UNIT 3

Adventure Awaits

Join a team of expedition guides. Keep travelers healthy by understanding the cardiovascular, respiratory, and immune systems, then build a guide that keeps a group safe on a remote expedition.

CORNELL NOTEBOOK · fillable · John Hay Hornets

Essential questions for this unit

- How do the cardiovascular and respiratory systems work together to deliver oxygen and remove waste?
- How does the body defend itself against pathogens?
- How do extreme environments stress human physiology, and how do we reduce the risk?

Vocabulary bank (define each in your own words as you go)

- artery
- vein
- capillary
- atrium
- ventricle
- EKG
- cardiac cycle
- pulse
- alveolus
- gas exchange
- tidal volume
- vital capacity
- spirometry
- oxygen saturation
- skin
- lymph
- antibody
- antigen
- pathogen
- vaccine
- innate immunity
- adaptive immunity
- plaque assay
- antiviral
- altitude
- risk mitigation

How to use this Cornell notebook

1. NOTES (right column): take notes during class, video, reading, or lab.
2. CUES (left column): afterward, write questions and key terms that the notes answer. Some are seeded for you.
3. SUMMARY (gold box): in your own words, answer the essential question in 2-3 sentences.
4. Review by covering the notes and answering the cues from memory.

Tip: vetted readings, videos, and interactives for every lesson are on the class site under “Resources & readings.”

UNIT 3 · ADVENTURE AWAITS

Contents & notebook check

John Hay Biomedical · PLTW Human Body Systems · Cornell-style notebook

NAME

DATE PD

Number your pages and log each one as you finish. Use the date and self-rating columns for periodic notebook checks (rate 1-4 how complete the page is).

UNIT 3 · ADVENTURE AWAITS

Notebook rubric

John Hay Biomedical · PLTW Human Body Systems · Cornell-style notebook

NAME

DATE PD

How your notebook is scored. Aim for level 4 on every row. 4 Exemplary · 3 Proficient · 2 Developing · 1 Beginning.

Completeness & organization

MY SCORE

Every assigned page is present, in order, dated, and numbered.

Cue questions

MY SCORE

The left column has thoughtful questions and key terms that the notes answer.

Notes

MY SCORE

Notes are accurate and in your own words, with labeled diagrams where useful.

Summaries

MY SCORE

Each summary answers the essential question in 2-3 clear sentences.

Lab records

MY SCORE

Objective, data, and a claim-evidence-reasoning analysis are complete and dated.

MY GOAL FOR THIS UNIT'S NOTEBOOK

UNIT 3 · ADVENTURE AWAITS

3.1a Cardiopulmonary Connection: the heart

John Hay Biomedical · PLTW Human Body Systems · Cornell-style notebook

NAME

DATE PD

ESSENTIAL QUESTION

How does the heart move blood through the body?

CUE · QUESTIONS · KEY TERMS

- Trace blood through the four chambers.
- Artery vs. vein vs. capillary?
- What do the phases of the cardiac cycle do?
- What does an EKG measure?

KEY TERMS

- artery
- vein
- capillary
- atrium
- ventricle
- EKG
- cardiac cycle
- pulse

NOTES

SUMMARY : in your own words, answer the essential question (2-3 sentences)

UNIT 3 · ADVENTURE AWAITS

NAME

3.1a Lab record: Heart & vessel model; record/interpret an EKG

DATE PD

John Hay Biomedical · PLTW Human Body Systems · Cornell-style notebook

Dated lab record. This page is a gradeable artifact: complete every section.

OBJECTIVE (what question are you answering today?)

MATERIALS / SAFETY (equipment, PPE, SDS hazards noted)

DATA / OBSERVATIONS (record measurements; sketch or table as needed)

ANALYSIS (what does the data show? claim, evidence, reasoning)

REFLECTION (sources of error, next question, real-world link)

UNIT 3 · ADVENTURE AWAITS

3.1b Gas exchange & spirometry

John Hay Biomedical · PLTW Human Body Systems · Cornell-style notebook

NAME

DATE PD

ESSENTIAL QUESTION

How does the respiratory system exchange gases with the blood?

CUE · QUESTIONS · KEY TERMS

- Where does gas exchange happen, and why there?
- Tidal volume vs. vital capacity?
- How does spirometry work?
- How do the heart and lungs depend on each other?

KEY TERMS

- alveolus
- gas exchange
- tidal volume
- vital capacity
- spirometry
- oxygen saturation

NOTES

SUMMARY : in your own words, answer the essential question (2-3 sentences)

UNIT 3 · ADVENTURE AWAITS

3.1b Lab record: Sheep-pluck (or virtual) & spirometry lab

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NAME

DATE PD

Dated lab record. This page is a gradeable artifact: complete every section.

OBJECTIVE (what question are you answering today?)

MATERIALS / SAFETY (equipment, PPE, SDS hazards noted)

DATA / OBSERVATIONS (record measurements; sketch or table as needed)

ANALYSIS (what does the data show? claim, evidence, reasoning)

REFLECTION (sources of error, next question, real-world link)

UNIT 3 · ADVENTURE AWAITS

3.2 Body Guards: the immune system

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NAME

DATE PD

ESSENTIAL QUESTION

How does the body recognize and fight invaders?

CUE · QUESTIONS · KEY TERMS

- Innate vs. adaptive immunity?
- How do antibodies recognize antigens?
- What are the body's physical barriers?
- How does a vaccine create memory?

KEY TERMS

- skin
- lymph
- antibody
- antigen
- pathogen
- vaccine
- innate immunity
- adaptive immunity

NOTES

SUMMARY : in your own words, answer the essential question (2-3 sentences)

UNIT 3 · ADVENTURE AWAITS

NAME

3.2 Lab record: Immune-response modeling; plaque assay

DATE PD

John Hay Biomedical · PLTW Human Body Systems · Cornell-style notebook

Dated lab record. This page is a gradeable artifact: complete every section.

OBJECTIVE (what question are you answering today?)

MATERIALS / SAFETY (equipment, PPE, SDS hazards noted)

DATA / OBSERVATIONS (record measurements; sketch or table as needed)

ANALYSIS (what does the data show? claim, evidence, reasoning)

REFLECTION (sources of error, next question, real-world link)

UNIT 3 · ADVENTURE AWAITS

3.3 Adventure Medicine: the expedition guide

John Hay Biomedical · PLTW Human Body Systems · Cornell-style notebook

NAME

DATE PD

ESSENTIAL QUESTION

How do environment and physiology combine to create expedition health risks?

CUE · QUESTIONS · KEY TERMS

- What pathogens are native to your environment?
- How does altitude stress the body?
- Which systems are most at risk and why?
- What does good risk mitigation look like?

KEY TERMS

- plaque assay
- antiviral
- pathogen
- altitude
- extreme environment
- risk mitigation

NOTES

SUMMARY : in your own words, answer the essential question (2-3 sentences)

UNIT 3 · ADVENTURE AWAITS

NAME

DATE PD

3.3 Lab record: Antiviral plaque assay / cow-eye dissection (or simulations)

John Hay Biomedical · PLTW Human Body Systems · Cornell-style notebook

Dated lab record. This page is a gradeable artifact: complete every section.

OBJECTIVE (what question are you answering today?)

MATERIALS / SAFETY (equipment, PPE, SDS hazards noted)

DATA / OBSERVATIONS (record measurements; sketch or table as needed)

ANALYSIS (what does the data show? claim, evidence, reasoning)

REFLECTION (sources of error, next question, real-world link)

UNIT 3 · ADVENTURE AWAITS

Unit wrap-up & self-check

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NAME

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“I can…” :check each skill, then rate your confidence (1-4)

3.1	trace blood flow and explain the cardiac cycle and what an EKG shows.	
3.1	explain gas exchange and interpret spirometry / lung-volume data.	
3.2	distinguish innate and adaptive immunity and explain the antigen-antibody response.	
3.3	assess environmental health risks and design mitigation for an expedition.	

What was the most important idea in this unit?

What is still confusing, and what is your plan to fix it?

How does this unit connect to a real biomedical career or case?