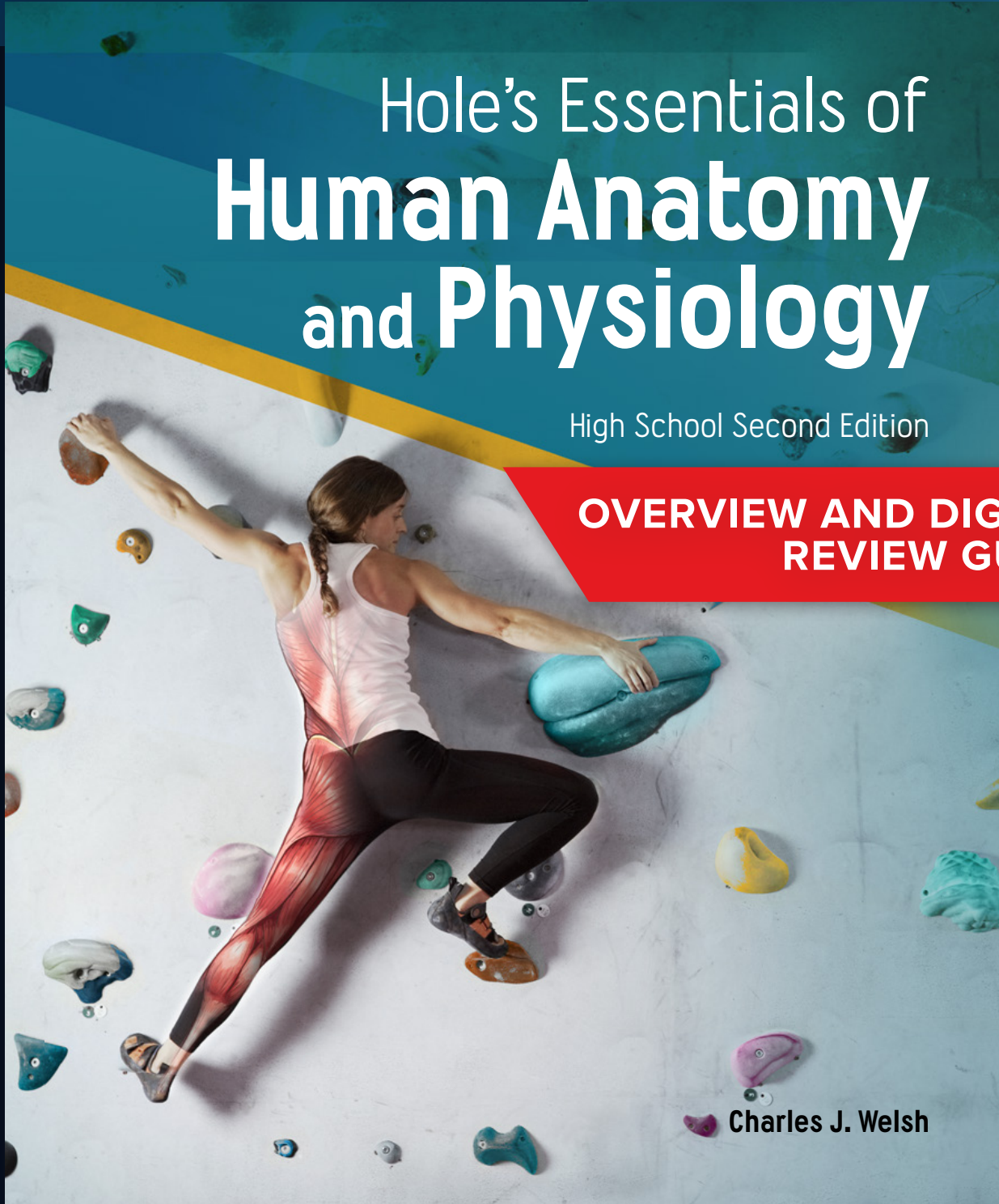


Hole's Essentials of **Human Anatomy and Physiology**

High School Second Edition

**OVERVIEW AND DIGITAL
REVIEW GUIDE**



Charles J. Welsh



Hole's Essentials of Anatomy & Physiology, High School Edition

2nd Edition ©2021 | Welsh

The #1 Program for Anatomy and Physiology, Aligned for Tennessee Success

Tennessee *Hole's Essentials of Human Anatomy and Physiology* was written for ease of readability and organized to serve both students and teachers with complete alignment to the Tennessee Academic Standards for the course.

Renowned for its high-quality content and dynamic features, this edition delivers enhanced science and engineering application integration and unmatched EL support. The high school-friendly presentation masterfully blends text and imagery to engage students with approachable content as they learn to apply concepts to various fields of study, making this an ideal selection for an introductory course.

We introduce Charles Welsh as the primary author to provide a cohesive narrative with a single voice. With over 30 years of experience in anatomy and physiology classrooms instructing future nurses and other allied health professionals, Dr. Welsh brings a fresh perspective to this well-respected text.

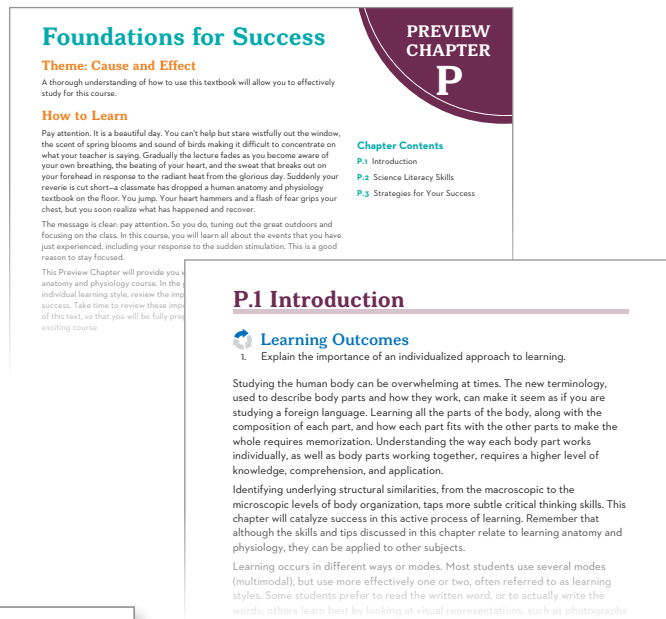
Establishing a Solid Framework

The proven **Learn, Practice, Assess** system sets students up for success by creating a familiar pattern of instruction, application, and mastery throughout each unit and chapter.

The **Preview Chapter** highlights learning tools for student success, including an overview of learning styles, a review of scientific literacy, and tips for how to prepare before, during, and after class.

Clear Alignment

A **full correlation** to the Tennessee academic standards is available on the digital course dashboard. Course content and assessments are tagged and searchable by Tennessee's standard.



Aids To Understanding Words (Appendix A has a complete list of Aids to Understanding Words.)

acetabul- [vinegar cup]	acetabulum: depression of the hipbone that articulates with the head of the femur.	fov- [pit]	fovea capitis: pit in the head of a femur.
ax- [axis]	axial skeleton: bones of the skull, vertebral column, ribs, and sternum.	glen- [joint socket]	glenoid cavity: depression in the scapula that articulates with the head of a humerus.
-blast [bud]	osteoblast: cell that will form bone tissue.	inter- [among, between]	intervertebral disc: structure between vertebrae.
carp- [wrist]	carpals: wrist bones.	intra- [inside]	intra-membranous bone: bone that forms within sheetlike masses of connective tissue.
-clast [break]	osteoclast: cell that breaks down bone tissue.	meat- [passage]	external acoustic meatus: canal of the temporal bone that leads inward to parts of the ear.
condyl- [knob]	condyle: rounded, bony process.	odont- [tooth]	odontoid process: toothlike process of the second cervical vertebra.
corac- [a crow's beak]	coracoid process: beaklike process of the scapula.	poie- [make, produce]	hematopoiesis: process that forms blood cells.
cris- [crest]	crista galli: bony ridge that projects upward into the cranial cavity.		

Building Scientific Literacy

Aids to Understanding Words helps students decode scientific terminology.

Application and Mastery

Found at the beginning of each chapter, **Case Studies** are essential to enhancing student understanding of clinical situations and allows them to study topics in greater depth. Case Study Connection boxes prompt students to think critically as they evaluate their initial ideas. The Case Study Wrap-Up provides students with an opportunity to complete a final assessment of their CER chart and analyze the evidence they collected.

13. How do sweat glands help regulate body temperature?
14. What is the function of the arrector pili muscle?
15. Describe the structure of a nail. How does the structure of a nail relate to its function?

16. Distinguish between first, second, and third-degree burns.
17. What are the different types of skin cancer? What are their characteristics?

Critical Thinking and Clinical Applications

1. **Relate Cause and Effect** Explain why it is painful to pull a hair out your head, but not when your hair is cut.
2. Acne is caused by a bacterium called *P. acnes*. What are some potential treatment options?
3. If someone asked you if you could live with diabetes, what would be your answer and why?

Lab Data Analysis: Wound Healing Rates

The integumentary system maintains a barrier between the body and the outside world, which can prevent infection. Wound healing repairs this barrier when it is compromised. Some diseases such as diabetes impair proper wound healing, thus increasing the risk of infection.

Data and Observations

The graph to the right displays the rate of wound healing in square centimeters per day (cm²/day). Three groups of patients with different Hemoglobin A1c levels (HbA1c) are listed along the x-axis. The higher the HbA1c level, the more severe a patient's diabetes.

Think Critically

1. Which HbA1c category of patients has the fastest wound healing? Why do you think so?
2. Which HbA1c category likely includes patients with severe diabetes?
3. Which group of patients would you most want to counsel on the risks of eventually developing severe diabetes?

Case Study Wrap-up

Summarize your Evidence: Summarize the evidence gathered from your investigations and research and evaluate your Summary Table.
Explain your Reasoning: Does your evidence support your claim? Explain why your evidence supports your claim. If it does not, revise your claim.

152 UNIT 1 Support and Movement

Case Study

A forensic anthropologist is attending your school's career fair. She brings with her both actual bone specimens as well as a presentation. She picks up a hip bone and says "Did you know that when you are born this bone is actually three separate bones: the ilium, ischium, and pubis? And in most of you they are just now beginning to fuse together." Then, while holding a femur she explains that "the ends of the long bones fuse to the shaft at various ages, and for the femur, this is between 14 and 21 years, and for the clavicle it occurs between 20 and 30 years of age. Why do you think the skeleton starts off with more separate bones and fuses them along the life span? Do are there any advantages to either unfused or fused bones?"

Forensic anthropologists help to identify the age, gender, stature, and cause of death for an unidentified skeleton.

Claim, Evidence, Reasoning

Make Your Claim: Use your CER chart to make a claim about the characteristics of bones that make them valuable to forensic anthropology. Explain your reasoning.

Collect Evidence: Use the information in this chapter to collect evidence to support your claim. Record your evidence as you move through the chapter.

Explain Your Reasoning: You will revisit your claim and explain your reasoning at the end of this chapter.

Meaningful Review and Assessment

Students are given multiple ways to demonstrate their understanding and mastery of the concepts and content. Students apply their learning through **projects, data analysis, writing assignments, and traditional assessment questions.**

Additional Features:

- The **Teacher Manual**, available in print and online, includes teaching strategies and pacing, group projects, and classroom activities that support EL instruction.
- **Unit Projects** and thematic, chapter-level **Case Studies** bring relevance and real-world applications to instruction.
- **Chapter Reviews** include multiple-choice, short-answer, and critical-thinking and clinical-application questions.
- **Lab Data Analysis, Case Study Wrap-Ups, and Chapter Projects** help students enhance their engagement with, and proficiency in, the science and engineering practices.
- Online **Focus Activities** provide interactive labeling and vocabulary activities to check student mastery of difficult structures, vocabulary, and concepts.
- **Concept Overviews** offer groundbreaking interactive animations that encourage students to explore key physiological processes and difficult concepts.



Anatomy & Physiology REVEALED® (APR) is the ultimate dissection experience that visually enriches your lectures and labs with 3D interactive models, engaging animations, and real-life images.

The **Human Anatomy and Physiology Laboratory Manual** contains 34 hands-on laboratory activities. The labs are also available in the digital course.

Robust, Adaptive, and Dynamic Digital Resources

Our digital solutions are enriched with multimedia content including videos, animations, and simulations that enhance the teaching and learning experience inside and outside of the classroom.

Authored by the world's leading subject matter experts and organized at the chapter level, the resources provide students with multiple opportunities to apply their understanding and master course content. Teachers can save time, customize lessons, monitor student progress, and make data-driven decisions in the classroom with flexible, easy-to-navigate instructional tools.

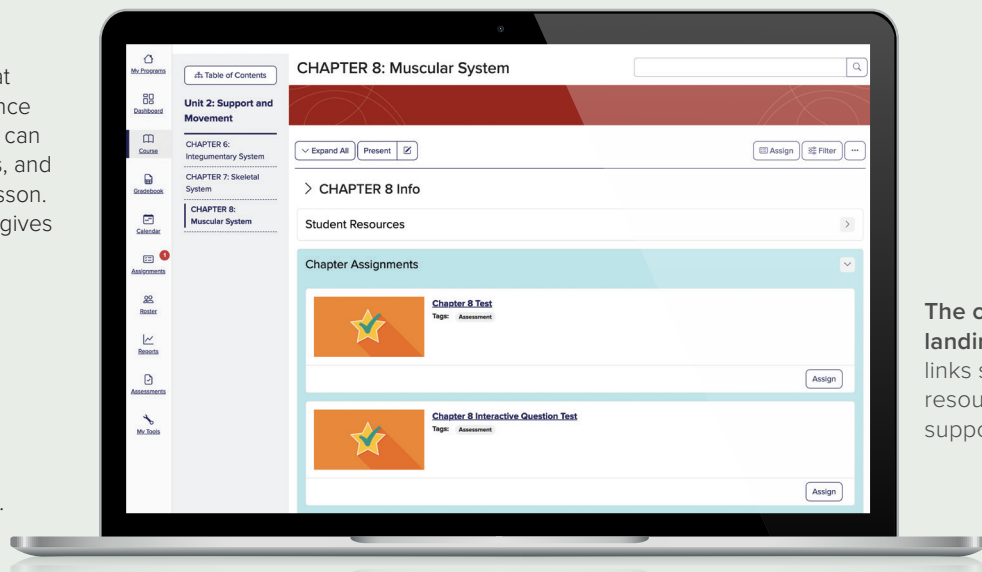
The robust digital platform includes:

- an interactive eBook;
- adaptive *SmartBook*® tagged to Tennessee standards;
- concept clips;
- vocabulary and labeling activities;
- Anatomy & Physiology Revealed;
- and dozens of virtual labs.

Intuitive Design

Resources are organized at the chapter level. To enhance the core content, teachers can add assignments, activities, and instructional aids to any lesson. The chapter landing page gives students access to:

- Adaptive *SmartBook*® assignments.
- Lab activities.
- Flashcards.
- An interactive eBook.
- Anatomy & Physiology Revealed assignments.



The chapter landing page links students to resources that support success.

Access to the Online Student Edition includes access to the eBook, SmartBook adaptive eBook, virtual labs and additional digital learning resources. Teacher resources include the eBook, SmartBook, Teacher Manual, PowerPoint presentations, assignable resources, Gradebook, Pacing Guides, and more.



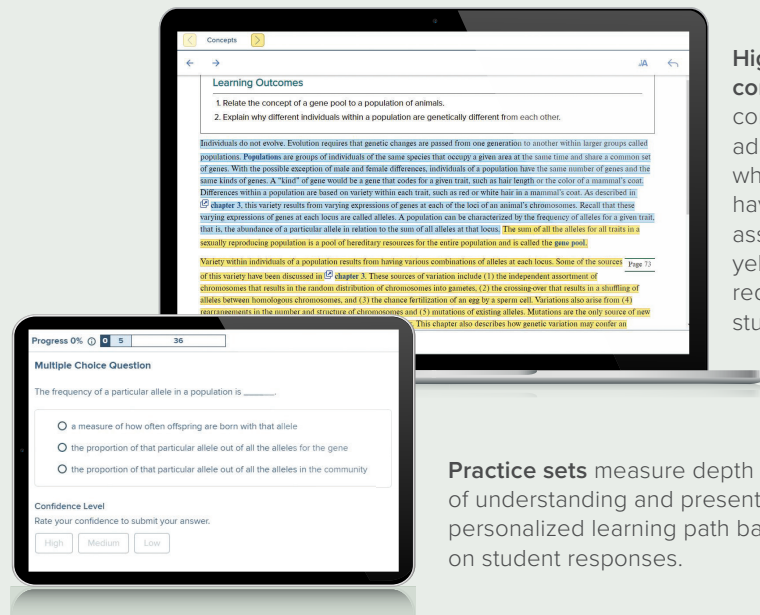
Mobile Ready

With the McGraw Hill K–12 Portal App, students can access their content any time on any device, with or without Internet access.

Adaptive Study Tools

SmartBook® is the online adaptive study tool. Its interactive features engage students and personalize the learning experience with self-guided tools that:

- Assess a student's proficiency and knowledge.
- Track which topics have been mastered.
- Identify areas that need more study.
- Improve reading comprehension by highlighting key content that needs additional study.
- Present focused content specific to the student's individual needs.



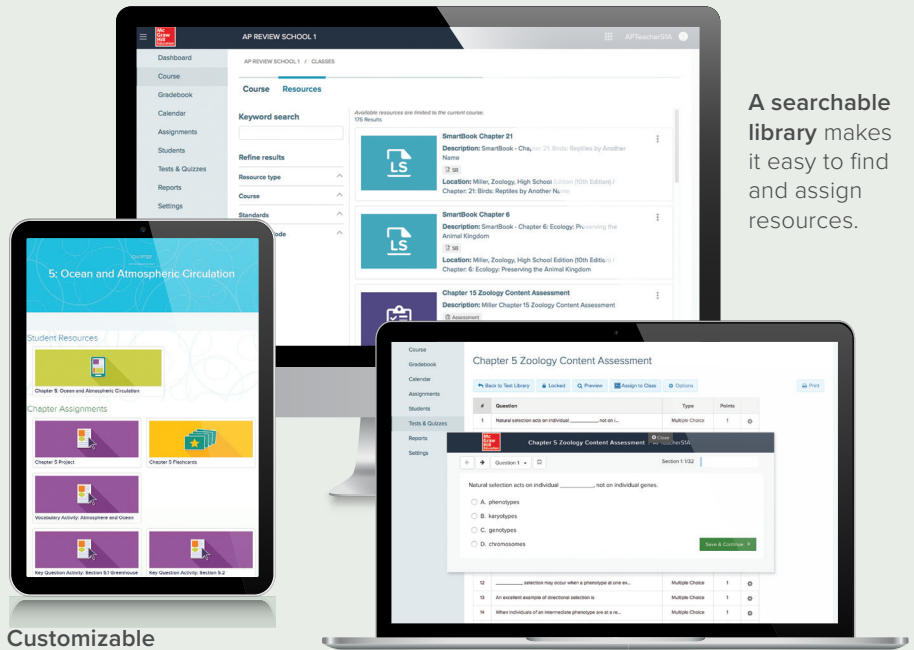
Highlighted content continuously adapts to show what students have been assigned in yellow and what requires further study in blue.

Practice sets measure depth of understanding and present a personalized learning path based on student responses.

Teacher Resources

Teachers have access to **SmartBook**®—an interactive, adaptive eBook—plus a wealth of customizable chapter resources and powerful gradebook tools. Resources include:

- An online Teacher Manual with chapter outlines, teaching suggestions, reading strategies, and pacing guides.
- Student performance reports to help teachers identify gaps, make data-driven decisions, and adjust instruction.
- Customizable PowerPoint presentations.
- Labeled diagrams, visual aids, animations, and additional ideas.



A searchable library makes it easy to find and assign resources.

Customizable assignments and quiz banks provide automated grading that populates easy-to-read reports.

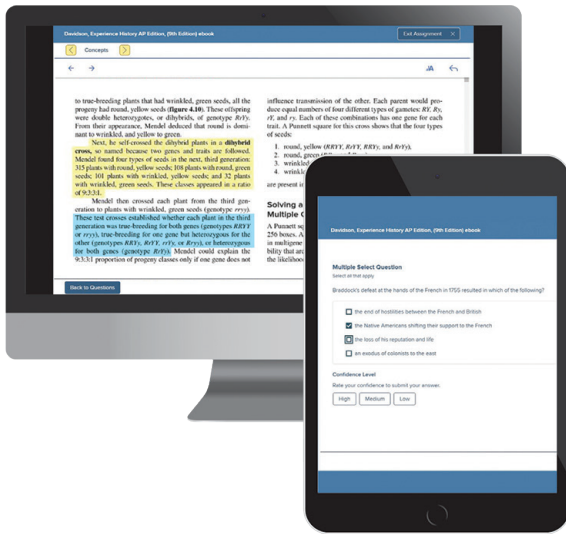


Harness technology to unlock success. Visit my.mheducation.com

The Learning is Always Personalized

SmartBook®

All core programs include *SmartBook* within the digital course. *SmartBook* delivers personalized, adaptive learning tailored to each student's individual needs by pinpointing knowledge gaps and focusing instruction on the concepts that require additional study. Teachers can assign a specific chapter, topic, or concept and access advanced reporting features with actionable insights to inform in-class instruction.



FOR STUDENTS

More Personalized. More Productive.

As students move through the material, multiple data points are captured to sequence and pace individual instruction.

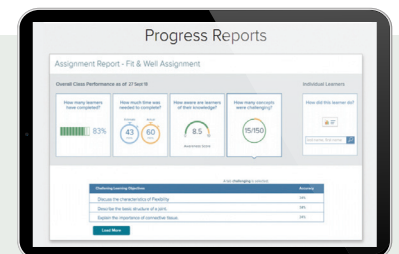
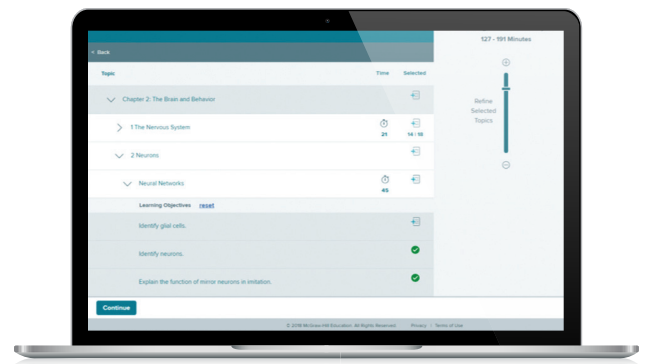
- **Focused Instruction:** Yellow highlights help students easily identify their assigned learning concepts.
- **Targeted Remediation:** Blue highlights bring focus to the contents and concepts that require additional study.
- **Meaningful Practice:** Practice sets with instant feedback allow students to ask for guidance and rate their confidence level.
- **Recharged Learning:** Students can access previously completed assignments with personalized recommendations.
- **Mobile Ready:** Assignments are accessible both online and offline with the McGraw Hill K–12 Portal app.

FOR TEACHERS

More Control. More Prepared. More Actionable.

Teachers can organize assignments to suit their students' needs and align to their course outcomes while easily tracking student progress.

- **Flexible Assignments:** Assign homework down to the subtopic level and time-on-task.
- **Manageable Content:** Assign content across multiple chapters to make connections between chapters, topics, and concepts.
- **Results-Based Support:** Provide personalized review assignments that target each student's areas of weakness.
- **Actionable Reports:** Advanced reporting features track individual and class progress with data-driven insights.



“Using *SmartBook* has been a game changer! It is like having a co-teacher! I can see how much they read. I can see how much they comprehended! I can see, specifically, what challenging concepts exist. Students can see their progress. Students can see that they are being held accountable in a much more realistic and targeted manner. Students are much more engaged in the class and better prepared to interact with a deeper level of academic conversation.”

– Marion Chase
Instructional Coach and AP Teacher

The Lab is Always Open

Virtual Labs

Virtual Labs empower students outside the classroom and outside the laboratory with 24/7 access. The labs are compatible with screen readers and keyboard navigation to ensure an accessible experience for all learners. The easy-to-follow on-screen instructions guide students through each part of their lab journey and their progress is automatically saved and always visible to help them take ownership of their learning.



Available 24/7
—even if the lab
space isn't



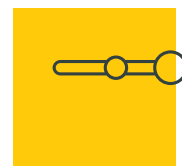
**Built with
accessibility
in mind**



**Easy-to-follow
on-screen
instructions**



**Student progress
is automatically
saved**



**Visible
progress
bar**

Virtual Labs, included in select courses, deliver a realistic, simulated lab experience that better prepares students with the fundamental skills for hands-on lab work. If needed, these labs can even supplant hands-on lab work.

These simulations help students learn practical and conceptual skills; they check for understanding, and provide feedback. With adaptive pre-lab and post-lab assessments available, teachers can customize each assignment.

The Virtual Lab Experience

In each lab experience, students are guided through the step-by-step phases. They use their mouse to manipulate the materials and are prompted with checks for understanding that deliver instant and guided feedback.

Students also have access to tools for notetaking, resetting the lab, labeling, and reviewing the list of methods at point of use. Once complete, the lab is automatically submitted to the teacher and students can save their work, print, or download a PDF for their records.

The screenshots illustrate the interactive nature of the Virtual Labs. The top image shows a 'CARDIOVASCULAR PHYSIOLOGY - BLOOD PRESSURE' simulation where a student is measuring a patient's blood pressure. The middle image shows a 'BLOOD - BLOOD TYPING' simulation with a lab bench containing various bottles, pipettes, and a biohazard container. The bottom image shows an 'OSMOSIS - MOVEMENT OF WATER ACROSS A SELECTIVELY PERMEABLE MEMBRANE' simulation with beakers of 10% Corn Syrup and Distilled Water, and a 'Question' pop-up asking why a selectively permeable membrane is called that.



Take a Tour and Explore

Use this guide to help you get familiar with a variety of digital tools, resources, and support to meet the needs of your classroom and students.

THE DIGITAL EXPERIENCE

LOG IN

1. Contact your sales representative to get login credentials.

Tracy Elliott

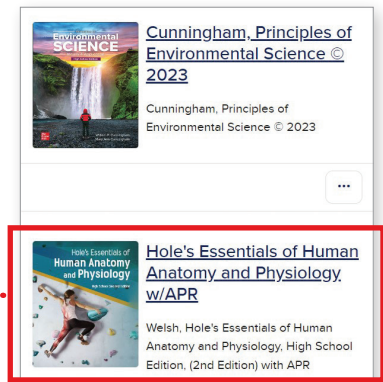
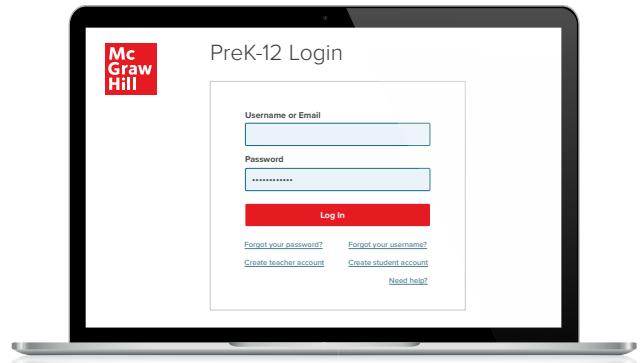
tracy.elliott@mheducation.com

Corrie Carroll

corrie.carroll@mheducation.com

2. Go to **my.mheducation.com** and log in using the credentials provided by your sales representative.
3. Locate and click on the course you wish to review.

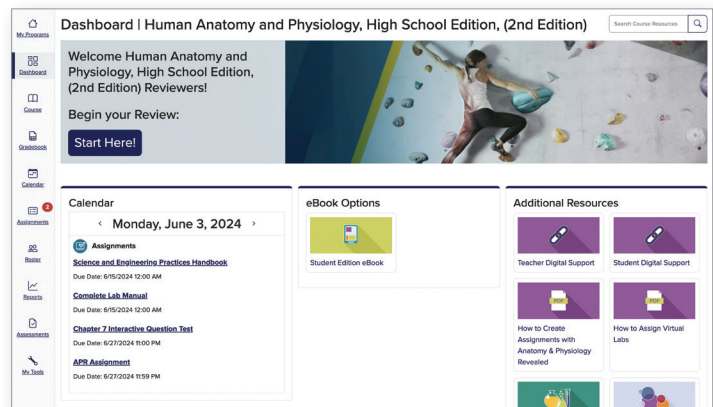
Note: All courses function similarly. You can explore any title within the demo account.



VIEW YOUR COURSE DASHBOARD

This is the **Digital Dashboard**. It's your home base for resources, such as:

- Full Teacher Manual
- Quick eBook Access
- Correlations
- Assignment Calendar
- Digital Teacher Support
- Digital Student Support



BROWSE YOUR COURSE

Click **Start Here!** to expand the menu and explore units, chapters, assignments, activities, assessments, and more.

Welcome Human Anatomy and Physiology, High School Edition, (2nd Edition) Reviewers!

Begin your Review:

Start Here!

BROWSE UNITS AND CHAPTERS

Select a unit from the left navigation to open the chapters within the unit.

Click **Go** to select a chapter to review.

- CHAPTER 6: Integumentary System **Go →**
- CHAPTER 7: Skeletal System **Go →****
- CHAPTER 8: Muscular System **Go →**

- Preview Chapter: Foundations for Success
- Unit 1: Levels of Organization
- Unit 2: Support and Movement**
- Unit 3: Integration and Coordination
- Unit 4: Transport
- Unit 5: Absorption and Excretion
- Unit 6: The Human Life Cycle

BROWSE CHAPTER CONTENTS

Select **Expand All** to open all of chapter contents for both students and teachers.

You can also click the **arrows** to the right of the blades to open one resource type at a time.

▼ Expand All Present [checkbox]

Assign Filter ...

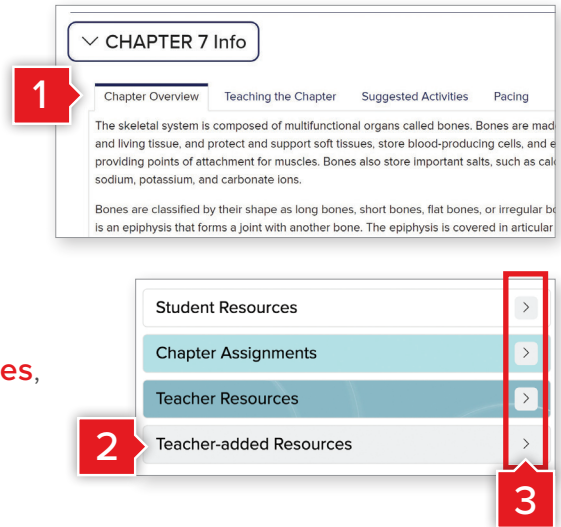
> CHAPTER 7 Info

- Student Resources >
- Chapter Assignments >
- Teacher Resources >
- Teacher-added Resources >

BROWSE INSTRUCTIONAL RESOURCES

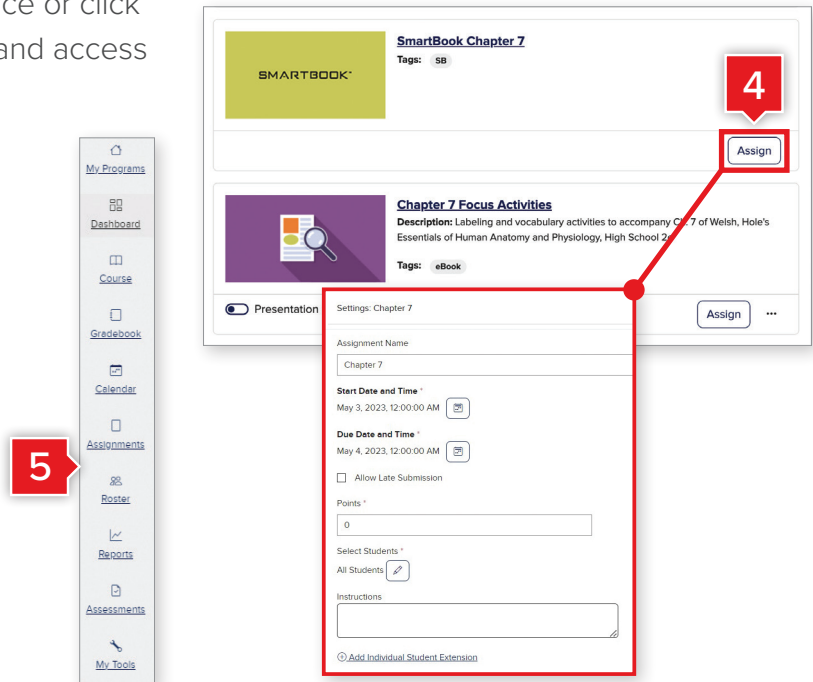
Selecting a chapter will take you to the **Chapter Landing Page**.

1. Click **Chapter Info** and use the tabs to explore Overviews, Pacing, Instructional Strategies, Suggested Assignments, and Benchmarks.
2. Your own materials can be uploaded and assigned to students in **Teacher-added Resources**.
3. The arrows to the right open to reveal **Student Resources**, **Chapter Assignments**, and **Teacher Resources**.



ASSIGN RESOURCES

4. Click on the tile to preview the resource or click **Assign** to open the course calendar and access options for assigning.
5. As you navigate your program, the Program Menu is always visible at the left side of the screen to help you navigate quickly to the **Gradebook**, **Calendar**, **Assignments**, **Roster**, **Reports**, and **Assessments**.



READ OFFLINE ANYTIME, ANYWHERE

Mobile ready! With the **McGraw Hill K–12 Portal app**, students can access their content any time on any device, with or without Internet access.

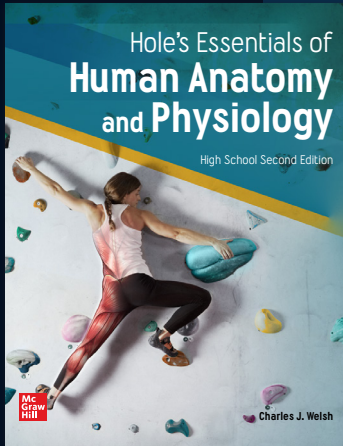


There's Even More To Explore

Find the right solutions to ensure students develop the academic and real-world skills they need to make the successful transition to college and/or the workforce. Provide meaningful experiences with purposeful lessons, extensive practice, and a variety of opportunities for concept mastery to lead them to success in college and beyond.



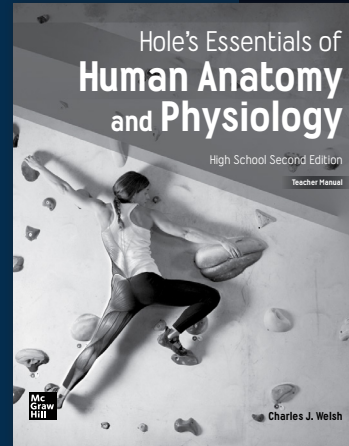
Scan the QR code to explore the resources that support Tennessee AP®, Honors, and Electives teacher and student success!



STUDENT EDITION



STUDENT LAB MANUAL



PRINTED TEACHER MANUAL

Learn more at mheducation.com/tennessee

