

Name: _____ Block: _____ Date: _____

Biology 12 - Respiration

⇒ Part A: Definitions: Define the following terms, **IN YOUR OWN WORDS, IN AS FEW WORDS AS CLARITY ALLOWS.**

1. breathing	
2. external respiration	
3. internal respiration	
4. cellular respiration	
5. inspiration	
6. expiration	
7. vocal cords	
8. trachea	
9. bronchi	
10. bronchioles	
11. alveoli	
12. ventilation	
13. diaphragm	
14. pleural membranes	
15. hemoglobin	
16. negative pressure	
17. breathing center	
18. dead air	
19. residual air	
20. stretch receptors	

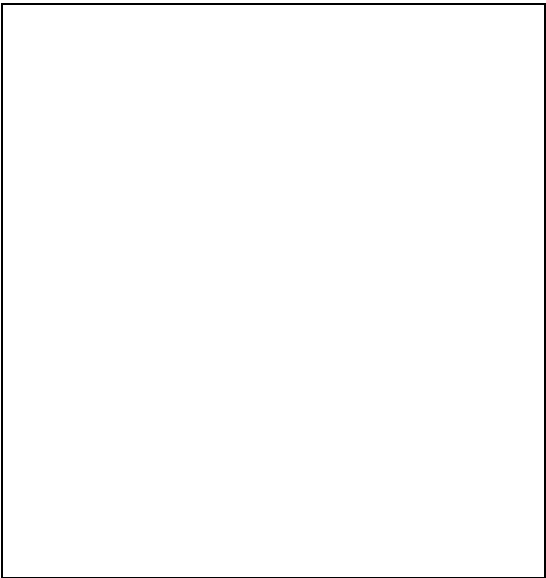
Part B - Short Answers

1. Inspiration and expiration are involved in the process of _____.
2. During inspiration, the rib cage moves up and _____; the diaphragm moves _____.
3. The primary stimulus for breathing is the amount of _____ in the blood.
4. Oxygen moves from the alveoli to the capillaries by means of _____.
5. Carbon dioxide is carried in the plasma as the _____ ion.
6. Hemoglobin readily takes up oxygen in the lungs, where the pH is _____ and the temperature is _____.
7. At the tissues, _____ diffuses out of the blood and _____ diffuses into the blood.
8. In which structures does gas exchange actually occur? _____
9. When food is swallowed, the respiratory passage is closed off. How are the nasal passages closed off?

10. How is the trachea (larynx) closed off?

11. Make a sketch that includes the following parts. Be sure to label all the parts:

- a. sinus
 - b. nasal cavity
 - c. hard palate
 - d. opening to eustachian tube
 - e. soft palate
 - f. epiglottis
 - g. glottis
 - h. larynx
 - i. trachea
12. Indicate whether the following phrases describe INSPIRATION or EXPIRATION:
- i) lungs expanded _____
 - ii) _____ muscles (diaphragm and ribs) relaxed
 - iii) _____ diaphragm dome-shaped
 - iv) _____ chest enlarged
 - v) _____ less air pressure in lungs than environment _____



13. Put these statements in the proper sequence:

	Event
a	Respiratory center stops sending messages to diaphragm and rib muscles
b	Respiratory center sends excitatory message to diaphragm and rib muscles
c	Diaphragm becomes dome-shaped and rib muscles relax
d	Chest expands as diaphragm goes down and rib cage goes out.
e	Air goes rushing out as lungs recoil.
f	Air comes rushing in as lungs expand
g	Expanded lungs send message to respiratory system

Correct sequence: _____

14. Where does oxygen enter the blood? _____. Where does oxygen leave the blood? _____
15. Where does carbon dioxide enter the blood? _____ Where does it exit from the blood? _____
16. Give the equation that describes how oxygen is transported in the blood. Label one arrow *lungs* and the reverse arrow *tissues*.
17. Give the equation that describes how most carbon dioxide is transported in the blood. Label one arrow *lungs* and the reverse arrow *tissues*.
18. What is the name of the enzyme that speeds up the above reaction? _____
19. Carbon dioxide combining with water produces hydrogen ions. Why does the blood not become acidic? _____
20. Hemoglobin is remarkably suited to the transport of oxygen. Why? _____
21. Why does a person die from carbon monoxide poisoning? _____
22. How does hemoglobin help with the transport of carbon dioxide? _____

23. Rewrite these false statements to make true statements:

- i. Diffusion of gases occurs in the lungs but not in the tissues

- ii. The trachea is held open by cartilaginous rings so that food can pass down more easily.
- iii. The glottis opens wide during swallowing.
- iv. An alveolus is a thin-walled air sac surrounded by a layer of poorly vascularized tissue.
- v. The respiratory center is sensitive to low oxygen content in the blood.
- vi. A person can commit suicide by holding his or her breath.
- vii. The direction in which gases move between the lungs and the blood is determined by temperature.

24. List the four steps that lead to bronchiogenic carcinoma.

25. Smoking cigarettes a) cause tuberculosis b) leads to emphysema and cancer c) increases the vital capacity of the lungs d) leads to super health and a long, happy life

RESPIRATION STUDY GUIDE

1. List the structures, in order, in which air passes through from nostrils to alveoli.
2. Briefly describe the structure and function of each of the following:

• larynx	• bronchioles
• bronchi	• diaphragm and ribs (function only)
• alveoli	• cilia
• trachea	
3. Describe and distinguish among breathing, external respiration, internal respiration, and cellular respiration.
4. Explain how the structure of alveoli is related to function.
5. What are pleural membranes? Describe their structure and function in respiration.
6. Explain how the nervous system controls the rate of breathing (inspiration and expiration).
7. Explain how the *partial pressures* of O₂ and CO₂ influence their transport at the alveolus-capillary level and at the capillary-tissue (non-lung) level.
8. What are oxyhemoglobin and carbaminohemoglobin? How do they form? What is their role in the transport of gases in the blood?
9. What is the role of hemoglobin in maintaining blood pH?

Critical Thinking Questions

1. The following table shows the relative amount of oxygen consumed by the major organs in an adult human:

	Oxygen Consumption	
	Rest	Heavy Work
Skeletal Muscles	0.30	6.95
Digestive organs	0.25	0.20
Heart	0.11	0.40
Kidneys	0.07	0.07
Brain	0.20	0.20
Skin	0.02	0.08
Other	0.05	0.06

- Explain the change in the uptake of oxygen between rest and heavy work by each of the following:
- a) Skeletal Muscles b) Skin c) Heart d) Digestive organs e) Brain
2. A person was brought to the emergency room unconscious. Breathing was shallow and irregular. A blood sample showed the blood pH to be 7.18 (normal = 7.4). A mechanical respirator, which increased breathing rate, was inserted and sodium bicarbonate was administered intravenously.
- a) Explain why the lowered breath rate lowers the blood pH
 - b) How does the respirator help return the blood pH to normal?
 - c) What was the reason for administering the sodium bicarbonate?