**Polishing Pennies**

**Standards and skills:**

3.1f Objects and/or materials can be sorted or classified according to their properties.

\*Constructing explanation and designing solutions -- Early in their science education, students need opportunities to engage in constructing and critiquing explanations. They should be encouraged to develop explanations of what they observe when conducting their own investigations and to evaluate their own and others’ explanations for consistency with the evidence.

**Deep Understandings**?

Students **apply** scientific thinking to understanding that objects have properties and these properties can be used to “polish” a penny. Some liquids are acidic, some are basic, and some are neutral.

Students will **conduct** an investigation, record and analyze results

Students will **reflect** on new learning and **compare** to prediction

**Materials Monica will bring: Teacher Materials**

Pennies Name Tags

Lemon Juice

Milk

Cola

Petri Dishes

Packets

Pipettes

**Polishing Pennies**

Introduction: Scientists and inventors must keep good records of the experiments they conduct. This helps them keep track of what they do and what happens. If they discover something new, they can go back to look at what they did and try it again! They also use the records to help them change and improve the experiment if something does not work.

Before beginning an experiment, scientists have a hypothesis, or idea, about what will happen. In this experiment, you will try to polish old pennies using

1. Lemon juice , Milk , Cola, WaterCola

Make a hypothesis, or guess, about how each liquid will work.

Write your prediction in the red circle…

I think lemon juice, milk, cola or water will polish the penny.

**Experiment:**

…Now you are ready to test your hypothesis. To conduct the experiment, you will need:

1. Four (4) Petri dishes
2. Lemon juice
3. Milk
4. Cola
5. Water -- control
6. Four (4) tarnished pennies

Follow these steps to find out what happens when you try to polish a penny with different liquids.

1. Before you conduct your experiment, write down what each penny looks like in the “Before” blanks below.
2. Put about an inch of one of the liquids in each cup or glass.
3. Drop a tarnished penny into each glass.
4. Let the pennies sit in the liquids for about 5 minutes.
5. Remove each penny from the liquid.
6. Examine each penny for changes and record what you see in the “After” blanks below.

Record in the yellow circle.

Discuss while completing experiment.

Write results in the green circle and explain results

(compare prediction to what actually happened)

**Extension and Explanation:**

As you learned in this experiment, some liquids polish pennies better than others. Liquids that are good polishers are acids. Liquids that don’t work so well are bases. Acids taste sour, while bases taste bitter and feel slippery. Acids also react with some metals to give off hydrogen gas. This is what happens when you drop a penny into an acid. When the metal and acid react, they give off hydrogen which polishes the penny!

|  |  |
| --- | --- |
| You probably have many acids and bases around your home or classroom. Here are a few examples: **Acids** | **Bases** |
| Lemon juice | Dish soap |
| Orange juice | Baking soda |
| Vinegar | Milk of magnesia |
| ` | |

**Stop and Think:** ***Predict what will happen:***

* What do you already know about this topic?
* What is your prediction or hypothesis of what will happen or what will occur and WHY?

**Observe Carefully: *Use your senses to be aware of what is going on and record your data.***

* Observe what is happening
* Collect, record, and interpret your data (information you gather from your senses)
* Measure
* Make inferences (statement to explain the observations)
* Manipulate and/or use numbers and formula’s if necessary
* Replicate (repeat) when possible

**Go right ahead:** ***Make a conclusion based on what you know and what you have observed.***

* Interpret your data by analyzing the information you have collected and describing what occurred and why
* Identifying variables: characteristics of objects or events that stay the same (control) or change (variable)
* Compare what you thought would happened to what actually happened and explain your results
* Communicate your findings either visually or with a presentation

Make a prediction or hypothesis, about what liquid will polish the penny.

I predict \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will polish the

penny because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Observations:**

|  |  |  |
| --- | --- | --- |
| **Liquid** | **Before** | **After** |
| Lemon Juice |  |  |
| Milk |  |  |
| Cola |  |  |
| Water |  |  |

My prediction was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because