Respiratory System Review

A. Directions: Fill in the blank with the appropriate vocabulary word or words (several examples require a short phrase).

1. Two branches of the trachea _____bronchi_____.
2. Air sacs at the end of bronchioles _____alveoli_____.
3. Main organs or the respiratory system _____lungs (nasopharynx, larynx, trachea, bronchi)_____.
4. Maximum amount of air that can be moved into and out of the respiratory system _____vital capacity_____.
5. Subdivisions of the bronchi _____bronchioles_____.
6. Structure in the respiratory system located in the throat behind the mouth _____pharynx_____.
7. Action during which air is pulled into the lungs _____inspiration_____.
8. Elastic folds of tissue located inside the larynx _____vocal cords_____.
9. Large flat muscle responsible for inhalation and exhalation _____diaphragm_____.
10. Structure referred to as the voicebox _____larynx_____.
11. Action during which air is pushed out of the lungs _____expiration_____.
12. Passageway between larynx and lungs _____trachea_____.
13. Red-colored protein that carries oxygen and is found in red blood cells _____hemoglobin_____.
14. Soap-like particles that coat the inner surface of alveoli and decrease water’s surface tension _____surfactant_____.
15. Amount of gas that includes the residual volume+the vital capacity _____total lung capacity_____.
16. Enzyme that converts carbonic acid to carbon dioxide and vice versa _____carbonic anhydrase_____.
17. Microscopic area where gas exchange takes place _____alveoli/capillaries_____.
18. Pressure exerted by air _____atmospheric pressure_____.
19. Allows the airway to close when food is swallowed _____epiglottis_____.
20. Medical professionals use this to determine lung capacity _____spirometer_____.
21. Common apparatus used in schools to determine lung capacity _____lung bag_____.

B. Use the words below to fill in the blanks (a blank may be filled by one or more words, if a phrase is needed).

a. Diffusion  
b. Capillary blood to alveolar air  
c. Higher concentration  
d. Tissue cells to capillary blood  
e. Air of alveoli to capillary blood  
f. Capillary blood to tissue cells  
g. Lower concentration  
h. Expiration  
i. CO₂ poor and O₂ rich  
j. O₂ poor and CO₂ rich
22. All gas exchanges are made by the process of ________a_________.
23. This can occur because of a ___k_____.
24. When substances pass in this manner, they move from areas of their _____c_______ to areas of ______g_____.
25. Thus oxygen passes continually from ____e________ and then the ____f_________.
26. Conversely, CO₂ (carbon dioxide) moves from the ____d__________, and the ______b___________.
27. From there it passes out the body during ____h_________.
28. As a result of such exchanges, arterial blood seems to be ___i_____, while venous blood is _____j_____.

C. Fill out the chart below

<table>
<thead>
<tr>
<th>Phase of respiration</th>
<th>Atmospheric pressure</th>
<th>Alveolar pressure</th>
<th>Air moves from…</th>
<th>O₂ levels highest in</th>
<th>CO₂ levels highest in</th>
<th>Muscles contracting</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. Inspiration</td>
<td>760 mm Hg (high)</td>
<td>758 mmHg (low)</td>
<td>b. atmosphere</td>
<td>c. lungs/alveoli</td>
<td>d. blood</td>
<td>e. diaphragm; external intercostals</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>to lungs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.Expiration</td>
<td>760 mm Hg (low)</td>
<td>762 mmHg (high)</td>
<td>b. lungs to</td>
<td>c. blood</td>
<td>d. lungs/alveoli</td>
<td>e. internal intercostals/abs</td>
</tr>
</tbody>
</table>

29. The partial pressure of oxygen us highest in the alveolar air/blood (circle one).

KEY FOR THIS CHART IS A COMPLETED CHART AFTER THE BLANKS

Look at the chart provided.

30. Provide labels for the volumes shown at
A. ____________ ____________.
Diagram 1 describes the lung volumes and lung capacities associated with different phases of the respiratory cycle.

- **Lung volumes** and **lung capacities** refer to the volume of air associated with different phases of the respiratory cycle.

31. Describe how the person is breathing (ex. Normal breathing, forced exhale/inhale) at each labeled location on the graph.

32. During a routine medical exam, the doctor asks you to take your deepest breath in and let out all the air you can. What volume or capacity is he referring to?

33. Name three ways carbon dioxide is transported within the blood to the lungs:
   1. Dissolved in plasma
   2. Carbaminohemoglobin
   3. Bicarbonate ion
Fill in the chart below. Make sure you know the equations for calculating each capacity.

34. What is the total lung capacity of the person whose data is shown in the chart? (TLC = VC + RV)
35. Show your work for calculating the vital capacity (VC = IRV + ERV + TV)

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Description</th>
<th>Normal value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tidal volume (TV)</td>
<td>Volume breathed in normal breath</td>
<td>500mL</td>
</tr>
<tr>
<td>Inspiratory Reserve Volume (IRV)</td>
<td>Quantity of air that can be forcefully inspired after a normal tidal inspiration.</td>
<td>3000mL</td>
</tr>
<tr>
<td>Expiratory reserve volume</td>
<td>Quantity of air that can be forcefully expired after a normal tidal expiration.</td>
<td>1200mL</td>
</tr>
<tr>
<td>Vital capacity</td>
<td>Maximum quantity of air that can be moved into and out of the lungs</td>
<td>4500-5500mL</td>
</tr>
<tr>
<td></td>
<td>VC = IRV+ERV+TV</td>
<td></td>
</tr>
<tr>
<td>Functional residual capacity</td>
<td>Volume of lung after normal exhalation FRC = ERV+RV</td>
<td>2400mL</td>
</tr>
<tr>
<td>Residual volume</td>
<td>Amount of air left in lungs after forced expiration</td>
<td>1200mL</td>
</tr>
<tr>
<td>Total lung capacity</td>
<td>Maximum quantity of air the lungs can hold (TLC= VC+RV)</td>
<td>4400-6400mL</td>
</tr>
</tbody>
</table>
36. Label the structures on the diagram
KEY WILL BE ADDED FRIDAY

Key for questions 37 and 38 is after the questions on the next page.

37. Be able to trace the path of air through the structures of the respiratory system in order
38. Know:
- the function of each structure of the respiratory system
- the epiglottis: structure, function, and detail
- tracheal cartilages (one is solid, while the others are C shaped)
  o know: which is which and the significance of that
- what is coughing; why it’s important
- the most sensitive part of the trachea
- compare healthy lungs to smoker’s lungs in terms of:
  o elasticity
  o gas exchange capability
  o oxygen needs
  o causes of lung cancer (95% due to smoking)
Be able to:

☐ trace the path of air through the structures of the respiratory system in order

PATH OF AIR

1. **External nares** – entryway for air
2. **Nasal cavity** – increased surface area allows for large amounts of respiratory mucosa to help trap unwanted particles
3. **Pharynx** – serves as a common passageway for food and air
4. **Larynx** – routes air and food into the correct locations; plays a role in speech
5. **Trachea (windpipe)** – lined of ciliated mucosa that propels mucus with dirt and debris away from the lungs; filters, warms, and moistens incoming air
6. **Primary bronchus** – the two main air passages that branch from the trachea and send air to the lungs
7. **Secondary bronchus** – serve as the airway to their respective lobe of the lung
8. **Tertiary bronchus** – carry air to the 10 bronchopulmonary segments of each lung
9. **Bronchiole** – serve as passageways by which air enters the air sacs of the lungs
10. **Alveolar duct** – connect the respiratory bronchioles to alveolar sacs containing alveoli
11. **Alveoli** – location of gas exchange