Principles of the Biomedical Sciences™
Outline

Unit One: Human Body Systems

Lesson One: The Mystery (17 days)
  Activity 1.1.1: The Mystery—Was It a Crime?
  Activity 1.1.2: How Is a Career Journal Entry Completed?
  Activity 1.1.3: How Do the Parts Make a Whole?
  Activity 1.1.4: What Is Our Skeletal System?
  Activity 1.1.5: How Do Systems Interconnect?
  Activity 1.1.6: What Does the Evidence Say?
  Activity 1.1.7: Why Confidentiality?
  Activity 1.1.8: Careers that Determine the Cause of Death

Lesson Two: The Engineering of the Human Body (6 days)
  Activity 1.2.1: Is the Human Body a Machine?
  Activity 1.2.2: What Is Biomedical Engineering?
  Activity 1.2.3: Careers that Link Biomedical Science and Engineering

Unit Two: Heart Attack

Lesson One: Pumps (2 days)
  Activity 2.1.1: What Is a Pump?

Lesson Two: The Structure of the Human Heart (5 days)
  Activity 2.2.1: How Many Chambers Does It Have?
  Activity 2.2.2: What Does a Heart Really Look Like?

Lesson Three: The Heart at Work (10 days)
  Activity 2.3.1: How Can Heart Function Be Monitored Using LabVIEW?
  Activity 2.3.2: What Makes Your Heart Beat Faster?
  Activity 2.3.3: What Is Blood Pressure?
  Activity 2.3.4: The EKG - What Can It Tell Us?
  Activity 2.3.5: Careers that Involve Cardiac Testing

Lesson Four: Blood – The River of Life (8 days)
  Activity 2.4.1: How Do Blood Cells Differ?
  Activity 2.4.2: Where Does All that Blood Go?
  Activity 2.4.3: Why Are Cells So Small?
  Activity 2.4.4: Careers that Involve Cardiac Tissues

Unit Three: Diabetes
Lesson One: What Is In Our Food? (11 days)
   Activity 3.1.1: What Is in That Stuff We Eat?
   Activity 3.1.2: How Much Energy Is in Food?
   Activity 3.1.3: What Makes All Matter?
   Activity 3.1.4: Where Is the Energy?
   Activity 3.1.5: Careers in Food Science

Lesson Two: Macromolecules (7 days)
   Activity 3.2.1: What Are Macromolecules?
   Project 3.2.2: Which Molecule Am I?

Lesson Three: Molecules Working Together (4 days)
   Activity 3.3.1: What Are Action Molecules?

Lesson Four: The Diabetes Connection (13 days)
   Activity 3.4.1: Can Negative Feedback Be a Positive Thing?
   Activity 3.4.2: Why Is Too Much Sugar in Blood Bad?
   Project 3.4.3: How Does Insulin Work?
   Activity 3.4.4: What Is Diabetes?
   Activity 3.4.5: Careers Involved in Treating Diabetes

Lesson Five: Life with Diabetes (3 days)
   Activity 3.5.1: So What Can I Eat? (Optional, additional 3 days)
   Activity 3.5.2: What Is a Day in the Life of a Diabetic Really Like?
   Activity 3.5.3: Careers that Aid Diabetics

Unit 4: Sickle-Cell Disease

Lesson 4.1: What Is Sickle Cell Disease? (5 days)
   Activity 4.1.1: What Are Sickle Cells?
   Activity 4.1.2: What Are the Clinical Symptoms and Complications?
   Activity 4.1.3: What Is the World Distribution of Sickle Cell Disease?
   Activity 4.1.4: Careers That Involve the Study of Disease

Lesson 4.2: What Causes Sickle Cell Disease? (8 days)
   Activity 4.2.1: What Are Chromosomes?
   Activity 4.2.2: The Story of HeLa Cells
   Activity 4.2.3: The Doctor’s Point of View
   Activity 4.2.4: How Does Sickle Cell Pass through Families?
   Activity 4.2.5: What Is a Family’s Pedigree?
   Activity 4.2.6: What Is the Probability?
   Activity 4.2.7: Careers that Study Family Traits

Lesson 4.3: How Do Chromosomes Carry Information? (9 days)
   Activity 4.3.1: How Do Chromosomes Carry Information?
   Activity 4.3.2: What Is the Structure of DNA?
   Activity 4.3.3: How Is DNA Isolated from Cells?
   Activity 4.3.4: How Much DNA Is in a Human Cell?
   Activity 4.3.5: Careers that Study DNA

Lesson 4.4: What Is the DNA Code? (7 days)
Activity 4.4.1: What Is the DNA Code?
Activity 4.4.2: What Determines the Shape of a Protein?
Activity 4.4.3: What Is the Shape of Beta-Globin? (Optional, additional 3 days)
Project 4.4.4: How Are Designer Proteins Made?

Lesson 4.5: Mistakes Happen (5 days)
Activity 4.5.1: What Is Karyotyping?
Activity 4.5.2: Does Changing Just One Nucleotide Makes A Big Difference?

Unit 5: Hypercholesterolemia

Lesson 5.1: Cholesterol (4 days)
Activity 5.1.1: Aren’t All Fats the Same?
Activity 5.1.2: What are LDL and HDL?
Activity 5.1.3: Careers the involve Diet and Lifestyle Changes

Lesson 5.2: Molecular Biology Techniques (5 days)
Activity 5.2.1: How Does PCR Amplify DNA?
Activity 5.2.2: What Is Familial Hypercholesterolemia and How Is It Diagnosed?
Activity 5.2.3: Careers that Involve Molecular Biology

Unit 6: Infectious Diseases

Lesson 6.1: Bacteria (8 days)
Activity 6.1.1: What Are Bacteria?
Activity 6.1.2: How Do Bacteria in the Mouth Affect the Heart?
Activity 6.1.3: Which Antibiotic Is the Best Choice?

Lesson 6.2: Viruses (4 days)
Activity 6.2.1: What Are Viruses?
Activity 6.2.2: Careers that Deal with Infectious Diseases

Lesson 6.3: Public Health Campaign (5 days)
Project 6.3.1: How Do We Tell Others?

Unit 7: Medical Interventions

Lesson 7.1: Medical Interventions (11 days)
Activity 7.1.1: What Are Medical Interventions?
Project 7.1.2: How Are Pharmaceuticals Developed?
Activity 7.1.3: What Can Pharmaceuticals Do?
Problem 7.1.4: What Medical Interventions Might Have Helped?
Activity 7.1.5: Careers that Deal with Medical Interventions

Unit 8: Grant Proposal

Lesson 8.1: Grant Proposal (10 class days interspersed through last 10 weeks)
Problem 8.1.1: A Call for Grant Proposals—What Can We Do?