



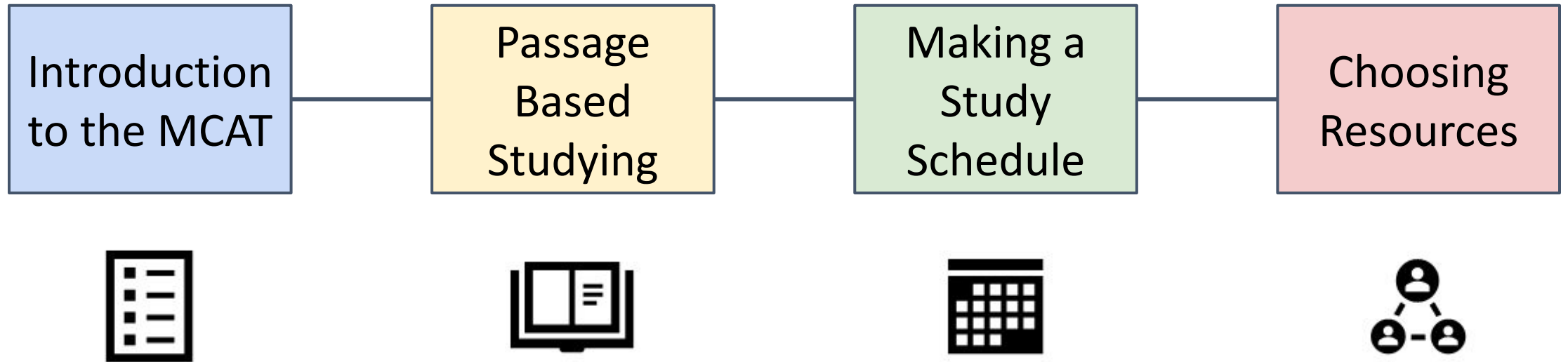
Demystifying the MCAT

Presented by:
San Francisco State University's
Pre-Health Post-Bac Program







SAN FRANCISCO
STATE UNIVERSITY

Presentation outline



MCAT format

Section	 Chemical and Physical Foundations of Biological Systems (C/P)	 Critical Analysis and Reasoning Skills (CARS)	 Biological and Biochemical Foundations of Living Systems (B/B)	 Psychological, Social, and Biological Foundations of Behavior (P/S)
Questions	44 passage-based 15 independent	53 passage-based	44 passage-based 15 independent	44 passage-based 15 independent
Time (7 hrs)	95 min	90 min	95 min	95 min

10 min break

30 min break

10 min break

MCAT format takeaways

- You can plan your study schedule to mimic the internal timing of exams: study blocks of 95 minutes with 10-30 minute breaks in between.
- It's good to have at least one day a week (or more) where you include four of these study blocks totalling 7+ hours. This may help prepare you to concentrate for the amount of time required by the MCAT.

MCAT content

Three of the MCAT's four sections (all besides CARS) require you to have a basic understanding in the natural, psychological and social sciences. This content should be covered in the following courses:

One year with lab (2 semesters or 3 quarters)	One term (1 semester or quarter)
Gen Chem*, Organic Chem*, Gen Bio*, Physics*	Biochemistry*, Psychology, Sociology

Takeaway: when you take these courses, put them as top priority.

*Starred courses are typically required at most med schools

MCAT CARS topics

Humanities and social sciences:

- Architecture
- Art
- Dance
- Ethics
- Literature
- Music
- Philosophy
- Popular Culture
- Religion
- Theater
- Studies of Diverse Cultures
- Anthropology
- Archaeology
- Economics
- Education
- Geography
- History
- Linguistics
- Political Science

Takeaway: For CARS, the concepts you need to know will be provided within the passage - be cautious of using outside knowledge. You don't need to take these courses, but do need to be a strong reader and critical thinker.

Financial burden of taking the MCAT

Costs:

- MCAT registration fee: \$335
- AAMC Bundle: \$320
- Blueprint* (Qbanks + Full length): \$319

*Blueprint is one of a handful of companies offering scored full length practice exams.

MCAT reschedule fees:

- >60 days before exam: \$50
- 30-59 days before exam: \$100
- 10-29 days exam: \$200

MCAT cancellation refund:

- >60 days before exam: \$165
- 30-59 days before exam: \$165
- 10-29 days before exam: \$0

Fee Assistance Program (FAP)

Financial support for MCAT and medical school applications for those that qualify (financial need-based):

- Discounted MCAT registration from \$335 to \$140 and free MCAT prep material.
- Free MSAR subscription and free AMCAS applications (up to 20 schools).
- While you may qualify for the FAP up to five times, the free MCAT prep material is only given once.
- If your benefits are approved on any date in 2024, your benefits will expire at the end of 2025.

[Fee Assistance Program \(FAP\)](#)

MCAT Passages

Anatomy of an MCAT passage (see next slide)

- The passage is taken from the AAMC MCAT sample exam
- Passages are shown on the left and may contain figures and tables. You have to scroll to see the whole passage. You can highlight and strikethrough text.
- 4-7 questions on the right, presented one at a time.
- You can flag a question for review (come back to it later). You can navigate to any question (its passage will be shown on the left).

Pause

Passage 1 (Questions 1-4)

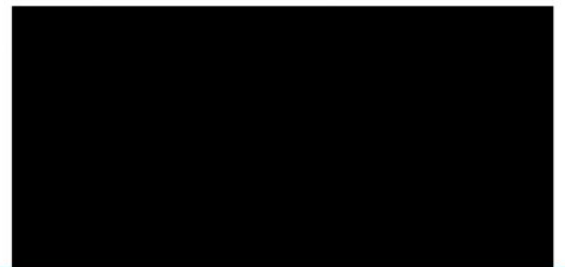
[Redacted passage text]

[Redacted passage text]



Figure 1 [Redacted]

[Redacted passage text]



Question 1

[Redacted question stem]

- A. [Redacted]
- B. [Redacted]
- C. [Redacted]
- D. [Redacted]

MCAT passages and questions

- A passage and its roughly 5 questions might take 10 minutes to complete.
- Many elements of a passage will not be reflected in its questions.
- However, many of the questions cannot be answered without recognizing a key idea **buried** within the passage - it's often more difficult than locating a fact. You may have to reason through a broad concept implied by the passage.

Example passage

- Here is an example passage from the bio/biochem section.
- Take one minute to quickly skim it (I will provide a brief summary afterwards).

The myocellular transmembrane Na^+ gradient is important for proper cellular function. During septic shock, disruption of Na^+ homeostasis often occurs and leads to decreased membrane potential and increased intracellular Na^+ . It has been found that failure of cellular energy metabolism is a common symptom in septic patients who do not respond to therapeutics. Because normal intracellular levels of Na^+ are maintained by the $\text{Na}^+\text{K}^+\text{ATPase}$, it is important to understand how metabolic energy production is linked to cation transport.

Researchers are interested in whether the energy used for ion transport is derived from glycolysis or oxidative phosphorylation. This information would provide a better understanding of myocellular damage that occurs during critical illness. Experiments were conducted to evaluate the effects of glycolytic inhibition on cellular Na^+ and K^+ concentrations and lactate production in rat skeletal myocytes.

Rat skeletal muscle fibers were extracted and incubated in normal media (control), glucose-free media (G(-)), and glucose-free media with various concentrations of the glycolytic inhibitor iodoacetate (IAA). IAA directly prevents the formation of 1,3-bisphosphoglycerate. After one hour in the media, the muscle tissues were assayed for intracellular Na^+ and K^+ content and lactate production. Cellular viability was determined by measuring the amount of lactate dehydrogenase (LDH) released, as LDH release is an indicator of cell death. The results are displayed in Figure 1.

The researchers also examined the effect disruption of oxidative phosphorylation had on Na^+ and K^+ content. Inhibition of oxidative phosphorylation was caused by carbonyl-cyanide m-chlorophenylhydrazone (CCCP), an ionophore that allows protons to move freely through membranes. No correlation between Na^+ and K^+ content and oxidative phosphorylation was found.

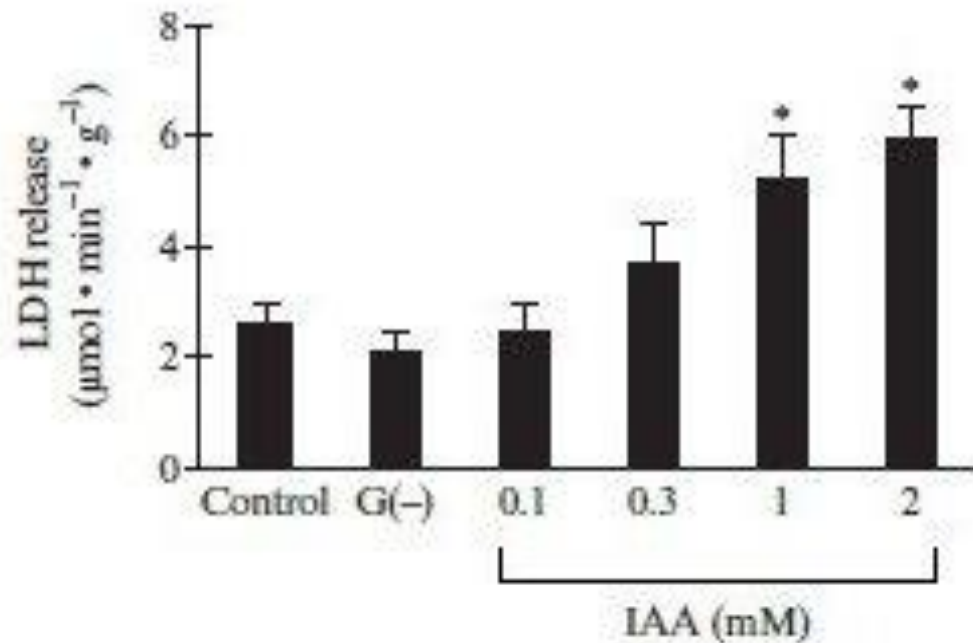
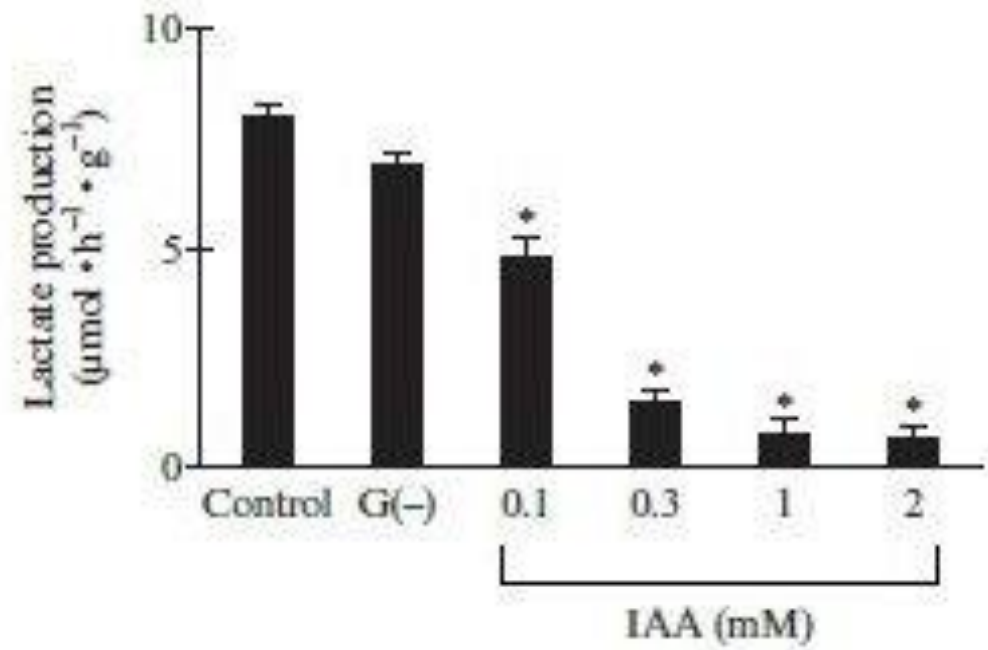
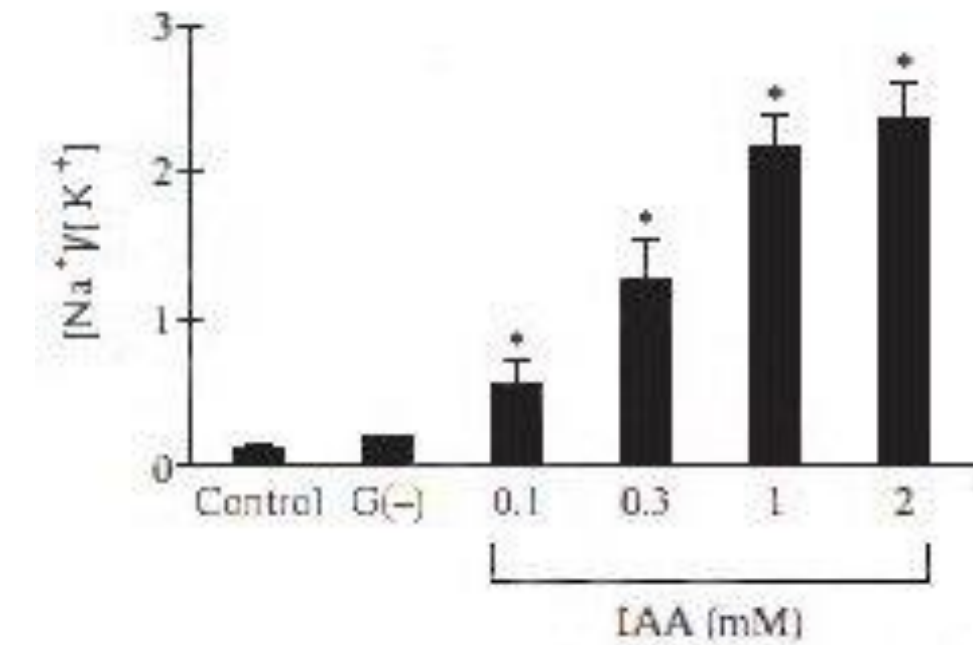


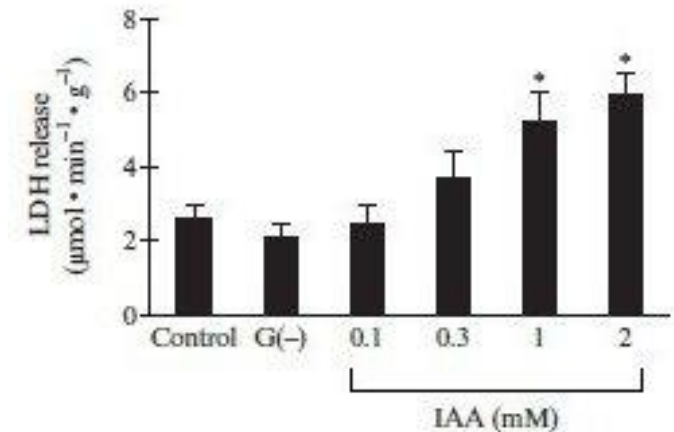
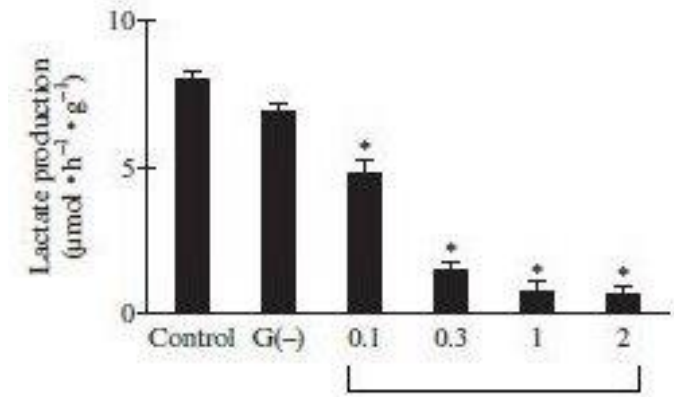
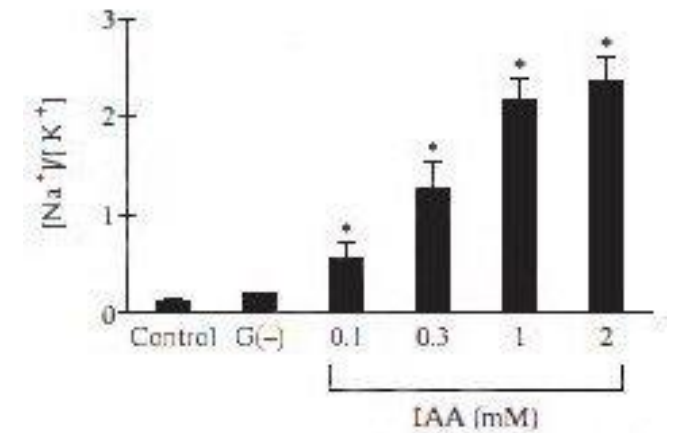
Figure 1 Effects of glycolytic inhibition on intracellular Na^+ and K^+ content and lactate production with cellular viability measured by LDH release. (Note: The * indicates $p < 0.05$ versus control.)

My passage summary

- Septic shock leads to increased intracellular Na^+ (muscle cells)
- Research question: does energy used for ion transport come from glycolysis or oxidative phosphorylation?
- Rat muscle cells incubated in 1) control, 2) glucose-free and 3) glucose-free with glycolysis inhibitor IAA
- Cells evaluated for Na^+ , K^+ , lactate and LDH - an indicator of cell death (figure 1)
- Disruption of oxidative phosphorylation did not alter Na^+ and K^+ content

My figure summary

- Intracellular Na^+ increases with the glycolytic inhibition but not glucose restriction.
- Lactate production slows with presence of inhibitor but not glucose restriction.
- Glycolytic inhibition leads to cell death (correlates well with increased Na^+)
- **Bottom line:** inhibition of glycolysis leads to increased intracellular Na^+



The benefits of summarizing

- Being able to create your own summary is an important preparation strategy because it helps you read carefully and think critically about what you are reading. Also, by identifying the locations of key ideas in the passage or its figures, you are training your information-locating skills.
- We recommend you create a summary for each passage you practice before looking at its answer key.

Example question

3. If the effects of IAA treatment in nerve cells are the same as those observed in myocytes, which feature of an action potential would be most affected by IAA treatment?




- A) Initiation of depolarization
- B) Rising phase of depolarization
- C) Falling phase to undershoot
- D) Return to resting potential

Reasoning through the question

- **Reasoning within the passage (what it tells you):** Glycolysis inhibitor IAA increases intracellular Na^+ .
- **Reasoning outside the passage (knowledge you need to bring in):** Na^+ enters a neuron during an action potential and is pumped out during its return to rest.
- Which phase of an action potential would be most affected by increased intracellular sodium?

<https://students-residents.aamc.org/prepare-mcat-exam/biological-and-biochemical-foundations-living-systems>

Passage practice routine

Step A (10 min)	Step B (5-60 min)	Step C (0-15 min)
Timed passage and questions	Untimed passage, question and content review	Consult the answer key
		

Step A

- Helps prepare you for the pace required by the MCAT right from the start.
- Helps you develop and refine your quick reading and critical thinking skills.
- Reinforces the truth that passage information comes from the paragraphs and from the tables/figures.
- Helps you practice finding the relevant information quickly.

Step B

- In Step B, you can review content and revisit your answers (from step A) before consulting the answer key. Make your own passage summary and answer key.
- Helps you develop the ability to figure the answer out yourself.
- Helps you learn the content in context of how information is used on the exam.

Step C

- Provides further information on how you did in step B and helps you to evaluate your content knowledge and analytical reasoning.
- While looking at the answer key is beneficial, especially in the beginning, we wonder if an overreliance on the key hampers students' progress. After all, you will never see the key of the official MCAT you take. Might it be a good idea to take some passages and ask a friend to say how many questions were answered right without saying which ones?

MCAT Prep Schedule

MCAT 2024 dates

Jan	Mar	Apr	May	Jun	Jul	Aug	Sep
12	9	12	4	1	13	2	5
13	22	13	10	14	26	17	6
18		26	11	15		23	13
26		27	16	22		24	14
			24	27			

MCAT registration

- Registration for the next year's dates opens in October. Seats at your desired location might go fast, so have a plan in mind for the date you want and register as soon as it opens.
- Once you know your testing center, you can consider traveling to it beforehand so the trip and location are familiar.

General prep strategy

- **Before dedicated test prep:** focus heavily on the relevant courses when you take them, seek to develop your reading speed and comprehension.
- **Right before test prep:** minimize distractions, adjust responsibilities.
- **During test prep:** emphasize learning through passages, take many (10+) full length practice exams, take care of your physical, mental and emotional health.




When to take the MCAT?

- We believe that students should take the required courses listed earlier before starting their MCAT prep.
- We've seen too many students take the MCAT before they were sufficiently prepared, often because they were following their peers or a recommendation from someone who were not aware of the student's responsibilities or circumstances.
- There isn't one size fits all answer for when you should take your MCAT. It might be a worthwhile idea to consult a pre-health advisor at your school.

How long to study/prepare?

- We've observed students take anywhere from 3 months to a year or more preparing for their MCAT.
- Because there is such variation in the amount of prep time needed, we encourage all student not to compare themselves to others!
- We think it wise to study for the MCAT during a time when you have reduced other responsibilities, so that you can put the MCAT as your primary focus with as few distractions as possible.

Preparation timeline

Phase 1	Phase 2	Phase 3
Standalone Passages + Content Review	Standalone Passages + Full Length Exams + Content Review	Full Length Exams + Content Review
		

Phase 1

- You'll be doing a lot of content review here (in step B while working through passages), but it will be in the context of passages and their questions.
- We recommend the three step procedure outlined earlier.
- We recommend distributing the various subjects throughout the week, rather than studying all of one subject for weeks before moving on to the next.

Phase 2

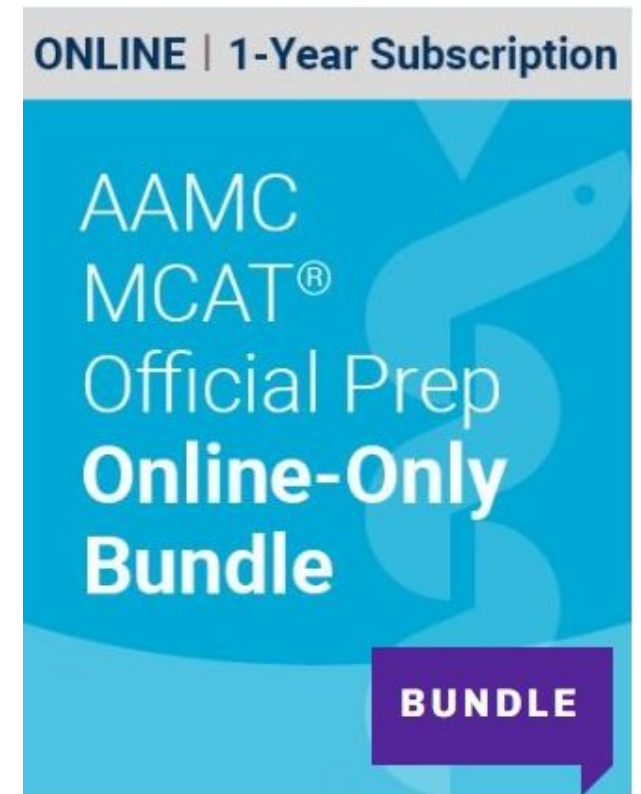
- Phase 2 is similar to phase 1, in that you will be doing standalone passages and performing the three-step method on them.
- Phase 2 adds in full length practice exams at a suggested rate of about 1 per week.
- A full length exam takes a day to complete and one or two days to review.

Phase 3

- Phase 3 consists mostly of full length practice exams and their review.
- Aim to complete 10+ practice exams along your preparation journey (split between phases 2 and 3)
- We recommend two practice tests per week in phase 3.

The AAMC bundle

- Contains practice passages, independent questions and six full length exams.
- It's a little light on practice psych/soc passages, so you may need to supplement with Khan Academy or similar.
- We think it's a good idea to start with the AAMC practice passages and questions (but save their full length exams until a little later in the preparation timeline).



[AAMC complete bundle](#)

AAMC materials

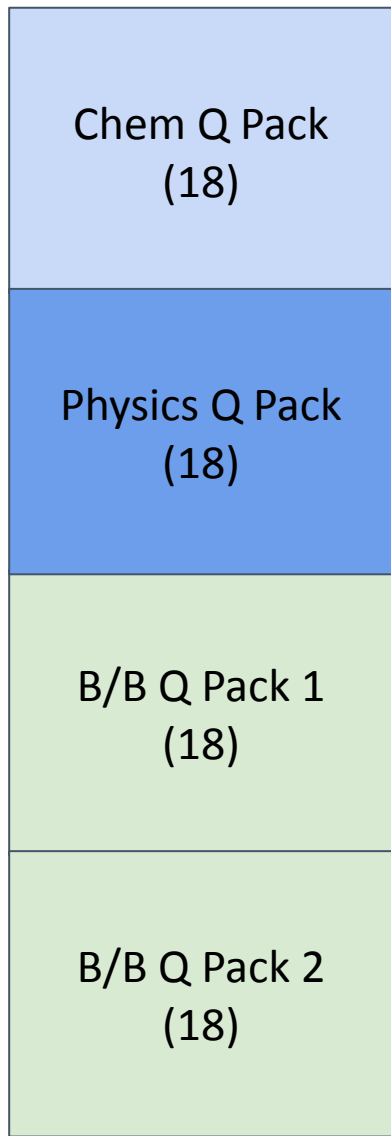
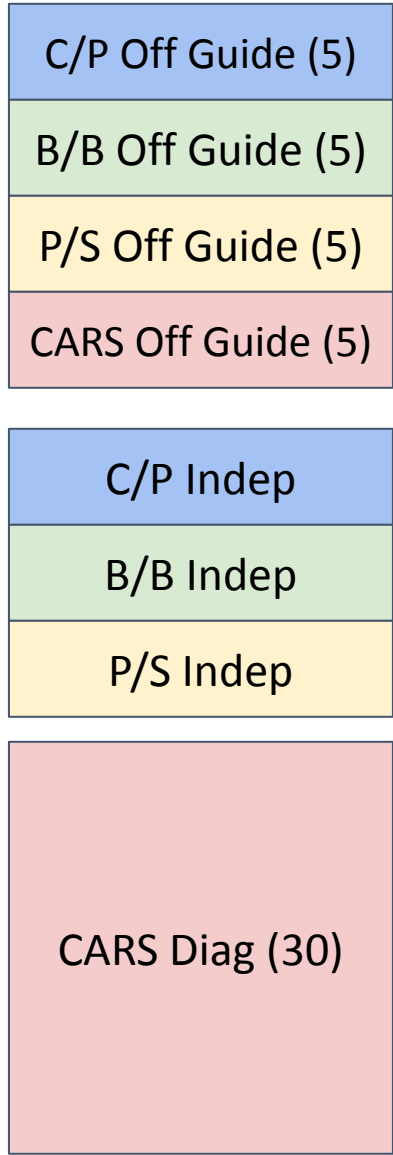
- Section banks (passages from C/P, B/B and P/S).
- Question packs (passages from C/P, B/B and CARS).
- Independent question banks (questions from C/P, B/B and P/S).
- CARS diagnostic (passages from CARS).
- Official guide (passages from all sections)
- Full length practice exams (1 unscored and 5 scored)

Dividing the AAMC bundle into 3 phases

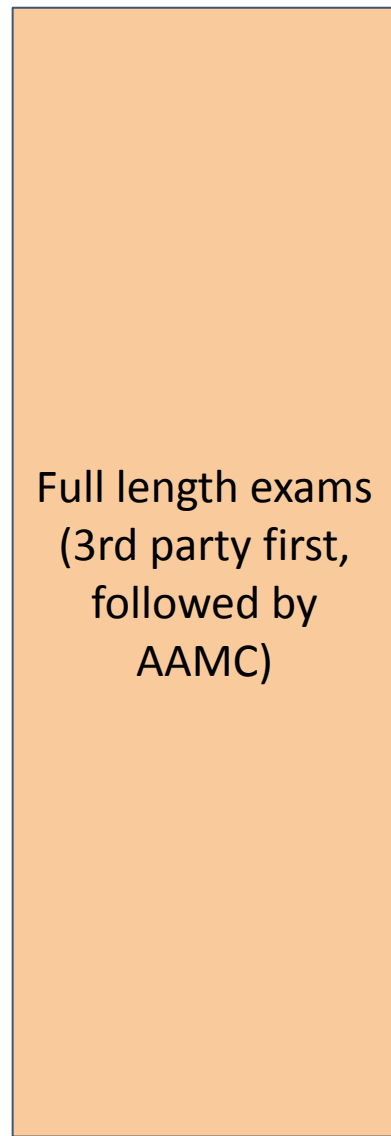
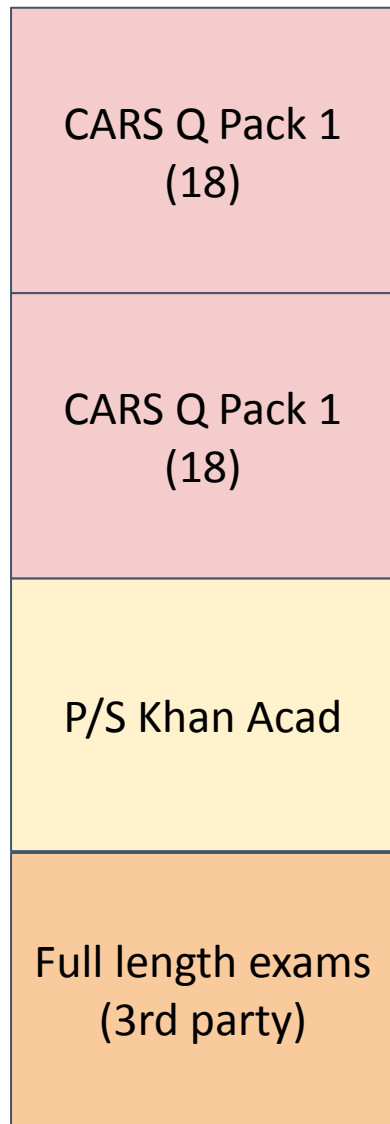
- In this example, we will take the AAMC material and divide its contents into the three study phases.
- Phase 1 will consist of AAMC practice passages.
- Phase 2 will consist of AAMC practice passages and full length exams (most likely from a third party like BluePrint).
- Phase 3 consists of full length AAMC practice exams and supplementary full length exams from a third party.



Phase 1



Phase 2



Phase 3

Planning the phase 1 schedule

- Let's take the components we planned for phase 1, break them into smaller pieces and arrange them in a study order.
- We will alternate the content area topics, but include CARS every session.
- In our example, phase 1 will take four weeks, but it could take between 1 and 4 weeks, depending on how much review you need.

Example phase 1

- If we had four days per week to study, we could arrange the components as follows.
- Of course you can adjust the pace to meet your needs.
- You might find that you can more passages than what we will be showing. Our example is just intended to convey the idea of how to break a set of passages up into a daily study plan.

	Mon	Wed	Fri	Sat
Week 1	<div style="background-color: #ADD8E6; padding: 5px; text-align: center;">C/P Indep</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #90EE90; padding: 5px; text-align: center;">B/B Indep</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #FFFACD; padding: 5px; text-align: center;">P/S Indep</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #ADD8E6; padding: 5px; text-align: center;">C/P Off Guide (5)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>
Week 2	<div style="background-color: #90EE90; padding: 5px; text-align: center;">B/B Off Guide (5)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #FFFACD; padding: 5px; text-align: center;">P/S Off Guide (5)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Off Guide (5)</div>	<div style="background-color: #ADD8E6; padding: 5px; text-align: center;">C/P Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>
Week 3	<div style="background-color: #90EE90; padding: 5px; text-align: center;">B/B Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #FFFACD; padding: 5px; text-align: center;">P/S Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #ADD8E6; padding: 5px; text-align: center;">C/P Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #90EE90; padding: 5px; text-align: center;">B/B Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>
Week 4	<div style="background-color: #FFFACD; padding: 5px; text-align: center;">P/S Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #ADD8E6; padding: 5px; text-align: center;">C/P Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #90EE90; padding: 5px; text-align: center;">B/B Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>	<div style="background-color: #FFFACD; padding: 5px; text-align: center;">P/S Sec Bank (4)</div> <div style="background-color: #F08080; padding: 5px; text-align: center;">CARS Diag (2)</div>

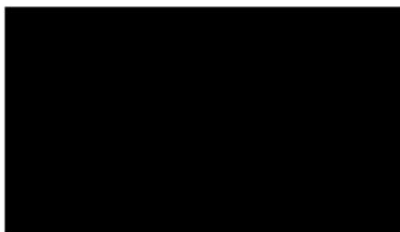
Passage/question subject area

- When reviewing your AAMC questions, you will notice that the content area is shown. Read the bottom right (next slide) as “physics content category 4C” which you can find on the Jack Westin outline; just go to the physics section and find 4c.
- The AAMC also has an outline (without content descriptions) and a module within their bundle that walks you through it.

<https://students-residents.aamc.org/media/9261/download>

Passage 1 (Questions 1-6)

[Redacted text]
[Redacted text]
[Redacted text]
[Redacted text] (structure shown).



[Redacted text]
[Redacted text]

Table 1 [Redacted text]

[Redacted text] Figure 1.



[Redacted text]

A [Redacted text]

B [Redacted text]

C [Redacted text]

D [Redacted text]

Solution: [Redacted text]

[Redacted solution text]

✓
Correct

Your Answer:
●

Correct Answer:
●

Confidence Level:
Not Selected

Content & Skills ⓘ

SIRS2

CC4C

FC4

PHY

Useful tools from Jack Westin

- Review materials following the AAMC topic outlines

<https://jackwestin.com/resources/mcat-content/aamc-mcat-science-outline/>

- Answers/explanations to AAMC content (download chrome extension required)

<https://jackwestin.com/resources/mcat-content/aamc-advanced-solutions>

MCAT Preparation Resources

AAMC prep materials

- 6 full length exams, question banks

Extra practice exams

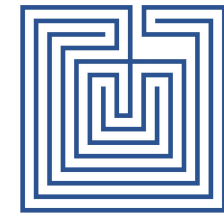
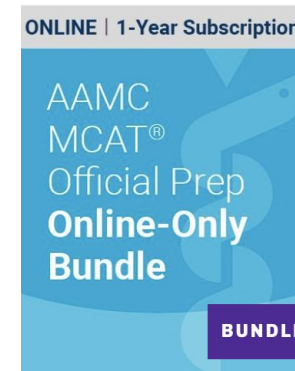
- Blueprint, Altius

Extra question banks (optional)

- Khan Academy, UWorld, BluePrint, Kaplan, Altius, Princeton Review

Study Flashcards

- Anki



blueprint

MCAT preparation



Stay in touch!
IG: @sfsupostbac
email: pbadmit@sfsu.edu



Presented by:
San Francisco State University's
Pre-Health Post-Bac Program