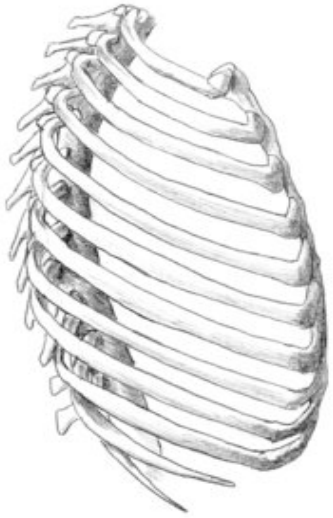
Name _____ **Per.** _____ **Date** _____

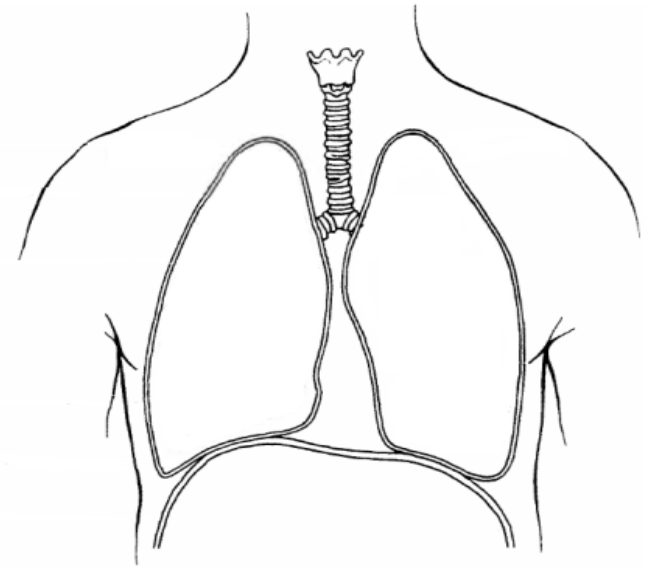
Ventilation and Lung Volumes Worksheet
Honors Anatomy

Ventilation

Inspiration



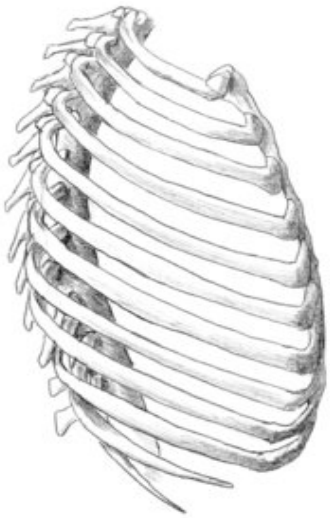
Lateral View



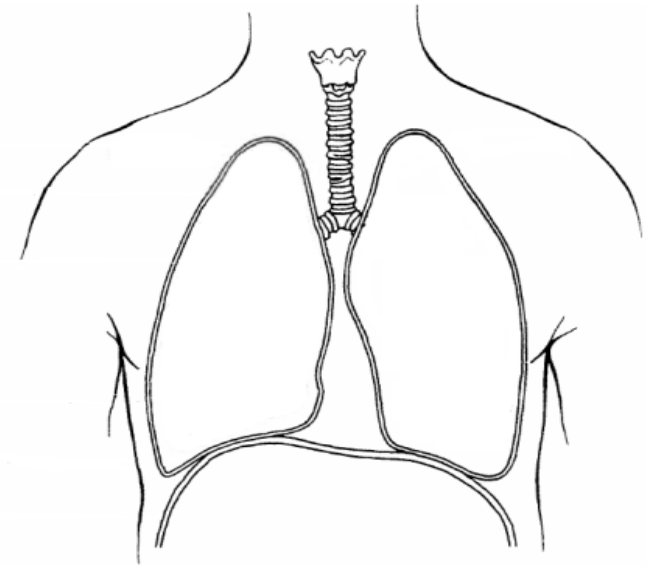
Anterior View

1. On the lateral view illustration, label, draw and color red the external intercostal muscles.
2. On the lateral view illustration, draw purple arrows showing the direction the rib cage moves during inspiration.
3. On the anterior view illustration, label and color blue the diaphragm.
4. On the anterior view illustration, draw purple arrows showing the direction the diaphragm moves during inspiration.
5. On the anterior view draw green arrows showing the direction of air flow during inspiration.

Expiration



Lateral View



Anterior View

1. On the lateral view illustration, label, draw and color red the external intercostal muscles.
2. On the lateral view illustration, draw purple arrows showing the direction the rib cage moves during expiration.
3. On the anterior view illustration, label and color blue the diaphragm.
4. On the anterior view illustration, draw purple arrows showing the direction the diaphragm moves during expiration.
5. On the anterior view draw green arrows showing the direction of air flow during expiration.

1. What 2 principles govern the air flow during ventilation?

2. Air pressure outside the lungs and body is called _____ _____ whereas air pressure inside the lungs is called _____ _____.

3. Given the atmospheric and alveolar pressures, draw an arrow between the 2 bubbles that correctly illustrates air flow. Next name the correct part of ventilation represented by the direction of your arrows.

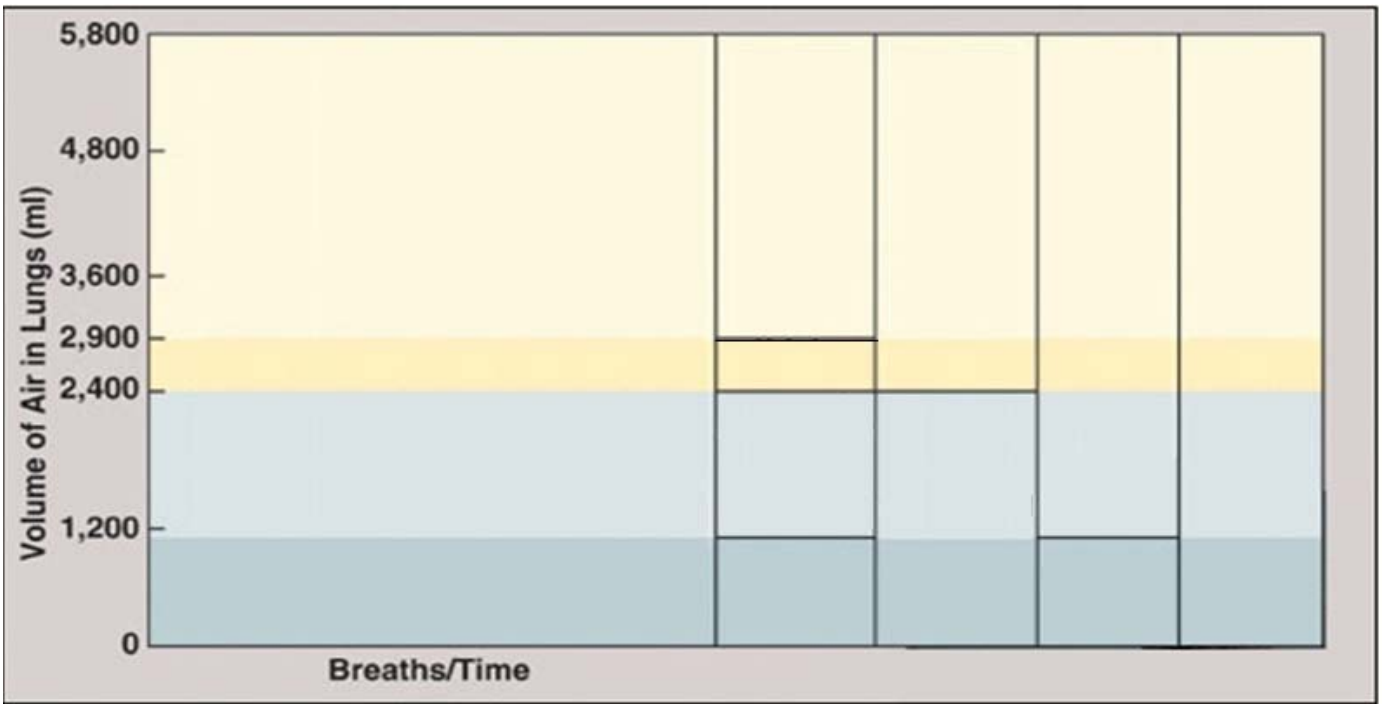
	Atmospheric Pressure	**Alveolar Pressure**	**Part of Ventilation**
A.	760 mmHG	759 mmHG	_____
B.	760 mmHG	761 mmHG	_____

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. _____

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



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

1. Based on your graph, fill out the table for the volume of air for each lung volume.

Lung Volume	Volume of Air (mL)
Tidal Volume	500 mL
Inspiratory Reserve Volume	
Expiratory Reserve Volume	
Residual Volume	
Vital Capacity	
Total Lung Capacity	

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.