Pacing Guide for 7-12 Curriculum

Course Title: Forensic Science

Length of Course: 36 weeks

Week Number	Chapter/ Topic	COS	Objectives SWBAT	Strategies / Materials Needed
Week 1	Introduction/ Syllabus Lab Safety procedures, review and test	Biology COS 1. Select appropriate laboratory glassware, balances, time measuring equipment, and optical instruments to conduct an experiment. • Identifying safe laboratory procedures when handling chemicals and using Bunsen burners and laboratory glassware	Select appropriate glassware, balances, time measuring equipment, and optical instruments to conduct an experiment.	Go over syllabus, class rules, and procedures, lab safety rules, symbols and equipment.
Week 2	Introduction to Forensic Science and to the Law	n/a	1. Define forensic science and the major disciplines it encompasses. 2. Recognize major contributions to the development of forensic science by various scientists. 3. Account for the rapid growth of forensic laboratories over the last 40 years. 4. Differentiate between criminalists and criminologists. 5. Explain the importance of Locard's Exchange Principle. 6. Describe the basic legal system in the United States on the federal, state, and municipal levels. 7. Explain the role and responsibilities of an expert witness.	PowerPoint, Deductive Reasoning Lab
Week 3	Introduction to Forensic Science and to the Law	n/a	1. Define forensic science and the major disciplines it encompasses. 2. Recognize major contributions to the	Vocabulary, review questions, and Locard's Exchange Principle Lab

			development of forensic science by various scientists. 3. Account for the rapid growth of forensic laboratories over the last 40 years. 4. Differentiate between criminalists and criminologists. 5. Explain the importance of Locard's Exchange Principle. 6. Describe the basic legal system in the United States on the federal, state, and municipal levels. 7. Explain the role and responsibilities of an expert witness.	
Week 4	The Crime Scene	FORENSIC COS 1. Describe responsibilities of various personnel involved in crime scene investigations. Examples: police, detectives, laboratory specialists, medical examiners • Explaining how to search, sketch, and record data from a crime scene	1. Discuss the responsibilities of the first officer on the scene. 2. Explain the steps to be taken to thoroughly record a crime scene. 3. Describe proper procedures for conducting a systematic search for evidence at a crime scene. 4. Define and understand the chain of custody. 5. Define physical evidence. 6. Describe proper techniques for packaging common types of physical evidence. 7. Relate what steps are typically required to maintain appropriate health and safety standards at a crime scene.	PowerPoint, Individual vs. Class Evidence Worksheets
	Evidence	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene.	1. Define physical evidence. 2. Discuss common types of	Systematic Search Activity

Week 5		• Distinguishing between physical evidence and witness evidence	physical evidence encountered at a crime scene. 3. Define and contrast class and individualized evidence. 4. Explain the purpose of physical evidence plays in reconstructing the events surrounding the commission of a crime. 5. List and explain the function of national databases available to forensic scientists. 6. Describe proper techniques for packaging common types of physical evidence. 7. Distinguish between physical evidence and testimonial evidence. 8. Explain the difference between the identification and comparison of physical evidence.	
Week 6	Evidence	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Distinguishing between physical evidence and witness evidence	1. Define physical evidence. 2. Discuss common types of physical evidence encountered at a crime scene. 3. Define and contrast class and individualized evidence. 4. Explain the purpose of physical evidence plays in reconstructing the events surrounding the commission of a crime. 5. List and explain the function of national databases available to forensic scientists. 6. Describe proper techniques for packaging common types of physical	Review Questions

			evidence. 7. Distinguish between physical evidence and testimonial evidence. 8. Explain the difference between the identification and comparison of physical evidence.	
Week 7	Microscopy	Biology COS 1. Select appropriate laboratory glassware, balances, time measuring equipment, and optical instruments to conduct an experiment.	1. List and understand the parts of a compound microscope. 2. Define magnification, field of view, working distance, and depth of focus. 3. Explain how to make a wet mount properly. 4. Contrast the comparison and compound microscopes. 5. Outline some forensic applications of the scanning electron microscope.	Microscope Labeling Worksheet, Microscope Lab

Week 8	Hairs and Fibers	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Describing ways to identify hair, fiber, and blood evidence	1. Recognize and understand the cuticle, cortex, and medulla areas of the hair. 2. List the three phases of hair growth. 3. Appreciate the distinction between human hair and other animals. 4. Explain the proper collection of forensic hair evidence. 5. Describe and understand the role of DNA typing in hair comparisons.	PowerPoint, Hair Lab

			6. List hair features that are useful for the microscopic comparison of human hairs.	
Week 9	Hairs and Fibers	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Describing ways to identify hair, fiber, and blood evidence	1. Understand the differences between natural and manufactured fibers. 2. List the properties of fibers using a microscope, and performing a burn test. 3. Describe the proper collection of fiber evidence. 4. List the properties of fibers that are most useful for forensic comparisons.	PowerPoint, Fibers Lab
Week 10	Crime Scene Processing	FORENSIC COS 1. Describe responsibilities of various personnel involved in crime scene investigations. Examples: police, detectives, laboratory specialists, medical examiners • Explaining how to search, sketch, and record data from a crime scene FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Distinguishing between physical evidence and witness evidence	1. Define physical evidence. 2. Discuss common types of physical evidence encountered at a crime scene. 3. Discuss the responsibilities of the first officer on the scene. 4. Define and understand the chain of custody. 5. Explain the steps to be taken to thoroughly record a crime scene. 6. Describe proper techniques for packaging common types of physical evidence. 7. Describe proper procedures for conducting a systematic search for evidence at a crime scene. 8. Record a crime scene properly. 10. Collect evidence properly.	Crime Scene Processing Lab
Week 11	Fingerprints	FORENSIC COS 2. Explain ways to collect and preserve	1. Know the common ridge	PowerPoint,

		evidence from a crime scene. • Comparing the three main pattern types that combine to form an individual's unique fingerprint • Explaining different methods of latent fingerprint development	characteristics of a fingerprint. 2. List the three major fingerprint patterns and their respective subclasses. 3. Distinguish visible, plastic, and latent fingerprints. 4. Describe the concept of Automated Fingerprint System (AFIS). 5. List and describe the techniques for preserving a developed latent fingerprint. 6. List the techniques for developing latent fingerprints on various surfaces.	Fingerprint Worksheets, 10 print cards , Fingerprint Dusting Lab
Week 12	Fingerprints	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Comparing the three main pattern types that combine to form an individual's unique fingerprint • Explaining different methods of latent fingerprint development	1. Know the common ridge characteristics of a fingerprint. 2. List the three major fingerprint patterns and their respective subclasses. 3. Distinguish visible, plastic, and latent fingerprints. 4. Describe the concept of Automated Fingerprint System (AFIS). 5. List and describe the techniques for preserving a developed latent fingerprint. 6. List the techniques for developing latent fingerprints on various surfaces.	Fingerprint Lift Al Can Lab, Fingerprint Developing Baby Powder Lab
Week 13	Fingerprints	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Comparing the three main pattern types that combine to form an individual's unique fingerprint	1. Know the common ridge characteristics of a fingerprint. 2. List the three major fingerprint patterns and their respective subclasses.	Latent Fingerprint Developing Lab

		• Explaining different methods of latent fingerprint development	3. Distinguish visible, plastic, and latent fingerprints. 4. Describe the concept of Automated Fingerprint System (AFIS). 5. List and the techniques for preserving a developed latent fingerprint. 6. List the techniques for developing latent fingerprints on various surfaces.	
Week 14	Other Impressions	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Identifying origins of impressions, including footwear and tire treads	1. Explain prints that can be left at a crime scene other than fingerprints. 2. Explain how shoe prints can be class evidence in certain situations , and other times be individualized. 3. Identify information that can be determined from a shoeprint.	Shoeprint Matching Lab, and Shoe Cast Lab
Week 16	Supplement: Forensic Odontology Questioned Documents	FORENSIC COS 7. Identify the importance of skeletal remains in forensics. • Comparing bones and skulls based on age, sex, and race • Using forensic dentistry to establish identity FORENSIC COS 10. Describe techniques used to determine the validity of documents. Examples: fiber and handwriting analyses, ink chromatography	1. Explain the forensic significance of dental impressions. 2. Discuss various things that contribute to dental impressions being individual evidence. 3. Explain how dental records are used to identify victims and suspects. 4. Make cast of teeth from bite impressions. 5. Match dental overlays to bite impressions. 6. Define questioned document. 7. Know what common individual characteristics are associated with handwriting.	PowerPoint, Bite-mark and Dental Impression Labs

			8. List some guidelines for collecting known writing samples for comparison to a questioned document. 9. Recognize some of the class and individual characteristics of printers and photocopiers. 10. List some techniques document examiners use to uncover alterations, erasures, obliterations, and variations in pen ink.	
Week 17	Questioned Documents	FORENSIC COS 10. Describe techniques used to determine the validity of documents. Examples: fiber and handwriting analyses, ink chromatography	1. Define questioned document. 2. Know what common individual characteristics are associated with handwriting. 3. List some guidelines for collecting known writing samples for comparison to a questioned document. 4. Recognize some of the class and individual characteristics of printers and photocopiers. 5. List some techniques document examiners use to uncover alterations, erasures, obliterations, and variations in pen ink.	PowerPoint and Questioned Documents Lab
Week 18	Supplement: Ballistics	FORENSIC COS 3. Distinguish between class and individual characteristics of firearms. Examples: toolmark, caliber, scatter pattern	1. Discuss the differences between a handgun, a rifles and a shotgun. 2. Distinguish between a bullet and a cartridge. 3. Discuss rifling on a gun barrel and how it affects the flight of the projectile. 4. Explain the relationship	PowerPoint, Review Questions, and Serial Restoration Lab

			between barrel size and caliber. 5. Explain how bullets are test-fired and matched. 6. Discuss the role of ballistics recovery and examination at the crime scene. 7. Determine the position of the shooter based on bullet trajectory.	
Week 19	Forensic Serology	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Describe ways to identify hair, fiber, and blood evidence FORENSIC COS 4. Describe presumptive and confirmatory tests. Examples: blood type comparison, DNA testing FORENSIC COS 9. Use laws of physics to explain forensic evidence. • Analyzing blood splatter patterns in relation to speed, height, and direction • Tracking trajectories of collected evidence	1. Define serology. 2. List and describe test used to characterize a stain as blood. 3. Understand the concept of antigen-antibody interactions, and how it is applied to species identification and drug identification. 4. Describe ways to identify blood evidence. 5. Describe presumptive and confirmatory tests for blood type comparisons. 6. Discuss blood in terms of of class and individual evidence.	PowerPoint, ABO-Rh blood typing labs
Week 20	Forensic Serology	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Describing ways to identify hair, fiber, and blood evidence FORENSIC COS 4. Describe presumptive and confirmatory tests. Examples: blood type comparison, DNA testing FORENSIC COS 9. Use laws of physics to explain forensic evidence. • Analyzing blood splatter patterns in relation to speed, height, and direction • Tracking trajectories of collected evidence	1. Define serology. 2. List and describe test used to characterize a stain as blood. 3. Understand the concept of antigen-antibody interactions, and how it is applied to species identification and drug identification. 4. Describe ways to identify blood evidence. 5. Describe presumptive and confirmatory tests for blood type comparisons. 6. Discuss blood in terms of	Phenolphthalein Presumptive Test, Blue-Star or Luminol Test

			of class and individual evidence.	
Week 21	Forensic Serology	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Describing ways to identify hair, fiber, and blood evidence FORENSICS COS 4. Describe presumptive and confirmatory tests. Examples: blood type comparison, DNA testing FORENSICS COS 9. Use laws of physics to explain forensic evidence. • Analyzing blood splatter patterns in relation to speed, height, and direction • Tracking trajectories of collected evidence	1. Define serology. 2. List and describe test used to characterize a stain as blood. 3. Understand the concept of antigen-antibody interactions, and how it is applied to species identification and drug identification. 4. Describe ways to identify blood evidence. 5. Describe presumptive and confirmatory tests for blood type comparisons. 6. Discuss blood in terms of of class and individual evidence. 7. Conduct a blood-spatter analysis.	Angle of Impact Lab, and Blood Drops at Different Heights and Speeds Lab,
Week 22	Forensic Serology	FORENSIC COS 2. Explain ways to collect and preserve evidence from a crime scene. • Describing ways to identify hair, fiber, and blood evidence FORENSIC COS 4. Describe presumptive and confirmatory tests. Examples: blood type comparison, DNA testing FORENSIC COS 9. Use laws of physics to explain forensic evidence. • Analyzing blood splatter patterns in relation to speed, height, and direction • Tracking trajectories of collected evidence	1. Define serology. 2. List and describe test used to characterize a stain as blood. 3. Understand the concept of antigen-antibody interactions, and how it is applied to species identification and drug identification. 4. Describe ways to identify blood evidence. 5. Describe presumptive and confirmatory tests for blood type comparisons. 6. Discuss blood in terms of of class and individual evidence. 7. Conduct a blood-spatter analysis.	Blood Spatter and Bludgeon Head labs

Week 23	Forensic Toxicology	FORENSIC COS 8. Describe general categories of drugs and poisons and their effects on humans. • Explaining ways poisons are detected at autopsy	1. Compare and contrast psychological and physical dependence. 2. Name and classify the commonly abused drugs. 3. List and define the schedules of the controlled substance act. 4. Describe the laboratory tests normally used to perform a routine drug identification analysis. 5. Explain the testing procedures used for forensic identification of marijuana. 6. Understand the proper collection and preservation of drug evidence. 7. Describe commonly employed field sobriety tests to assess alcohol impairment. 8. List and contrast laboratory procedures for measuring the concentration of alcohol in the blood. 9. Relate the precautions to be taken to properly preserve blood in order to analyze its alcohol content. 10. Describe techniques that forensic toxicologists use to isolate and identify drugs and poisons.	PowerPoint, Review Questions, and Worksheets
Week 24	Forensic Toxicology	FORENSIC COS 8. Describe general categories of drugs and poisons and their effects on humans. • Explaining ways poisons are detected at autopsy	1. Compare and contrast psychological and physical dependence. 2. Name and classify the commonly abused drugs. 3. List and define the schedules of the controlled substance act.	Narcotics Lab

			4. Describe the laboratory tests normally used to perform a routine drug identification analysis. 5. Explain the testing procedures used for forensic identification of marijuana. 6. Understand the proper collection and preservation of drug evidence. 7. Describe commonly employed field sobriety tests to assess alcohol impairment. 8. List and contrast laboratory procedures for measuring the concentration of alcohol in the blood. 9. Relate the precautions to be taken to properly preserve blood in order to analyze its alcohol content. 10. Describe techniques that forensic toxicologists use to isolate and identify drugs and poisons.	
Week 25	Supplement: Forensic Pathology	FORENSIC COS 8. Describe general categories of drugs and poisons and their effects on humans. • Explaining ways poisons are detected at autopsy	1. Discuss the history of coroners and medical examiners. 2. Describe the steps of a death investigation. 3. Discuss how laboratory tests are used to determine the contributing factors that led to someone's death. 4. Compare and contrast collection of biological and nonbiological evidence during an autopsy. 5. Describe the organization	PowerPoint and Medical Examiner Activity

			and structure of the autopsy report. 6. Identify various duties a medical examiner is responsible for. 7. Distinguish between cause, manner, and mechanism of death. 8. Identify various ways medical examiners approximate time of death. 9. Define and distinguish between algor, livor, and rigor mortis. 10. Appreciate the significance of finding a drug in human tissues and organs to assess impairment of a victim.	
Week 26	Supplement: Forensic Pathology	FORENSIC COS 8. Describe general categories of drugs and poisons and their effects on humans. • Explaining ways poisons are detected at autopsy	1. Discuss the history of coroners and medical examiners. 2. Describe the steps of a death investigation. 3. Discuss how laboratory tests are used to determine the contributing factors that led to someone's death. 4. Compare and contrast collection of biological and nonbiological evidence during an autopsy. 5. Describe the organization and structure of the autopsy report. 6. Identify various duties a medical examiner is responsible for. 7. Distinguish between cause, manner, and mechanism of death. 8. Identify various ways medical examiners approximate time of death.	Pig Autopsy

			9. Define and distinguish between algor, livor, and rigor mortis. 10. Appreciate the significance of finding a drug in human tissues and organs to assess impairment of a victim.	
Week 27	Serial Killer Research and PowerPoint Presentation	n/a	1. Explain what defines a serial killer. 2. Identify various trademarks of serial killers. 3. Use the modern technology to research serial killers and create a PowerPoint. 4. Identify forensic evidence, and techniques that have been essential in catching various serial killers.	Computer Lab for Research and PowerPoint
Week 28	Serial Killer Research and PowerPoint Presentation	n/a	1. Explain what defines a serial killer. 2. Identify various trademarks of serial killers. 3. Use the modern technology to research serial killers and create a PowerPoint. 4. Identify forensic evidence, and techniques that have been essential in catching various serial killers.	Presentations
Week 29	DNA Analysis	FORENSIC COS 4. Describe presumptive and confirmatory tests. Examples: blood type comparison, DNA testing FORENSIC COS 5. Describe the importance of genetic information to forensics. • Using the process of gel electrophoresis to identify patterns in DNA	1. Discuss the structure and function of DNA. 2. Explain what causes variation in DNA. 3. Differentiate between the various types of DNA analysis. 4. Explain the proper methods of collecting DNA evidence at a crime scene.	PowerPoint, DNA Color Sheet, DNA Double Helix Questions

			5. Compare and contrast the methods of extracting DNA. 6. Describe the difference between nuclear and mitochondrial DNA. 7. Understand the use of DNA computerized databases in criminal investigations. 8. List the necessary procedures for the proper preservation of bloodstained evidence for laboratory DNA analysis.	
Week 30	DNA Analysis	FORENSIC COS 4. Describe presumptive and confirmatory tests. Examples: blood type comparison, DNA testing FORENSIC COS 5. Describe the importance of genetic information to forensics. • Using the process of gel electrophoresis to identify patterns in DNA	1. Discuss the structure and function of DNA. 2. Explain what causes variation in DNA. 3. Differentiate between the various types of DNA analysis. 4. Explain the proper methods of collecting DNA evidence at a crime scene. 5. Compare and contrast the methods of extracting DNA. 6. Describe the difference between nuclear and mitochondrial DNA. 7. Understand the use of DNA computerized databases in criminal investigations. 8. List the necessary procedures for the proper preservation of bloodstained evidence for laboratory DNA analysis.	Electrophoresis, Sealed with a Kiss DNA Lab

Week 31	Supplement: Forensic Anthropology	FORENSIC COS 7. Identify the importance of skeletal remains in forensics. • Comparing bones and skulls based on age, sex, and race • Using forensic dentistry to establish identity	1. Identify functions of bones. 2. Distinguish between male and female skeletal remains based on skull, jaw, brow ridge, pelvis, and femur. 3. Describe how bones contain a record of injuries and disease. 4. Describe how a person's approximate age could be determined by examining his or her bones. 5. Explain the differences in facial structures among different races. 6. Describe the role of mitochondrial DNA in bone identification. 7. Identify skull differences between various ethnic groups. 8. Approximate a person's height from long bone measurements.	Bone diagrams, PowerPoint, disarticulated skeleton lab, skull examples of different ethnic groups activity
Week 32	Supplement: Forensic Anthropology	FORENSIC COS 7. Identify the importance of skeletal remains in forensics. • Comparing bones and skulls based on age, sex, and race • Using forensic dentistry to establish identity	1. Identify functions of bones. 2. Distinguish between male and female skeletal remains based on skull, jaw, brow ridge, pelvis, and femur. 3. Describe how bones contain a record of injuries and disease. 4. Describe how a person's approximate age could be determined by examining his or her bones. 5. Explain the differences in facial structures among different races. 6. Describe the role of mitochondrial DNA in bone identification.	Height calculations from bone measurements

			7. Identify skull differences between various ethnic groups. 8. Approximate a person's height from long bone measurements.	
Week 33	Supplement: Forensic Entomology	FORENSIC COS 6. Describe the decomposition process. • Using entomological life cycles to determine time of death	1. Define forensic entomology. 2. Discuss the life cycle of insects. 3. Explain how time of death is estimated using insect evidence. 4. Describe the effects of insects on human remains. 5. Explain the use of entomological evidence to solve crimes. 6. Describe the impact of weather on metamorphosis. 7. Describe the proper procedures for collection and preservation of entomological evidence.	PowerPoint, Entomology Lab or Video
Week 34	Supplement: Forensic Entomology	FORENSIC COS 6. Describe the decomposition process. • Using entomological life cycles to determine time of death	1. Define forensic entomology. 2. Discuss the life cycle of insects. 3. Explain how time of death is estimated using insect evidence. 4. Describe the effects of insects on human remains. 5. Explain the use of entomological evidence to solve crimes. 6. Describe the impact of weather on metamorphosis. 7. Describe the proper procedures for collection and preservation of entomological evidence.	Entomology Lab

Week 35	Final Crime Scene	Course of Study Objectives	Course Objectives	Final Crime Lab
Week 36	Final Crime Scene and Final Exam	Course of Study Objectives	Course Objectives	Study Guide and Final Exam