Wyoming Department of Education Required Virtual Education Course Syllabus

Converse County School District # 1

Course Information	
Program Name	Biology
Course ID	H405
Course Name	Forensic Science
SCED Code	03214G0.5011
Content Area	Science
Grade Level	12
# of Credits	.5 high school
Curriculum Type	District Developed
Please give a concise description of this course including the purpose and what students will demonstrate and/or gain from this course.	
This course is designed to provide students an introduction to the methods and types of evidence used in crime scene investigations and to increase interest in applied sciences.	

Wyoming Content and Performance Standards	
Standard	
HS-ETS1-5	Evaluate the validity and reliability of claims in a variety of materials.
HS-LS3-1	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits
HS-PS2-6	Communicate scientific and technical information about why the molecular-level structure is important in materials.

WYOMING DEPARTMENT OF EDUCATION

VIRTUAL 307

Wyoming Content and Performance Standards

HS-PS2-1	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object

Scope and Sequence

Unit Outline	Standard #	Outcomes Objectives/Student Centered Goals
Observation Introduction 4 Digging Deeper with Forensic Science e-Collection 4 What Is Observation? 4 Observations by Witnesses 5 Digging Deeper with Forensic Science e-Collection 8 Observations in Forensics 9 Summary 10 Case Studies 10 Careers in Forensics Paul Ekman 12 Chapter 1 Review 13	ETS-1-5 Validity and reliability of data and observations	Objectives By the end of this chapter, you will be able to: ✔ Defi ne observation and describe what changes occur in the brain. ✔ Describe examples of factors infl uencing eyewitness accounts of events. ✔ Compare the reliability of eyewitness testimony to what actually happened. ✔ Relate observation skills to their use in forensic science. ✔ Defi ne forensic science. ✔ Practice and improve your own observation skills Activity 1-1 Learning to See 15 Activity 1-2 You're an Eyewitness! 16 Activity 1-3 What Influences Our Observations? 17
Evidence collection introduction 22 Principle of Exchange 22 Types of Evidence 23 The Crime-Scene Investigation Team 24 The Seven S's of Crime-Scene Investigation 24 Digging Deeper with Forensic Science e-Collection 26 Digging Deeper with Forensic Science e-Collection 29 Analyze the Evidence 29 Crime-Scene Reconstruction 29 Staged Crime Scenes 30 Summary 30 Case Studies 31 Careers in Forensics Crime-Scene Investigator 32 Chapter 2 Review	ETS-1-5 Validity and reliability of data and observations	Objectives By the end of this chapter you will be able to: ✔ Summarize Locard's exchange principle. ✔ Identify four examples of trace evidence. ✔ Distinguish between direct and circumstantial evidence. ✔ Identify the type of professionals who are present at a crime scene. ✔ Summarize the seven steps of a crime-scene investigation. ✔ Explain the importance of securing the crime scene. ✔ Identify the methods by which a crime scene is documented. ✔ Demonstrate proper

Scope and Sequence		
		technique in collecting and packaging trace evidence. ✔ Describe how evidence from a crime scene is analyzed Activity 2-1 Locard's Principle 37 Activity 2-2 Crime-Scene Investigation 41
Hair introduction 50 History of Hair Analysis 50 The Function of Hair 51 The Structure of Hair 51 Digging Deeper with Forensic Science e-Collection 57 Digging Deeper with Forensic Science e-Collection 58 Summary 59 Case Studies 59 Careers in Forensics William J. Walsh, Chemical Researcher 61 Chapter 3 Review 62	LS-3-1 DNA and genetic variability	Objectives By the end of this chapter you will be able to ✔ Identify the various parts of a hair. ✔ Describe variations in the structure of the medulla, cortex, and cuticle. ✔ Distinguish between human and nonhuman animal hair. ✔ Determine if two examples of hair are likely to be from the same person. ✔ Explain how hair can be used in a forensic investigation. ✔ Calculate the medullary index for a hair. ✔ Distinguish hairs from individuals belonging to the broad racial categories Activity 3-1 Trace Evidence: Hair 66 Activity 3-2 Hair Measurement and Match 70 Activity 3-3 Hair Testimony Essay 75
Fingerprints Introduction 160 History of Biological Evidence in Forensics 160 The Function and Structure of DNA 160 DNA Identification 162 Digging Deeper with Forensic Science e-Collection 163 Sources of DNA 164 Collection and Preservation of DNA Evidence 164 DNA and Probes 167 Digging Deeper with Forensic Science e-Collection 168 Analysis of DNA Fingerprints 168 Summary 169 Case Studies 170 Careers in Forensics Kary Banks Mullis, Nobel Prize–Winning Chemist 172 Chapter 7 Review 173	LS-3-1 DNA and genetic variability	Objectives By the end of this chapter you will be able to ✔ Discuss the history of fingerprinting. ✔ Describe the characteristics of fingerprints. ✔ Identify the basic types of fingerprints. ✔ Describe how criminals attempt to alter their fingerprints. ✔ Determine the reliability of fingerprints as a means of identification. ✔ Explain how fingerprint evidence is collected. ✔ Describe the latest identification technologies. ✔ Determine if a fingerprint matches a fingerprint on record. ✔ Use the process of lifting a latent print Activity 7-1 DNA Fingerprinting Simulation Using Dyes 175 Activity 7-2 Where's the CAT? Simulation 179 Activity 7-3 Ward's DNA Fingerprinting Simulation 185 Activity 7-4 Who Are the Parents? 187 Activity 7-5 Which Man Is the Father? 189 Activity 7-6 The Break-In 191 Activity 7-7 Internet Search 193
Exam 1: Chapters 1-5 September		

Scope and Sequence		
Blood spatter Introduction 196 Blood History 196 Composition of Blood 197 Digging Deeper with Forensic Science e-Collection 202 Blood Spatter 203 Crime-Scene Investigation of Blood 207 Digging Deeper with Forensic Science e-Collection 207 Summary 208 Case Studies 208 Careers in Forensics Michael Baden 210 Chapter 8 Review 211	LS-3-1 DNA and genetic variability PS-2-1 Newtons laws of motion	Objectives By the end of this chapter you will be able to ✔ Explain the composition of blood. ✔ Describe the functions of blood cells. ✔ Describe a brief history of the use of blood and blood-spatter analysis in forensics. ✔ Describe how to determine the blood type of a sample of blood. ✔ Describe how to screen for the presence of human blood. ✔ Calculate the probability of certain blood types within a population. ✔ Conduct a blood-spatter analysis. ✔ Examine stab wounds and describe the nature of the weapon. ✔ Use blood-spatter evidence to recreate the events at a crime scene Activity 8-1 A Presumptive Test for Blood 216 Activity 8-2 Blood Typing 220 Activity 8-3 Blood-Spatter Analysis: Effect of Height on Blood Drops 225 Activity 8-4 Blood-Spatter Impact Angle 229 Activity 8-5 Area of Convergence 235 Activity 8-6 Point of Origin 239 Activity 8-7 Crime-Scene Investigation 247
Handwriting Forgery Introduction 278 History of Forensic Handwriting Analysis 279 Introduction to Handwriting 279 Handwriting Examination 282 Digging Deeper with Forensic Science e-Collection 286 Counterfeiting 286 Summary 289 Case Studies 290 Digging Deeper with Forensic Science e-Collection 290 Careers in Forensics Lloyd Cunningham, Document Expert 291 Chapter 10 Review 292	LS-3-1 DNA and genetic variability	Objectives By the end of this chapter, you will be able to ✔ Describe 12 types of handwriting exemplars that can be analyzed in a document. ✔ Demonstrate an example of each of the 12 exemplars of handwriting traits. ✔ Identify the major goals of a forensic handwriting analysis. ✔ Describe some of the technology used in handwriting analysis. ✔ Distinguish between the terms forgery and fraudulence . ✔ Identify several ways in which businesses prevent check forgery. ✔ Describe four features of paper currency that are used to detect counterfeit bills Activity 10-1 Handwriting Analysis 294 Activity 10-2 Analysis of Ransom Note and Expert Testimony 297 Activity 10-3 Examination of U.S. Currency: Is It Real or a Forgery? 301
Glass evidence Introduction 396 The History of Glass 396 What Is Glass? 396 Types of Glass 397 Properties of Glass 397 Application	PS-2-6	Objectives By the end of this chapter you will be able to ✔ Explain how glass is formed. ✔ List some of the characteristics of glass. ✔ Provide examples of different types of glass. ✔ Calculate the density of glass. ✔

Scope and Sequence		
of Refractive Index to Forensics 402 Digging Deeper with Forensic Science e-Collection 404 Digging Deeper with Forensic Science e-Collection 407 Summary 409 Case Study 410 Careers in Forensics Neutron Activation Analyst 411 Chapter 14 Review 412	Molecular structures of materials	Use the refractive index to identify different types of glass. ✔ Describe how glass fractures. ✔ Analyze glass fracture patterns to determine how glass was broken. ✔ Explain how glass is used as evidence 412 Activity 14-1 Glass Fracture Patterns 416
Casts and Impressions Introduction 432 Shoe Impressions 433 Digging Deeper with Forensic Science e-Collection 436 Tire Treads and Impressions 437 Dental Impressions 441 Summary 443 Case Studies 444 Careers in Forensics Before CSI, there was Quincy; before Quincy, there was Thomas Noguchi 446 Chapter 15 Review	ETS-1-5 Validity and reliability of data and observations	Objectives By the end of this chapter you will be able to ✔ Distinguish between latent, patent, and plastic impressions. ✔ Explain how various types of impressions can be used as trace evidence. ✔ Describe how to make foot, shoe, and tire impressions. ✔ Use track width and wheelbase information to identify vehicles. ✔ Prepare dental impressions and match them with bite marks 447 Activity 15-1 Casting Plaster of Paris Impressions 450 Activity 15-2 Shoe Size (Foot Size) and Height 454 Activity 15-3 Tire Impressions and Analysis 457 Activity 15-4 Vehicle Identification 460 Activity 15-5 Dental Impressions 464
Exam 2: Chapters 6-10 October		
Ballistics Introduction 492 History of Gunpowder and Firearms 492 Long Guns and Handguns 493 Firearms and Rifling 494 Bullets, Cartridges, and Calibers 494 The Study of Bullets and Cartridge Casings 496 Gunshot Residues 497 Databases 498 Digging Deeper with Forensic Science e-Collection 498 Trajectory 498 Digging Deeper with Forensic Science e-Collection 500 Bullet Wounds 501 Summary 502 Case Studies 502 Careers in Forensics Forensics Technician 504 Chapter 17 Review 505	PS-2-1 Newtons laws of motion	Objectives By the end of this chapter you will be able to ✔ Discuss the differences between a handgun, a rifl e, and a shotgun. ✔ Distinguish between a bullet and a cartridge. ✔ Discuss rifl ing on a gun barrel and how it affects the fl ight of the projectile. ✔ Explain the relationship between barrel size and caliber. ✔ Explain how bullets are test-fi red and matched. ✔ Discuss the role of ballistics recovery and examination at the crime scene. ✔ Determine the position of the shooter based on bullet trajectory Activity 17-1 Bullet Trajectory 507 Activity 17-2 Firing Pin Match 512