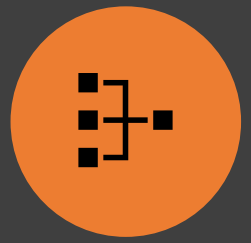

# MCAT SEMINAR:

## M-DO'S AND M-DON'TS

VINCENT BROWN, UMBC

NOAH GOLD, UMBC

# OVERVIEW



MCAT BASICS

MY EXPERIENCE

ESSENTIAL MATERIALS

STUDY SCHEDULE TIPS

Q&A

# WHAT'S ON THE MCAT?

Chemical and Physical Foundations of Biological Systems

Critical Analysis and Reasoning Skills

Biological and Biochemical Foundations of Living Systems

Psychological, Social, and Biological Foundations of Behavior

# HOW LONG IS IT?

- 10 min breaks after Chem/Phys
- 30 min break after CARS
- 10 min break after Bio/Biochem

**Exam Overview**

| Section | # of Questions | Time Allotted |
|---|---|---|
| Examinee Agreement | | 8 minutes |
| Tutorial (optional) | | 10 minutes |
| Chemical and Physical Foundations of Biological Systems | 59 | 95 minutes |
| Break (optional) | | 10 minutes |
| Critical Analysis and Reasoning Skills | 53 | 90 minutes |
| Mid-Exam Break (optional) | | 30 minutes |
| Biological and Biochemical Foundations of Living Systems | 59 | 95 minutes |
| Break (optional) | | 10 minutes |
| Psychological, Social, and Biological Foundations of Behavior | 59 | 95 minutes |
| Void Question | | 5 minutes |
| Satisfaction Survey (optional) | | 5 minutes |
| Total Content Time | | 6 hours \| 15 minutes |
| **Total "Seated" Time*** | | **Approx. 7 hours \| 33 minutes** |

**Total seated time does not include check-in time on arrival at the test center.*

# CHEMICAL AND PHYSICAL FOUNDATIONS OF BIOLOGICAL SYSTEMS

**Content Breakdown:**

- First-semester biochemistry, 25%*
- Introductory biology, 5%*
- General chemistry, 30%*
- Organic chemistry, 15%*
- Introductory physics, 25%*

**Time Breakdown:**

- 59 questions; 95 minutes
- 8 minutes per passage (10 passages)
- 1 minute per discrete (15 discrete questions)

*Estimates from the AAMC

# CRITICAL ANALYSIS AND REASONING SKILLS

**Content Breakdown:**

- Foundations of Comprehension, 30%*
- Reasoning Within the Text, 30%*
- Reasoning Beyond the Text, 40%*

- Humanities, 50%*
- Social Sciences, 50%*

**Time Breakdown:**

- 53 questions, 90 minutes
- 10 minutes per passage
- 9 passages

*Estimates from the AAMC

# BIOLOGICAL AND BIOCHEMICAL FOUNDATIONS OF LIVING SYSTEMS

**Content Breakdown:**

- First-semester biochemistry, 25%*
- Introductory biology, 65%*
- General chemistry, 5%*
- Organic chemistry, 5%*

**Time Breakdown:**

- 59 questions, 95 mins
- 8 minutes per passage (10 passages)
- 1 minute per discrete (15 discrete questions

*Estimates from the AAMC

# PSYCHOLOGICAL, SOCIAL, AND BIOLOGICAL FOUNDATIONS OF BEHAVIOR

**Content Breakdown:**

- Introductory psychology, 65%* (5% are biology-related)
- Introductory sociology, 30%*
- Introductory biology, 5%*

**Time Breakdown:**

- 59 questions 95 minutes
- 8 minutes per passage (10 passages)
- 1 minute per discrete (15 discrete questions)

*Estimates from the AAMC

# General MCAT Prep

**Must have materials**

- MCAT Book set
- Practice tests
  - Book sets: There are many sets from different companies. For ex: I used the Kaplan set and have had a good experience.
  - Practice tests: essential to practice AAMC versions

**Study Steps**

Phase I

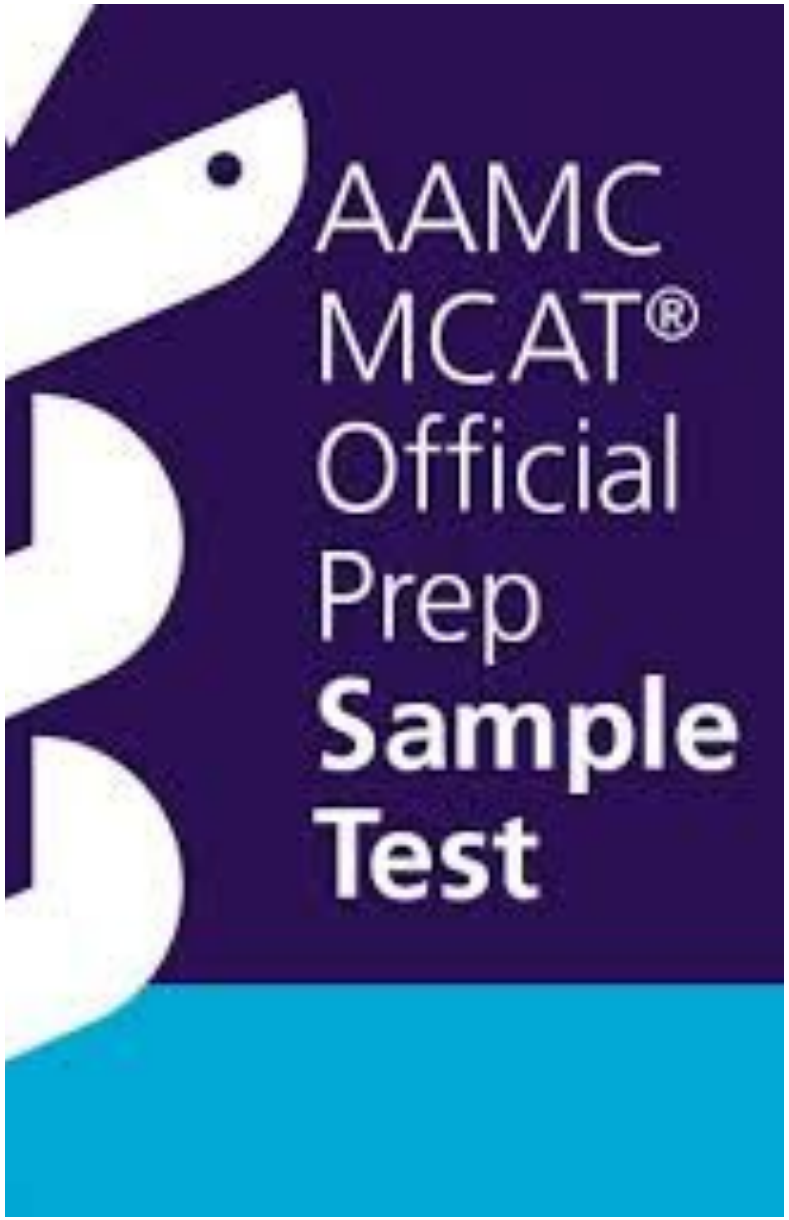
- Diagnostic exam
- Inclusive content review
- Periodic "checkpoint" tests

Phase II

- Continued review of topics (as needed)
- Practice

# MY MCAT EXPERIENCE:

- Began on June 1st ; Took exam on August 9th
- Started with the AAMC Sample Test
  - Strong and weak points?
- Used this to see what I needed to spend the most time on
- Created my schedule from this



- 506

| N/A | N/A | 171 of 230 | 05:13:18 | 05-31-2019 |
|---|---|---|---|---|
| Scaled Score | Percentile Rank | Questions Correct | Time Spent | Attempt Date |

Configuration

Total Time: 07:22:00 (x 1 time applied)

Test Sections

Review All Questions

| Sections | Scaled Score | Percentile Rank | Questions Correct | Questions Incomplete | Avg. Time Per Question | # Flagged Answered Correctly | # Flagged Answered Incorrectly | |
|---|---|---|---|---|---|---|---|---|
| Chemical and Physical Foundations of Biological Systems | N/A | N/A | 38 of 59 | 0 | 00:01:23 | 0 | 3 | » |
| Critical Analysis and Reasoning Skills | N/A | N/A | 41 of 53 | 0 | 00:01:34 | 3 | 5 | » |
| Biological and Biochemical Foundations of Living Systems | N/A | N/A | 47 of 59 | 0 | 00:01:30 | 8 | 6 | » |
| Psychological, Social, and Biological Foundations of Behavior | N/A | N/A | 45 of 59 | 0 | 00:01:01 | 3 | 1 | » |

# MY SCHEDULE

- Created my schedule using Studyschedule.org
- Sunday-Friday; Took Saturday off
- Each day I would read my assigned chapters (Kaplan) from 8-12PM
- Practice questions from the AAMC section bank for about an hour; 1 CARS passage a day
- Watch any Khan Academy videos that I needed to help me understand something
- Watched the corresponding Picmonic Videos of the content

# MCAT STUDY GUIDE

- AAMC MCAT Content Guides for each section
- Read the Kaplan chapters and filled in notes on the content guides

***Content Category 4A: Translational motion, forces, work, energy, and equilibrium in living systems***

The motion of any object can be described in terms of displacement, velocity, and acceleration. Objects accelerate when subjected to external forces and are at equilibrium when the net force and the net torque acting upon them are zero. Many aspects of motion can be calculated with the knowledge that energy is conserved, even though it may be converted into different forms. In a living system, the energy for motion comes from the metabolism of fuel molecules, but the energetic requirements remain subject to the same physical principles.

The content in this category covers several physics topics relevant to living systems including translational motion, forces, work, energy, and equilibrium. The topics and subtopics in this category are the following:

Equations: $F_g = \frac{G m_1 m_2}{r^2}$ $G = 6.67 \times 10^{-11}$ $v = v_0 + at$ (no dist) $x = v_0 t + \frac{1}{2}at^2$ (no $v_0$) $F_c = \frac{mv^2}{r}$ $\tau = rF\sin\theta$ $v^2 = v_0^2 + 2a\Delta x$ (no time) $x = \bar{v}t$ (no acceleration) $F_{gy} = mg\sin\theta$ $F_{gx} = mg\cos\theta$

PHYS 1 **Translational Motion (PHY)**

- Units and dimensions
- Vectors, components → vectors = Mag and direction
- Vector addition Tip-Tail
- Speed, velocity (average and instantaneous) Speed: Avg = $\frac{\text{Total distance}}{\text{Total time}}$; Instantaneous = magnitude of the instaneous velocity
- Acceleration change in velocity over time $a = \frac{\Delta v}{\Delta t}$ Velocity: Avg = $\frac{\text{Total displacement}}{\text{Total time}}$; Instantaneous = $\frac{\text{Avg velocity}}{\Delta t}$ as it reaches 0

PHYS 1 **Force (PHY)**

- Newton's First Law, inertia → $F_{net} = ma = 0$ [rest, stays at rest]
- Newton's Second Law ($F = ma$) Acceleration b/c of the sum of forces on an object
- Newton's Third Law, forces equal and opposite $F_{AB} = -F_{BA}$ (doesn't have to be contact)
- Friction, static and kinetic Force that opposes motion; Static = $0 \le F_s \le \mu_s N$ (not moving) Kinetic = $F_k = \mu_k N$ (moving) [$F_k < F_s$ always]
- Center of mass = The single point where gravity acts
  - Uniform object = the geometric center

PHYS 1 **Equilibrium (PHY)**

- Vector analysis of forces acting on a point object Trans Equilibrium = Absence of any net forces acting. $F_{net} = 0$, constant velocity $a = 0$ Rot Equilibrium = Absence of any net torque. $\tau_{net} = 0$
- Torques, lever arms $\tau = rF_\perp \sin\theta°$; r = lever arm/distance from pivot

PHYS 2 **Work (PHY)** → Work = Transfer of energy (J)

- Work done by a constant force: $W = Fd\cos\theta$ The force must be parallel to the displacement
- Mechanical advantage Reduction of force to achieve Work by increasing the distance; Mech A = $\frac{F_{out}}{F_{in}}$
- Work Kinetic Energy Theorem Relationship btw W and E; can calculate work w/o knowing net F or net a; $W_{net} = \Delta K$
- Conservative forces
  - Conservative = Path Independent; Don't dissipate Energy (Gravitational; Electrostatic); Nonconservative = Friction; Air Resistance (Path dependent)

PHYS 2 **Energy of Point Object Systems (PHY)**

- Kinetic Energy: KE = ½ $mv^2$; units Energy of Motion (Speed not velocity); Units are J or $\frac{kg \cdot m^2}{s^2}$
- Potential Energy Potential to do work
  - PE = $mgh$ (gravitational, local)
  - PE = ½ $kx^2$ (spring)
- Conservation of energy
- Power, units $P = \frac{W}{s} = \frac{\Delta E}{t}$
  - Power = Rate of energy transfer; W or J/s

• Total Mechanical Energy: $E = U + K$
  - Only conservative Forces: $\Delta E = \Delta U + \Delta K = 0$ ($\Delta U = \Delta K$)
  - W/ Nonconservative present: $W_{nonconser} = \Delta E = \Delta U + \Delta K$

Mech A is dimensionless; $MA = \frac{F_{out}}{F_{in}} = \frac{F \text{ by machine}}{F \text{ on machine}}$



Pulleys: W/ nonconservative forces; Efficiency = $\frac{W_{out}}{W_{in}} = \frac{(\text{load})(\text{load distance})}{(\text{effort})(\text{effort distance})}$

Load = output force of machine
Load distance = distance that the load moves over
Effort = input force (ma)
Effort distance = distance of effort
↳ This is X times more than load distance
↳ X = the # of ropes

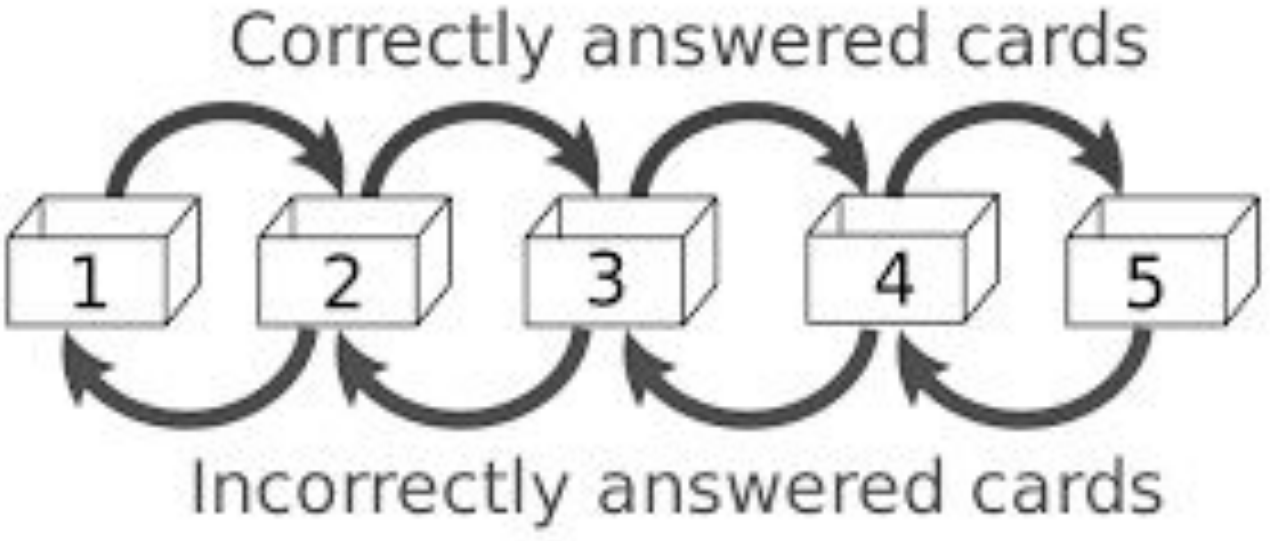
• More pulleys = less effort needed; 3 pulleys (6 Ropes) = ⅙ the effort needed

# MCAT STUDY GUIDE

- AAMC MCAT Content Guides for each section
- Read the Kaplan chapters and filled in notes on the content guides (at first)
- Then started to ANKI everything

# ANKI

- Anki is a spaced repetition flashcard software.
  - Helps with the "curve of forgetting".
- Reviewed my cards EVERY DAY



AT&T LTE 7:22 PM 43%

Decks Add Edit Find

What's the anatomy and function of the Large Intestine?

0 + 0 + 2

AT&T LTE 7:22 PM 43%

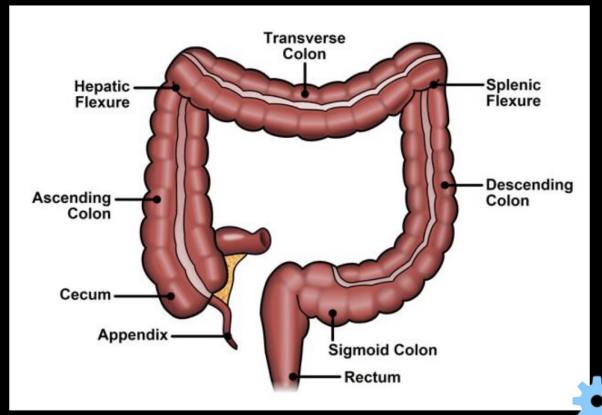
Decks Add Edit Find

Divided into the cecum, colon and rectum

**Cecum** = Accepts from small intestine through ileocecal valve and connects to the appendix

**Colon** = (Ascending, transverse, descending, and sigmoid) Absorbs water and salt to form feces

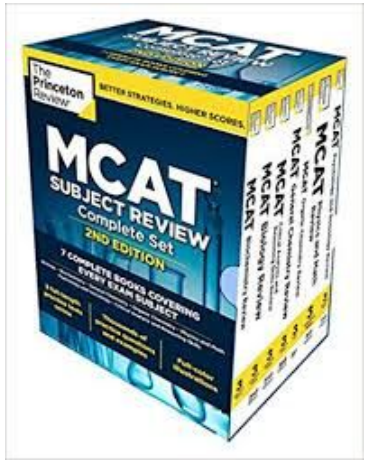
**Rectum** = Storage site for feces (Anus has internal and external sphincters)




10m Again | 1.5mo Hard | 3.4mo Good | 4.5mo Easy

# OVERALL STUDY TIMELINE:

- Content review from June 1st to July 28th
- I took a total of 7 Full lengths (4 AAMC, 3 Next Step)
- AAMC Test 1 on June 15th : 508
- Next Step 1 on July 13th : 510
- Next Step 2 on July 29th : 512
- Next Step 3 on July 31st : 511
- AAMC 3 on August 2nd : 515
- AAMC 2 on August 5th : 516






# ESSENTIAL MATERIALS

- Books I used: Kaplan 7-book set
- Other good books: Princeton Review, Examkrackers, Next Step

# ESSENTIAL MATERIALS

- ANKI:
  - Spaced Repetition to help you remember MCAT material
  - Free desktop and Android app ($25 for IOS app)
- Picmonic:
  - Picture mnemonics for most of the MCAT topics
  - Basic version is free and premium is

# ESSENTIAL MATERIALS

## All AAMC materials:

- 5 Full lengths tests (Starting October)
- Section Bank and Question Packs (Best CARS practice available)

## Next Step Materials:

- Up to 10 Full Lengths; 1 for free (4 for $99)
- Master Classes on all MCAT topics and strategies (FREE)

# ESSENTIAL MATERIALS

- Khan Academy:
  - Has a whole section devoted to MCAT prep

# ESSENTIAL MATERIALS

- Podcasts and YouTube!
  - The MCAT PODCAST
  - AK Lectures on YouTube

# HOW TO MAKE A SCHEDULE

- Prioritize your WEAK areas
  - Can't improve in them if you don't work at them
- Schedule in practice questions frequently
- DO FULL LENGTH TESTS!!!!
  - AAMC (Best there is!) and Next Step (Next best thing)
- Decide when you want/can take the MCAT.
  - Determining your test day is VERY IMPORTANT
- Then use studyschedule.org to create a schedule that works best for you

# AAMC FEE ASSISTANCE PROGRAM (FAP)

- Helps students afford the MCAT and apply to Med schools through AAMCAS.
- Eligibility:
  - U.S citizen, DACA, Green Card holder, Permanent Resident, Granted asylum/refugee status.
  - Must have a total family income of 300% the National Poverty Line for your family size.
- Benefits:
  - Get all the AAMC test prep materials for free.
  - MCAT costs $130 instead of $320.
  - Free access to MSAR.
  - Waiver for all AAMCAS fees for (1) application with up to 20 different med schools.

# PRE-SUBMITTED QUESTIONS:

- **What advice would you give current sophomores to prepare for mcat?**
  - Make sure to really LEARN the material the first time.
  - Save your notes.
  - Research what's on the MCAT and look for resources that you can use when you start studying.
- **What study material would you recommend to purchase (Kaplan, Princeton, etc.)?**
  - Kaplan (Because that's what I used).

# PRE-SUBMITTED QUESTIONS:

- **What is the best way to read a paragraph, understand it, grasp the REAL question , and answer it correctly in the time constraint we have?**
  - This comes with practice. You have to find out what works best for you by doing lots of practice passages and full lengths.
  - One thing you can do is highlight key words, results, or correlations you find in the passage. (What I did)
- **How early should we start studying?**
  - Depends on how much time you need to study: Do you understand most of the material from when you learned it in class?
  - 2-3 months (or entire summer) if that's all you're doing; 5-6 months if you are taking classes while studying.
- **When should you take the MCAT (at what level of education or after taking what courses)?**
  - Most ideal: After all pre-requisites; But this depends on how comfortable you are on self teaching (I don't recommend)

YOU ALL CAN DO IT!!!!!!

YOU CAN GET THE SCORE YOU WANT/DESERVE!!!

# Q&A

- What questions can I answer?

# LINKS TO RESOURCES

- Study Schedule Maker
- AAMC MCAT Materials
- ANKI
- Picmonic
- Next Step MCAT Prep
- Khan Academy
- AK Lectures