UNIT 1: FINGERPRINTS

Goals and Objectives

1. Students will understand how forensics originated and grew as a science to the point that it is used today.
2. Students will understand how the scientific method is used at a crime scene and crime lab.
3. Students will understand how the basic principles of fingerprinting and a solid classification system allow fingerprints to be a valid form of evidence.
4. Students will be able to collect latent fingerprints and identify their characteristics in order to make a match.

Major Assessments	**Process Overview**
Fingerprint Guide	Forensic Pioneers Discussion/Summary Fingerprint Collection Activity Fingerprint Identification Activities, Ten-Print Cards Fingerprint Analysis Lab 6 Point Match Case Study Summaries Outline Creating Crime Scene Scenarios Rough Draft Peer Review Final Fingerprint Guide Project/Unit Reflection

Reading/Writing Skills	**Major Concepts**	**Content Information**
• Non-fiction reading and writing • Annotating and Summarizing text • Building context for terminology • Cornell note-taking	• How did forensics begin in history and how does it affect modern society? • How is a crime scene organized? • How are fingerprints used in criminal investigations? • How are classification systems important for validating evidence?	• Use of the scientific method in gathering, processing, and employing evidence • Historical development of scientific concepts • Relationship between science and society • Identification of fingerprints based on characteristics • Methods of collecting fingerprints on various surfaces • Use of classification system to evaluate validity of a “match”

Texts/Materials Needed	**Regents/SAT Preparation**
• Fingerprint Analysis Lab (WARDS) • Landmark Case Studies • Ink pads, brushes, powder	• Living Environment Standard 1: Students will use scientific inquiry to pose questions, seek answers, and develop solutions.

UNIT 2: TRACE EVIDENCE

Goals and Objectives

1. Students will understand how the transfer of trace evidence such as hair, fibers, glass, paint, dirt, and plant materials can be used to link a suspect to a crime scene.
2. Students will be able to use microscopic observations to evaluate trace evidence samples.

Major Assessments

Expert Testimony Letter

Process Overview

Microscope Lab
Human hair parts, differences – sketching
Hair Case studies
Animal hair sketching
Human vs. Animal hair lab
Modeling business letter
Fibers case studies
Fiber observation/analysis stations
Rough Draft
Plant material observation/analysis
Making slides: plant materials
Final draft of letter
Project/Unit reflection

Reading/Writing Skills

- Cornell note-taking
- Paragraph writing
- Writing a business letter

Major Concepts

- How are different forms of trace evidence used to link a suspect to a crime scene?
- How is trace evidence documented, collected, and protected from contamination?
- How are scientific instruments used to analyze trace evidence?
- How do scientists classify hair, fibers, and other forms of trace evidence?

Content Information

- Microscope parts and usage
- Preparing microscope slides
- Locard's exchange principle
- Characteristics of human and animal hairs - mammals
- Polymers
- Natural and synthetic fibers
- Plant parts, plant cells and pollen

Texts/Materials Needed

- Slide sets: Hair, fibers, plant materials
- Microscopes
- Hair and Fiber case studies: Wayne Williams, Hair Evidence, Fiber Evidence, Pollen Points to Murderers

Regents/SAT Preparation

Living Environment Skills:

- Uses a compound microscope effectively to see specimens clearly, using different magnifications
- Designs and uses dichotomous keys to identify specimens
- Analyzes results from observations

UNIT 3: BLOOD & DNA

Goals and Objectives

1. Students will understand how blood and DNA evidence is used to link a suspect to a crime scene.
2. Students will understand the proper techniques for processing and analyzing biological evidence and the importance of avoiding contamination.

Major Assessments
Jury Packet and Final Verdict Essay

Process Overview
OJ Simpson case readings and video
Blood Typing
Blood Spatter Analysis
DNA at a crime scene examples
DNA Isolation
Electrophoresis Lab
OJ trial excerpts
Small group fact sequencing
Rough draft
Whole class debate
Final Verdict
Project/Unit reflection

Reading/Writing Skills

- Close reading: Highlight and underline, vocabulary context clues
- Annotating
- Summarizing information
- Identifying Point of View

Major Concepts

- What is blood and how is it analyzed by forensic investigators?
- Why is DNA an effective form of identification?
- How is biological evidence collected and processed?

Content Information

- Blood: components and typing/groups
- Physics of blood spatter: angle of impact, velocity, distance, direction
- DNA composition and role in the body
- Sources of DNA at a crime scene
- Blood/DNA processing techniques: isolation, electrophoresis, PCR
- Contamination of evidence
- Ethical use of DNA
- Recognizing patterns and trends

Texts/Materials Needed

- OJ Trial Articles
- Blood Spatter Lab
- Electrophoresis Lab

Regents/SAT Preparation

- Living Environment Standard 4, Key Idea 2: Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.
- Living Environment Skills: Uses electrophoresis to separate molecules, identifies a control group, analyzes results from observations/data

UNIT 4: TIME OF DEATH

Goals and Objectives

1. Students will understand how human body systems react during a trauma and at the time of death.
2. Students will be able to determine the time of death of a victim using the formulas for rigor mortis, algor mortis, and livor mortis.
3. Students will be able to perform a fetal pig autopsy following forensic protocol.

Major Assessments	**Process Overview**
Medical Examiner's Handbook	Rigor Mortis reading, formulas, practice sets Algor Mortis reading, formulas, practice sets Livor Mortis reading, formulas, practice sets Witness testimonies Stomach contents problem solving Draft of TOD formulas and sample problems Body systems and major organs Dissection techniques and lab safety Fetal pig autopsy Draft of autopsy technique Peer review Final Draft Project/Unit reflection

Reading/Writing Skills	**Major Concepts**	**Content Information**
• Procedure writing • Writing problem sets • Outlining • Formal lab report	• How does a medical examiner determine the time of death of a victim? • How is an autopsy performed to determine how, when, and why someone died? • What precautions must be taken in a scientific laboratory?	• Human body systems, especially muscular, circulatory, digestive • Rigor Mortis, Algor Mortis, Livor Mortis Formulas • Measuring body temperature, ambient temperature, humidity • Autopsy • Dissection Techniques • Lab Safety

Texts/Materials Needed	**Regents/SAT Preparation**
• Fetal Pig Autopsy Kit (Carolina) • Time of Death Case Studies	Living Environment: • Performance Indicator 1.2: Describe and explain the structures and functions of the human body at different organizational levels • Performance Indicator 5.2: Explain disease as a failure of homeostasis • Skills: follows safety rules in the laboratory, uses a compound microscope, dissects animal specimens to expose and identify internal structures

UNIT 5: TOXICOLOGY

Goals and Objectives

1. Students will understand the effects of drugs and other toxins on the human body, and how these toxins may be detected by a medical examiner.
2. Students will understand the effects of environmental toxins on an ecosystem.
3. Students will be able to identify the proper methods of use and disposal of substances that may be harmful to organisms and their environment.

Major Assessments

Woburn Town Hall Meeting

Process Overview

Drug Classes and Effects
Nervous, Immune, and Excretory Systems
Drug Contamination Lab
Poisoning Case Studies
Pesticide Activity
Common Carcinogens
Woburn Articles and Video Clips
Assign Roles
Toxins in our area: Gowanus Canal, Newtown Creek
Water and Soil Testing Labs (Out of building)
Woburn Jigsaw
Argument Draft
Peer Review
Town Hall Meeting
Final draft and reflection

Reading/Writing Skills

- Procedure writing
- Paragraph writing
- Finding and referencing sources
- Persuasive essays
- Formal lab report writing

Major Concepts

- How do drugs and other poisons affect the human body?
- How can drugs and other poisons be detected by scientists?
- What are environmental toxins and how do they disturb an ecosystem?
- How should potentially toxic substances be handled?

Content Information

- Drug types and composition
- Effects of drugs on body systems
- Nervous, Immune, Excretory Systems
- Soil, air, water analysis
- pH
- Types of environmental toxins
- Effects of toxins on ecosystems, food chains/webs, watersheds
- Proper use and disposal of chemicals
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Texts/Materials Needed

- Drugs and Human Behavior (Grilly)
- A Civil Action (Harr)
- Woburn Articles
- Water and Soil Analysis Labs

Regents/SAT Preparation

Living Environment Standard 4:

- Key Idea 5: Organisms maintain a dynamic equilibrium that sustains life.
- Key Idea 6: Plants and animals depend on each other and their physical environment.
- Key Idea 7: Human decisions and activities have a profound impact on the physical and living environment.

UNIT 6: FORENSIC ANTHROPOLOGY

Goals and Objectives

1. Students will understand how various bones and bone fragments are analyzed in order to identify a crime victim.
2. Students will be able to differentiate bones from different sources.
3. Students will understand how a crime scene is organized.

Major Assessments

Final Crime Scene

Process Overview

Parts of a bone
Skeletal System
Bones Lab
Casting
Making Classification Keys
Archaeology and Excavation Techniques
Review Crime Scene Organization and Sketching
Simulated Crime Scene
Sketches and list of evidence
Crime Scene/Evidence Report and conclusion

Reading/Writing Skills

- Summarizing
- Annotating
- Identifying and using appropriate sources

Major Concepts

- How do forensic anthropologists analyze bones to determine the biological characteristics of an individual?
- How do you search for evidence in a large open area crime scene?

Content Information

- Skeletal System
- Bone structure
- Classification Systems
- Bone growth and repair
- Connective tissue
- Organization of a crime scene

Texts/Materials Needed

- Skeletons and bone samples

Regents/SAT Preparation

Living Environment

- Performance Indicator 1.2: Describe and explain the structures and functions of the human body at different organizational levels
- Skills: Designs and uses dichotomous keys to identify specimens