

Unit 06: Ballistics, Document Examination and Impressions

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

New Jersey Student Learning Standards

Crosscutting Statements

1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.

Macroscopic patterns are related to the nature of microscopic and atomic-level structure.

Patterns can be used to identify cause and effect relationships.

2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.

Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.

Cause and effect relationships may be used to predict phenomena in natural or designed systems.

3. Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.

Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.

Scientific relationships can be represented through the use of algebraic expressions and equations.

4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.

7. Stability and Change – For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.

Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales, including the atomic scale.

Small changes in one part of a system might cause large changes in another part.

Stability might be disturbed either by sudden events or gradual changes that accumulate over time.

Systems in dynamic equilibrium are stable due to a balance of feedback mechanisms.

Connections to Engineering, Technology and Applications of Science

Interdependence of Science, Engineering, and Technology

Science and technology drive each other forward.

Influence of Engineering, Technology, and Science and the Natural World

The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.

Technology use varies over time and from region to region.

Connections to the Nature of Science: Most Closely Associated with Crosscutting Concepts **Science is a Way of Knowing**

Science is both a body of knowledge and the processes and practices used to add to that body of knowledge.

Science knowledge is cumulative and many people, from many generations and nations, have contributed to science knowledge.

Science is a way of knowing used by many people, not just scientists.

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.

Science carefully considers and evaluates anomalies in data and evidence.

Science is a Human Endeavor

Men and women from different social, cultural, and ethnic backgrounds work as scientists and engineers.

Scientists and engineers rely on human qualities such as persistence, precision, reasoning, logic, imagination and creativity.

Advances in technology influence the progress of science and science has influenced advances in technology.

Science Addresses Questions About the Natural and Material World.

Scientific knowledge is constrained by human capacity, technology, and materials.

Science limits its explanations to systems that lend themselves to observation and empirical evidence.

Science knowledge can describe consequences of actions but is not responsible for society's decisions.

Capacities of the Literate Individual **Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language**

They demonstrate independence.

They build strong content knowledge.

They value evidence.

They use technology and digital media strategically and capably.

LA.RH.6-8	Reading History and Social Studies
LA.K-12.NJSLSA.R1	Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.K-12.NJSLSA.R3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
	Craft and Structure
LA.K-12.NJSLSA.R4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
	Integration of Knowledge and Ideas
LA.RH.6-8.7	Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
LA.K-12.NJSLSA.R7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
LA.K-12.NJSLSA.R8	Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
LA.RH.6-8.8	Distinguish among fact, opinion, and reasoned judgment in a text.
LA.K-12.NJSLSA.R9	Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
LA.RST.6-8	Reading Science and Technical Subjects
LA.RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
LA.K-12.NJSLSA.W	Writing
LA.RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LA.RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
LA.K-12.NJSLSA.W2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
LA.RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
LA.WHST.6-8.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.
SCI.MS-PS1-2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
SCI.MS-PS1	Matter and Its Interactions
SCI.MS-PS1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

Integration of Career Readiness, Life Literacies and Key Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

TECH.8.1.8	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.8.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.3	Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
TECH.8.1.8.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.8.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
TECH.8.1.8.D.5	Understand appropriate uses for social media and the negative consequences of misuse.
TECH.8.1.8.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.8.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
TECH.8.1.8.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.8.F.1	Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.
TECH.8.2.8	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.8.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.

TECH.8.2.8.B.2	Identify the desired and undesired consequences from the use of a product or system.
TECH.8.2.8.B.3	Research and analyze the ethical issues of a product or system on the environment and report findings for review by peers and /or experts.
TECH.8.2.8.B.4	Research examples of how humans can devise technologies to reduce the negative consequences of other technologies and present your findings.
TECH.8.2.8.B.5	Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries and societies.
TECH.8.2.8.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
TECH.8.2.8.E.1	Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale

Unit Rationale

The purpose of this unit...

Ballistics, document examination, and shoe impressions help investigators to build a unique profile of an assailant. Examining specific characteristics created by firearms, handwriting and shoes, investigators are able to connect suspect to crime scenes. By collecting and examining trace evidence, students will think critically to make realistic connections and informed decisions.

Meaning

Essential Questions

Essential Questions

Ballistics:

What is ballistics?

Why do investigators pick up casings at a crime scene?

If you find a projectile used in a crime, why is it important to find the gun?

What information do investigators gain from these objects?

Document Examination:

What do you look for when you compare handwriting samples?

What factors can contribute to variations in handwriting samples?

Is it a forgery/counterfeit?

Impressions:

What sources can we obtain imprint evidence from?

What areas are examined in a footwear-impression?

What information can a shoe print provide in an investigation?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

Ballistics:

Firearms evidence is common at many crime scenes.

Every firearm leaves unique identifying characteristics on the bullet and the cartridge during the firing process.

The microscopic marks created by a firearm are similar to fingerprints; just as no two sets of fingerprints are alike, no two firearms are the same.

Document Examination:

Handwriting identification is based on the principle that there are individual features that distinguish one person's writing from that of another.

Forgery is the process of making, adapting, or imitating objects, statistics, or documents with the intent to deceive. Many tests can be done on a document to determine whether or not it is a forgery.

Counterfeit products are made to imitate the real product. Many tests can be done to determine the authenticity of the item.

Impressions:

Imprint evidence involves the examination and comparison of footwear impressions or other types of imprint/impression evidence.

Specific areas of casts and impressions are studied to identify a suspect.

Acquisition (Student Learning Objectives)

Knowledge

Knowledge
Students will know...

Ballistics:

Ballistics is the science of mechanics that deals with the launching, flight, behavior, and effects of projectiles.

The path that a projectile follows indicates the angle from which it was fired and the distance it traveled.

Document Examination:

Each person has features in their handwriting that make it unique to an individual.

Forgery and counterfeit products are made to resemble a realistic product.

Impressions:

Impressions provide investigators with information about who has visited a crime scene.

Impressions distinguish unique characteristics possessed by an individual.

Skills

Skills

Student will be skilled at ...

Ballistics:

Students will observe various firearm projectiles.

Students will examine the path a projectile followed and use mathematical knowledge to calculate specific data.

Document Examination:

Students will explain the process of forensic handwriting analysis.

Students will compare handwriting samples.

Students will describe the technology used in handwriting analysis.

Students will explain how to determine if a bill is counterfeit.

Impressions:

Students will identify the different sources that could provide imprint evidence.

Students will examine examples of impressions and use specific techniques to identify connections.

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

Chromebooks

Schoology

Internet/Videos

PowerPoint/Google Presentations

Google Forms

Smart board/Interactive Websites

Document Camera

Lab Materials

Copies of Worksheets

Smart Notebook Files

Formative Assessment Strategies

Formative Assessment Strategies

Observations

Questioning/Polling

Group Discussions

Graphic Organizers

Peer/Self Assessments (Reflection)

Individual Whiteboards

Notebook Checks

Learning Activities/Unit of Study

Learning Activities/Unit of Study

Daily Warm-Ups

Inquiry-Based Learning

Non-Fiction Reading/Writing

Note Taking/Annotations

Performance/Lab Based

Classroom/Small Group Discussions

Ballistics Analysis

Chromatography

Handwriting Analysis

Cast and Impression Collection

Cast and Impression Analysis

Crime Scene Analysis

Crime Scene Scenarios

Peer Review

Guest Speakers

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, Gifted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.

