


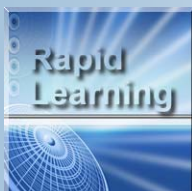
 **Rapid Learning Center**  
Chemistry :: Biology :: Physics :: Math 

Rapid Learning Center Presents ...

**Teach Yourself**  
**MCAT General Chemistry in 24 Hours**




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 **MCAT General Chemistry**  
**Introduction to General Chemistry in the MCAT**

**Rapid Learning MCAT Series**

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**Rapid Learning Center**  
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## Learning Objectives

By completing this tutorial, you will learn about:

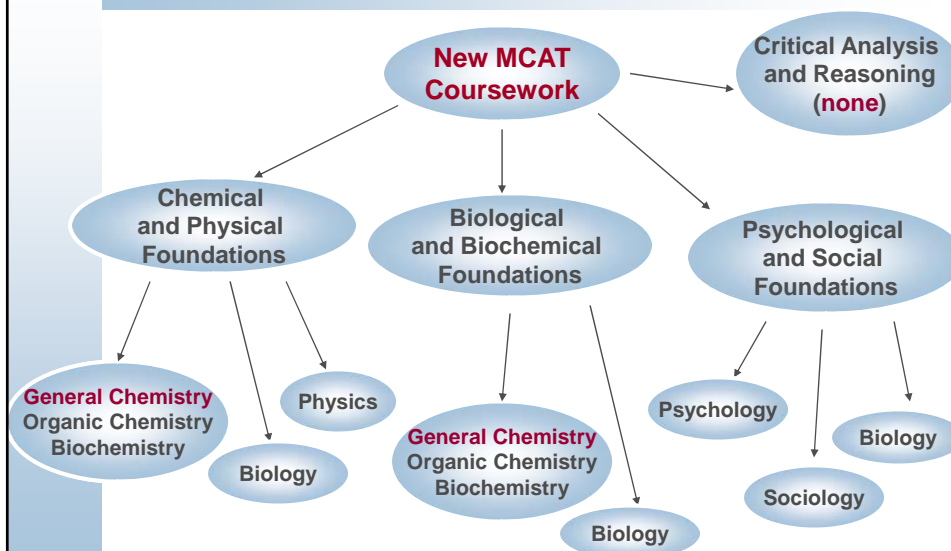


- The MCAT Exam
- The MCAT Format and Score
- Rapid Learning Path to the MCAT
- General Chemistry in the MCAT
- How to Attack Passage based questions and Discrete MCAT Questions
- Test-Preparation Strategies
- Test-Taking Strategies

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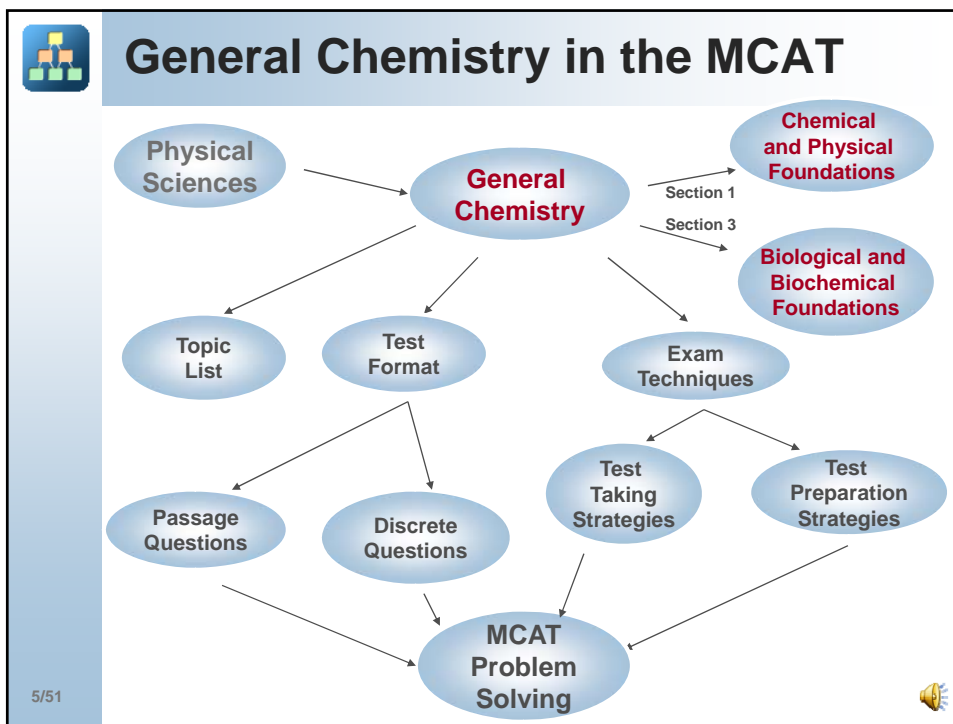


## Concept Map - MCAT



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**Introduction to the "New" MCAT**

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## 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/>

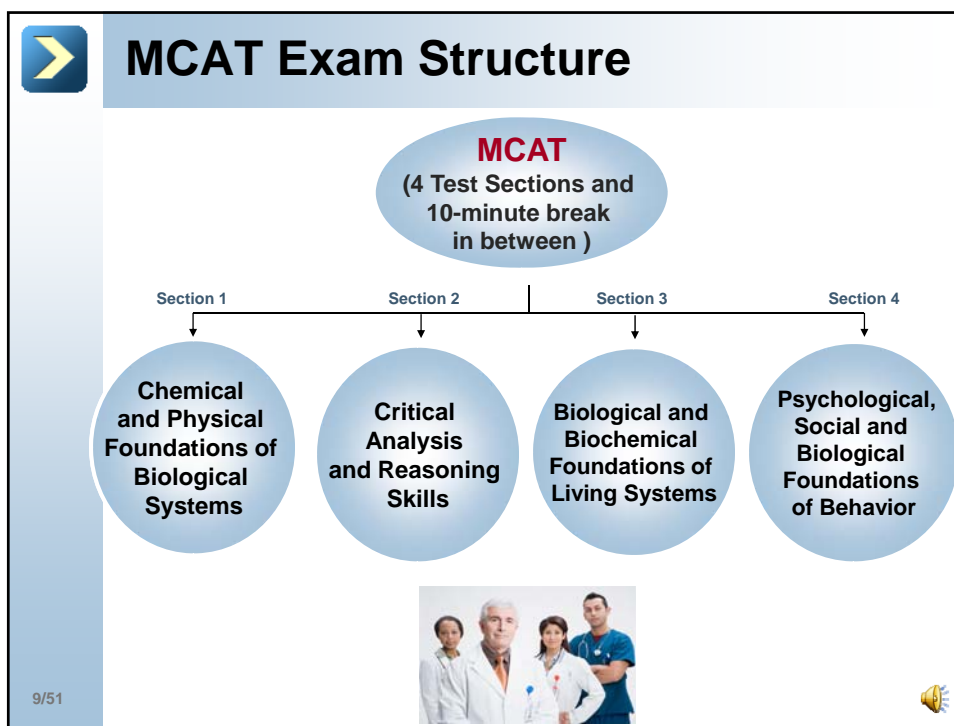
The ideal time to take the MCAT is when you have completed the basic science courses and between 12-18 months before entry into medical school.

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



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## MCAT 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 (125)
Total Score (sum of 4)	472-528 (500)

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
<b>General Chem, 30%</b> Organic Chem, 15% Biochemistry, 25% Physics, 25% Biology, 5%	Biochemisry, 25% Biology, 65% <b>General Chem, 5%</b> Organic Chem, 5%	Psychology, 65% Sociology, 30% Biology, 5%	<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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## Mental Math and Calculations

**Currently, the MCAT does not permit the use of calculator on the test. Scratch paper is provided.**

Arithmetic and basic algebra calculations are common in the MCAT's general chemistry and physics questions.

Most numerical answers on the MCAT are sufficiently far-apart to allow imprecision.

Learn to do mental math and simple calculations on scratch paper. For more complex numerical problems, estimate by hand.



**Note:** Some Rapid Learning chapter problem drills here will require you to work through calculations that potentially require a calculator. In that case, focus on the steps of problem solving and use a calculator if you must for numerical parts, but make an attempt to estimate first. 💡

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## No Equation Sheet

**A periodic table is provided during the exam to answer questions in the physical and chemical foundations section.**

No equation sheet is provided for the current test. It is not permitted to bring your own either.

All formulas and equations should be memorized.

Simple and common physical constants should also be memorized, although it might be stated in the question statements.



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## Rapid Learning for MCAT



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## 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



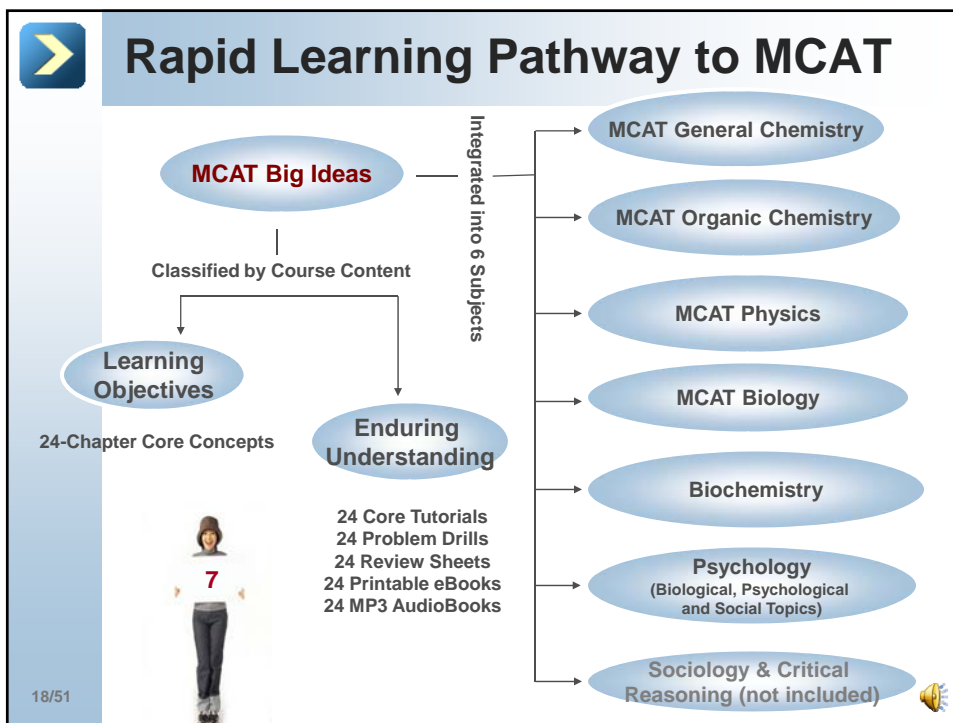
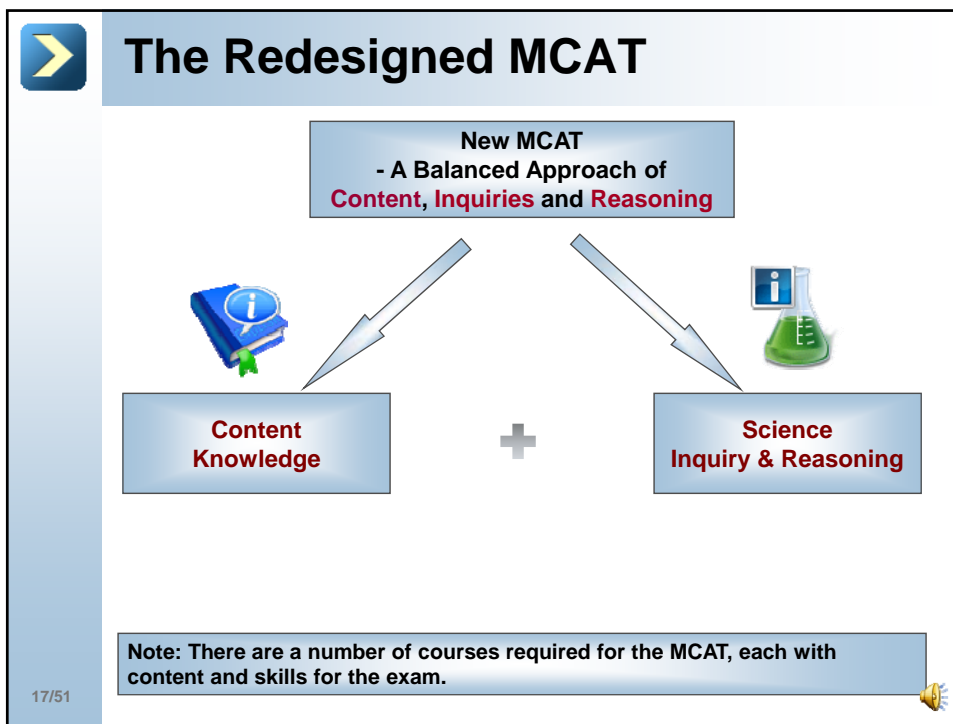
**V:** Visual  
**A:** Aural  
**R:** Read/Write  
**K:** Kinesthetic

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.

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

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## General Chemistry On the MCAT



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## MCAT General Chemistry Topics

MCAT tests the following General Chemistry topics:

- Electronic Structure & Periodic Table
- Bonding
- Phases & Phase Equilibria
- Stoichiometry
- Thermodynamics & Thermochemistry
- Kinetics & Equilibrium
- Solutions
- Acids & Bases
- Electrochemistry



MCAT Section	% General Chemistry Questions
Chem/Phys	30%
Bio/Biochem	5%

A two-semester general chemistry course is required in order to do well in both sections of the MCAT test.

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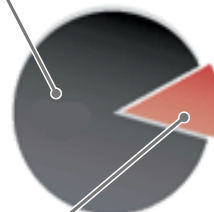


## Passage and Discrete Question Types

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.

	# Passage Questions	# Discrete Questions
Chem/Phys	44	15
Bio/Biochem	44	15



The remainder 25% will be stand-alone multiple-choice questions.

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## Type I: Passage-Based Questions

**Passage-based questions require information found in the passage, as well as outside knowledge.**

Passage-based questions require interpreting information, such as boiling points, to answer questions.

However, often times these questions require knowledge of chemistry concepts and formulas NOT found in the accompanying passage.



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## Sample Passage

**This is an example of a passage typically found on the MCAT:**

To study the chemistry of iron, a series of chemical reactions was carried out.

**Reaction 1:** Initially, 45.0 mL of 1M  $\text{Fe}(\text{NO}_3)_2$  was mixed with 22.0 mL of 0.2M  $\text{Na}_2\text{SO}_4$ . All of the  $\text{Fe}(\text{NO}_3)_2$  were reacted to form Compound C, a red precipitate. Compound C was removed by filtration.



**Reaction 2:** Next, 35.0 mL of 0.2M KI was added to Compound C and slightly mixed. A yellow precipitate of  $\text{FeI}_2$  was formed.

**Reaction 3:** The  $\text{FeI}_2$  was then mixed with 12.0 mL of 0.3M  $\text{Na}_2\text{CO}_3$ . A white precipitate of  $\text{FeCO}_3$  was formed.

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## Example Passage Questions

**Each passage has 4-8 questions. However, not all questions require the passage to answer.**

1. The identity of Compound C is \_\_\_\_\_.

- (A)  $\text{Fe}(\text{NO}_3)_2$
- (B)  $\text{FeSO}_4$
- (C)  $\text{PbSO}_4$
- (D)  $\text{FeCl}_2$

This question requires the passage to answer.

2.  $\text{Fe}(\text{OH})_2$  is slightly soluble in water. How would the amount of  $\text{Fe}(\text{OH})_2$  that normally dissolves in 1 L of water be affected if the pH were 9.0?

- (A) Less would dissolve
- (B) The same amount would dissolve
- (C) More would dissolve
- (D) There is no way to predict the effect of the change

This question can be answered without the passage.

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## Type II: Discrete Multiple Choice Questions

**Some questions are not with a passage and are prefaced with a statement and they are independent from each other.**

(1)  $\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \rightarrow 2\text{HBr}(\text{g})$        $\text{Rate} = k[\text{H}_2][\text{Br}_2]$   
What is the overall order of this reaction?


- (A) Zero order
- (B) First Order
- (C) Second Order
- (D) Third Order

(2) In general, which of the following is the least ordered phase?

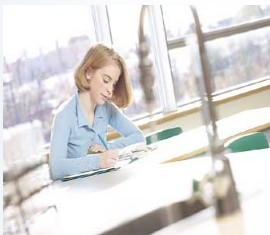
- (A) Liquid
- (B) Gas
- (C) Solid
- (D) Fusion


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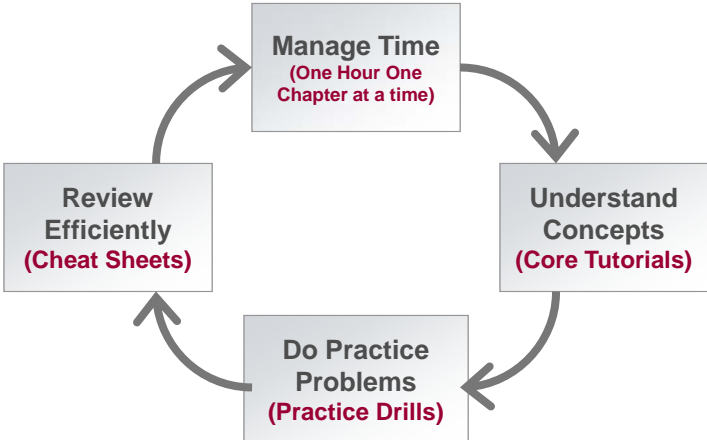
## MCAT Test Preparation Strategies



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## Test Preparation Overview

Follow this four-step process to successfully prepare for General Chemistry 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 - 1

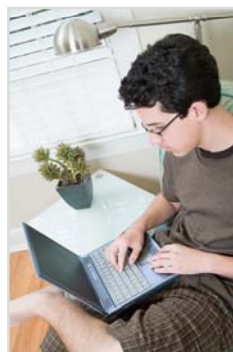
**Use your time wisely. Study only the topics that will be on the MCAT.**

The MCAT does not contain every single General Chemistry concept.

There are some topics in your textbook that are not on the MCAT.

Don't waste time on concepts not tested.

Use this tutorial series to focus on the tested material.



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## Time Management - 2

**Focus core study hours on weak areas.**

Study all of the topics listed on the MCAT Big Ideas.

Focus your efforts on your weak areas.

Don't study all of the topics concurrently. Master a topic before moving on to the next.



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## Time Management - 3

**Plan ahead: set a study schedule and make appointments with yourself.**

Set aside a couple of hours every day to study.

Write down on your calendar the specific hours each day for the chapters.

In Rapid Learning, you will need to study 1-2 hours, i.e. 1-2 chapters, each day.

You need to study and practice EVERY DAY in the coming weeks and months.



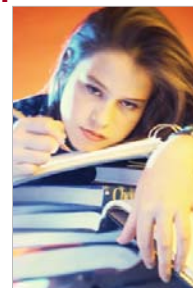
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## How our Brains Store Information

**Space out your study to avoid cramming.**

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



However, as any neurologist will tell you, building long term memory by studying in set doses ahead of time increases memory and the understanding of concepts. Do not cram for the exam.

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## Concept Mastery - I

**Translate formulas into words to give them meaning.**

Simply memorizing formulas is not enough.

The best way to understand and memorize formulas is to understand what they mean. You should translate any formulas you learn into **words** and **images** that are meaningful to you.



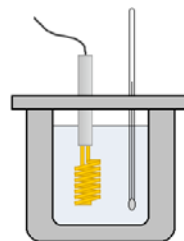
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## Concept Mastery I - Example

For example, let's say you need to memorize the equation for heat transfer:  $Q = mc\Delta T$

A less effective method is to memorize “ $Q$  is equal to  $m$ ,  $c$ , change in  $T$ .” What are the odds that you will remember it after fifty more equations?



However, let's say you take the time to understand what “ $c$ ” is.

$c$  is the specific heat. In words, specific heat is the property of a material that specifies how many calories (heat) are needed to raise every 1 gram of the material by 1 degree Celsius.

$Q = mc\Delta T$  is no longer just letters. Now it means that the amount of heat needed depends on the material, how much of the material is present, and how much the temperature changes.

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## Concept Mastery I - In Action

**Let's see it in action.**

Now, you see this:

“How much heat is needed to raise 100 grams of water from 20°C to 55°C?”

Because you know that every material has a different specific heat, you will remember that you have to use “**c**”.



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## Concept Mastery - II

**Generalize concepts to save memorization and time.**

To generalize means to remember only the most basic and broad concept or formula.

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



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## Concept Mastery II - Example

**From the Ideal Gas Law you can figure out Charles' Law, Boyle's Law, and Avagadro's Laws.**

Instead of memorizing Boyle's Law, you know the Ideal Gas Law ( $PV = nRT$ ).

You understand that for the same gas,  $n$  (# of moles),  $R$  (constant), and  $T$  (temperature) are all constant ( $k$ ).

Then you will understand that  $PV = k$  no matter how pressure or volume changes.

So, if at condition 1,  $P_1V_1 = k$ , and at condition 2,  $P_2V_2 = k$ , then from algebra you know they must be equal to each other. Thus,  $P_1V_1 = P_2V_2$  (which is Boyle's Law).



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## Concept Mastery - III

**Get your questions resolved.**

If you have questions about a concept or problem, don't leave them hanging—Get an answer!



Look through your study materials, search online yourself, or email someone, but make sure you do everything it takes to master the concept.

It may feel tedious, or even a waste of time to google for just one answer, but eventually, these unresolved questions will show up again, and very likely on your MCAT.

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## Practice Problems

**Use practice problems to solidify concept understanding.**

Concepts must be applied to fully understand them.

**You may understand what “spontaneity of a reaction” means in words, but what good is it if you can’t use Gibbs Free Energy to calculate whether a reaction is spontaneous?**



Concept understanding goes hand-in-hand with doing practice problems.

As soon as you learn a new concept, try to solve the practice problems that come with this tutorial series. You can also use textbooks and online sources for more practice!

Try to do a few full length practice tests in stages.

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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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## MCAT Test Taking Strategies




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## 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 and 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.
  - Breathe deeply and refocus on what you know.
- Set the time limit on each problem and move on.



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## Zoom in on the Answer

### Be efficient in solving problems.

- Try to think of an answer to the question before looking at the answer choices...then look for your answer there (this helps you avoid traps).
- If you can't think of an answer first, scan through all the choices.
  - Don't pick the first one you see that looks good...there might be a better one later.
- Beware of absolutes—rarely are things “**always or never**” in the world!
- If you see two opposite choices, usually one of them is correct.



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## Guess The Right Way - 1

**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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## Guess The Right Way - 2

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

Let's try the following problem.

Which of the following is true regarding catalysts?

- (A) Catalysts are used up in a reaction
- (B) Catalysts are necessary for a reaction to occur
- (C) Catalysts lower activation energy
- (D) Catalysts change the free energy of a reaction

Let's assume you are not sure which answer is correct. Eliminate choices that you know are wrong. For example, let's say you knew that catalysts are not used up in a reaction. You can cross out answer choice A. This has increased your odds of guessing the correct answer from 1-in-4 to 1-in-3.

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## Learning Summary


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

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

**General Chemistry is tested in two science sections. The contents are covered in a traditional two-semester general chemistry course.**

**There are three science sections, each with 59 questions in 95 minutes, and one critical reasoning section, made up of 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 a midpoint of 500.**


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## Congratulations

You have successfully completed the core tutorial

### Introduction to General Chemistry 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>