

SC131 Unit 8 Assignment

Directions

- Go to the [Acid-Base Balance](#) PowerPhys lab in WileyPLUS (you must be logged into the classroom to utilize the blue link).
- As you complete the assigned steps outlined below, answer the corresponding questions on your answer sheet. You will **NOT** complete the entire lab or submit the generated lab report. You are to **only** access PowerPhys to complete the assigned steps from the worksheet and gather background information to successfully answer the questions below.
- Type your **answers only** onto a separate Word Document (.doc) and submit that document to the Unit 8 Assignment dropbox for a grade. Please do not type on this worksheet as it is only a guide for you to follow.

Objectives, Review & Pre-lab

Use the “Objectives”, “Review”, and “Pre-lab” tabs to complete the questions below questions:

OBJECTIVES AND REVIEW > PRE-LAB QUIZ > PRE-LAB REPORTING > DATA COLLECTION > DATA ANALYSIS > LABORATORY REPORT



Questions 1-15 (worth 2 pts each)

1. List the normal **range** of blood pH?
2. Describe what occurs during acidosis in your own words.
3. Describe what occurs during alkalosis in your own words.
4. A patient has an above normal respiratory rate, above normal $p\text{CO}_2$, above normal HCO_3^- , and below normal pH. This person has:
 - a. Respiratory alkalosis
 - b. Respiratory acidosis
 - c. Metabolic acidosis
 - d. Metabolic alkalosis
5. A patient's respiratory rate and pH are above normal, HCO_3^- is normal, and $p\text{CO}_2$ is below normal. This person has:
 - a. Metabolic acidosis
 - b. Metabolic alkalosis
 - c. Respiratory alkalosis
 - d. Respiratory acidosis

6. Bicarbonate (HCO_3^-) levels are measured directly using the potentiometer.
 - a. True
 - b. False

7. A patient's respiratory rate is higher than normal; HCO_3^- , pH and pCO_2 are below normal. This person has:
 - a. Metabolic acidosis
 - b. Metabolic alkalosis
 - c. Respiratory alkalosis
 - d. Respiratory acidosis

8. A patient's respiratory rate is lower than normal, while HCO_3^- , pH and pCO_2 are above normal. This person has:
 - a. Respiratory alkalosis
 - b. Metabolic alkalosis
 - c. Metabolic acidosis
 - d. Respiratory acidosis

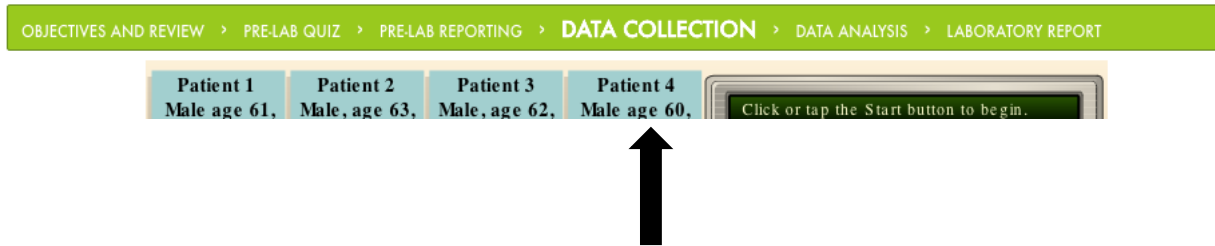
9. During respiratory acidosis, compensation:
 - a. Occurs when the respiratory rate returns to normal
 - b. Occurs when the kidneys (renal system) secrete (remove) more HCO_3^- .
 - c. Occurs when the kidneys (renal system) reabsorb (add) more HCO_3^- .
 - d. Occurs within seconds

10. Uncontrolled diabetes mellitus increases release of acids into the blood. This may cause:
 - a. Respiratory acidosis
 - b. Respiratory alkalosis
 - c. Metabolic alkalosis
 - d. Metabolic acidosis

11. During COPD (Chronic Obstructive Pulmonary Disease), gas exchange is reduced. This may cause:
 - a. Metabolic acidosis
 - b. Respiratory alkalosis
 - c. Metabolic alkalosis
 - d. Respiratory acidosis

Data Collection

Click the “Data Collection” tab and perform the experiment. Make sure to read each step to ensure information is not overlooked while performing the lab.



	Normal	Patient 1	Patient 2	Patient 3	Patient 4
Respiratory rate (breaths/min)	12 - 18	36	22	8	28
pH	7.35 - 7.45	7.54	7.29	7.5	7.3
pCO ₂ (mmHg)	35 - 45	26	63	48	31
HCO ₃ ⁻ (mEq/L)	22 -26	22	30	37	15

Using the chart above, answer questions #12-15 below:

12. Which Acid-Base disorder is present for Patient #1?
13. Which Acid-Base disorder is present for Patient #2?
14. Which Acid-Base disorder is present for Patient #3?
15. Which Acid-Base disorder is present for Patient #4?

Questions 16-24 (worth 5pts each)

Refer to the Objectives & Review section of the lab and the unit chapter readings from your digital book to successfully answer the following questions.

16. During **respiratory acidosis**, explain how the *renal* compensatory mechanism works to return the body back to homeostasis. Be sure to indicate which substances are excreted **AND** reabsorbed from the body in your explanation.
17. During **respiratory alkalosis**, explain how the *renal* compensatory mechanism works to return the body back to homeostasis. Be sure to indicate which substances are excreted **AND** reabsorbed from the body in your explanation.

18. During **metabolic acidosis**, explain how the respiratory compensatory mechanism works to return the body back to homeostasis. Be sure to indicate which substance is removed from the body in your explanation.
19. During **metabolic alkalosis**, explain how the respiratory compensatory mechanism works to return the body back to homeostasis. Be sure to indicate which substance is kept in the body in your explanation.
20. Explain how respiratory acidosis occurs in someone with respiratory acidosis. Make sure to indicate how the respiratory system is affected by a patient with COPD.
21. Little 3-year-old Sally has decided to throw a temper tantrum and has chosen to hold her breath and stomp her feet. However, it is known that she can only hold her breath for a limited period of time before Sally will involuntarily begin to breathe again. Describe the feedback mechanism and anatomical structure that initiates involuntary breathing. Make sure to include how an increased level of CO₂ affects this mechanism.
22. Explain how hyperventilation causes respiratory alkalosis to occur.
23. Tom has diabetes by not managing his condition he has developed metabolic acidosis. Explain how not controlling his medical condition caused metabolic acidosis to occur.
24. A patient was admitted to the ED with severe nausea, vomiting and abdominal pain was found to have severe metabolic alkalosis. Explain what caused this condition to occur and how it can be corrected medically.