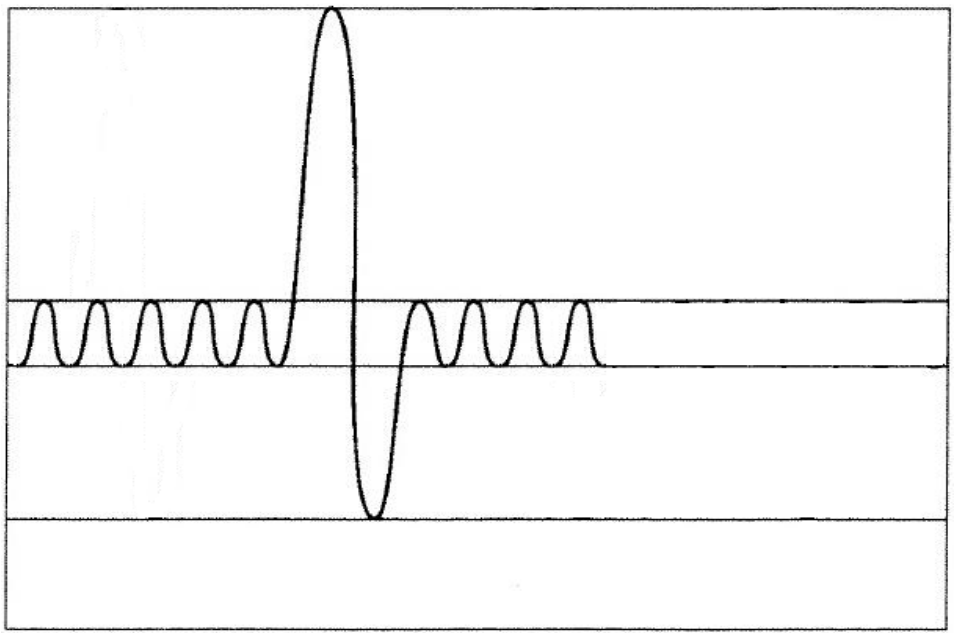
Name _____ **Per.** _____ **Date** _____

Section 14.2- Mechanisms of Breathing
Regular Anatomy

Using the list below, label the respiratory volumes on the graph.



Expiratory reserve volume	Residual volume	Total lung capacity
Inspiratory reserve volume	Tidal volume	Vital capacity

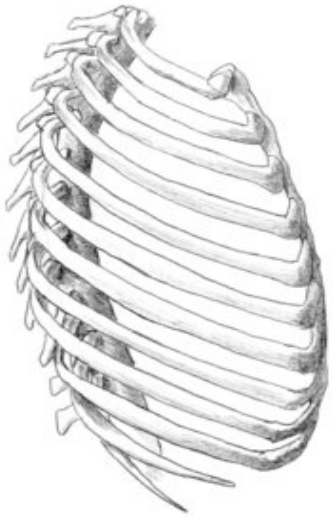
1. Label the X axis "Breaths/Time."
2. Label the Y axis "Volume of Air in Lungs (mL)." Next, label the numerical increments on the Y axis beginning with zero.
3. Based on your graph, the volume of air in a normal breath is _____ mL.
4. Write a mathematical formula showing the relationship between vital capacity, inspiratory reserve volume, expiratory reserve volume, and tidal volume.

5. A particular student has a vital capacity of 4000 mL, a tidal volume of 450 mL, and an expiratory reserve volume of 1350 mL. Calculate his inspiratory reserve volume?

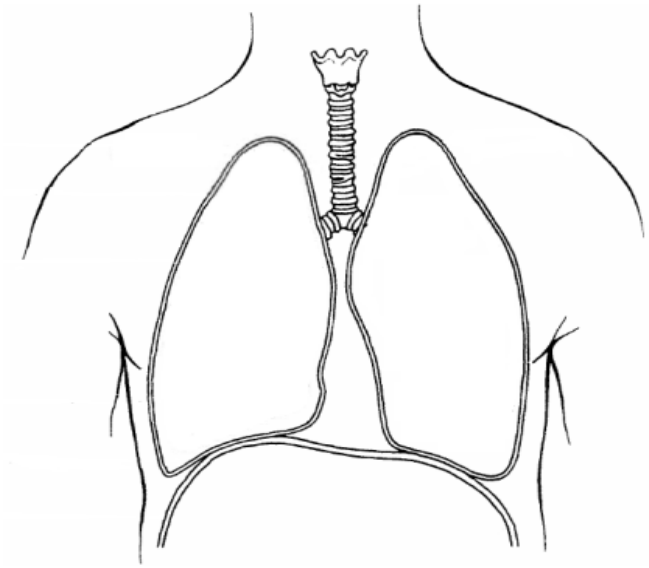
6. Using the same volume numbers above and given that this same student has a residual volume of 1100 mL, calculate the total lung capacity of this student.

Ventilation

Inspiration

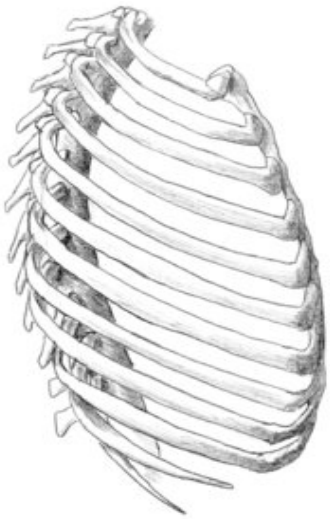


Lateral View

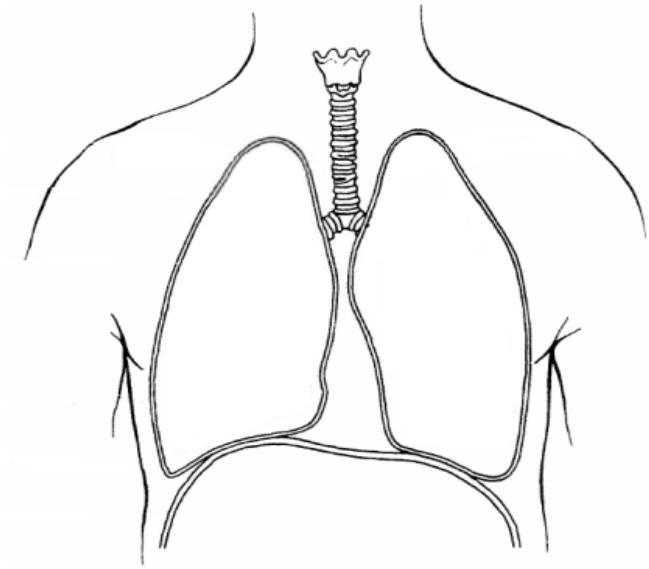


Anterior View

Expiration



Lateral View



Anterior View

1. For both lateral view illustrations, label, draw and color red the external intercostal muscles. Be sure to correctly draw the direction of the striations.
2. For both lateral view illustrations, draw purple arrows showing the direction the rib cage moves during inspiration. Then draw brown arrows showing the direction the rib cage moves during expiration.
3. For both anterior view illustrations, label, draw and color blue the diaphragm.
4. For both anterior view illustrations, draw a purple arrow showing the direction the diaphragm moves during inspiration. Then draw a green arrow showing the direction the diaphragm moves during expiration.
5. For both anterior view illustrations, draw green arrows showing the direction of air flow during inspiration. Then draw yellow arrows showing the direction of air flow during expiration.

Complete the paragraph about ventilation.

__1__, or ventilation is divided into 2 phases. The first phase is __2__, or breathing in, and the second phase is __3__, or breathing out. In order to breathe, lung volume must change and there must be a difference between atmospheric pressure and alveolar (lung) pressure. Inspiration is an __4__ process meaning that it requires energy. During inspiration, the _____ __5__ ____ contract pulling the rib cage __6__ and out while the __7__ contracts downward pulling on the inferior part of the lungs. As the rib cage expands it pulls on the pleural membranes which in turn pull on the lungs. Both muscle contractions increase the __8__ of the lungs which decreases the __9__ _____ compared to atmospheric pressure. Because atmospheric pressure is greater than alveolar pressure, air moves __10__ the lungs. Conversely, expiration is a __11__ process meaning that it does not require energy. During expiration, the _____ __12__ _____ relax causing the rib cage to move __13__ and in while the __14__ relaxes allowing the lungs to recoil back to its original shape. The rib cage, moving inward, causes the lungs to decrease in size. The relaxation of both muscles __15__ the volume of the lungs which __16__ the alveolar pressure compared to atmospheric pressure. Because alveolar pressure is greater than atmospheric pressure, air moves __17__ of the lungs. There is a time when expiration becomes an active process and that is during forced expiration. During forced expiration, the _____ __18__ _____ contract further pulling the rib cage down and in. This causes the lung volume to further __19__ which causes the alveolar pressure to further __20__. Because alveolar pressure is greater than atmospheric pressure, air is forcefully moved out of the __21__.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____