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"The Study Guides provide aspiring doctors, dentists and vets with a free long-distance learning programme to develop wider knowledge and transferrable skills.



FORWARD

HOW TO USE THE STUDY GUIDE

Work through it individually or as part of a medics society in your school!

The guides can be worked through individually, or as a group and can form the basis for meetings run by school medics societies. You can even invite Mentors to your school to help set up a society!"



THE PBL CASES

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Pulmonary Oedema-Conservation -Oral and Denture Health

Dr Quinn

The Multiple Mini Interview

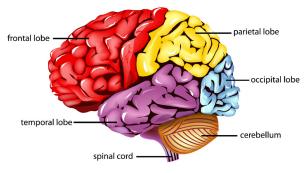
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QUICKFIRE QUIZ

The Brain - Anatomy and Functionallity



UCAT & BMAT

Quick questions, you have 60 seconds!

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Where do you stand?



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24 CRITICAL ANALYSIS OF AN ARTICLE

Do Zoos Conserve or Preserve Animal Species?

MENTOR MAGAZINE, WINTER/SPRING 2020

MOTIVATING

MEDICAL

MINDS



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TAKE YOUR FIRST STEPS TOWARDS A CAREER IN

Medicine

Vet Med

Dentistry

Believe me, as a Doctor myself, having been through the journey of medical school applications and all the way through to working life, I know it is not an easy path, but it is most certainly an enjoyable, diverse and rewarding one!

First and foremost, congratulations! To be even considering the prospect of a career in medicine, dentistry or veterinary is an incredible accolade.

Getting into a competitive healthcare course requires a great degree of dedication, in addition to showing an early aptitude for the profession, i.e. a few sparks of potential that will one day make a healthcare professional.

We hope you enjoy the study guide and encourage you to read the reviews and thoughts published in the Medic Mentor magazine.

Good luck!

FOREWARD

BY DR LAUREN QUINN, MBChB, BMedSci, PRESIDENT OF MEDIC MENTOR. EMAIL: PRESIDENT@MEDICMENTOR.INFO TWITTER: @MMDRQUINN

monthly •his study quide provides the ingredients to build your on early aptitude, helping you to develop your skills in problem learning, based debate, critical appraisal and ethical reasoning, which form the very foundations a successful of the career health sciences, from medicine, dentistry

veterinary medicine. Harnessing these skills early will not only equip you well for the application process and make stand out you from the crowd, but will serve you all through your degree and future careers. The more you put into this study guide, the more you will get out. We strongly encourage to use this study guide in a group

setting, to work together through the chapters and build on your skills as a team. However, monthly study guide will also be accompanied by a monthly webinar professionals the sectors of medicine, dentistry and veterinary medicine, to broaden your horizons and provide context the cases.

The most successful Medic Mentor students get involved in everything! Don't hesistate; put yourself outside of your comfort zone and your confidence will grow! Apply for competitions, attend events, read as much as you can, and follow the Study Series!

Problem Based Learning Case:

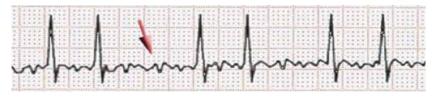
Problem based learning (PBL) is a popular method, currently used by most health professional courses in the UK, in one form or another. The aim of PBL is for the learner to read through a complex and broad series of information, to identify areas of interest and areas they would like to explore further, in order to enhance their knowledge of specific topics, in a self-directed fashion. Through this series, we encourage prospective students to gain their first insights of PBL; read the case individually or as a group, look up what you don't know and scrutinise topics of interest. The questions provided offer ideas of topics to explore and are written in three streams for aspiring medics, dentists and veterinarians; focus on all three or simply what interests you!

THE **MEDIC** PBL CASE

PULMONARY OEDEMA

Mr Jack Smith is a 67-year-old male who lives with his wife, Deirdre, in a semi-detached house. He has been quite stressed for about a year now due to his two children both going through difficult divorces. For the past few months he has been experiencing a pounding in his chest and a feeling of breathlessness, both of which get worse after going up the stairs to the bedroom. He found that he had to rest on the landing for a few minutes to catch his breath after each ascent and felt lightheaded. Deirdre became concerned after Jack nearly fainted one morning, and she took him to the hospital the next day for a check-up, even though he thought it was probably nothing.

On arrival, the doctors ran an ECG and took blood and urine samples. Serum creatinine was found to be raised, and the urine was low in volume and very dark. Troponin levels and liver function were normal.



On examination, Jack had a raised BMI and capillary refill time was >5 seconds. His mouth and mucus membranes were very dry,

and his legs were slightly swollen. His blood pressure was 80/50.

On auscultation, heart sounds: I + II + 0 and there were fine crackles at the base of each lung.

The doctors decided to put Jack on Warfarin and drugs for heart rate and rhythm control, gave him plenty of fluids, and kept him in hospital for monitoring. Jack began to feel better.

However, 3 days later in the morning while he was reaching for a glass of water by his bed, he realised that he couldn't move his right arm properly and knocked the glass over onto the floor. He also experienced tingling and numbness in that hand, as well as tunnel vision. He felt as though he was drunk, even though he had not had any alcohol recently. The doctors were alerted immediately, and Jack was taken for a CT scan of his head.

After treatment for thrombolysis and several weeks of physiotherapy, Jack was able to return home with Deirdre and made a full recovery, albeit with several more medications that he had to take.

HERE ARE SOME THOUGHTS TO HELP YOU GUIDE YOUR DISCUSSION:

- 1. What types of health behaviours delay seeking treatment?
- 10. Why would troponin levels and liver function have been checked?
- 2. Discuss the physiological impacts of stress on health and well-being.
- 11. Describe the results of the auscultation and what do they show?
- 3. Research the electrical conduction pathways of the heart and how they correspond to the shapes on an ECG.
- 12. What are the causes of bibasal lung crackles?
- 4. What is Jack's range in heart rate?
- 13. Research the two causes of the neurological condition that Jack developed and how the treatments differ for each.
- 5. What kind of arrhythmia does the ECG show and how do you know?
- 14. Discuss the positives and negatives of a CT scan.
- 6. What are the complications might arise with this condition?
- 15. What is the structure of a medical history?
- 7. How would you assess for dehydration?
- 16. Summarise what you think has happened to Jack and how his condition has caused others to develop.
- 8. What is meant by a reference range?
- 9. What does serum creatinine help diagnose?

THE **VET** PBL CASE

CONSERVATION

Conservation is the protection of plants, animals and habitats, especially from human activity.

In order to conserve species, we need to understand the challenges that a species face in their natural habitat; so we can mitigate these risks.

This month's problem based learning will be to look into threats facing the Serengeti Lion, Pathera leo.

HEREARESOMETHOUGHTS TO HELP YOU GUIDE YOUR DISCUSSION:

- 1. What diseases are lions prone to catching in the Serengeti?
- 2. Are any of these diseases treatable?
- 3. Can these diseases be prevented?
- 4. What diseases do lions face specifically in a conservation setting, as a result of captivity?
- 5. What human factors are causing risks to lions in the wild?
- 6. How can these human factors be mitigated?
- 7. What role can education play in protecting Serengeti Lions?



Medic Mentor Magazine

The Mentor magazine offers students a chance to have their work published.

If you think you can write an essay, reflection or opinion article email our magazine team.

Medicine

Vet Med

Dentistry



THE **DENTIST** PBL CASE

ORAL AND DENTURE HEALTH

Patrick, a 78 year old male has been struggling with his denture as it has become very loose.

He moved house 5 years ago to be nearer to his family and did not get round to registering with a dental practice in the new area where he lives.

He decides that he cannot cope any longer with his denture in its current state so visits his local dental practice to register and book an appointment.

Dr Hodgkins calls Patrick into the surgery and introduces himself. Patrick takes a seat in the dental chair and starts to explain his problem. He says that he has had his dentures for 10 years and has had no previous issues with it.

However, 3 months ago it started to become slightly loose and has gradually loosened more and more. At present, his dentures are so loose that the upper denture falls down onto the lower denture when he is speaking. He cannot eat with his dentures in either. Patrick also explains that he has not been to see a dentist in 5 years since he moved to the area, as he kept forgetting to register.

Dr Hodgkins empathises with Patrick and says to him that he will do what she can to provide him with a denture that fits better.

Dr Hodgkins next takes a medical history.

Patrick informs Dr Hodgkins that he is asthmatic and has been his whole life. He uses Ventolin (100 micrograms) and clenil (100 micrograms) to treat his asthma. He is a non-smoker and he drinks 5 units a week. He brushes his teeth and dentures twice a day for two minutes with toothpaste. Patrick also takes his dentures out just before he goes to bed.

Dr Hodgkins then does an extra-oral and intra-oral examination. He then charts Patrick's dentition: Upper partial cobalt chrome denture which 2 clasps have fractured off from and is very loose, lower complete acrylic denture that is loose and UR5 slight distal caries. He then records a BPE of X23/XXX.

Dr Hodgkins explains to Patrick the diagnoses that he has made and how they have occurred. He then outlines to Patrick the treatment options that are available, as well as the benefits and risks of each.

Dr Hodgins says that he will do his best to provide a set of dentures that are better than his current ones, but made Patrick aware that they will never be as good as natural teeth. Patrick agrees to a treatment plan with Dr Hodgkins and is relieved that soon he will hopefully be able to talk and eat normally again.

HERE ARE SOME THOUGHTS TO HELP YOU GUIDE YOUR DISCUSSION:

- 1. What is asthma?
- 2. How do ventolin and clenil treat asthma?
- 3. What other questions should Dr Hodgkins ask about Patrick's asthma?
- 4. How can clenil affect the oral cavity? What oral hygiene advice would you give Patrick when he uses clenil?
- 5. What is the recommended alcohol limit for males and females in the UK?
- 6. How does alcohol affect the oral cavity?
- 7. Why should Patrick not use tooth paste to clean his dentures? What should he use instead?
- 8. What other advice should Dr Hodgkins give to Patrick about keeping his dentures clean?
- 9. Why is it important that Patrick leaves his dentures out whilst he's sleeping?
- 10. What does an 'X' mean as part of a BPE score?
- 11. What is the difference between an acrylic and a cobalt chrome denture?
- 12. Dr Hodgkins believes that the upper denture has become loose due to two clasps fracturing off of it. What do clasps do and how do they work? Based on this, would you agree with Dr Hodgkins?
- 13. What could be the cause of the lower complete denture becoming loose?
- 14. Why is it important to manage patient's expectations?

THE MULTIPLE MINI INTERVIEW EXERCISE

Multiple Mini Interviews are a very common technique used to address applying students at interview.

Stations are set up with an assessor; these are normally doctors or other healthcare professionals who give you a task to complete within a set time.

These tasks could be anything from a mock patient consultation, to a maths problem or even to explain a medical procedure while rewiring a plug.

These tasks are designed to challenge you; for you to demonstrate how you react in stressful situations, a chance to show your academic ability, your capacity for empathy and basic understanding of medical and ethical principles that are expected from all doctors by the GMC. In this next section; here are a few exercises you can set up your own MMI.

You can work with your Medical Society and set up a small MMI, take it in turns to be the interviewer and the interviewee.

You can have a go at these with friends or family, they can help to assess and perhaps give you pointers.

Remember, these are a rough guide to give you an idea of how these MMI panels work, your teachers at school and us at Medic Mentor can help you with interview practise.

It's all about building confidence and knowing how to come across professionally in an interview situation.

What doctors need to know about Good Medical Practice:

Knowledge, skills and performance

- Make the care of your patient your first concern.
- Provide a good standard of practice and care.
- Keep your professional knowledge and skills up to date.
- Recognise and work within the limits of your competence.

Safety and quality

- Take prompt action if you think that patient safety, dignity or comfort is being compromised.
- Protect and promote the health of patients and the public.

Communication, partnership and teamwork

- Treat patients as individuals and respect their dignity.
- Treat patients politely and considerately.
- Respect patients' right to confidentiality.
- Work in partnership with patients.
- Listen to, and respond to, their concerns and preferences.
- Give patients the information they want or need in a way they can understand.
- Respect patients' right to reach decisions with you about their treatment and care.
- Support patients in caring for themselves to improve and maintain their health.
- Work with colleagues in the ways that best serve patients' interests.

Maintaining trust

- Be honest and open and act with integrity.
- Never discriminate unfairly against patients or colleagues.
- Never abuse your patients' trust in you or the public's trust in the profession.

You are personally accountable for your professional practice and must always be prepared to justify your decisions and actions...

General Medical Council

Regulating doctors
Ensuring good medical practice

Exercises

Some of these scenarios may seem hard, but don't worry it's all a part of the skills you are going to develop over time. What you really need to take away from this is what ethics and guidlines you will need to hold yourself too when you become a doctor.

- 1. In this exercise, you must show your observational skills, and your ability to multitask. You will need a square of paper and must follow the instructions of how to make a origami crane. While making this crane you must describe to your interviewer what you can see in the x-ray. (needed resources on next page)
- 2. This scenario requires a little acting, the interviewer must take on the roll of a patient and the interviewee the doctor: You will need to listen to you patient and decide how you might help them and how best you can promote healthy options. *
 - (**Tip:** Don't worry too much about medical terms or treatments this is about you following the GMC guidelines and upholding the four ethical pillars of medicine)
- 3. Before you start this question read this example and then begin the test question after:
 As a doctor you may need to calculate how long a introvenious infusion of medication will last.

Study this example: How long will a 100ml infusion of sodium bicarbonate last if it is running at 42 drops per minute?

In this example, we'll assume the drop factor for the equipment is 20 drops per ml.

To solve this, we first need to find out how many millilitres are transfused per minute, we do this as follows:

- •The drop rate is 42 drops per minute.
- •The drop factor is 20 drops per ml.
- •If we divide 42 drops per minute by 20 drops per millilitre, we'll find out how many millilitres per minute.
- •42/20 = 2.1 ml per minute.

Now we can divide the overall infusion of 100ml by the millilitres tranfused per minute to get our answer:

100 ml / 2.1 ml per minute = 47.6 minutes.

Now try this:

A patient is to be given **1000 ml** by IV using a controller with a drip factor of **15 drops/ml**. The infusion starts at **8.00am**. If the drip rate was set at **25 drops per minute**, at what time would the drip be complete?

(*The marking sheet and answers for these exercises are on the last pages of this study guide along with the resources you will need for exercise no. 2)

QUICKFIRE QUIZ

THE BRAIN - ANATOMY AND FUNCTION

Time for a quickfire quiz, this section is here to help with your revision for the multitude of topics you will be learning at school, these questions will be a mixture of medical, social and scientific questions. See how many you can answer on your own from what knowledge you have already gained.

Remember a lot of these question could be used in your Medical Society meetings!

- 1. What is Homeostasis and what does it maintain?
- 2. A patient presents with loss of balance and nausea; which they tell you started after they were cleaning their painting tools with paint thinner, you diagnose them with ataxia, what part of the brain does this effect?
- 3. What part of the nervous system does the brain fall under?
- 4. What are the three types of neuron?
- 5. The peripheral nervous system is split into two divisions; name them.
- 6. The autonomic nervous system had two sub-divisions: think briefly what each of these systems do and how they effect in the human body:
 - The sympathetic
 - The para-sympathetic

Group activity opportunity: Can you name any of the subdivisions of the brain.

Para-Sympathetic - division of the nervous system primarily controls visceral organs such as glands. The nerve fibres of the parasympathetic nervous system are the cranial nerves, primarily the vagus nerve, and the lumbar spinal nerves. When stimulated, these nerves increase digestion and reduce the heartbeat.

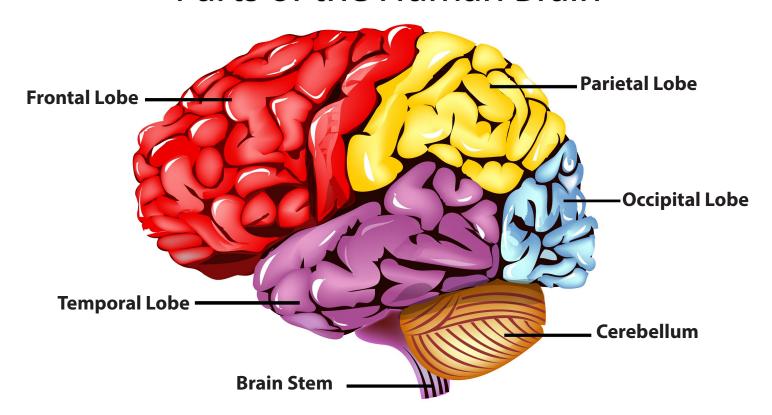
Sympathetic – division of the nervous system proforms localized adjustments (such as sweating as a response to an increase in temperature) and reflex adjustments of the cardiovascular system. Under conditions of stress, the entire sympathetic nervous system is activated, producing the immediate and widespread fight-or-flight response.

Somatic = associated with the voluntary control of body movements via skeletal muscles.

- Autonomic = the control of automated systems such as the heart and blood pressure.
 - 4. The three types of neuron are: sensory, motor and relay.
 - 3. The brain falls under the central nervous system along with the spinal cord.
- 2. The cerebellum is the area of the brain effected by ataxia, this type of ataxia would be "acquired" ataxia due to chemical exposure, as apposed to a genetical developed form; all of which predominantly effect an individuals balance.

extracellular fluid, the concentrations of sodium, potassium and calcium ions, as well as blood sugar level, and these need to be regulated despite changes in the environment, diet, or level of activity.

Parts of the Human Brain



Frontal Lobe

The frontal lobe is the largest lobe within the brain, it is where most of our higher executive functions take place, such as problem solving, our personality, how we react behaviourally in any given situation, our mental flexibility an awareness of our own limitations. It is also responsible for motor planning in regard to our movement and the mechanical aspect of speech, this area is known as the Broca's area.

Particital Lobe

The Parietal lobe processes a lot of our sensory input largely touch, our visual perception by making sense of the world around us in regard to distances and the size and shape of objects. It is also the area of the brain where our academic learning is processed.

Temporal Lobe

The temporal lobe is where our memories are stored for later retrieval. It is also the part of the brain where we process what we hear, our awareness of music and the comprehension of the spoken word an area known as the Wernicke's area.

Occupital Lobe

The occipital lobe is responsible for our visual processing and interpretation.

Cerebellum.

The Cerebellum is where our coordination and equilibrium control come from through voluntary movement such as walking, climbing stairs. It is also where the awareness of our limbs are at all times, through a process called proprioception.

Brain Stem

The brain stem is contained within the skull and connects to the spinal cord sending information from the epithalamus, the thalamus, the hypothalamus, and the subthalamus, this area of the brain controls many of our autonomic functions. The brainstem is divided into three sections, the midbrain, the pons and medulla oblongata.

UCAT

University Clinical Aptitude Test.

Becoming a doctor means not only having the intelligence and knowledge to succeed but also the mindset to be a Doctor. This is where the UCAT comes in. To go into medicine, you must take the UCAT; a multiple-choice computer test, comprised of five sections:

Section 1: Verbal Reasoning.
Section 2: Decision Making.
Section 3: Quantitative Reasoning.
Section 4: Abstract Reasoning.
Section 5: Situational Judgement.

Entire test running time: 2 hours

UCAT Practice Question

SECTION 1: VERBAL REASONING

In this section you must answer a series of statements taking the answers from a large body of text. You have 28 seconds to answer each question.

TIP: You have 1 minuet to read the text, remember the wording and the autors opinion is important.

Mount Vesuvius, a volcano near the Bay of Naples in Italy, has erupted more than 50 times. Its most famous eruption took place in the year 79 A.D., when the volcano buried the ancient Roman city of Pompeii under a thick carpet of volcanic ash. The dust "poured across the land" like a flood, one witness wrote, and shrouded the city in "a darkness... like the black of closed and unlighted rooms." Two thousand people died, and the city was abandoned for almost as many years. When a group of explorers rediscovered the site in 1748, they were surprised to find that—underneath a thick layer of dust and debris—Pompeii was mostly intact. The buildings, artifacts and skeletons left behind in the buried city have taught us a great deal about everyday life in the ancient world.

Greek settlers made the town part of the Hellenistic sphere in the 8th century B.C. An independently-minded town, Pompeii fell under the influence of Rome in the 2nd century B.C. and eventually the Bay of Naples became an attraction for wealthy vacationers from Rome who relished the Campania coastline.

In August 79 A.D., Mount Vesuvius erupted again. The blast sent a plume of ashes, pumice and other rocks, and scorching-hot volcanic gases so high into the sky that people could see it for hundreds of miles around.

As it cooled, this tower of debris drifted to earth: first the fine-grained ash, then the lightweight chunks of pumice and other rocks. It was terrifying—"I believed I was perishing with the world," Pliny wrote, "and the world with me"—but not yet lethal: Most Pompeiians had plenty of time to flee.

For those who stayed behind, however, conditions soon grew worse. As more and more ash fell, it clogged the air, making it difficult to breathe. Buildings collapsed. Then, a "pyroclastic surge"—a 100-miles-per-hour surge of superheated poison gas and pulverized rock—poured down the side of the mountain and swallowed everything and everyone in its path.

By the time the Vesuvius eruption sputtered to an end the next day, Pompeii was buried under millions of tons of volcanic ash. About 2,000 Pompeiians were dead, but the eruption killed as many as 16,000 people overall. Some people drifted back to town in search of lost relatives or belongings, but there was not much left to find. Pompeii, along with the neighboring town of Herculaneum and a number of villas in the area, was abandoned for centuries. - History.com

Answer the following with either: True, False or Can't tell:

- 1. Pompeii was settled by the Romans in the 8th Century B.C.
- **2.** The lethal part of the eruption was the pyroclastic surge.
- **3.** When Vesuvius first erupted most Pompeiians decided to flee.
- **4.** The remains of Pompeii were uncovered over 1600 years later by explorers.

BMAT Practice Question

SECTION 2: SCIENTIFIC KNOWLEDGE AND APPLICATION

In this section of the BMAT you would have 30 mins to complete 27 multiple choice questions. Ensure that you read the wording of each answer closely.

A. Here are five statements about natural selection:

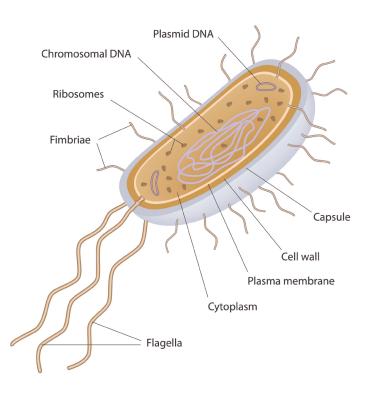
- 1. Individuals within a species show variation.
- 2. Individuals within a species compete with each other for, among other things, resources.
- 3. Individuals with advantageous adaptations are more likely to survive.
- 4. Only Individuals with advantageous adaptations will be able to breed.
- 5. Alleles for advantageous adaptations are more likely to be inherited.

Which of the above statements are correct?

A. None	D. 1, 3, 4 & 5
---------	-----------------------

B. Bacteria are much smaller than eukaryotic cells. The genetic material in a bacterium is not in a nucleus - these are said to be prokaryotic cells.

Use the following diagram to answer the following:



BMAT

BioMedical Aptitude Test

The BMAT is required by these universities in the UK:

University of Cambridge University of Oxford Medical School

Imperial College London
University College London
Leeds' School of Medicine
Brighton & Sussex Medical
School

Keele University Lancaster University

The BMAT is a written test that tests your scientific knowledge as well as your aptitude for medicine, it does this over three sections:

Section 1: Aptitude and Skills. Section 2: Scientific Knowledge and Application. Section 3: Writing Test.

Entire test running time: 2 hours

Which of the following statements are true?

- The genetic material is usually a single loop of DNA, there may be one or more rings of DNA called plasmids.
- 2. The majority of bacteria contain a nucleus within the cytoplasmic layer of the cell.
- 3. Comparatively bacteria cells are the same size or larger than animal or plant cells.
- 4. A flagellum is a tail like organelle found on bacteria as well as some protists used to help it move the bacteria toward nutrients.



Find out how over 80% of last year's Summer School students successfully applied to Medical Schools in the UK

GIVE YOURSELF THE BEST CHANCE OF GETTING AN OFFER TO STUDY

Medicine

Vet Med

Dentistry

Situational Judgement Test Question

Situational Judgement Tests (SJT) are an important means of assessing a healthcare professionals' professionalism and ethical reasoning. SJT questions comprise of real-life challenging scenarios and provide five options for actions that could be taken in the situation given. The answers usually need to be selected or ranked in order of importance, from most suitable action/reasoning to least suitable action/ reasoning. Respondents are expected to answer the question, in accordance with the guidelines from their governing body; in the case of doctors, this would be the General Medical Council (GMC). SIT questions are designed to challenge but with practice and understanding the reasoning behind the answers, they are something you can get the hang of. This is really important for applying to medical school, as you will be ranked on SJT questions in the UCAT, but also throughout your degree and in your future career.

UCAT Answers:

- 1. Pompeii was settled by the Romans in the 8th Century B.C. (**false**) Actually the Greek 600 years earlier
- 2. The lethal part of the eruption was the pyroclastic surge. (**true**)
- 3. When Vesuvius first erupted most Pompeiians decided to flee (can't tell) Article doesn't mention if they did or did not only that they had the time too
- 4. The remains of Pompeii were uncovered over 1600 years later by explorers. (**true**)

BMAT Answer:

- A. = Statement C. 1, 2, 3 & 5
- B. = 1. True.
 - 2. False (bacteria do not contain a nucleus)
 - 3. False (bacteria is 10x smaller)
 - 4. True.

THE **MEDIC** SJT

You are on work experience at a hospital with a fellow student and you are both on a ward chatting with different patients.

You see the other student sitting on the edge of the bed, which you have been told isn't allowed during your induction by your work experience supervisor due to infection control.

Order the responses from most appropriate to least appropriate.

- **A.** Say nothing to the student but monitor them to see if they do it again and step in next time.
- **B.** Interrupt the conversation to remind the student that they shouldn't be sitting on the bed.
- **C.** Say nothing to the student and raise the concern with the nurse in charge.
- **D.** Say nothing to the student but raise the concern with your work experience supervisor so that they can emphasise it more in future training.
- **E.** Report the student to Infection Control that the student is non-compliant with hospital policy.

Situational Judgement Test Answer: BCDAE

If there is a situation where a person is putting patient safety at risk, it is a doctor's duty to raise the concern. This reasonably extends to students on work experience. If it is due to a misunderstanding, such as is likely in this scenario, it would be best to raise it with the person concerned first without escalating it unnecessarily, and you can better explore the reasons why the person is not compliant with hospital policy. (**B**). The next best course of action would be to discuss this with the nurse in charge as they will be overseeing infection control on the

ward and they could remind the student for you (**C**). The supervisor would be the next best person to involve, as they can make sure that everyone is aware of this area of policy and can highlight it to everyone at the next opportunity. However, this will not immediately address the issue and the student may go on to sit on other beds, which could put other patients at risk (**D**). Saying nothing to anyone is less appropriate, as this also doesn't immediately address the issue and you may not get chance to see the student in future patient interactions (**A**). However, this would be more appropriate than directly involving infection control (**E**) as this could damage the relationship with your fellow student and will not explore the reason for them sitting on the bed.

THE **VET** SJT

When on your break from completing a research project into the behaviours and enclosure usage of the tigers at your local zoo; you notice your partner in the café creating false information for the study whilst he should be observing the tigers. You know this will affect the outcomes of the study, and that the data collected will be used to plan future enclosure developments and enrichment and as such the animals may suffer. What do you do?

- **A.** Discard his data from the data set when you complete statistical analysis and not inform him or your supervisor of your intention to do so you don't want to affect his grade.
- **B.** Ignore him. You've completed your observations accurately and its not up to you to supervise your partner.
- **C.** Ask him why he is in the cafe. Try to explain to him the importance of the study and ask him to remove the falsified data and arrange extra time slots for him to monitor the animals.
- **D.** Bring this up with your supervisor and your partner at your next review. You know the false data may skew the results and you aren't sure if your partner's data should still be included. Even if you delete the false data, its initial creation may cause debate over the integrity of the study. You don't know how much of his data is true and how much is falsified. It may be necessary to start the study again from scratch.

Situational Judgement Test Answer: DCAB

Going through official channels and speaking with your supervisor would be the best option, falsified information in any study can result in many problems, not just for those responsible for the false data but also all other member involved as well as potentially causing issues for the zoos and animals (**D**) In this instance, you could speak with your partner and find out if something could be done between to ensure the research data collected is accurate. (**C**) This

is not advisable, it would be wrong to just remove your partners data, there would be nothing to prevent him potentially falsifying other data in other research which could cause problems for others later. (A) It would be your ethical responsibility to try and ensure and all research data to be accurate, to be of most help to the zoo and the animals. (B)

An important skill as a future medical practitioner is to debate, critically appraise information, weigh up arguments for and against and come to a considered and well-reasoned view point. In this series, we provide a debate topic which we want you to consider in detail; what immediately comes to mind, how would you defend your point of view if challenged, what evidence would you use to support your arguments and what are the strengths and flaws of the for and against arguments? We encourage you to work through the questions adjacent, ideally with peers or colleagues.

THE MEDIC & DENTIST DEBATE

"OLD AGE IS NOTHING TO FEAR"

Points to consider:

- What age are you considered to be an 'older person'?
- What types of health condition are more common in older people?
- What advantages are there to being older?
- Are there any biases in society against older people?
- Could older people be happier than younger people?
- What is square wave death, and should we be aiming for it?
- What proportion of older people develop dementia and what proportion end up in care homes or assisted living rather than living at home?
- What is polypharmacy and can it be avoided?
- How much of your life expectancy is governed by genetics and how much is environmental?
- What is the socioemotional selectivity theory and how does this relate to ageing?
- How much are older people still able to contribute to society?

THE **VET** DEBATE

THE ROLE OF THE MODERN ZOO - CONSERVATION LEADERS OR UNNATURAL CAPTIVITY?

Zoos are often charities, dedicated to the conservation of rare species from around the world.

However, their flagship animals often live in a climate much different to their natural home.

These animals are often bred in captivity as part of genetic breeding program to prevent the extinction of rare species, with the end aim of re-introduction to the wild.

But increasingly animal rights activists are protesting about the keeping of these animals in captivity.

- Looking at both parties stance, the conservationists and the animal rights activists, look at both points of view, and debate both.
- What facts can you find to back up your points?
- What are the chances of animals introduced back into the wild from captivity in regards to survival?
- Do some rare spices have better chances that others?
- How much of an effect does a different climate have on animals, for example: lions living in Scotland?
- Do animals in live "better" lives in captivity or in the wild?
- Some species now only exist in captivity, their numbers too low to sustain themselves in the wild, is it better that they be kept in zoos?
- How does this relate to the ethical principles such as utilitarianism and deontology?

Lead by Dr Olivia Coldicuff, Dr Siobhan Chien and Dr Priya Chohan Vice Presidents of Leadership

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THE FOUR BASIC BIOETHICAL PRINCIPLES GOVERN MEDICAL ETHICS FOR ALL WHO WORK IN HEALTHCARE. THESE ARE;

- AUTONOMY
 Respecting an individual's choice to make their own informed decisions.
- JUSTICE Ensuring that all patients are treated equally and fairly.
- BENEFICENCE Doctors must always act in the patien's best interest.
- NON-MALEFICENCE "Do no harm". If some harm or discomfort is a result of treatment it must be outweighed by the benefits.

Keep these principles as a framework when answering any ethical situation that you encounter.

THE **MEDIC** ETHICAL SCENARIO

You are a registrar in A&E and there is an 18-year-old man who has come in by ambulance with a stab wound. He has lost a lot of blood and requires a life-saving blood transfusion. He consents to this, but before the transfusion can be administered, his mother arrives and has a hurried conversation with him. He then withdraws his consent for the blood transfusion and, although clearly worried when the doctors tell him that he will die without the treatment, repeats that he does not want the transfusion. The reason he gives is that he and his family are Jehovah's Witnesses.

- 1. What is your initial view of the scenario and what would you do?
- 2. Describe the scenario in terms of the four pillars of medical ethics.
- 3. What are the key elements of a legally valid consent for adults?
- 4. Has your decision changed?
- 5. What is it that Jehovah's Witnesses believe that would affect their consent to medical treatment?
- 6. Are there any times when you might continue with a procedure despite a person's consent not being given?

Would you like to write for the MENTOR magazine and have your work published? Email: mag@medicmentor.org



INSIGHT CONFERENCE

The Insight Conference is an essential event for any aspiring doctor, dentist or vet. It will help you to make an informed career decision and develop a greater insight into your chosen profession, which is a scored component of the UCAS application.

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This is the most comprehensive UCAS lecture available, for students who want to take the next step and make a competitive application to medical school. It also covers much of the medical-wider reading that students are not taught in schools.

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Suitable for students in year 10/S3-12/S5. Parents and teachers are also welcome. Proceeds from these events are reinvested to support the next generation of healthcare professionals with scholarships and free educational initiatives.

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MEDICINE CONFERENCE DATES:

MEDICINE COM ENLINCE DATES.		
22nd March	25th & 26th April	16th May
LONDON	LONDON	LONDON
28th & 29th	2nd & 3rd May	30th May
March SCOTLAND	LONDON	LONDON
18th April	9th May	6th June
CARDIFF	LEICESTER	LONDON
19th April	10th May	7th June
MANCHESTER	BIRMINGHAM	HERTFORDSHI

Medic Mentor Students:

Awards Program

2020







Every student considering an application to medical, dental or vet school should also be enrolled on the Awards Programme because...

- 1. It increases your chances of getting into medical, dental and vet school
 - 2. It helps you to focus your efforts and achievements
 - 3. It is an impressive medically relevant Award to have on your CV
 - 4. It puts you in the running for a £12,000 scholarship for university
 - 5. It makes the process more fun and less stressful!

Dr Sharron Uppal has put together a diagram to help explain how the Awards Program is structured.

It breaks down what your role is, and how we at Medic Mentor work alongside you, from the assignment of you Awards Mentor (AM), how they will assess your Evidence Submission Forms (ESF) to ensure you are meeting the Awards criteria for the level you have entered at, be it Bronze, Silver or Gold depending on your year.

It will give you a wide array of skills to help you with the medical school application process and as a bonus all the content and achievements you will cover are medically relevant.

THE **DENTIST** ETHICAL SCENARIO

You are a new clinician in an established dental surgery. The dentist who previously held your position for the past twenty years; has subsequently moved to another surgery elsewhere in the country. You have taken on their patients as a part of your new position.

Your first patient arrives for their sixth month check-up, you have reviewed their past notes ready for their check-up, they are an acknowledged smoker and attend check-ups regularly. Noting that their previous visit they complained of two of their teeth feeling loose, pain in their gums and throat as well as strange lumps that had recently formed in their mouth over the weeks prior to their check-up; the treatment suggested by your predecessor; was advice on dental hygiene, including a chlorhexidine gluconate oral rinse and sensitive toothpaste to be used as and when needed.

You introduce yourself and begin your initial assessment enquiring about the past problems mentioned in their notes.

The patient tells you that the lumps never did go away and they were no longer suffering pain, but their mouth did tend to feel numb and sometimes they had difficulty moving their jaw.

After a visual assessment you realise that the patient has symptoms pointing towards oral cancer.

You inform the patient and refer them to hospital to see a specialist. The symptoms your patient described six months ago to the previous dentist were also indicative of oral cancer, which leaves you to wonder why the dentist before you did not refer the patient earlier.

You will now need to investigate and discuss the case with the practice principle due to a potential misdiagnosis that could risk the patient's life.

- 1. What is a practice principle?
- 2. How would you escalate this issue?
- 3. Who are the GDC and how do they operate?
- 4. How obvious were the patient's symptoms, six months ago, to the symptoms of oral cancer?
- 5. Could it have been an easy misdiagnosis on the previous dentist's part, considering the patients history and symptoms described?
- 6. How dangerous is a delayed diagnosis of oral cancer?
- 7. How do the bioethical principles relate to this situation, on the dentist part and for the patient?

HAVE YOU READ THE LATEST ISSUE?

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CRITICAL ANALYSIS OF AN ARTICLE

LEARN TO THINK CRITICALLY LIKE A HEALTHCARE PROFESSIONAL

key skill that every medical student should acquire is the critical appraisal of research articles. In the UK, we practise evidence-based medicine which essentially means that decisions regarding clinical guidelines, investigations and management conditions are made after careful evaluation of scientific evidence. The most basic form of such evidence is research published in peerreviewed scientific papers. However, there is a real art to distinguishing between robust scientific good, findings and science that is lacking in good evidence. Just because something is published in a newspaper, online, journal, or even a textbook does not mean it is definitely true.

Critical appraisal is a process used to identify the strengths and weaknesses of an article in order to objectively assess its usefulness and validity.

Ve, at Medic Mentor, would like to encourage you to learn this invaluable skill as soon as possible. However, instead of reading dry scientific papers that are likely to be above your level of understanding, in each School Societies Bulletin we will give you an interesting medicine-related article to read and appraise. This is also a useful skill, as we are presented with opinions mixed in with facts in the media every day, and doctors need to be able to dissect to the key issues.

As well as this, we now offer amazing opportunity for those of you who want to voice your opinion or just get a huge brownie point for application to medical school and beyond. Write down your critical appraisal using the "Letter Guidance" in the downloads section of our website for full details. The best letters will be published in the subsequent issue of Medic Mentor Magazine, the only magazine in the UK dedicated to students applying healthcare to degrees, where school students can put their name to an article. It cannot be emphasised enough how good such a thing would look on a medical candidate's CV.

CRITICAL ANALYSIS OF AN ARTICLE

"DO ZOOS CONSERVE OR PRESERVE ANIMAL SPECIES?"

Here we have an article taken form the Medic Mentor magazine, the theme was

"Bridging The Gap"

After having worked through this study guide you should have a grasp on how to read, and without bias, analyse the information presented to you in the article. In March's Study Guide, one of our mentors will have analysed this same article for you to compare to you own critical analysis.

Do zoos conserve or preserve animal species?

HANNAH JAHANGIR

The definition of what a zoo is varies. In essence it is an establishment which maintains a collection of wild animals for study, conservation or display to the public. This definition is constantly changing and has a different meaning for different people. Zoos have changed the idea of lifelong animal captivity throughout the years, with more and more success stories of animals being released into the wild after treatment and breeding to increase the numbers of endangered species. Zoos are also viewed as entertainment for families and have grown to the point where they have become top tourist attractions in many countries. However, there is often ethical debate in society asking whether zoos are good or bad. So, what is the purpose of a modern-day zoo? Is it to conserve species with the intention of release into the wild or is it to preserve species for future generations to witness?

Successful breeding programmes in zoos are the only definitive way to ensure that some species are conserved.

There is no doubt that controlled breeding and specialist veterinary care in zoos, allows successful conservation of species, of which some incredibly endangered in the wild. Animals have direct access to rehabilitation in order to maintain the diversity of endangered species. Every species of animal in the world has a purpose and by conserving them, this helps our planet as a whole. Most zoo veterinarians find that working closely

with wild, often endangered species, is rewarding and just as important as domestic animals. The diversity of the veterinary species at zoos is more fascinating than working with the domesticated companion or livestock species. Veterinarians and zoo staff work tirelessly in zoos to maximise animal health and welfare. This is demonstrated by the likes of Denver Zoo in America and Zoological Society of London (ZSL). Denver Zoo is nationally recognised in its field conservation projects. They contrast the concept of keeping animals in captivity regardless of conservation efforts. In Botswana, they are currently working towards conserving five endangered vulture species and African wild dogs. Many other countries, such as Peru, Mongolia and Vietnam are fortunate enough to be involved with the conservation projects. Locally, this would be the Zoological Society of London (ZSL), which is well known for its conservation efforts. Understandably, conservation is crucial for saving endangered species and ZSL works toward increasing population numbers as their main priority. In 2019, ZSL joined partners at a Vulture Conservation Breeding Centre in Nepal. This was done in hope for vultures to return to the skies. ZSL doesn't just centre itself in London, as it works across the globe in hopes to help species located in different biomes, like the Tundra and Tropical Rainforest.



Dr. Larsen of Denver Zoo talks about the recreation of natural habitats in zoos and the ability to pursue comprehensive research on animals that are rarely witnessed in the wild to help in the fight to protect our most endangered species. This is a perfect example of a passionate vet involved in conservation. Learning about this from different zoos across the world helps to widen our knowledge of rare species. The popularity of zoos has allowed some financial profit to be dedicated to research and conservation projects on captive and wild animals. This funding would not be available without the presence

of zoological business. A statistical report in 2019 by The IUCN Red List of Threatened species, showcased that 15,000 more species made the list. In 2012, the WWF reported that the terrestrial living planet index (LPI) shows that populations have declined by 38% overall and marine LPI shows a 36% overall decline in species. Given that statistics show a decline, it has been suggested that the successful breeding programmes of animals in zoos is the only definitive way to ensure that these species are conserved. It is unlikely that deforestation, climate change and population will stop soon enough to protect wild animals.

Zoos provide a logical approach to providing the best for endangered species.

Conservation projects are beneficial, but in reality, there are limitations to what can be achieved. This is because animals aren't always released into the wild, and if they are, then they spend most of their time away from their natural habitat. This tends to defeat the purpose of true conservation. Are zoos really achieving what they claim? While conceding that zoos have become more proactive and benevolent in their efforts, critics still feel that "good zoos" are in the minority. Among the 2,400 animal enclosures licensed by the U.S. Department of Agriculture, only 212 are under strict regulation of the American Zoo and Aquarium Association (AZA); the other 2,188 are not. There is an estimate that less than 3% of the budgets of these 212 accredited zoos goes towards conservation efforts. It is difficult to comprehend that conservation efforts aren't

always successful. Benjamin Beck, former associate director of biological programs at the National Zoo of Washington D.C. found that in the last century, only 16 of 145 reintroduction programs worldwide ever actually restored any animal populations to the wild. It makes you wonder where the rest of the time, money and effort is spent.

Captive breeding has often been claimed to be a useful tool in preservation of biodiversity. Captive breeding programmes are very resource demanding and can only be afforded for a very small number of



species, which evidently limits their value. However, the efforts towards educating people into the lives of endangered species and the value they hold in our ecosystems are beneficial as more and more people are becoming aware of what is important. This is why a majority of zoos and organisations claim to be successful rather than worthless. The Bronx Zoo, along with four other New York City zoos and aquariums, is part of the Wildlife Conservation Society (WCS). The WCS is considered prestigious due to its designing of innovative exhibits and effective environmental programs that reach an international audience. By keeping animals in "cages", it educates the public about the beauty of our natural world. These approaches towards captive breeding are important for species to feel comfortable while vet care is available to them. Zoos provide a logical approach to providing the best for endangered species. Research is constantly being conducted in zoos in order to understand the diversity of wild animals currently in captivity.

Animals become domesticated and struggle when eventually released into the wild, by losing natural instinct.

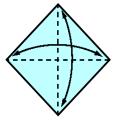
Preservation has its benefits, nonetheless, keeping animals in captivity consequently leads to problems arising. Despite successful cases, zoos have been responsible for many deaths and health problems in respect of the animals in captive breeding. An example would be in Copenhagen Zoo. In 20 months alone, evidence in articles claimed around 148 incidents of zoo and aquarium deaths.



These included large charismatic mammals, such as gorillas, dolphins, lions and elephants. This highlights the threat of mortality that comes from preservation. It could be argued that preservation is possible in order to make money from people that are attracted to the diverse species of animals. This contradicts what zoos portray themselves to be,

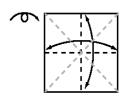
which is why there is a large moral debate towards the reality of zoo life for the animals held captive. The cases recorded portray the difficulty and questioning of keeping large animals in enclosed areas just for research that isn't always being funded. A very famous case would be the death of Harambe. Harambe was a 17 year old western lowland gorilla, who was shot after it came into contact with a threeyear-old boy that climbed into the gorilla enclosure at the Cincinnati Zoo. Other cases include Marius the giraffe in Copenhagen Zoo, who was killed to prevent inbreeding (he was dissected and fed to lions in front of an audience who visited the zoo that day). Understanding and controlling the behaviour of animals and the natural reproduction of animals is merely impossible, as it should be left in the wild where they belong. Animals become domesticated and struggle when eventually released into the wild, by losing natural instinct. Preserving animals causes cases like these; which inevitably result in less attraction towards zoos that are responsible for them. It is a vicious cycle that can be overcome by releasing animals into the wild again and making efforts to protect natural habitats.

Evidently, there is a fair share between preserving and conserving animals currently in zoos, however, there are cases of conservation being unsuccessful despite projects arising that work towards saving endangered species. Preservation can be analysed in two ways. It can merely be used as a way to make money or it can be used to educate people on the importance of conservation. For a zoo experience to be beneficial, there must be an effort to take all visitors through the scientific and preservation components, but this is currently unavailable and many zoos use their animals as entertainment. A zoo can be integral to local communities, with the correct approach towards animal welfare, so they can be seen as more than entertainment, more of a sanctuary from the cruel and dissipating natural world. The controversy surrounding zoos will never stop, as they can be seen as a positive place to maintain a high quality of life, or they can be seen as an unethical approach to animal welfare as wild animals should not be enclosed. Whether a zoo exists to conserve or preserve, the ethical debate should shift to the destruction of wild habitats and climate change, both man made problems that all species face. <



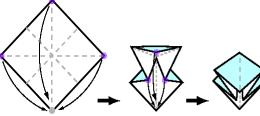
1. Start with a square piece of paper, colour one side so it differs to the other, lay it down coloured side up.

Fold in half then open. Then fold in half the other way.



2. Turn the paper over to the white side.

Fold the paper in half, crease well and open, and then fold in the other direction.



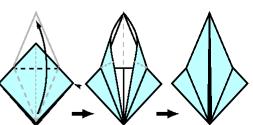
3. Using the creases you have made. Bring the top 3corners of the moel down to the bottom corner. Flattern model.



4. Fold top triangular flaps into the centre and unfold.

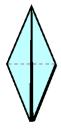


5. Fold top of model downwards, crease well and unfold.

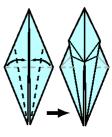


6. Open the upermost flap of the model, bringing it upwards and pressing the sides of the model inwards at the same time.

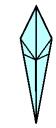
Flattern down, creasing well.



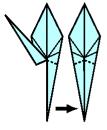
7. Turn model over and repeat Steps 4 - 6 on the other side.



8. Fold top flaps into the centre.



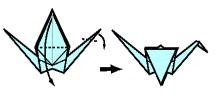
9. Repeat on the other side.



10. Fold both 'legs' of model up, crease very well, then unfold.



11. Inside Reverse Fold the 'legs' along the creases you just made.



12. Inside Reverse Fold one side to make a head, then fold down the wings.



Finished Crane



Multiple Mini Interview Question and Answers.

Here are the guidelines on how the interviewer should mark or act in the following questions:

Question 1:

In this exercise, you must show your observational skills, and your ability to multitask. You will need a square of paper (one side coloured one side white) and must follow the instructions of how to make a origami crane. While making this crane you must describe to your interviewer what

you can see in the x-ray.

Answer: (They must show that they can multitask making the origami and still speaking about what they can see.

There are no wrong answers about the x-ray, they simply need to say what they see, e.g. colours, what bones they see, what organs they can identify, where in the body it is showing.)

Question 2:

This scenario requires a little acting, the interviewer must take on the roll of a patient and the interviewee the doctor: You will need to listen to you patient and decide how you might help them and how best you can promote healthy options. (don't worry too much about medical terms or treatments this is about you following the GMC guidelines and upholding the four ethical pillars of medicine)

Answer: (You are a 18 year old secondary school student (MAKE SURE THEY KNOW YOU ARE PLAYING AN 18 Year Old) who is feeling very down, maybe even a little depressed. You are worried about your studies and falling behind.

You haven't been feeling very well lately and wonder if it might be your diet, you haven't been eating any fruit and vegetables for some time and you haven't been outside much. You really don't want your doctor to tell your parents.

Key marking points: Following the guidance by the GMC they must:

Have a sense of empathy.

Promote healthy options, not necessarily medication.

Supporting them to take care of themselves and their health.

Be polite and respectful.

Listen to their patient.

Respect their patients right to confidentiality. (as a 18 year old)

Question 3:

A patient is to be given **1000 ml** by IV using a controller with a drip factor of **15 drops/ml**. The infusion starts at **8.00am**. If the drip rate was set at **25 drops per minute**, at what time would the drip be complete?

Answer:

- If we divide 25 drops per minute by 15 drops per millilitre, we get how many millilitres per minute = 1.67 ml/min.
- If we then divide 1000ml by 1.67 ml per minute we get 600 minutes.
- 600 minutes = 10 hours
- 8am plus 10 hours = 6pm