
*The Mission of the Chardon Local Schools is High Achievement
for All Students, Where Learning is Our Most Important Work.*

Science Course of Study:

FORENSICS

Revised February 2022



Forensics

Committee Members: Jill Carpenter

Strand: Observation Skills

<p>Learning Standards:</p> <ul style="list-style-type: none">● ODE Nature of Science:<ul style="list-style-type: none">○ Scientific knowledge is open to revision in light of new evidence. Science is not static.○ Science depends on curiosity, imagination, creativity and persistence.● Forensics:<ul style="list-style-type: none">○ Define observation, and describe what changes occur in the brain while observing.○ Describe examples of factors influencing eyewitness accounts of events.○ Compare the reliability of eyewitness testimony to what actually happened.○ Relate observation skills to their use in forensic science.○ Define forensic science○ Identify questions and concepts that guide scientific investigations.○ Make observations and look for patterns.	<p>How Taught? Teaching activities may include, but are not limited to:</p> <ul style="list-style-type: none">● Students closely read select passages from documents to analyze text structure, development, and consequent meanings.● Teacher provides direct instruction, give feedback, and model critical thinking● Small group and class discussions● Cooperative learning groups● Students to define, use, and connect to content area and based vocabulary● Students analyze video content related to standards that provide a broader global perspective of content.● Design and conduct lab-based investigations that connect content to real-life experiences.● Provide opportunities for out of building excursions (field trips) to provide additional real world application of standards.● Using technology and mathematics to improve investigations and communications.● Utilize data to impact instruction
<p>Materials:</p> <ul style="list-style-type: none">● Forensic textbook● Lab equipment and chemicals● Worksheets● Online platform: Murder at Old Fields● Crime Documentaries● Gradecam/Google Forms● Art supplies● Calculators	<p>How Assessed? Assessments may include, but are not limited to:</p> <ul style="list-style-type: none">● Pre-Assessments (pre-tests, observation, questioning, diagnostics)● Formative Assessments (entry/exit slips, mini analysis assignments, group work, discussions, homework/classwork, self and peer evaluations, checklists, guided notes, observations, quizzes, conferences, rubrics, lesson review questions, lab reports)● Summative Assessments (formal essays, using rubrics; tests/exams, project, evaluation, demonstration, lab practicals) <p>How Re-Taught? Re-teaching activities may include, but are not limited to:</p> <ul style="list-style-type: none">● descriptive feedback on original task/assessment● student examples of expectations● modeling● student self assessments

- manipulatives
- presenting the information again in a different way
- review sessions
- graphic organizers
- small-group instruction
- practice activities
- computer tutorials / programs
- peer tutoring
- breaking down concept into smaller components
- games and hands-on activities
- cooperative learning
- Universal Design for Learning principles offering students opportunities to experience and engage material in new and different ways

Strand: Crime Scene Investigation and Evidence Collection

Learning Standards:

- **ODE Nature of Science:**
 - Scientific knowledge is open to revision in light of new evidence. Science is not static.
 - Science depends on curiosity, imagination, creativity and persistence.
- **Forensics:**
 - Summarize Locard's Principle of Exchange.
 - Identify four examples of trace evidence.
 - Distinguish between direct and circumstantial evidence.
 - Identify the types of professionals who might be present at a crime scene Summarize the seven steps (seven S's) 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 technique in collecting and packaging trace evidence. Explain what it means to map a crime scene.
 - Describe how evidence from a crime scene is analyzed.
 - Formulate and revise explanations and models using logic and scientific evidence (critical thinking).
 - Communicate and support scientific

How Taught?

Teaching activities may include, but are not limited to:

- Students closely read select passages from documents to analyze text structure, development, and consequent meanings.
- Teacher provides direct instruction, give feedback, and model critical thinking
- Small group and class discussions
- Cooperative learning groups
- Students to define, use, and connect to content area and based vocabulary
- Students analyze video content related to standards that provide a broader global perspective of content.
- Design and conduct lab-based investigations that connect content to real-life experiences.
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- Using technology and mathematics to improve investigations and communications.
- Utilize data to impact instruction

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<p>Materials:</p> <ul style="list-style-type: none"> ● Forensic textbook ● Lab equipment and chemicals ● Worksheets ● Online platform: Murder at Old Fields ● Crime Documentaries ● Gradecam/Google Forms ● Art supplies ● Calculators 	<p>How Assessed? Assessments may include, but are not limited to:</p> <ul style="list-style-type: none"> ● Pre-Assessments (pre-tests, observation, questioning, diagnostics) ● Formative Assessments (entry/exit slips, mini analysis assignments, group work, discussions, homework/classwork, self and peer evaluations, checklists, guided notes, observations, quizzes, conferences, rubrics, lesson review questions, lab reports) ● Summative Assessments (formal essays, using rubrics; tests/exams, project, evaluation, demonstration, lab practicals)
	<p>How Re-Taught? Re-teaching activities may include, but are not limited to:</p> <ul style="list-style-type: none"> ● descriptive feedback on original task/assessment ● student examples of expectations ● modeling ● student self assessments ● manipulatives ● presenting the information again in a different way ● review sessions ● graphic organizers ● small-group instruction ● practice activities ● computer tutorials / programs ● peer tutoring ● breaking down concept into smaller components ● games and hands-on activities ● cooperative learning ● Universal Design for Learning principles offering students opportunities to experience and engage material in new and different ways

Strand: Hair and Fibers as Evidence

<p>Learning Standard:</p> <ul style="list-style-type: none"> ● ODE Nature of Science: <ul style="list-style-type: none"> ○ Scientific knowledge is open to revision in light of new evidence. Science is not static. ○ Science depends on curiosity, imagination, creativity and persistence. 	<p>How Taught? Teaching activities may include, but are not limited to:</p> <ul style="list-style-type: none"> ● Students closely read select passages from documents to analyze text structure, development, and consequent meanings. ● Teacher provides direct instruction, give feedback, and model critical thinking ● Small group and class discussions ● Cooperative learning groups
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- **Forensics:**

- 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 broad racial categories.
- Identify and describe common weave patterns of textile samples.
- Compare and contrast various types of fibers through physical and chemical analysis.
- Describe principal characteristics of common fibers used in their identification.
- Apply forensic science techniques to analyze fibers.

- Students to define, use, and connect to content area and based vocabulary
- Students analyze video content related to standards that provide a broader global perspective of content.
- Design and conduct lab-based investigations that connect content to real-life experiences.
- Provide opportunities for out of building excursions (field trips) to provide additional real world application of standards.
- Using technology and mathematics to improve investigations and communications.
- Utilize data to impact instruction

Materials:

- Forensic textbook
- Lab equipment and chemicals
- Worksheets
- Online platform: Murder at Old Fields
- Crime Documentaries
- Gradecam/Google Forms
- Art supplies
- Calculators

How Assessed?

- Pre-Assessments (pre-tests, observation, questioning, diagnostics)
- Formative Assessments (entry/exit slips, mini analysis assignments, group work, discussions, homework/classwork, self and peer evaluations, checklists, guided notes, observations, quizzes, conferences, rubrics, lesson review questions, lab reports)
- Summative Assessments (formal essays, using rubrics; tests/exams, project, evaluation, demonstration, lab practicals)

How Re-Taught?

Re-teaching activities may include, but are not limited to:

- descriptive feedback on original task/assessment
- student examples of expectations
- modeling
- student self assessments
- manipulatives
- presenting the information again in a different way
- review sessions
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Strand: Fingerprints as Evidence

Learning Standard:

- **ODE Nature of Science:**
 - Scientific knowledge is open to revision in light of new evidence. Science is not static.
 - Science depends on curiosity, imagination, creativity and persistence.
- **Forensics:**
 - Outline the history of fingerprinting.
 - Describe the characteristics of fingerprints.
 - Compare and contrast the basic types of fingerprints.
 - Describe how criminals attempt to alter their fingerprints.
 - Present and refute arguments that question fingerprint evidence reliability.
 - Summarize the proper procedures for collecting fingerprint evidence.
 - Describe the latest identification technologies.
 - Determine if a fingerprint is consistent with a fingerprint on record.
 - Lift a latent print.
 - Prepare a ten card and analyze the ridge patterns of the prints.

How Taught?

Teaching activities may include, but are not limited to:

- Students closely read select passages from documents to analyze text structure, development, and consequent meanings.
- Teacher provides direct instruction, give feedback, and model critical thinking
- Small group and class discussions
- Cooperative learning groups
- Students to define, use, and connect to content area and based vocabulary
- Students analyze video content related to standards that provide a broader global perspective of content.
- Design and conduct lab-based investigations that connect content to real-life experiences.
- Provide opportunities for out of building excursions (field trips) to provide additional real world application of standards.
- Using technology and mathematics to improve investigations and communications.
- Utilize data to impact instruction

Materials:

- Forensic textbook

How Assessed?

Assessments may include, but are not limited to:

<ul style="list-style-type: none"> ● Lab equipment and chemicals ● Worksheets ● Online platform: Murder at Old Fields ● Crime Documentaries ● Gradecam/Google Forms ● Art supplies ● Calculators 	<ul style="list-style-type: none"> ● Pre-Assessments (pre-tests, observation, questioning, diagnostics) ● Formative Assessments (entry/exit slips, mini analysis assignments, group work, discussions, homework/classwork, self and peer evaluations, checklists, guided notes, observations, quizzes, conferences, rubrics, lesson review questions, lab reports) ● Summative Assessments (formal essays, using rubrics; tests/exams, project, evaluation, demonstration, lab practicals)
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Strand: DNA Fingerprinting

Learning Standard:

- **ODE Nature of Science:**
 - Scientific knowledge is open to revision in light of new evidence. Science is not static.
 - Science depends on curiosity, imagination, creativity and persistence.

- **Forensics:**
 - Explain how DNA can be important to criminal investigations.
 - Explain how crime-scene evidence is collected for DNA analysis.
 - Describe how crime-scene evidence is processed to obtain DNA.
 - Explain what short tandem repeat (STR) is, and explain its importance to DNA profiling.
 - Explain how law-enforcement agencies compare new DNA evidence to existing DNA evidence.
 - Describe the use of DNA profiling using mtDNA and Y STRs to help identify a person using the DNA of family members.
 - Explain how DNA evidence can be used to incriminate and exonerate suspects/criminals.

How Taught?

- Students closely read select passages from documents to analyze text structure, development, and consequent meanings.
- Teacher provides direct instruction, give feedback, and model critical thinking
- Small group and class discussions
- Cooperative learning groups
- Students to define, use, and connect to content area and based vocabulary
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- Using technology and mathematics to improve investigations and communications.
- Utilize data to impact instruction

Materials:

- Forensic textbook
- Lab equipment and chemicals
- Worksheets
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How Assessed?**Assessments may include, but are not limited to:**

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Strand: Blood and Blood Spatter

Learning Standard:

- **ODE Nature of Science:**
 - Scientific knowledge is open to revision in light of new evidence. Science is not static.
 - Science depends on curiosity, imagination, creativity and persistence.
- **Forensics:**
 - Describe the forensic significance of the different types of blood cells.
 - Summarize the history of the use of blood and blood-spatter analysis in forensics.
 - Outline the procedure used to determine blood type.
 - Describe how to screen for the presence of human blood.
 - Calculate the probability of a person having a specific blood type, using data from population studies.
 - Describe the proper procedures for handling blood evidence.
 - Analyze blood-spatter evidence using angle of impact, area of convergence, and area of origin.
 - Compare and contrast different types of blood-spatter patterns.
 - Describe how different types of blood-spatter patterns are formed.

How Taught?

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