

Lesson Plan Title	Seeing through the Evidence-Analysis of Glass (Chapter Tour, p. 57, <i>Beyond the Blueprint</i>)
Lesson Plan Created by	Mary Anne Butler, CSDE Educational Consultant for Secondary Science
Grades	11-12
Subject	Forensic Science
Content / Content Standards Addressed	D INQ. 4 Design and conduct appropriate types of scientific investigations to answer different questions. D INQ. 7 Assess the reliability of the data that was generated in the investigation. D INQ. 8 Use mathematical operations to analyze and interpret the data, and present relationships between variables in appropriate forms.
Time	90 minutes
Objective(s) of Lesson	Design and conduct an experiment using Archimedes' Principle to determine the density of known sources of glass and use that data to identify the source of an unknown piece of glass.
Required Materials for Lesson / Technology	Electronic balance various glass samples (Pyrex, headlight, tempered, windshield, drinking) Tweezers for handling glass Empty plastic containers (Cool Whip) Water Fishing line, string or fine wire Scissors Calculator Standard glass densities Ring stands (optional)
Initiation (prior knowledge; connections; vocabulary)	Key vocabulary: physical properties, density, Archimedes' Principle, mass, volume, significant figures, certainty in measurement and probative value
Learning Procedures	Assess prior knowledge of density and its usefulness in identification of substances. Review Archimedes' Principle and how it relates to volume. Break out into teams of two for creating a procedure. Conduct the experiment. Whole group sharing of results and analysis. Chapter Tour to set up homework assignment.
Guided Practice	Whole class sharing of data for analysis and identification of any aberrant data. Review process of finding error percentage to assist

	students in the reporting of their results.
Instructional Strategies	Whole group assessment of prior knowledge. Teams of two for experimental design and execution. Individual coaching for teams as needed. Whole class discussion of results and applications.
Closure	Identify situations in forensic science where this technique could be used (insurance fraud, car accident reconstruction, homicide).
Independent Practice	Chapter Tour (Beyond the Blueprint, Section 7, pg. 57) to precede reading assignment for homework: “Properties of Matter and the Analysis of Glass” from <i>Forensic Science an Introduction</i> , Saferstein.
Assessment based on Objectives (informal, formal, formative, summative – essential question)	Formative assessment to provide feedback on experimental design and results.
Interventions (for struggling students)	Provide direct procedural steps Limit samples for evaluation
Enrichment (for gifted students)	Visit “Demonstrations of Physical Properties” at www.intro.chem.okstate.edu/ChemSource/Forensic/forechem8.htm and select a demonstration or technique in the identification of glass to later share with the class (refractive index, temperature effects, fracture analysis).
Connections to Other Subjects	Student will use mathematics to analyze the quality of their results. Students will understand the use of science in answering legal questions.