

How do you know the **identity** of something? How do we ever **know** what we have? I found a coin at a flea market: **real or fake?**

1. Research tests and possible outcomes; research the coin itself.
 - a. Contextualize this investigation in some of the chemistry and economics of coins. Consider beginning to address analysis questions below.
 - b. Create a series of 3 tests to determine the authenticity of the metal currency.
 - c. For each test, describe the possible outcomes.
 - d. For each outcome, explain what it would indicate and why (chemically) it would indicate a specific metal or group of metals.
2. Develop a hypothesis, grounded and evidenced by research, predicted that your coin is real or fake, the tests.
3. Create a step-by-step procedure for your tests.
4. *Conduct your analyses!*
5. Present your data clearly and understandably, in a way that not only communicates that you understand your data and how to share it but also allows the reader to better understand your investigation, results, and conclusions.
6. Analyze data, discussing experimental error, considering follow-up studies, and most importantly, relating back to the hypothesis. In this discussion, specifically address:
 - a. Do these tests prove that your coin is silver?
 - b. Is your item more valuable as a coin or as the molten metal? Why would that be?
 - c. What makes some metals or materials more or less valuable? How are the values of 2 different items compared?



Begin sketching out some ideas here! Woo-hoo!

Your work will be assessed according to rubric →

	Emerging	Developing	Proficient	Advanced
Background: <i>Support the Hypothesis & Analyze the Issue</i> [Adapted from ISSN Standard SCI9-10.INV2.SOURC]	Gathers background information from a limited number of sources (1-2) and begins to analyze these sources	Gathers background information from a variety of sources (2-3) and compares and analyzes it, with results beginning to support the hypothesis	Gathers relevant background information from a variety of sources (2-3) and compares and analyzes it, providing support for most issues raised by the hypothesis	Gathers relevant background information from a variety of sources (3-4) and compares, analyzes, and evaluates it, providing clear support for the hypothesis
Hypothesis: <i>Predict & Describe</i> [Adapted from ISSN Standard SCI9-10.INV1.QUSTN]	Raises questions about a science issue, but the hypothesis is missing or it neither presents a prediction about the coin's validity nor presents the tests or outcomes related to the coin	Formulates questions about a significant science issue, beginning to explain the purpose of the study and presents some tests and outcomes related to the coin OR presents a prediction about the coin's validity	Formulates questions about a significant science issue through a clearly constructed hypothesis , explaining the purpose of the study , a prediction about the coin's validity, and the tests and outcomes related to the coin	Formulates and refines questions about a significant science issue through a clearly constructed, specific, and focused hypothesis , explaining the purpose of the study , a prediction about the coin's validity, the tests and anticipated outcomes that would either support or fail to support the validity of the coin, and other any other important parameters
Procedures: <i>Experimental Design</i> [Adapted from ISSN Standard SCI9-10.INV4.XPRMT]	Designs an experiment that is related to the stated hypothesis	Designs an experiment that is related to the stated hypothesis, testing the range of outcomes	Designs an experiment that is relevant to the stated hypothesis, and partially, testing the range of outcomes ; the explanation of the procedure allows for replication by other scientists (including necessary materials, constants, and other important parameters)	Designs an experiment that offers a detailed method for investigating and testing the hypothesis , using appropriate technology, testing the range of outcomes ; the explanation of the procedure allows for replication by other scientists (including necessary materials, constants, and other important parameters)
Data: <i>Raw and Charted</i> [Adapted from ISSN Standard SCI9-10.COMM2.VSULS]	Presents data with visual representations, demonstrating a basic understanding of the science issue and experiment OR display of data partially follows the conventions of scientific communication (i.e. appropriate formatting, labels, units, etc.)	Presents data with visual representations that mostly support explanation of science issue and experiment AND display of data follows most conventions of scientific communication (i.e. appropriate formatting, labels, units, etc.)	Presents data with visual representations that support explanation of the science issue and experiment AND research presentation follows most conventions of scientific communication (i.e. appropriate formatting, labels, units, etc.)	Presents data with visual representations that enhance understanding of the science issue and experiment AND research presentation applies most conventions of scientific communication (i.e. appropriate formatting, labels, units, etc.) to express ideas and learning
Analysis: <i>Process and Describe Data AND Conclude</i> [Adapted from ISSN Standard SCI9-10.PERS2.DATA]	Organizes and restates experimental data, begins to identify patterns, refers to given questions, and refers back to the hypothesis	Identifies patterns or relationships in the data (specifically, explaining the effects of the tests on the coin and their implications, supported by research) with limited mathematical analysis and few errors, identifies and discusses experimental error, refers to given questions, refers to hypothesis	Analyzes patterns and relationships in the data (specifically, explaining and beginning to interpret the effects of the tests on the coin and their implications, supported by research) with mostly correct mathematical analysis, identifies and interprets experimental error, presents responses and justifications of the given questions, begins to consider follow-up studies, and concludes by evaluating hypothesis	Evaluates patterns and relationships in the data (specifically, explaining and interpreting the effects of the tests on the coin and their implications, supported by research) with mathematical analysis, identifies and interprets experimental error, presents responses and thorough, evidenced justifications of the given questions, considers follow-up studies, and concludes by evaluating hypothesis based on evidence from data