

The MCAT scores consist of four individual section scores and one total score.

Section	Range (Midpoint)
1. Chemical/Physical 2. Critical/Reasoning 3. Biological/Biochemical 4. Psychological/Social	118-132 ( <b>125</b> )
Total Score (sum of 4)	472-528 ( <b>500</b> )

The scores are released approximately 1-2 months after the test. The MCAT Scores are equated. The equating is designed to correct small difference in difficulty among exams on different dates.

The MCAT is completely computer based. 


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**➤ Test Specifics and Subjects Covered**


Chemical /Physical	Biological /Biochem	Psychological /Social	Critical /Reasoning
59 questions 95 minutes	59 questions 95 minutes	59 questions 95 minutes	53 questions 90 minutes
General Chem, 30% Organic Chem, 15% Biochemistry, 25% Physics, 25% <b>Biology, 5%</b>	Biochemisry, 25% <b>Biology, 65%</b> General Chem, 5% Organic Chem, 5%	Psychology, 65% Sociology, 30% <b>Biology, 5%</b>	<u>No specific courses</u> Humanities, 50% Social Sciences, 50%
44 passage questions & 15 multiple choice	44 passage questions & 15 multiple choice	44 passage questions & 15 multiple choice	All 53 passage questions

**It's a longer test! The entire test will be 6 hours 15 minutes long, with an optional 10-minute break between each section. The total seat time is 7 hours 30 minutes.** 💡

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## Rapid Learning for MCAT



💡



## What is Rapid Learning?



Rapid learning is a set of break-through methods to **increase the speed of learning and deepen the understanding of the subjects.** This is done by breaking down each complex subject into 24 manageable units and facilitating rich-media teaching, providing an effective multi-modal learning opportunity.

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## The Science of Rapid Learning



**V:** Visual

**A:** Aural

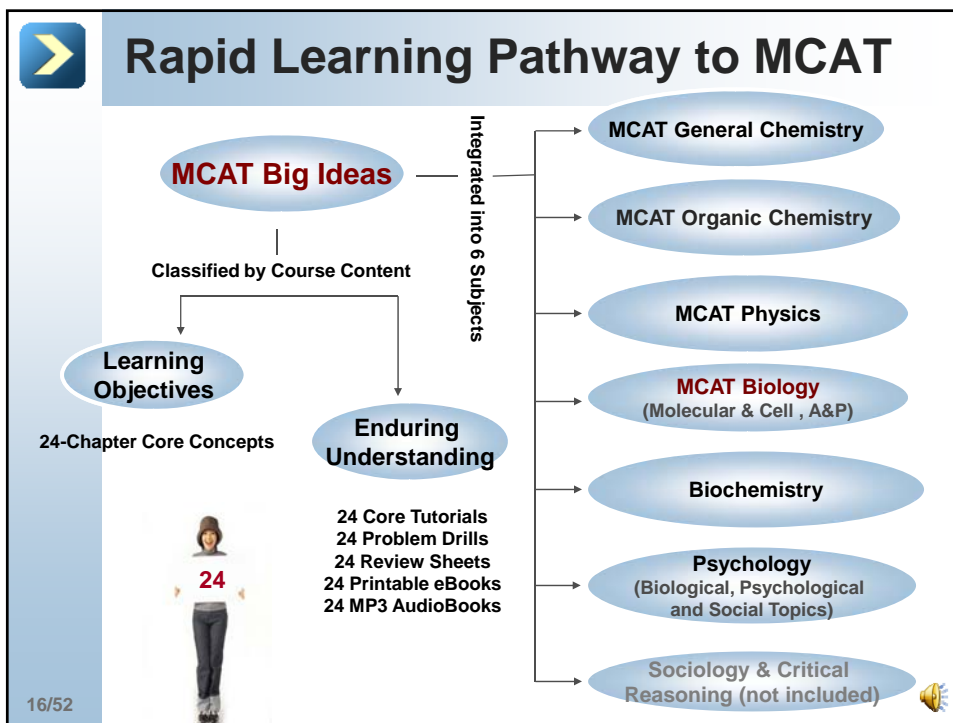
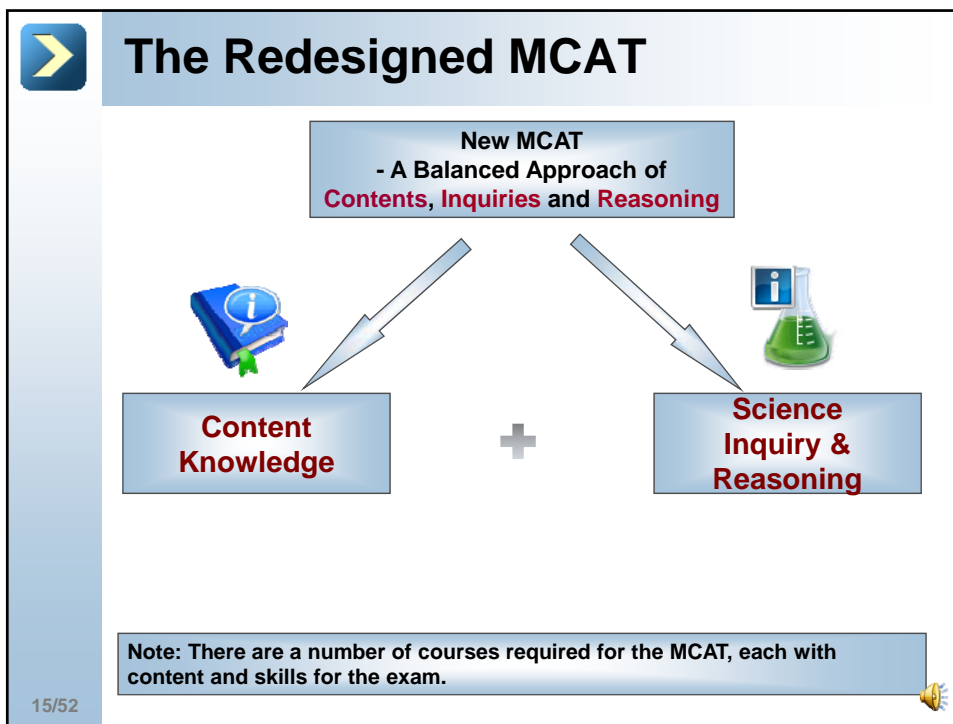
**R:** Read/Write

**K:** Kinesthetic

Rapid Learning courses are designed to optimize the learning experience for all four types of learners by presenting materials visually, providing narrations for aural learners, involving students with interaction drills and encouraging note-taking and re-writing of review cheat sheet to engage both read/write and kinesthetic learners.

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## Rapid Learning vs Other Test-Prep

**Rapid Learning is not a “review” course, rather a “re-learn” of the subjects from the start, visually.**

Other Test-Prep	Rapid Learning
Printed books or test-prep classes by college <b>students</b>	Rich-Media Courses by <b>professors</b>
High-Level <b>Review</b>	Comprehensive <b>Re-Learn</b>

If you are looking for a simple review, go for Amazon's test-prep books. If you are looking to re-study the subject courses from the beginning to end, use Rapid Learning.

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For many, the combination of both might work the best.



## Biology in the MCAT



Topics List

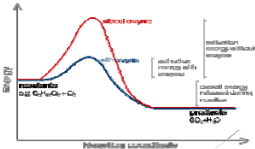
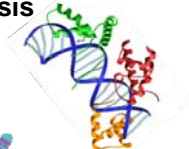

Overview of MCAT Biology

Preview Question Formats












## ▶ MCAT Biology Topics - 1

- **Enzymes:**
  - Enzyme structure & function
  - Control of enzyme activity
  - Basic metabolism
- **Molecular Biology: DNA and Protein Synthesis**
  - DNA structure & function
  - DNA replication, repair and recombination
- **Protein Synthesis**
  - Genetic code, transcription & translation
- **Molecular Biology: Eukaryotes**
  - Chromosome organization, control and gene expression.
- **Genetics**
  - Mendelian concepts
  - Meiosis, genetic variability, mutation
  - Sex-linked characteristics

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## ▶ MCAT Biology Topics - 2

- **Analytic Methods** 
- **Microbiology** 
  - Fungi, Virus Structure and life cycle
  - Prokaryotic structure, growth, physiology and genetics.
- **Eukaryotic Cells: structure, function, regulation and specialization.** 
- **Nervous and Endocrine System**
- **Circulatory, Lymphatic and Immune Systems** 
- **Respiratory System** 
- **Skin System** 
- **Digestive and Excretory Systems** 
- **Muscle and Skeletal Systems**
- **Reproductive System and Development** 
- **Evolution** 

Note: In-depth biology contents at molecular, cellular and organ levels can further be covered in more advanced courses: Molecular & Cell Biology and Anatomy & Physiology. 💡

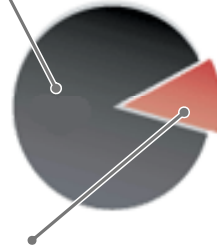
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## Passage and Discrete Question Types

There will be passage-based questions and standalone multiple choice (discrete) questions.

The majority (roughly 75%) of the questions will be passage-based questions. Passages can be an informational presentation, problem-solving techniques, research studies, or persuasive arguments in the context of biological systems.

	Type I # Passage Questions	Type II # Discrete Questions
Chem/Phys	44	15
Bio/Biochem	44	15
Psy/Social	44	15



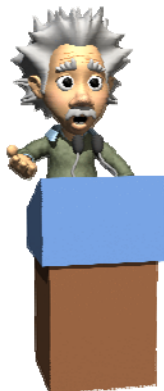
The remainder 25% will be standalone multiple-choice questions.

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## Type I - Passage-Based Question

The passage based question will present information and require outside knowledge.



### Passage Example

A change in the cell's genetic material results in a mutation. A mutation may be silent, include one or few nucleotides or may be a large change in the DNA molecule such as a translocation or large deletion.

A mutation in a germ cell will be transmitted to the offspring and is responsible for most of the genetic diseases.

A point mutation is a change in a single nucleotide. This may be sub-classified as a substitution, deletion or insertion. These mutations may lead to mis-sense, nonsense, silent or frame-shift effects.

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## Passage Question Examples

Passages will have a set of 4-8 questions associated with them.

1. Sickle cell hemoglobin is produced by which type of mutation?  
 (A) Deletion  
 (B) Insertion  
**(C) Substitution**  
 (D) None of the above
2. A mutation converts an AGA codon to a TGA codon (in DNA). This mutation is an example of \_\_\_\_\_.  
 (A) Termination mutation  
 (B) Mis-sense mutation  
 (C) Frame-shift mutation  
**(D) Nonsense mutation**



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## Type II – Discrete Questions

Discrete questions are multiple choice type questions with four answer options. You will pick **ONE** best answer. They are standalone without any passage (Correct answer in red).


1. In a plasma membrane, which of the following provides a general barrier to the movement of molecules?  
 (a) Proteins  
**(b) Lipids**  
 (c) Carbohydrates  
 (d) Fatty Acids
2. When a trauma victim is first admitted into an Emergency Room doctors perform a test to determine if the patient is suffering from shock. Shock is a serious medical condition where cells are not receiving enough oxygen. Which characteristic of human cells makes them susceptible to oxygen deprivation?  
**(a) Use of mitochondria**  
 (b) Use of a ribosome  
 (c) Replication of DNA  
 (d) Cell division

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## MCAT Test Preparation Strategies

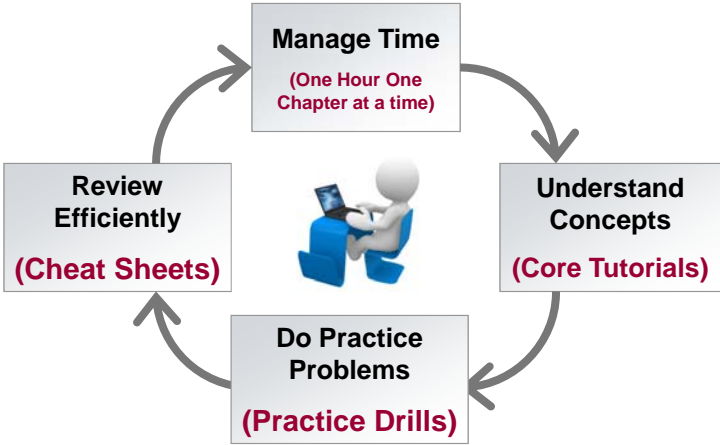


- Time Management
- Concept Mastery
- Practice
- Review




## Test Preparation Overview


Follow this four-step process to successfully prepare for Biology on the MCAT.




```
graph TD; A[Manage Time  
(One Hour One Chapter at a time)] --> B[Understand Concepts  
(Core Tutorials)]; B --> C[Do Practice Problems  
(Practice Drills)]; C --> D[Review Efficiently  
(Cheat Sheets)]; D --> A;
```



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## Time Management Study & Focus



The MCAT does not test every single biology concept.

So only study the topics that the MCAT actually tests.

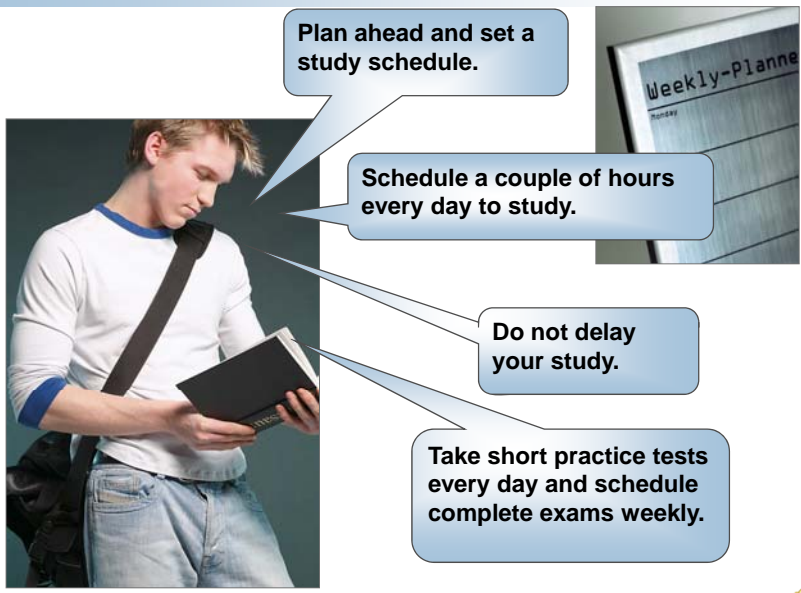
Focus core study hours on weak areas.

Do not study all areas concurrently.

Track mastery using practice exams. Check to see that the areas you are focusing on are improving.

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## Forward Planning



Plan ahead and set a study schedule.

Schedule a couple of hours every day to study.

Do not delay your study.

Take short practice tests every day and schedule complete exams weekly.

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## Long Term Study Goals

**Some students incorrectly believe that if they study more as the test date approaches, they will remember more.**



Studying in set doses ahead of time results in greater memory and understanding of concepts.

Studies show that the more “passes” you make over information the more you will “own” it.

Repetition of concepts and information over time is the winning way to master the MCAT.

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## Master the General Concepts

Work on mastery of general concepts that connect to one another.

Lysosomes are the membrane bound organelles in eukaryotic cells which contain hydrolases. Lysosomes are regarded as the digestive tract of the cells.

Hydrolases are the enzymes that bring about hydrolysis of various compounds.



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**> Connect Concepts**


Generalizing concepts allows you to understand and solve many other concepts without memorizing them.

Example: Now when we talk about the digestion of proteins, lipids, carbohydrates and nucleic acids in the digestive tract, it is hydrolysis that takes place.

Recall from the previous slide: Hydrolysis happens in the presence of hydrolases.


Notice the concept connection!



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**> Seek Answers to Your Questions**

If something is confusing or unclear get your questions resolved.



Make absolutely certain that you have points of confusion resolved as soon as you identify them. Don't put it off thinking that somehow they will "self clarify".

Though tedious, these unanswered questions will show up again and probably on your MCAT.

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## ➤ Partial Comprehension

For example let's say you didn't really understand what the genetic code is, but you still manage to successfully discuss protein synthesis superficially e.g. 'In a majority of proteins, AUG acts as the initiator codon?'

Then a more complex problem rests on this concept, such as: 'What is meant by the term wobbling?'. Because of the superficial understanding of the concept of the genetic code you cannot extrapolate it to "wobble".

By 'mental skimming' you will drown yourself on the MCAT.

But you can master these concepts and perform well if you plan and practice the plan.



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## ➤ Creative Supplemental Study

**Summarize what you learn with cheat sheets.**


**Cheat Sheets:** A cheat sheet is a summary of what you learned in a **SIMPLE AND BRIEF** outline for a chapter.

Use the ones provided with this series, but making your own is a wonderful way to cement concepts in your head!



**Use your smartphone for audio learning.**

Audio learning is ideal for learning on-the-go. It also reinforces what you have learned visually and practice the recalling from your long term memory.



Rapid Learning provides 24 audiobooks for 24 chapters in a subject. Plug the mp3 into your smart phone and start learning.

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**> Cheat Sheets for Quick Review**


Summarize what you have learned into a **SIMPLE** and **BRIEF** outline.

Use the cheat sheets provided in the Rapid Learning Tutorials.


Cheat sheets should include all key terms and concepts. Give yourself memory clues that work for you. Such as pneumonics, images or other memory games.

Use or create your own MCAT mnemonics:  
i.e. **immunoglobulins**  
**"MADGE"**, IgM, IgA, IgD, IgG and IgE.

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**MCAT Test Taking Strategies**



Overview

Know the Test

Plan Your Attack

Focus

Choosing the Right Answer

Guessing



## Test Taking Overview

**Follow these steps during the test:**

- 1 **Know The Test** inside and out before you take the MCAT.
- 2 **Plan Your Attack** the minute the test begins.
- 3 Use techniques to **Build Focus**: It will improve your score.
- 4 Apply techniques to **Zoom In On The Answer** & avoid exam traps.
- 5 If you don't know the answer, **Guess The Right Way**.



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## Know the MCAT

**Prepare ahead of time and know the test process.**

- **Bring your alert mind and a valid ID;**  
Leave your personal items in your locker.
- **Arrive at least 30 minutes before the start time and be prepared for the check-in process (fingerprint etc.).**
- **Know the format of the test inside out – no surprise.**
- **Know the instructions of the sections to save time the day of the test.**



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## Plan Your Attack

### Use game-plan strategies.

- Scan the section and make a note of where the midpoint question is - try to be there half-way through the time.
- Use the onscreen clock to keep track of your time.
- Use approximately 1 minute per question for multiple choice - the rest of the time is needed to read and refer to passages.
- Except for the stand-alone questions, answer problems sequentially as information from an earlier problem may help you understand a later problem.



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## Build Your Focus

### Get into a rhythm by focusing.

- Confidence builds speed, accuracy and score.
- Trust your instincts and don't waste time second-guessing.
- Improve your concentration:
  - Do one problem at a time and do not worry about the problem before or after.
  - Use the scratch paper to organize your thoughts and draw your attention.
  - Breath deeply and refocus on what you know.
- Set the time limit on each problem and move on.



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## Guess The Right Way

**To make an educated guess, eliminate wrong answers first.**

The MCAT does not penalize you for wrong answers. This means you should answer every question even if you have to guess, because there's a chance you might choose the correct answer.



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## Think of the Answer!

Read the question and before you begin scanning the answers come up with your own answer.

Two answers often look similar in the MCAT. If you have answered the question in your mind before you read the solutions you will not be confused by the options.



The enzymes in the Krebs's cycle are located in:

- A. Cytoplasm
- B. Mitochondrial membrane
- C. Mitochondrial matrix
- D. Microsomes

For this question both Choice **B** and **C**, look similar. What should you do?

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**Beware of the Familiar**

**Beware of the Familiar:** Test writers love to include something that seems very obvious as an answer choice. This tempts students to choose the wrong answer because it seems correct at first glance.

Which of the following is true with regards to mitosis?

- A. Mitosis occurs in diploid cells only.
- B. Mitosis is a reductional division.
- C. Prophase I shows complex chromosomal behavior and five sub stages.
- D. Mitosis consists of a single nuclear division.

In this problem, choice **A** is the trap because most students intuitively assume that mitosis occurs in diploid cells only.



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**Beware of the Absolute**

The absolute answer is usually wrong because it only takes one exception to break the absolute.


In most cases relative words like: “possibly”, “sometimes”, “often” etc., indicate the correct answer.

Answer A has already been disqualified. Notice that B is an “absolute” statement describing a process.

**Beware of the absolute statement such as “always”, “never”, “all” etc.**

Which of the following is true with regards to mitosis?

- A. ~~Mitosis occurs in diploid cells only.~~
- B. ~~Mitosis is a reductional division.~~
- C. Prophase I shows complex chromosomal behavior and five sub stages.
- D. Mitosis consists of a single nuclear division.




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**> Answer Selection**

This leaves **C** and **D** as possible choices. Of these two, **D** is correct.

Which of the following is true with regards to mitosis?

- A. ~~Mitosis occurs in diploid cells only.~~
- B. ~~Mitosis is a reductional division.~~
- C. ~~Prophase I shows complex chromosomal behavior and five sub stages.~~
- D. Mitosis consists of a single nuclear division.


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**> Dealing With Similar and Opposites**

Out of two opposite choices, one is usually correct. Similar choices are usually both incorrect.

If two answer choices are very similar in wording, the answer is probably neither of them; because there can only be one correct answer.

However, if two answer choices are opposites, one of them is probably correct; because the test wants you to differentiate between the two core ideas.

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## ➤ Significance of Opposites


If you have no idea at all about which of these answers is correct base your "guess" on the clue of opposites.


Choices A and B are opposites and should be the answers you focus on.

Induction is a process by which the synthesis of an enzyme in an organism is:

- A. Increased
- ~~B. Decreased~~
- ~~C. Controlled~~
- ~~D. Inhibited~~

In this case, the correct answer choice is **A**. Using educated guessing you may deduce that, induction, would mean to increase something.





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## ➤ Elimination and Answer Selection


Choice B and choice C are opposite answers, out of which B is correct.

Choice A and choice D are both automatically incorrect, because they are the unrelated answers to the question.

The best stimulant for secretion of insulin from beta cells in the islets of Langerhans in the pancreas is \_\_\_\_\_.

- A. ~~Hyperlipidemic state~~
- B. Hyperglycemic state
- C. Hypoglycemic state
- D. ~~Normoglycemic state~~





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## Educated Guessing

### Educated Guessing = Wrong Answer Elimination

Simple feedback inhibition in a metabolic sequence is brought about by:

- A. End-product inhibiting the last enzyme in the sequence.
- B. End-product inhibiting the first enzyme in the sequence.
- C. Accumulation of intermediates in the sequence.
- D. End-products altering the kinetics of the sequence.



For instance if you knew that the intermediates are not accumulated in the sequence, then you can cross out answer choice **C**.

Your odds of guessing the correct answer have changed from 1-in-4 to 1-in-3.

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## Learning Summary

Rapid Learning provides six MCAT subjects in general and organic chemistry, biochemistry, biology, physics and psychology.

The MCAT is a standardized test for medical school admission, with four sections equally weighted.

General Biology is tested in three science sections, 5%, 65% and 5%. The contents are covered in a traditional two-semester general biology course.

There are three science sections, each with 59 questions in 95 minutes, and one critical reasoning section, with 53 questions in 90 minutes.

There are two question types, passage and discrete questions. Each section has the score range of 118-132 with the midpoint at 125. The MCAT total score has the range of 472-528 with midpoint of 500.

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**Congratulations**

You have successfully completed the  
core tutorial

**Introduction to Biology in  
the MCAT**

**Rapid Learning Center**


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 **Rapid Learning Center**   
Chemistry :: Biology :: Physics :: Math

**What's Next ...**

Step 1: Concepts – Core Tutorial (Just Completed)  
→ Step 2: Practice – Interactive Problem Drill  
Step 3: Recap – Super Review Cheat Sheet

**Go for it!**

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<http://www.RapidLearningCenter.com>