Anatomy & Physiology \(BC\)

Event Leader Instructions

The format is identical for both division B and division C. The event consists of 20 stations and a disease packet. The disease packet will be answered by each team as they go through the stations and answer those questions as well. The competitors will be given 2 minutes per station (be sure to have someone time this well and accurately) before they have to move on to the next station. Competitors can NOT write on the disease packets and the stations. Their answer sheets have appropriate bubbles for both the stations and disease packets, so that is what they’ll write on. Lastly, as the students transition between stations, they are **allowed** to continue working on the disease packet in those few seconds of transition. So basically, they can work on the disease packet throughout the **ENTIRE** duration of the event once the first station is begun. Once the 20\(^\text{th}\) and final station allotted time is complete, students must stop work on both station questions and the disease packet questions. They will not get more time at the end to work on either. Prior to the start of the event, be sure to place the 20 stations around the room in a snake-like fashion so that it is easy for the students to move from station to station every 2 minutes. Make sure all the students are seated at a station prior to the start of the 2 minutes at any particular point in the event. Furthermore, before students are allowed into the room, keep 1 student response sheet and 1 disease packet at each station so students can just sit down at any station and fill out their information on the response sheet. The disease packets clearly state to not open them until the start of the event. Have a volunteer or two ensure that teams don’t open the packets before the start of the event. Also, make sure that the JV and Varsity teams from a respective school are well separated in terms of distance prior to the start of the event in order to keep the event fair. When grading the student response sheets, each correct answer is worth 1 point. Once all total scores are written down for each student response sheet, check for tie scores. In the highly likely event of a tie, follow the instructions for tiebreakers for each division. Division B and Division C have separate tiebreakers but identical guidelines for how to decimal rank the teams, as explained in the tiebreaker document included in the event materials. There are two rest stations each for both Division B and Division C. It is perfectly fine for a team to start on one because they can spend their first 2 minutes of the event working on the disease packet before answering station questions. Every other team will get 2 minutes at the rest station eventually to work on the disease packet as well, so this is fair. **NOTE:** If there are more than 20 teams in a given time block, you can compensate by adding more rest stations. Be sure to space these apart. You don’t want a rest station within close proximity to other rest stations.

**NOTE:** Each team is allowed to bring up to 2 non-programmable, non-graphing calculators and ONLY ONE TWO-SIDED page of notes. We are being very strict about this official rule so as to deter any cheating. A team is NOT allowed to have two one-sided pages of notes, nor are they allowed two one-sided pages in a page protector. If this is the case, you must force them to pick one of the pages.

If the team has two one sided pages that are glued/stapled/attached together, allow them to keep it as long as they can prove that their sheets cannot be separated and there is no extra sheet or tabs or anything hiding between their note sheets.

On behalf of the North Carolina Science Olympiad, thank you for volunteering for this event! We wish you all the best for a successful competition day!
Anatomy and Physiology 2018 Regional Tournament Level
Tiebreaker Instructions

In the very likely event that there is a tie, there will need to be tiebreakers set in place to establish the true order.

There are 20 tiebreakers set in place in order of priority such that 1) is the first tiebreaker to be checked and most important and 2) is the second and so on.

The questions within the tiebreaker order are different for Division B and C, but the rules on how to grade them and how to add the points back at the end are the same.

If you are grading Division B Anatomy and Physiology, then look at the attached Div B Tiebreakers document.
If you are grading Division C Anatomy and Physiology, then look at the attached Div C Tiebreakers document.

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We go down the tiebreakers in order of priority starting at 1.
Say we have 3 teams, meaning that n=3, that are tied at a score of X=100.

Team A, Team B, and Team C.

All 3 teams get the first tiebreaker correct, so we move on to the next.

For some reason, Team B missed the second tiebreaker, but Teams A and C got it correct. At this point, we remove Team B from further tiebreaker consideration and assign them a final score of 100.01 since they were the first team to be eliminated from the tiebreakers.
Then we proceed with Teams A and C further. Eventually, Team A gets eliminated before Team C, so we assign a final score of 100.02 to Team A and a 100.0n to Team C. Since in this example n=3, Team C's final score is 100.03.
TIEBREAKERS
A&P (Division B 2018)
North Carolina Science Olympiad Regional Tournament Level

The tiebreakers are utilized such that they are in order of priority.

1) Question 117
2) Question 105
3) Question 8
4) Question 51
5) Question 122
6) Question 72
7) Question 49
8) Question 44
9) Question 19
10) Question 120
11) Question 3
12) Question 87
13) Question 40
14) Question 65
15) Question 25
16) Question 21
17) Question 10
18) Question 27
19) Question 107
20) Most correct on Disease Packet (104-133)
104. There is no vaccination available for this type of Hepatitis.
   A. Hepatitis A
   B. Hepatitis B
   C. Hepatitis C
   D. Hepatitis D
   E. Hepatitis E

105. What is the first line of treatment for bleeding peptic ulcers offered in the United States?
   A. Antibiotics
   B. Acid reducer
   C. Endoscopic therapy
   D. Surgery
   E. None of the above

106. True/False: Diarrhea occurs when the feces are rushed out of the alimentary tract, resulting in inadequate absorption of water from the feces in the small intestine.
   A. True
   B. False

107. Traveller’s diarrhea is most commonly encountered when visiting which of these countries?
   A. United States of America
   B. Sweden
   C. Italy
   D. Costa Rica
   E. Russia

108. Lactose intolerance can be caused by all of the following except?
   A. Fat free milk
   B. A cappuccino
   C. Almond Milk
   D. Feta cheese
   E. Ice cream

109. Ram visits Anil, a local gastroenterologist, to inquire about a doubt he has in regards to his stools. Ram tells Anil that he has observed rectal bleeding in his stools and that he experiences significant constipation and abdominal cramping everyday. In order to investigate this, Anil performs an endoscopy procedure of Ram’s large intestine to screen for abnormal, malignant growths. Anil then discovers the formation of polyps in Ram’s large intestine. Based on these findings, Anil’s likely diagnosis is ________________.
   A. Diarrhea
   B. Peptic Ulcer Disease
   C. Colorectal Cancer
   D. Gastric Cancer
   E. None of the above

110. Stephenie, who is currently pregnant at the time, visits her primary care physician and complains of nausea, chills, and evident jaundice. The physician then explains to Stephenie that a potential form of hepatitis that leads to significant mortality among pregnant women is hepatitis ___ . Furthermore, the physician makes it clear that this form of hepatitis is also spread in similar fashion to hepatitis A and does not cause chronic liver disease.
111. Dwyane Wade and LeBron James are resting on the Cleveland Cavaliers bench during Game 7 of the 2018 NBA Finals minutes prior to the end of the game with them being up 35 points on the Golden State Warriors. Wade and James are cracking jokes with each other and suddenly a sound of flatulence is heard. James then looks to Wade and proceeds to cover his nose and walks away. Wade then yells “Sorry! I drank milk at halftime!” LeBron then retorts “Not my fault that your body can’t digest a certain disaccharide!” What is Wade’s likely condition?

112. After a playoff game versus the Houston Rockets, Paul George of the Oklahoma City Thunder proceeds to go to the restroom to enjoy a defecation break in the bathroom within the locker room. He felt quite dehydrated during the game for some reason, even though he drank plenty of water. As he defecates, he feels extremely terrible and is unable to handle the unnatural sensations associated with his defecation, moaning in the process. His stools are not solid like they should be. What is Paul likely dealing with?

113. At halftime of the game between the Washington Wizards and San Antonio Spurs, John Wall feels significant pain in the lower right section of his abdomen accompanied with a lack of appetite and vomiting sensation. The team doctor, Bradley Beal, checks John out and recommends that he undergo an ultrasound immediately. It is revealed that there is notable inflammation in the abdominal area that John is experiencing pain in. Bradley then recommends immediate surgery to remove the source of inflammation to prevent the risk of sepsis. What disorder is Wall likely afflicted with?

114. What does AIDS stand for?
   A. Acquired immune deficiency syndrome
   B. Autoimmune deficiency syndrome
   C. Anti-immune deficiency syndrome
   D. Acquired immunodestructive syndrome
   E. Autoimmune destructive syndrome

115. Which of the following words best describes Multiple Sclerosis?
   A. Degradation
   B. Demyelination
   C. Dysmyelination
   D. Inflammation
   E. Destruction

116. Which disease is characterized by the body attacking the synovial membrane?
   A. AIDS
   B. Multiple Sclerosis
   C. Rheumatoid arthritis
   D. Grave’s disease
   E. Contact dermatitis

117. Which of the following would not be an appropriate treatment for contact dermatitis?
   A. Calamine lotion
   B. Oral antihistamine
   C. Weak acid solutions
   D. Strong acid solutions
   E. Corticosteroids

118. True/False: Multiple Sclerosis is the most common immune-mediated disorder affecting the central nervous system?
   A. True
   B. False
119. During practice, Kevin Durant told his friend Steph Curry that he was feeling odd. He felt slightly dizzy and had trouble shooting the ball. He went and saw a medical specialist who confirmed that Kevin had blurred vision. What disease would you diagnose Kevin Durant with?

120. Esha goes to see her best friend Ashwin because she is having trouble running. She describes a lack of motion while exercising and reports swollen knees. Ashwin suggests that she get a lot of rest but Esha says that the pain became slightly worse after rest. What disorder is Esha likely affected with?

121. During an NBA playoff matchup between the Celtics and Cavaliers, Kyrie Irving saw his former teammate LeBron James and began to get slightly nervous. The two did not separate on the best of terms, causing Kyrie some stress and sleeping problems. Additionally, his teammate Gordon Hayward commented on his eyes excessively bulging outwards. Unfortunately, Kyrie was not able play the next NBA game because he could not fit into his uniform. What disease does Kyrie Irving most likely have?

122. Lonzo Ball is having an um.... well he's having a rookie year. To make matters worse, the past few weeks he found himself to be experiencing flu-like symptoms. He reported having a mild fever, shortness of breath, and night sweats. His doctor, LaVar Ball, diagnosed him with Kaposi's sarcoma and says, “Oh no, if this is what I think it is then it’s not good. Let’s just pray your career isn’t over”. What disease does Lonzo Ball have?

123. Vinícius visits his local physician complaining of an itchy, red area of his arm. The physician asks if his arm was exposed to a foreign substance of some kind, to which Vinícius says yes. An image of his irritated arm is shown below:

![Image of an irritated arm]

The physician then tells Vinícius that he has suffered an allergic reaction on his skin which caused these symptoms. What is your diagnosis?

124. Alveolar wall destruction that leads to the formation of spaces that remain filled with air upon exhalation occurs in patients afflicted by ___________.
   A. Asthma
   B. Emphysema
   C. Pneumonia
   D. Sleep Apnea
   E. Cystic Fibrosis

125. True/False: The disease you selected in the previous question is a type of disease that falls under COPD.
   A. True
   B. False
126. Which bacterium is the prime cause of pneumonia?
   A. *Mycobacterium pneumoniae*
   B. *Streptococcus pneumoniae*
   C. *Draymondeus pneumoniae*
   D. *Staphylococcus pneumoniae*
   E. *Stenotrophomonas pneumoniae*

127. Random cessation of breathing during sleep for short intervals is a characteristic of
   ____________________
   A. REM sleep
   B. Narcolepsy
   C. Sleep Apnea
   D. Insomnia
   E. None of the above

128. Loss of muscle tone in ____________ muscles is a cause of the disorder in the previous question.
   A. Pharyngeal
   B. Laryngeal
   C. Esophageal
   D. A & B
   E. A, B, & C

129. While running a marathon in cold weather, Peter experiences considerable coughing and chest
tightness. Because of this he panics, grabs an inhaler, and looks in his local environment for the
presence of potential allergens. What is the ailment that Peter is dealing with?

130. Graham is a smoker who also works in a highly-polluted work environment. One day, he realizes
that he is having considerable issues with his breathing. His physician notices that he is relying upon
his accessory muscles for breathing rather than the primary muscles used. In addition, upon
investigation, it is revealed that the elastin within his lungs is broken down significantly. What disease
does Graham have?

131. Vikram is running up the stairs one day when he realizes a sudden heavy sensation in his chest
accompanied with chills. He then visits his primary care physician who tells him that his lungs are
inflamed, possibly due to infection by pneumococci bacteria. What is your diagnosis of Vikram's
ailment?

132. Grant's wife complains to him about periods of snorting and gasping that tend to follow periods
of silence as he sleeps. Because of this, Grant becomes concerned and visits his primary care physician.
The physician then asks Grant if he experiences repetitive daytime sleepiness, to which Grant answers
yes. The physician then assesses for nasal obstructions and then tells Grant that a form of treatment
that is effective for this condition is weight loss. What is Grant's ailment?

133. One day, young Surag starts to regurgitate copious amounts of sticky mucus. The next day, these
symptoms still prevail and Surag goes to his primary care physician to get assessed. The physician
performs a diagnostic work-up, specifically a sweat test, which reveals elevated levels of sodium and
chloride. Unfortunately, the prognosis for this is poor as this disease is considered fatal. What is
Surag's condition?
Station 1

Rest Station

MOM MADE

PIZZA ROLL'S
Station 2

1. Which organ/structures does not serve a purpose in the body's immune response?
   A. Tonsils
   B. Thyroid
   C. Bone Marrow
   D. Skin
   E. Appendix

2. Select the type of leukocyte that has been improperly matched to its function.
   A. Basophil - release histamines and help combat allergic reactions
   B. Neutrophil - lyse foreign pathogens by injecting in acidic compounds
   C. Eosinophil - combat parasitic worms
   D. Macrophage - engulf pathogens by phagocytosis
   E. Mast cells - help induce inflammation

3. What is the name for a vesicle formed around an engulfed particle?
   A. Phagosome
   B. Phagocytosis
   C. Phagocytose
   D. Autophagosome
   E. Phagocytic vesicle

4. What cells are the first to respond to an infectious pathogen?
   A. Macrophages
   B. Dendritic Cells
   C. White Blood Cells
   D. Mast Cells
   E. Natural Killer Cells

5. Which of the following is not considered part of the body's 1st line of defense?
   A. Mouth
   B. Skin
   C. Stomach acid
   D. Granulocytes
   E. Tears
Station 3

6. Which of the following is not a function of the lymphatic system?
   A. Drain excess interstitial fluid
   B. Remove lymph from blood vessels
   C. Transport dietary lipids
   D. Carries out immune response
   E. Transport plasma cells and other leukocytes

7. The defense system in the human body is made up of _________ that use _________ to carry _________ (consisting of _________) around the body.
   A. Lymphatic organs, Lymphatic vessels, Lymphocytes, Lymph
   B. Lymphocytes, Lymph, Lymphocytes, Lymphatic organs
   C. Lymphatic vessels, Lymphocytes, Lymph, Lymphatic organs
   D. Lymphatic organs, Lymphatic vessels, Lymph, Lymphocytes
   E. Lymphatic vessels, Lymph, Lymphocytes, Lymphatic organs

8. What is the functional unit of a lymph vessel called?
   A. Lymphangion
   B. Lymphocyte
   C. Lymphite
   D. Lymphoid
   E. Lymphatic Nodule

9. What other type structure in the human body do lymph vessels resemble anatomically?
   A. Veins
   B. Arteries
   C. Arterioles
   D. Capillaries
   E. Nerves

10. The movement of lymph occurs due to?
    A. Diffusion
    B. Pumping of lymph nodes
    C. Peristalsis
    D. Intermolecular forces like hydrogen bonding
    E. Osmosis
Station 4

Select the letter corresponding to an aspect of the immune system that fits the description. If the structure does not appear, then write “L”.

11. Axillary Lymph nodes
12. Spleen
13. Adenoids
14. Peyer's Patches
15. Appendix
16. Thymus
17. Bone Marrow
Station 5

18. Innate immunity is primarily a ________ and associated with the ________ line of defense, while adaptive immunity is a ________ and mainly associated with the ________ line of defense.
   A. Delayed response, First, Quick response, Second
   B. Quick response, First, Delayed response, Second
   C. Delayed response, Second, Quick response, First
   D. Quick response, Second, Delayed response, First
   E. Delayed response, First, No response, Second

19. The main players in humoral immunity are ________ and the main players of cell-mediated immunity are ________. Both humoral and cell-mediated immunity fall under ________ immunity.
   A. B cells, T cells, innate
   B. T cells, B cells, innate
   C. B cells, G cells, adaptive
   D. B cells, T cells, adaptive
   E. T cells, B cells, adaptive

20. T cells mature in the ________, while B cells mature in the ________.
   A. Thyroid, Bone Marrow
   B. Spleen, Spleen
   C. Bone Marrow, Thymus
   D. Spleen, Thyroid
   E. Thymus, Bone Marrow

21. Which Major Histocompatibility Complex class molecule presents to cytotoxic T cells?
   A. MHC class I
   B. MHC class A
   C. MHC class II
   D. MHC class III
   E. MHC class B

22. Killer T cells are called?
   A. CD4+ T cells
   B. CD8+ T cells
   C. Cytotoxic T cells
   D. A and B
   E. B and C
Station 6

23. What is the most common leukocyte?
   A. Neutrophil
   B. Basophil
   C. Eosinophil
   D. T cell
   E. B cell

24. What is the lock and key mechanism of immunity?
   A. Only a specific antigen can be processed by a certain macrophage
   B. Only a specific antigen will activate a certain T or B cell
   C. Only a specific pathogen can cross the 1st layer of immunity
   D. Only a specific pathogen can cause a certain disease
   E. Only a specific antigen can be presented by a certain macrophage

25. Which is not a "professional" antigen presenting cell?
   A. Macrophages
   B. Dendritic cells
   C. B cells
   D. T cells
   E. None of the above

26. True/False: The thymus decreases in size as we age.
   A. True
   B. False

27. True/False: The more memory B cells your body has, the faster your body is able to react to the same pathogen and therefore produces less antibodies to combat the pathogen.
   A. True
   B. False
Station 7

28. True/False: Plasma cells secrete more antibodies than B cells but not more than Plasmablasts.
   A. True
   B. False

29. True/False: Basophils can produce histamine?
   A. True
   B. False

30. True/False: Eosinophils can produce histamine?
   A. True
   B. False

31. True/False: Natural killer cells are the same as natural killer T cells.
   A. True
   B. False

32. Which of the following is not a symptom of an allergic reaction?
   A. Sneezing
   B. Redness and itching of the eyes
   C. Impaired hearing
   D. Rashes
   E. None of the above
Station 8

33. Which of the following is NOT associated mechanical digestion?
   A. Chewing with the jaw
   B. Teeth
   C. Mixing of food with the tongue
   D. Churning of the food in the stomach
   E. None of the above

34. What is the approximate length of the alimentary canal?
   A. 5 feet
   B. 10 feet
   C. 20 feet
   D. 30 feet
   E. 40 feet

35. Which specific type of salivary gland secretes the most saliva?

36. Which of the following is not an accessory digestive organ?
   A. Teeth
   B. Tongue
   C. Gallbladder
   D. Pancreas
   E. Anus

37. The uvula is, in essence, a projection of the ____________ .
   A. Hard Palate
   B. Soft Palate
   C. Esophagus
   D. Nasal Cavity
   E. None of the above
Station 9

38. Mastication is another term for __________.
   A. Defecation
   B. Deglutition
   C. Respiration
   D. Chewing
   E. Coughing

39. What is the mineralized matrix that makes up teeth?

40. __________ is the hardest substance found in the human body.

41. Which types of teeth can have 1 or 2 roots?
   A. Incisors
   B. Cuspid
   C. Bicuspids
   D. A & B
   E. A, B, & C

42. Which types of teeth have only 1 root?
   A. Incisors
   B. Cuspid
   C. Bicuspids
   D. A & B
   E. A, B, & C

43. How many roots can molars have?
   A. No roots
   B. 1 root only
   C. 1 or 2 roots
   D. 2 roots only
   E. 3 or more roots
Station 10

44. What is the term for a mass of swallowed substance that travels through the esophagus?

45. What is the flap of cartilage that prevents food from entering the trachea?

46. True/False: The esophagus lacks muscular tissue.
   A. True
   B. False

47. True/False: The diaphragm contributes to vomiting.
   A. True
   B. False

48. What are the names of the four distinct layers of the alimentary canal from innermost to outermost?
   A. Submucosa, Muscularis, Serosa, Mucosa
   B. Serosa, Muscularis, Submucosa, Mucosa
   C. Muscularis, Mucosa, Submucosa, Serosa
   D. Mucosa, Submucosa, Serosa, Muscularis
   E. None of the above
Station 11

Rest Station

I'VE DECIDED TO TAKE MY TURNOVERS TO SOUTH BEACH AND JOIN THE MIAMI DOLPHINS
Station 12

49. Which statement regarding the four distinct layers of the alimentary canal is FALSE?
   A. The muscularis is comprised of an inner longitudinal layer and outer circular layer.
   B. The serosa is, in essence, the visceral peritoneum.
   C. The submucosa possesses blood flow.
   D. The mucosa consists of a muscularis mucosae.
   E. For the most part, the specific type of epithelial tissue involved with the alimentary canal is *simple columnar epithelium*.

50. Which distinct layer of the alimentary canal forms sphincters?
   A. Submucosa
   B. Muscularis
   C. Serosa
   D. Mucosa
   E. Adventitia

51. Which of the following is an INCORRECT statement regarding similarities/differences between the submucosal plexus and the myenteric plexus?
   A. Both plexi constitute the enteric nervous system.
   B. The myenteric plexus is primarily concerned with GI tract motility.
   C. The myenteric plexus is located in the mucosa.
   D. The submucosal plexus is located in the submucosa.
   E. The submucosal plexus is primarily concerned with GI gland activity as well as smooth muscle regulation in the mucosa.

52. What is the starting point of the four distinct layers of the alimentary canal?
   A. Mouth
   B. Oropharynx
   C. Nasopharynx
   D. Laryngopharynx
   E. Esophagus
Station 13

Select the letter corresponding to an aspect of the GI system that fits the name. Letters are used only once and not all letters will be used.

53. Salivary glands
54. Stomach
55. Duodenum
56. Appendix
57. Liver
58. Large intestine
59. Rectum
60. Anus
61. Tongue
62. Pancreas
63. Esophagus
Station 14

64. Give the order of the four main segments of the large intestine from the small intestine onwards.
   A. Sigmoid Colon, Ascending Colon, Transverse Colon, Descending Colon
   B. Ascending Colon, Sigmoid Colon, Descending Colon, Transverse Colon
   C. Ascending Colon, Transverse Colon, Descending Colon, Sigmoid Colon
   D. Descending Colon, Sigmoid Colon, Ascending Colon, Transverse Colon
   E. Descending Colon, Transverse Colon, Ascending Colon, Sigmoid Colon

65. The hepatic flexure is the junction between the ___________ colon and the ___________ colon.
   A. Ascending, Transverse
   B. Transverse, Sigmoid
   C. Sigmoid, Descending
   D. Transverse, Descending
   E. Ascending, Descending

66. The movement of feces into the ________ is what incites the urge to defecate.

67. True/False: The internal anal sphincter is under voluntary control.
   A. True
   B. False

68. True/False: The wall of the small intestine is thicker than that of the large intestine.
   A. True
   B. False

69. True/False: The diameter of the large intestine is larger than that of the small intestine.
   A. True
   B. False
Station 15

70. True/False: External respiration takes place at the alveoli and internal respiration takes place at the cells of the body.
   A. True
   B. False

71. The floor of the thoracic cavity is bounded by the _____________.

72. Pressure differentials between the lungs and the _________________ is what drives air into and out of the lungs.

73. During inhalation, the diaphragm ____________ in an effort to ____________ the volume of the chest cavity.
   A. Relaxes, Increase
   B. Relaxes, Decrease
   C. Contracts, Increase
   D. Contracts, Decrease
   E. None of the above

74. During exhalation, the diaphragm ____________ in an effort to ____________ the volume of the chest cavity.
   A. Relaxes, Increase
   B. Relaxes, Decrease
   C. Contracts, Increase
   D. Contracts, Decrease
   E. None of the above
Station 16

Based on the following spirometry diagram, select the letter that fits the name or description for the following 6 questions. Each letter will be used once.

75. Inspiratory Reserve Volume

76. Residual Volume

77. Tidal Volume

78. Vital Capacity

79. Total Lung Capacity

80. Expiratory Reserve Volume
Station 17

The following questions pertain to the number of lobes in each specific lung. Let $X$ represent the number of lobes in the LEFT lung and let $Y$ represent the number of lobes in the RIGHT lung. Express your answer to each of the following questions as a number.

81. What is the value of $X$?

82. What is the value of $Y$?

83. What is the value of $X$ subtracted from $Y$?

84. What is the value of the addition of $X$ and $Y$?

85. What is the value of the multiplication of $X$ by $Y$?

86. What is the name for the narrow superior portion of the lung?
   A. Apex
   B. Atlas
   C. Zenith
   D. Peak
   E. Crown
Station 18

87. What is the name for the detergent that reduces the surface tension of alveoli so that they don’t get crushed by their own weight during exhalation?

88. True/False: The detergent from the previous question is secreted by Type I alveolar cells.
   A. True
   B. False

89. What is another name for breathing in or inhalation?
   A. Respiration
   B. Inspiration
   C. Motivation
   D. Revelation
   E. None of the above

90. True/False: The horizontal fissure is only present on the right lung.
   A. True
   B. False

91. True/False: The oblique fissure is only present on the left lung.
   A. True
   B. False
Station 19

Select the letter corresponding to a structure of the respiratory system that fits the description. Note that not all the letters will be used.

92. Pleural cavity
93. Right bronchiole
94. Right secondary bronchus
95. Trachea
96. Larynx
97. Left tertiary bronchus
98. Visceral pleura
99. Diaphragm
Station 20

The following questions pertain to the oxyhemoglobin dissociation curve, shown in the image below. Select the appropriate direction shift of the curve based on the description provided.

![Oxyhemoglobin Dissociation Curve]

100. Decrease in temperature.
    A. Right
    B. Left

101. Increase in concentration of carbon dioxide.
    A. Right
    B. Left

102. Increase in temperature.
    A. Right
    B. Left

103. Decrease in the concentration of carbon dioxide.
    A. Right
    B. Left