Performance Assessment—Unit 1.1 and 1.2

What Substance Makes Up My Mystery Object?

Grade 8 Science

Overview
This performance assessment tests student's ability to apply the concepts of mass and volume to calculate density. Students use this characteristic property of matter to help identify the material from which an object is made. Although students are asked to outline their procedure for the performance assessment, they do not design the inquiry. To perform the inquiry, students must use a combination of skills recalled from previous lessons. Students should have access to their science notebooks, texts, and other records of their work. Some items of apparatus are provided to distract students. Students may design their own data table.

Each student is assigned a numbered mystery object and must use the available apparatus to determine the density of the substance from which their object is made. Objects should be different in both composition and size so students must use their own results. Using a chart of known densities of substances, each student must justify a conclusion about the assigned mystery object's composition.

Content Standards
Science GLE 0807.9.2 Explain that matter has properties that are determined by the structure and arrangement of its atoms.
Science 0807.Inq.4 Recognize possible sources of bias and error, alternative explanations, and questions for further exploration.
Science GLE 0807.Inq.5 Communicate scientific understanding using descriptions, explanations, and models.
Science GLE 0807.Inq.2 Use appropriate tools and techniques to gather, organize, analyze, and interpret data.
Learning Outcome: Defend the identification of a substance made by analyzing data about the properties of the substance.

Materials
Graduated cylinders, beakers, ruler, magnifying loupe, electronic balances, water, numbered mystery objects made of aluminum, steel, nylon, or copper

Resources
See STCMS Properties of Matter, Lesson 9, for a complete description of this assessment.

Assessment Rubric

Criteria	Advanced	Proficient	Below standard
Procedure	Correct outline of method includes measuring volume by displacement and mass, and using the correct apparatus	Recognizes need to measure mass and volume but method is uncertain	Does not recognize need to measure both mass and volume
Data	Measures mass and volume accurately, using the correct units	Measures mass and volume but has some error	Does not measure both mass and volume
Calculation	Uses the correct formula and math in calculation; uses the correct units	Uses the correct formula but has some error in calculation or units	Does not make a correct calculation
Conclusion	Logical presentation of results and application of knowledge leads to a correct identification of the substance	Identification of the substance is correct, but the justification is inadequate	Identification is not correct