

# What is the Respiratory System?

## Worksheet

The respiratory system brings air through the airway pathway into the alveoli of the lungs, where oxygen diffuses into the blood and carbon dioxide diffuses out, driven by pressure changes from the diaphragm and intercostal muscles.

## Questions

1. Where does oxygen diffuse into the bloodstream?

- A) Trachea
- B) Bronchi
- C) Alveoli
- D) Larynx

2. What is the formula for minute ventilation?

- A)  $TV + RR$
- B)  $TV \cdot RR$
- C)  $TV / RR$
- D)  $TV \cdot RR$

3. Which muscle contracts and flattens to increase chest volume during inhalation?

- A) Diaphragm
- B) Bicep
- C) Cardiac muscle
- D) Trapezius

4. Which respiratory tract structures are considered 'upper' airway?

- A) Bronchioles and alveoli
- B) Trachea and bronchi
- C) Nose, pharynx and larynx
- D) Lungs only

5. A resting adult has a tidal volume of 500 mL and breathes 12 times per minute. Find the minute ventilation.

6. During exercise, tidal volume rises to 800 mL and respiratory rate to 25 breaths/min. Find the new minute ventilation.

7. A patient's minute ventilation is measured at 9000 mL/min with a respiratory rate of 18 breaths/min. Find the tidal volume.

8. Define: What is the main function of the respiratory system?

9. Define: Where does gas exchange actually happen?

10. Define: What muscles drive normal breathing?

## Answer Key

1. C) Alveoli - Alveoli have thin walls and a huge surface area ideal for gas exchange.
2. B) TV RR - Minute ventilation equals tidal volume multiplied by respiratory rate.
3. A) Diaphragm - The diaphragm's contraction lowers it, expanding the thoracic cavity and drawing air in.
4. C) Nose, pharynx and larynx - The upper respiratory tract includes the nose, pharynx and larynx; the lower tract begins at the trachea.
5.  $VE = TV \cdot RR$   $VE = 500 \text{ mL} \cdot 12 \text{ breaths/min}$   $VE = 6000 \text{ mL/min} = 6 \text{ L/min}$
6.  $VE = TV \cdot RR$   $VE = 800 \cdot 25$   $VE = 20,000 \text{ mL/min} = 20 \text{ L/min}$
7.  $VE = TV \cdot RR$   $TV = VE / RR$   $TV = 9000 / 18$   $TV = 500 \text{ mL}$
8. Gas exchange: taking in oxygen and expelling carbon dioxide.
9. In the alveoli, tiny air sacs at the end of the bronchial tree.
10. The diaphragm and intercostal muscles, which change chest cavity pressure.

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