see pg. 282

Introduction to Respiration

When an organism is **aerobic**, it requires _____ to survive. In such organisms, a constant supply of oxygen is needed to carry out the process of _____. The waste product of this process is _____.

~~What is the main function of the respiratory system?~~ _____

_____

What are the **two requirements** shared by every respiratory system?

1. _____

2. _____

Explain how single-celled aerobic organisms such as protists perform gas exchange.

How do colonial algae obtain oxygen?

What do bacteria and fungi depend on for successful gas exchange?

The exchange of gasses across the skin of an animal is called _____. An example of an organism that demonstrates this specialized respiratory system is: _____.

In a fully labeled diagram, depict the specialized respiratory system utilized by fish. (see fig. 4 on pg. 283)

What are **spiracles**? What type of respiratory system are they involved with?

What type of respiratory system is characteristic of air-breathing vertebrates?

The **three** general types of respiratory systems are:

-
-
-

Outline the steps a frog takes to perform gas exchange.

Date: Name: Class:

Reinforcement
Chapter 8
BLM 8-2

Respiration in Animals

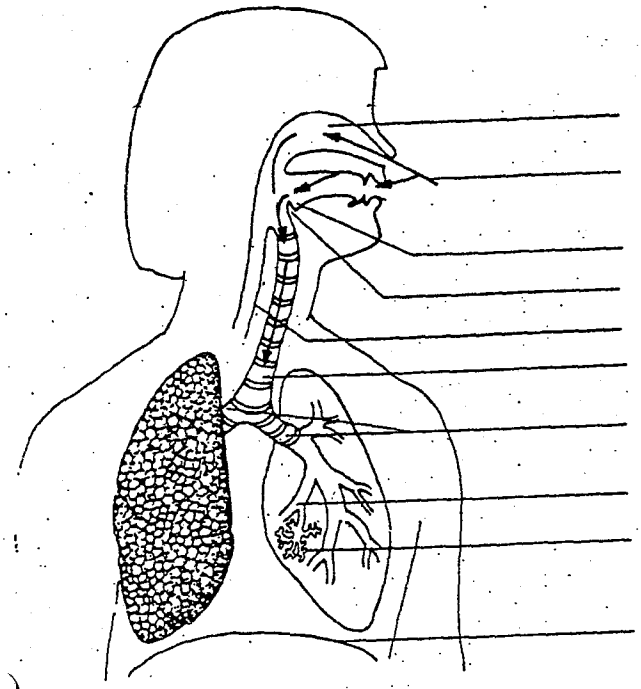
Goal Describe the major characteristics of the respiratory systems of different animals.

What To Do Using pages 282 – 284 of your textbook, complete the following chart.

Organism	Type of Respiratory System	Environment/Habitat	Specialized Structures for Respiration
bacteria			
earthworm			
fish			
grasshopper			
frog			
human			

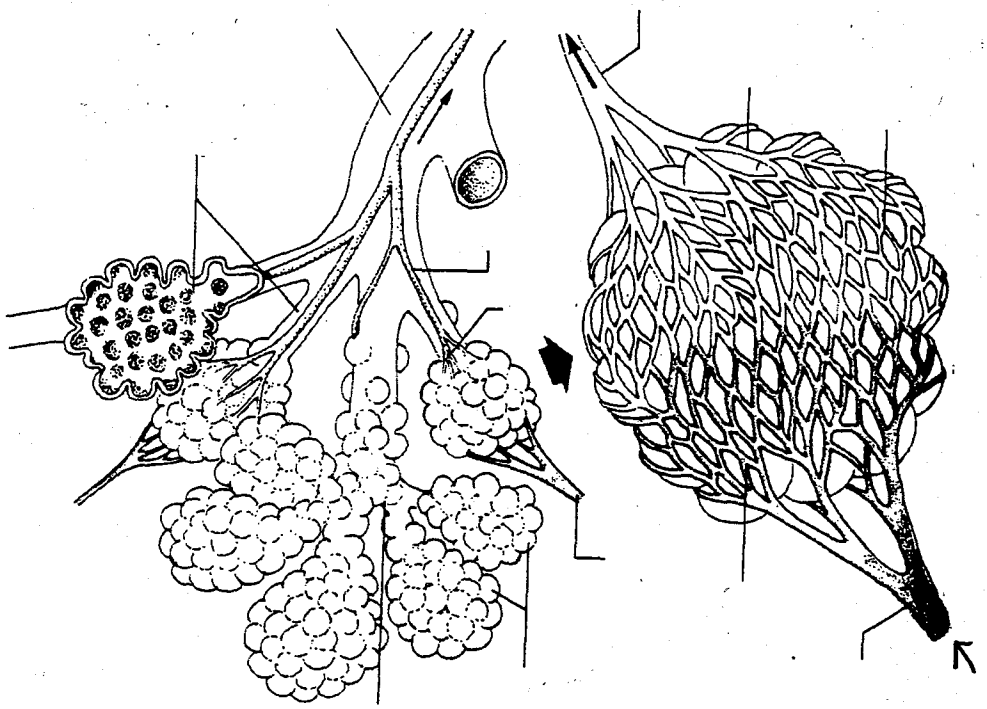
STRUCTURE AND FUNCTION OF THE HUMAN GAS EXCHANGE SYSTEM

UPPER RESPIRATORY TRACT



Outline the path taken by air as it passes through the upper respiratory tract:

THE LOWER RESPIRATORY TRACT



- the trachea continues downward into the _____
- the walls of the trachea are lined with cells, some of which have _____ and others that _____.
- at the lower end, the trachea divides into 2 _____
- each _____ divides into smaller and smaller _____ (which have NO supporting rings of cartilage)
- the small _____ finally lead to _____, which each end up in a group of *alveolar ducts* and *sacs* called _____

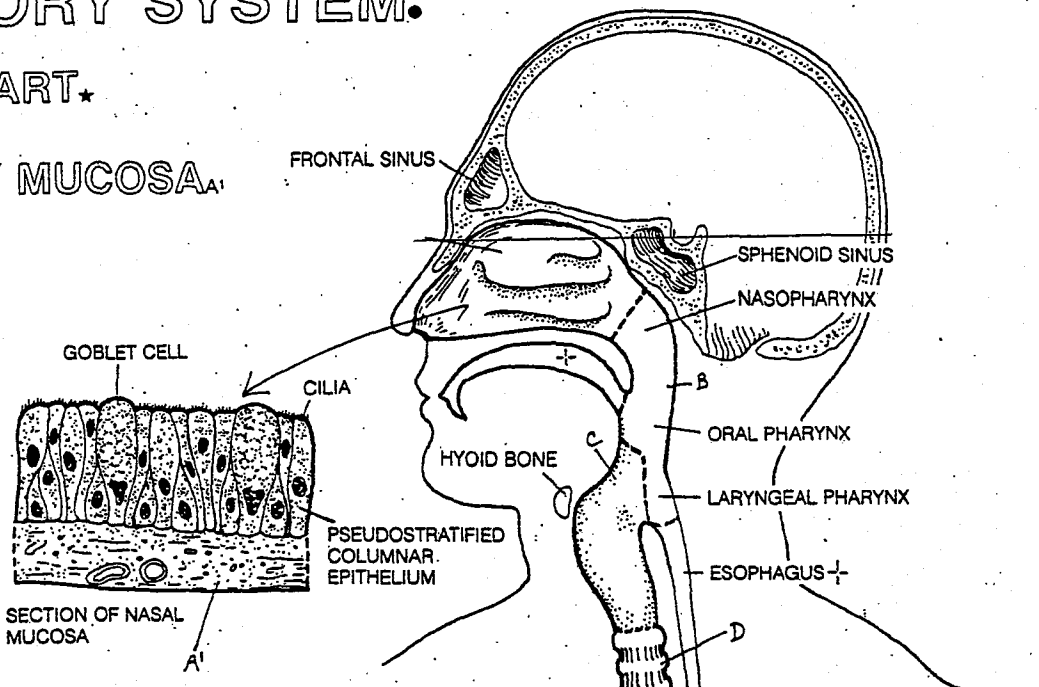
---

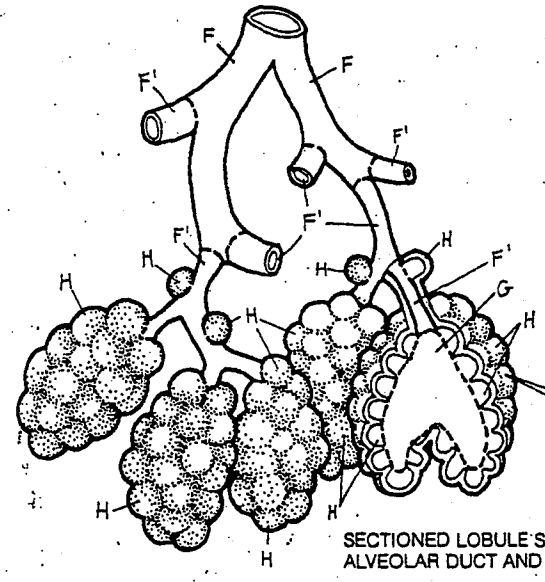
pg. 288 : (a) Explain the role of the external AND internal intercostal muscles.

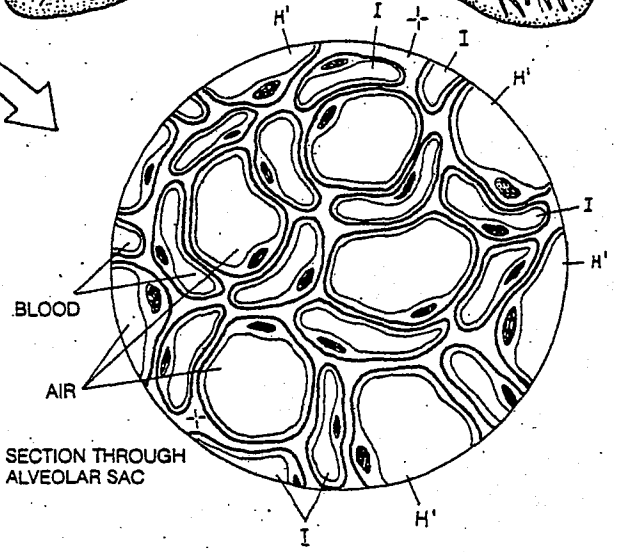
pg. 296 : (b) Define (i) tidal volume
(ii) expiratory reserve volume
(iii) vital capacity
(iv) inspiratory reserve volume

RESPIRATORY SYSTEM.

CONDUCTION PART★
NASAL CAVITY$_A$
RESPIRATORY MUCOSA$_{A'}$
PHARYNX$_B$
LARYNX$_C$
TRACHEA$_D$
BRONCHUS★
PRIMARY$_E$
SECONDARY$_{E'}$
TERTIARY$_{E^2}$
BRONCHIOLE$_F$



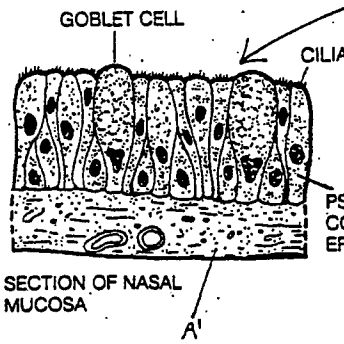


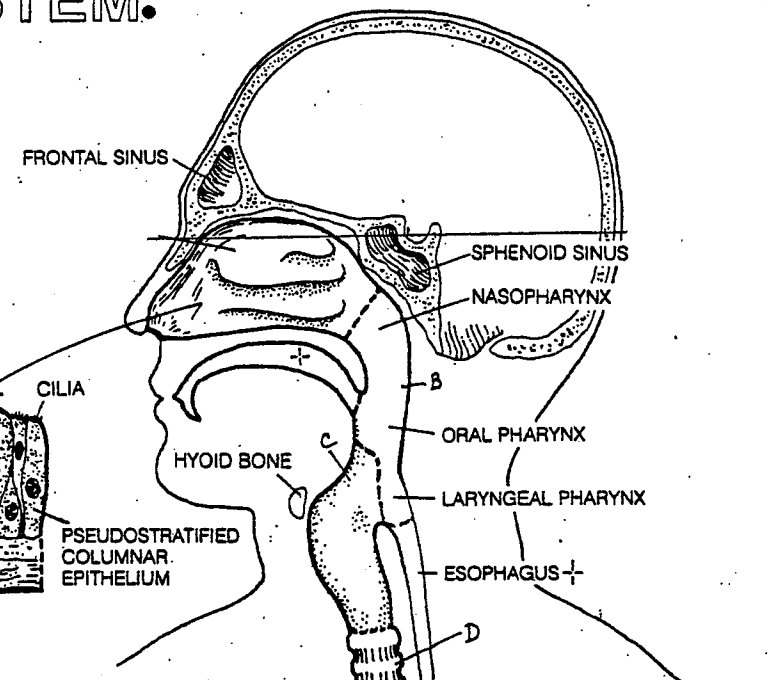


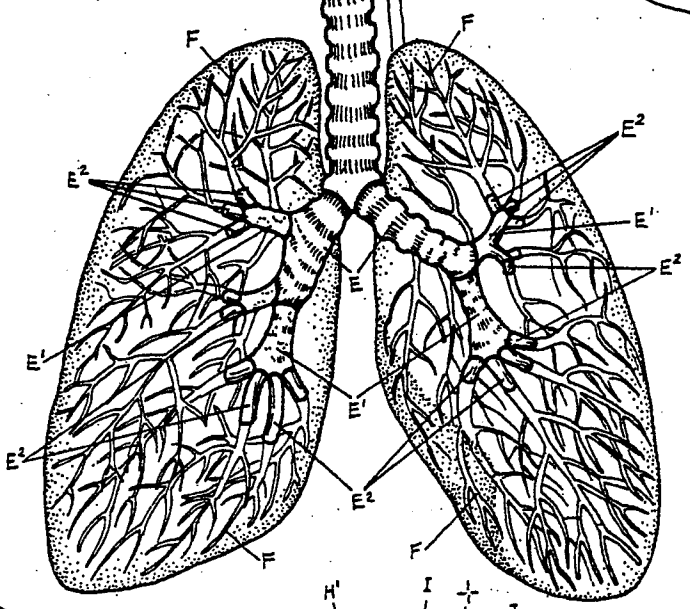
GAS EXCHANGE PART★
RESPIRATORY BRONCHIOLE$_{F'}$
ALVEOLAR DUCT$_G$
ALVEOLAR SAC$_H$
ALVEOLUS$_{H'}$
CAPILLARY$_I$

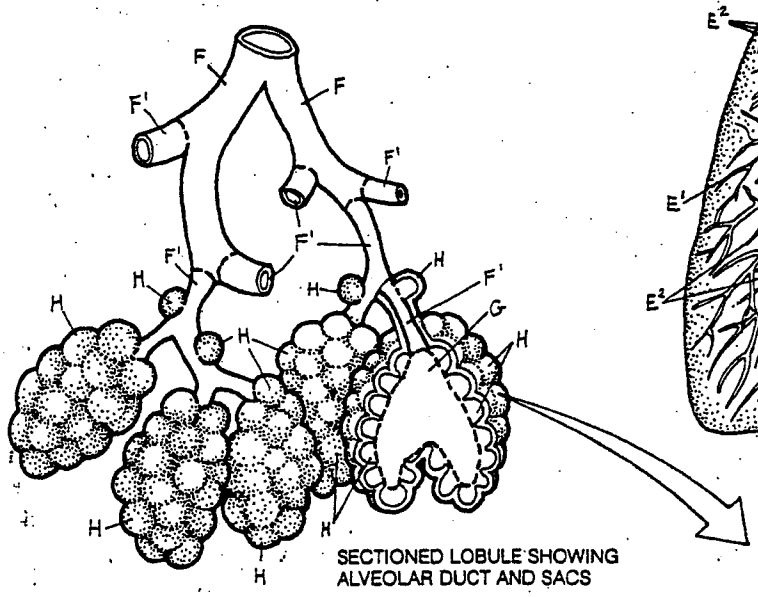
RESPIRATORY SYSTEM.

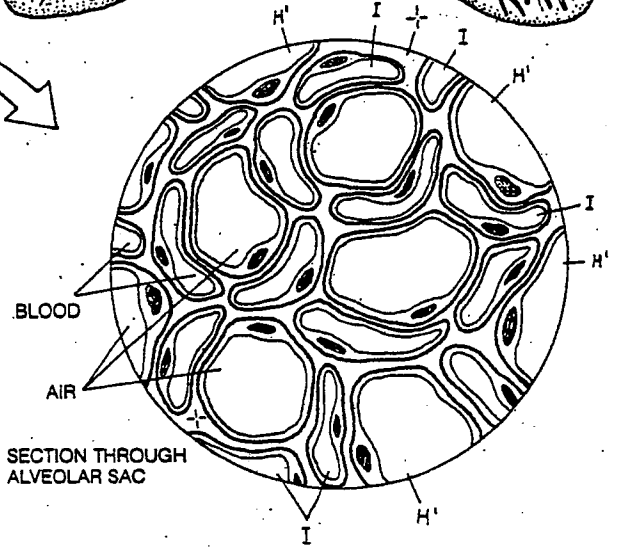
CONDUCTION PART★
NASAL CAVITY$_A$
RESPIRATORY MUCOSA$_{A'}$
PHARYNX$_B$
LARYNX$_C$
TRACHEA$_D$
BRONCHUS★
PRIMARY$_E$
SECONDARY$_{E'}$
TERTIARY$_{E^2}$
BRONCHIOLE$_F$











GAS EXCHANGE PART★
RESPIRATORY BRONCHIOLE$_{F'}$
ALVEOLAR DUCT$_G$
ALVEOLAR SAC$_H$
ALVEOLUS$_{H'}$
CAPILLARY$_I$

SBI 3U

Respiratory System Lab

Part A. Resting Breathing Rate

While sitting and relaxed, count how many times you take a breath in a one minute time interval.

Record your resting breathing rate: _____

Part B. Calculating $VO_{2\ max}$ Values

VO2 max can be predicted with 95 percent accuracy by running around a track on a windless day for exactly 15 minutes. The distance run to the nearest 25 meters is noted, and Bruno Balke's formula is used to predict VO2 max.

FYI: Here is a sample of measured VO2 max for selected athletes.

Athlete	Event	VO2 Max
Bjorn Daehlie	Cross country skier	90.0
Miguel Indurain	Cyclist (winner of Tour de France)	88.0
Dave Bedford	10km World Record holder	85.0
Steve Prefontaine	1 mile in 3:54.6	84.4
Lance Armstrong	Cyclist (winner of Tour de France)	84.0
Joan Benoit	Marathon runner (2:24:52)	78.6
Bill Rodgers	Marathon runner (2:09:27)	78.5
Sebastian Coe	Middle distance (1 mile WR)	77.0
Grete Waitz	Marathon runner (WR 1980)	73.0
Frank Shorter	Marathon runner	71.0

***Females <19 yrs should aim for a value between 31-40 ml/kg/min**

***Males ,19 yrs should aim for a value between 38-56 ml/kg/min**

***Accurate VO_2 measurements can only truly be obtained in a lab**

1. Record the distance you travelled in 15 min _____ m
2. Calculate your speed= distance(m) ÷ time(min) = _____
3. Calculate your VO_2 using the Balke formula:

$$VO_2 = (\text{speed} - 133) \times 0.172 + 33.3$$

$$= \_\_\_\_\_ \text{ ml/kg/min}$$

Name _____

MONITORING YOUR BREATH RECOVERY

PART ONE: RESTING BREATH RATE

My resting breath rate is

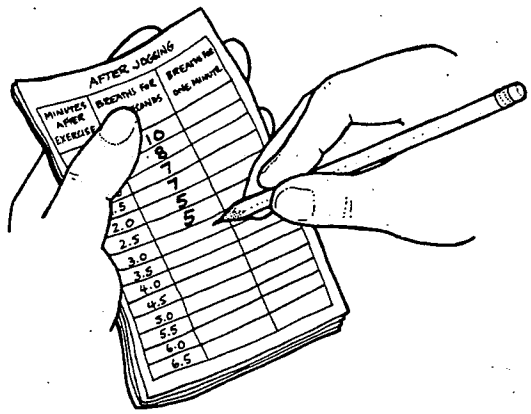
_____ breaths per minute.

PART TWO: AFTER-EXERCISE BREATH RATE

1. Sprint or jog.
2. Stop.
3. Sit and get ready for your partner to say: "Ready, Ready, Count."
4. At the "Count" signal, count your breaths (exhalations only) for 15 seconds.
5. When your partner says "Stop and record," record that count in the box next to 0.0
6. Listen for your partner to say "Count" again.
7. Repeat the counting and recording procedure.
8. Keep doing this for 6.5 minutes, even if your breath rate returns to normal.
9. If you miss a count, skip that box and wait for your partner's next "Count" signal.

AFTER SPRINTING		
MINUTES AFTER EXERCISE	**BREATHS IN 15 SECONDS**	**BREATHS PER MINUTE**
0.0		
0.5		
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5.0		
5.5		
6.0		
6.5		

AFTER JOGGING		
MINUTES AFTER EXERCISE	**BREATHS IN 15 SECONDS**	**BREATHS PER MINUTE**
0.0		
0.5		
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5.0		
5.5		
6.0		
6.5		



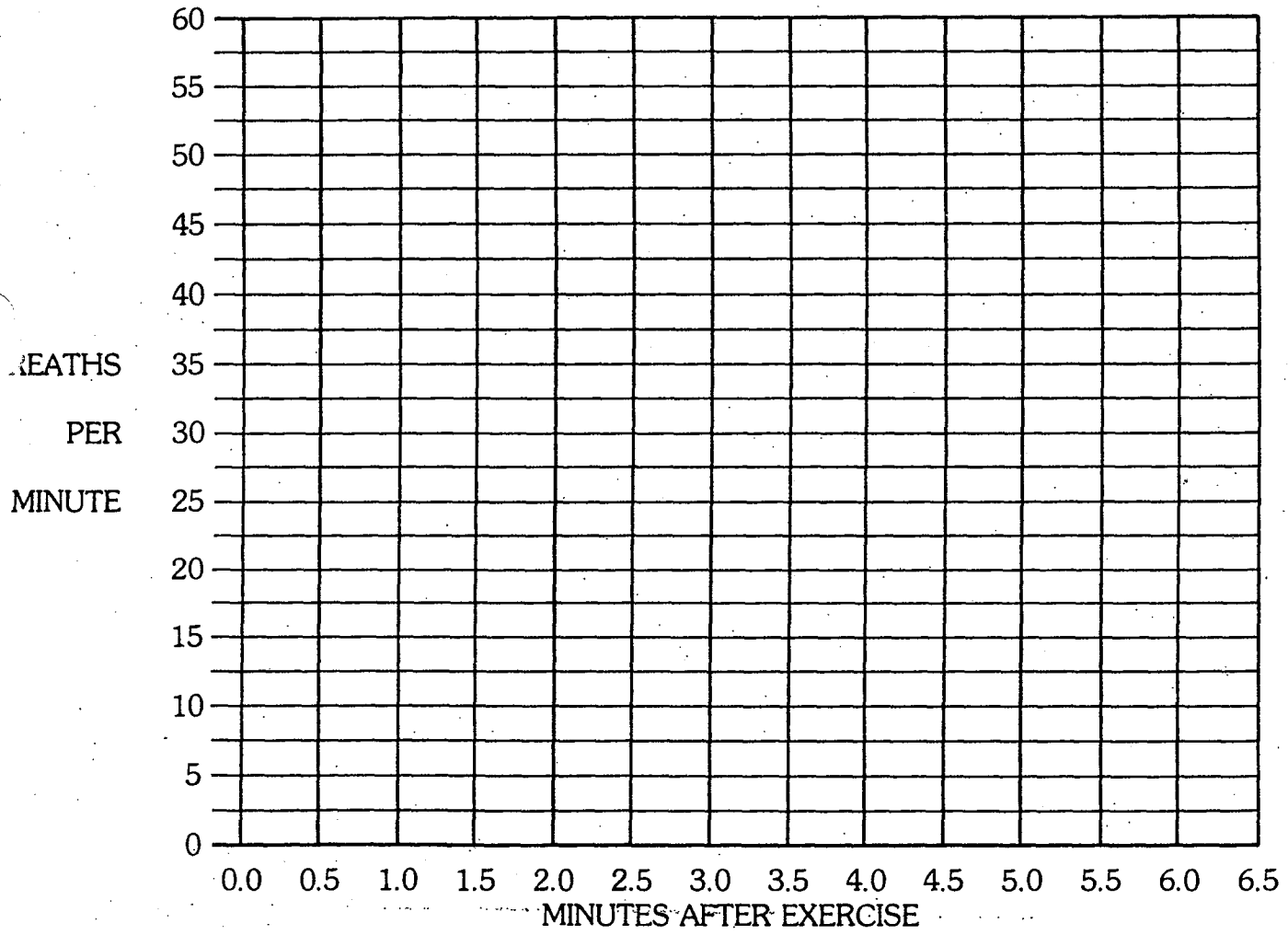
Name _____

GRAPHING YOUR BREATH RECOVERY

1. Draw a horizontal line across the chart at your resting rate. Label this line "Resting Breath Rate."

2. Plot your after-sprinting data with X's and connect the X's with a solid line. Label this line "After Sprinting."

3. Plot your after-jogging data with dots and connect the dots with a dashed line. Label this line "After Jogging."

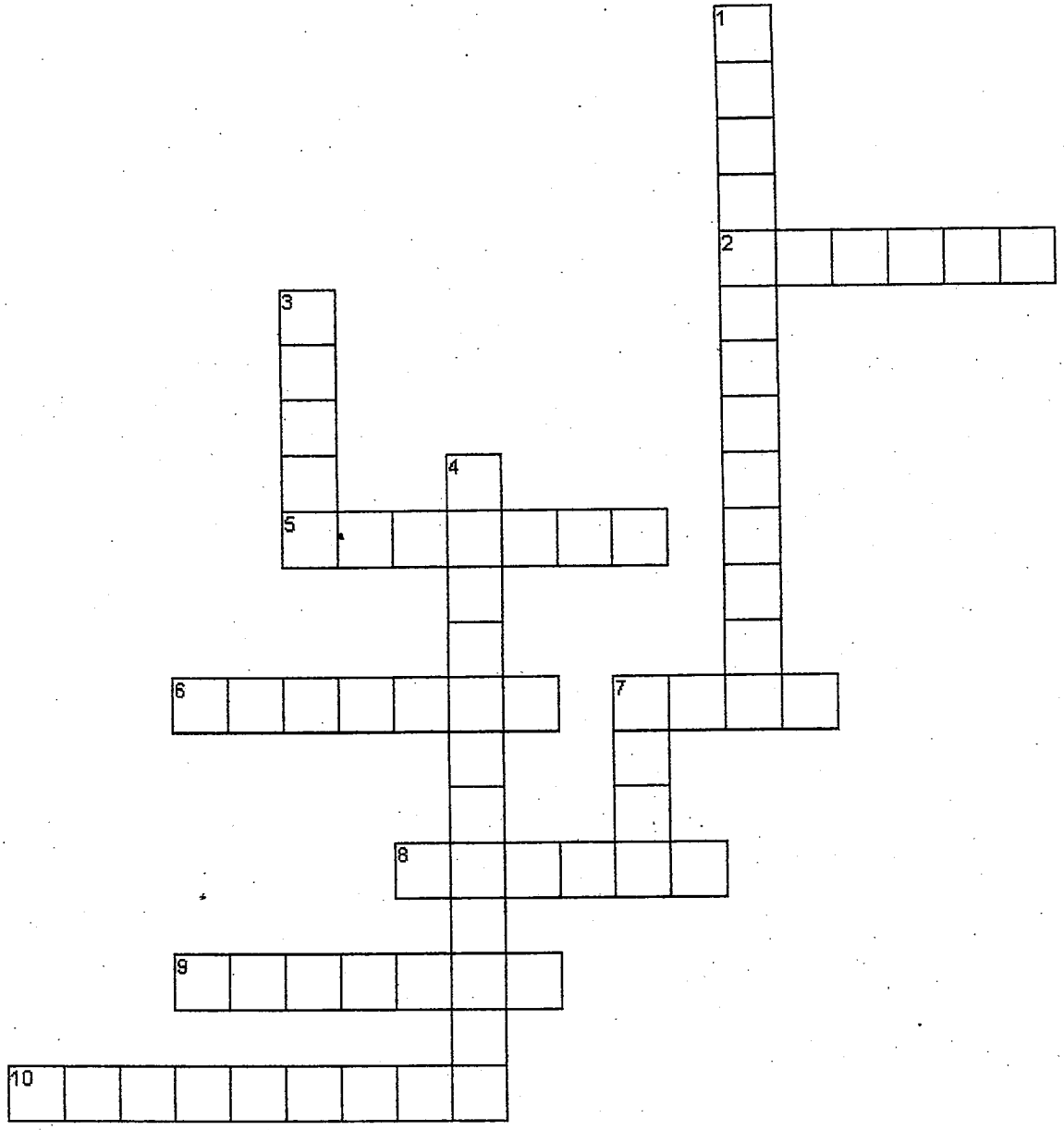


4. When was your breath rate highest? Circle one: AFTER SPRINTING or AFTER JOGGING

5. What was your after-sprinting breath recovery time? _____ minutes

What was your after-jogging breath recovery time? _____ minutes

GAS EXCHANGE



Across
2. product of photosynthesis
5. site of gas exchange with blood
6. the windpipe
7. one of three sites for plant gas exchange
8. vocal chords located here
9. requires oxygen for cellular respiration
10. simplest method for gas exchange

Down
1. waste product of cellular respiration
3. pore on plant leaf
4. anaerobic
7. one site for frog respiration

7/12/04