uBEATS Teacher's Guide:

History of Medicine/Pathology

(Grades 11-12)

This teacher guide is a supplementary text to support the use of the uBEATS History of Medicine/Pathology module for grades 11-12.

To help students develop the knowledge necessary for an incredible future in health care, we created UNMC Building Excellence in Academics Through STEM (uBEATS), an online health science resource for Nebraska students.

UNMC uBEATS modules are short (15 minutes or less), interactive online health science modules to supplement curriculum taught in grades 6 – 12. These do not replace curriculum, but are a supplement for teachers and students incorporating evidence based information and UNMC expert guided material. Each module is chunked into sections with formative and summative assessments with immediate feedback provided.

Tips on how to utilize uBEATS modules:

- Internet access is required to view uBEATS modules.
- For those who have access to one-to-one technology, modules can be used in or outside of the classroom as a topic introduction, extension, or review.
- For classrooms without individual student devices modules can be used in whole group instruction. Formative assessment questions can use the teacher's preferred call and response method and summative assessment questions can be displayed on the board and answered individually by students or printed and distributed to students after viewing the module.

Objectives

- Define the field of pathology.
- Discuss the role of Ancient Egyptian medicine in the documentation of diseases.
- Identify specific tolls that have contributed to advancements in medical practice through the centuries.

ubeats@unmc.edu

Introduction

Have you ever been sick? Everyone gets sick at some point in his or her life. Have you ever wondered how treatments are spread around the world? After completing this module you will know who studies the diseases that make us sick, and how documentation leads to treatments spreading around the world.

Prior Knowledge

Before beginning this module, the student should understand the Next Generation Science Standards (NGSS) featuring Three-Dimensional Learning.

Core Idea ETS2.B: Influence of engineering, technology, and science on society and the natural world. A Framework for K-12 Science Education.

- Science and engineering affect diverse domains—agriculture, medicine, housing, transportation, energy production, water availability, and land use, among others. The results often entail deep impacts on society and the environment, including some that may not have been anticipated when they were introduced or that may build up over time to levels that require attention. Decisions about the use of any new technology thus involve a balancing of costs, benefits, and risks—aided, at times, by science and engineering. Mathematical modeling, for example, can help provide insight into the consequences of actions beyond the scale of place, time, or system complexity that individual human judgments can readily encompass, thereby informing both personal and societal decision-making.

Science and Engineering Practices NGSS

- Asking questions and defining problems

Crosscutting Concepts NGSS

- Influence of science, engineering, and technology on society and the natural world.

Key Terms/Vocabulary

Pathology, disease, organ, tissue, cells, microscope, medicine, medical instruments, stone tools, bone, bronze, steel, iron, gold, nickel, stainless steel, carbon stainless steel, chrome, vanadium, titanium, scalpel, forceps, dissection hooks, catheters, drills, speculums, ligatures, crow's beak (hemostat), anesthesia, sterilization, laser surgery.

Science Standards

This module is related to the content of **UNMC High School Alliance: Introduction to Pathology and Microbiology**

- Pathology is the study of disease processes. The field lays the foundation for all of clinical medicine and medical research. All diseases begin at the cellular level and changes in the structure and function of tissues ultimately lead to symptoms that health care providers see on a daily basis. This course will introduce students to medical terminology, normal histology and gross/microscopic pathology, allowing students to correlate the findings they see into basic clinical concepts.

Nebraska's College and Career Ready Standards for Science 2024 Nebraska Science Standards

- Engineering in Health Sciences: SC.HSP.17.1
- Gather, analyze, and communicate evidence of the connection between health science careers and engineering.
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Extensions of the lesson

- To help students become more familiar with the Key Terms of this module, the teacher can use the vocabulary list for a classroom Word Wall, or integrate the vocabulary into classroom word games during review sessions.
- To help the students see personal relevance, suggest they have a **private** conversation at home to discuss a medical intervention actually experienced by a family member, and speculate how that medical problem might have been addressed 3,000 years ago; 1,000 years ago; 500 years ago; 100 years ago.
- As student misconceptions become apparent, the teacher may need to reinforce these important concepts:
    - Ancient cultures faced medical problems with the limited knowledge available to each community. The practice of documenting the medical interventions gave the following generations and cultures more background information for the development of new medical techniques.
    - Medical interventions were refined over time. Around 1,000 years ago a 30-volume encyclopedia (*Kitab al-Tasrif*) was written by Albucasis (whose Muslim name was Abū al-Qāsim Khalaf ibn al-'Abbās al-Zahrāwī al-Ansari). Al-Zahrawi's comprehensive manuscript covered many areas of medicine and was used in universities for 800 years.
    - The invention of the microscope allowed pathology to develop at the cellular level. This tool allowed practitioners to study tissue samples much deeper than surgical tools themselves could allow. The microscope also introduced the study of disease-causing microorganisms.

Enrichment

- For information about career opportunities, see UNMC's Careers in Healthcare.
- Students should be watchful in current events for recent news about innovative medical technologies.
- Search online for information about al-Zahrawi's *Kitab al-Tasrif* to see what he had to say 1,000 years ago about medicine, pathology, and surgery.
- In a classroom setting, use a microscope to examine skin cells from the cheek, and then have a class discussion about how the microscope might have changed al-Zahrawi's writings.
- To make connections in your community, contact local hospitals, healthcare clinics, nurses, doctors, medical laboratories.