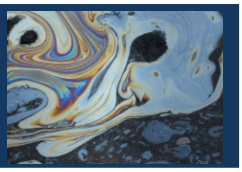
Welcome to MI Kids!



Grade 1-3

Dear Parent/Guardian:
Thank you for your interest in MI Kids!

These activities are a great way to encourage your child's curiosity and interest in science.

In the upcoming MI Kids event, your child will explore the scientific method while experimenting with solubility.

Have you ever wondered if permanent markers are really permanent? We will discuss the solubility of ink, and experiment with different solvents to see if we can dissolve "permanent" ink.

We'll use the scientific method -- question, hypothesis, experiment, analysis, conclusion, communication -- to come up with an answer.

No matter what your young scientist is trying to learn, using the scientific method can help them come up with an answer.

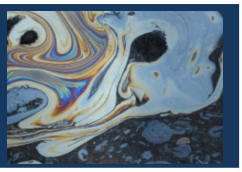
If you'd like to delve a little deeper into how scientists think, here are some great books to enjoy with your child:
https://www.readbrightly.com/books-teach-about-scientist-habits/

Looking forward to seeing you soon!

- The MI Kids Team

Grade 1-3

Solubility



Have you ever gotten ink on your hands or clothes and wondered how to remove the stain? Some inks, like watercolors, are easy to wash off. Others, like permanent markers or Sharpies, are much tougher. Why is that? It's because of the ink's **solubility**. Solubility means how easy it is for something to **dissolve**, or mix into a liquid. Have you ever made lemonade? When you stir the sugar into the mixture of lemon juice and water, does the sugar seem to disappear? That's because the sugar is soluble in water. The reason you can't just rinse permanent marker off your hands is because the ink is **insoluble** -- not able to dissolve -- in water. But are there other liquids that will dissolve permanent marker? *Are permanent markers really permanent?* We are going to use the **scientific method** to try to answer that question.

The scientific method is a process for doing experiments to answer questions. Here are the steps in the scientific method:

1. Ask a **question**.
2. Make a prediction, also called a **hypothesis**.
3. Test your hypothesis with **experiments**.
4. Gather **data**, or useful information, based on your experiments.
5. Analyze your data.
6. Draw **conclusions.**
7. Communicate your **results**.

Activity: Sharpie Solubility Experiment

- What question are we trying to answer? *(Are permanent markers really permanent?)*
- Based on your observations, what is your prediction or hypothesis? *(Sharpie ink will not dissolve in water, but maybe in a different liquid.)*
- Let's see if Sharpie ink will dissolve in vinegar or rubbing alcohol.
- Draw circles in different colors in the center of 3 coffee filters.
- Fold the coffee filters in half, and then in half again.
- Gently place 1 coffee filter in each cup, and wait about 10 minutes.
- What do you observe? Which liquid is dissolving the Sharpie ink?
- Write or draw your results on your lab sheet.
- What do you conclude from the experiment?
- Communicate your results and conclusions to your fellow students...were their results and conclusions similar?

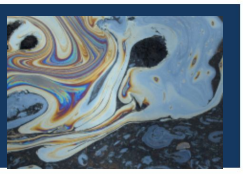
Materials for Each Student

- 3 Sharpie markers
- 3 small plastic cups labeled water, vinegar and alcohol
- 3 coffee filters
- white vinegar
- rubbing alcohol
- Water
- Student lab sheet

The MI Connection: All living things need clean water to survive and thrive. Sometimes harmful chemicals pollute water, and scientists help to clean it up. To clean up the pollutants, scientists need to know whether the chemicals are soluble or insoluble in water. At Microbial Insights, the scientists in our lab work with other scientists to find the best ways to clean up the chemicals and make sure that water is safe for people, animals, and plants.

Solubility

Grade 1-3



Student Lab Sheet

You will use the **scientific method** to find out if permanent markers are really permanent, or if there is some liquid that will **dissolve** the ink.

1. **QUESTION:** Are permanent markers really permanent? Will vinegar, rubbing alcohol, or water dissolve the ink?

2. **PREDICTION/HYPOTHESIS): Circle your choice(s)**
   - A. Vinegar will dissolve the ink.
   - B. Rubbing alcohol will dissolve the ink.
   - C. Water will dissolve the ink.

3. **DRAW YOUR RESULTS:**

Vinegar

Rubbing Alcohol

Water

4. **WHAT IS YOUR CONCLUSION?**
   - A. Vinegar dissolved the ink.
   - B. Rubbing alcohol dissolved the ink.
   - C. Water dissolved the ink.

Are permanent markers really permanent? Circle one: YES or NO

5. **Communicate your results and conclusions to your fellow students. Were their results and conclusions similar?**