

November 15

Mr. Clint Kiewel  
Director of Materials Testing  
CheMystery Labs, Inc.  
920 N. Capital  
Mitchell, SD 57301

Dear Sir,

In our research for creating a new type of glaze for our ceramic pottery, we have run into a problem. We have tried using a variety of compounds to develop a fixative for the glaze but have failed to find one that meets our criteria.

The compound in the fixative must be transparent when it dissolves and clear/white when it dries so that it will not affect the other colors in the glaze. Next, the compound must have a high melting point for the kiln firing. We would like the fixative to dissolve in water but not in alcohol. Finally, the compound must be electrically conductive when it is dissolved in distilled water. It does not matter whether the fixative is an ionic or covalent material. We have sent four materials for your study labeled A, B, C, and D. You should determine which of these substances are ionic and which are covalent and recommend which will best fit our criteria.

Sincerely,

*Kathleen Sylva*

Kathleen Sylva  
Head Researcher  
Ceramic Artisans

## Memorandum

Date: Dec. 1  
To: Lab Teams  
From: Kiewel

This company is on the cutting edge of new artistic ceramics materials. If we succeed in doing well on this contract, others could follow.

Upon completion of the lab, you should have a good idea of the general properties of the four substances with regards to 1)odor, 2)melting point, 3)hardness, and 4)conductivity. Read the letter carefully and follow all safety rules. KEEP the ethanol AWAY from flames.

This project requires that you make a letter/report that includes the following:

- 1) Paragraph summarizing your procedure
- 2) Data table
- 3) Conclusion/recommendation
- 4) Invoice

## Materials Cost

### Required items:

Lab space	\$15,000/day
Disposal fee	\$2000/g
Bunsen Burner and related equipment	\$5000

### Chemicals and optional equipment:

Ethanol	\$1000/ml
Substance A	\$1000/g
Substance B	\$1000/ml
Substance C	\$1000/g
Substance D	\$1000/g
Beakers/Flasks	\$1000/each
Graduated Cylinder	\$1000
Conductivity Apparatus	\$5000
Stirring rod	\$1000
Test tubes/Rack	\$2000
Spatula/Spoon	\$500
OSHA fines	\$2000/incident