What is the Human Respiratory System?

Worksheet

The respiratory system uses the diaphragm and intercostal muscles to draw air through the nose and trachea into the lungs. In the alveoli, oxygen diffuses into capillaries and carbon dioxide diffuses out for exhalation.

Questions

1. What happens to the diaphragm during inhalation?

A) It contracts and moves down
B) It contracts and moves up
C) It relaxes and moves down
D) It doesn't move

2. In the alveoli, which gas diffuses OUT of the blood?

A) Oxygen
B) Carbon dioxide
C) Nitrogen
D) Hydrogen

3. What is the primary role of intercostal muscles?

A) Produce oxygen
B) Exchange gases
C) Lift and lower the ribcage
D) Filter air

4. Approximately how many alveoli do the lungs contain?

A) 10 million
B) 50 million
C) 300 million
D) 1 billion

5. Trace the path of an oxygen molecule from the nose to the bloodstream.

6. Why are alveoli so small and numerous?

7. What would happen if the diaphragm were paralyzed?

8. Define: What is the primary muscle of breathing?

9. Define: Where does gas exchange occur?

10. Define: What is the trachea?

Answer Key

1. A) It contracts and moves down - During inhalation, the diaphragm contracts and moves downward, increasing lung volume and drawing air in.

2. B) Carbon dioxide - CO produced by cells diffuses from capillaries into alveoli and is exhaled. O diffuses in the opposite direction.

3. C) Lift and lower the ribcage - The external intercostal muscles lift the ribcage during inhalation; internal intercostal muscles help lower it during exhalation.

4. C) 300 million - The lungs contain ~300 million alveoli, providing a total surface area of about 70 m for efficient gas exchange.

5. Nose trachea main bronchus smaller bronchi bronchioles alveoli diffuses across alveolar wall capillary dissolves in blood plasma or binds to hemoglobin in red blood cells.

6. Alveoli are tiny (0.1-0.2 mm diameter) but the lungs contain ~300 million of them. This enormous surface area (70 m) maximizes gas exchange efficiency. More alveoli = more O absorption, more CO removal.

7. The diaphragm is the primary breathing muscle, responsible for ~70% of ventilation. If paralyzed, intercostal muscles could still create some ventilation, but far less air would enter the lungs. This would reduce oxygen intake and could cause respiratory failure (hence diaphragm damage in high spinal injuries is life-threatening).

8. The diaphragm, a dome-shaped muscle below the lungs that contracts during inhalation and relaxes during exhalation.

9. In the alveoli, tiny sacs at the end of bronchioles surrounded by capillaries.

10. The windpipe; a tube that carries air from the pharynx to the left and right main bronchi.