

# **Kit #19**

# **“Polly Mers”**

## **Student Journal**

**"The Strange (Fictional) Case of Dr. Polly Mers"**

This is a long and complicated mystery, but for our purposes we will give only the details that are most important. Dr. Polly Mers was an extraordinary chemist involved in materials research. She was as eccentric as she was brilliant.

Dr. Mers had many rules about research in her lab. For instance, she only put water in her graduated cylinders because she didn't want to stain them with the strange substances she was using. She was also afraid other people would steal her ideas and secret formulas, so she wrote all her notes in code, referring to her chemicals by such names as substance "X." She *did*, however, *always refer to water by name*.

Her colleagues were not overly concerned when Dr. Mers failed to appear at her lab one day. However, when her absence stretched to a week, her superiors finally entered the lab. What they found was a note, in Dr. Mers' handwriting:

*I have done all the work I can in this lab for now. I must continue my research in the jungles of Peru. As you can see, I have found some very interesting stuff. Only I know the secrets hidden here.*

*Dr. Polly Mers*

Sitting on Dr. Mers' table were three strange substances. They were labeled "Oobleck," "Polly Putty I," and "Polly Putty Too."

There were also several common materials sitting nearby:

- **Liquid Starch**
- **Elmer's Glue**
- **Liquid Borax**
- **Corn Starch**
- **Food Coloring**
- **Water**

Lastly, there were three sheets listing formulas for the mystery substances. The three sheets are summarized on the attached chart.

Our job today is to find the complete formulas for Dr. Mers' substances.

**Remember:**            **Only use water in the graduated cylinders!**

**Polly Mers Worksheet**

<p><b>Dr. Mers' Partial Formula (plus Our Groups' Plan)</b></p>	<p><b>Dr. Mers' Complete Formula (as discovered by Our Class)</b></p>
<p><b><u>"Oobleck"</u></b>                      Dr. Mers' notes say: <i>To make Oobleck: Place one ounce cup of powder "W" in larger cup. Mix with water containing one drop of green food coloring.</i></p> <p>Your job is to determine how much water to mix with which common material. She gives us a big clue as to which material to use. Write your group's plan below:</p>	
<p><b><u>"Polly Putty I"</u></b>                      Dr. Mers' notes say: <i>To make Polly Putty I mix two parts "X" with one part "Y." Add "Y" slowly to "X" while stirring until desired consistency is reached. Almost no liquid is left over!</i></p> <p>We know how much, but we don't know which materials to use. Write your group's plan on how <b>THE WHOLE CLASS</b> can work together to discover Dr. Mers' formula.</p>	
<p><b><u>"Polly Putty Too"</u></b>                      Dr. Mers' notes say: <i>To make Polly Putty Too add two drops of food coloring to 25 ml of substance "X." Then add 20 ml of water to the colored substance "X" and mix thoroughly. Add 15 ml of substance "Z" to this mixture. Stir and discard any remaining liquid. Knead for a few minutes. What interesting stuff this is!</i></p> <p>This should be easy! Write your group's plan for making Dr. Mers' Polly Putty Too. Remember---only water in graduated cylinders!</p>	