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Goldenrod Paper

SM-925

Our goldenrod paper is colored with a dye which is an acid-base indicator. It turns bright red in bases (e.g., solutions of ammonia, baking soda or washing soda) and golden-yellow in acids (e.g., vinegar or lemon juice).

Try these demonstrations:

- With a Q-Tip®, write a message on the paper with household ammonia. As the ammonia evaporates, the red message will disappear.
- To write a permanent message, use a base such as a baking soda or washing soda solution. The message remains.
- With a candle or wax crayon, write an invisible message on the paper, and then spray the paper with a basic solution to see the message.
- Use goldenrod paper to classify safe household products as acidic or basic.
- Use goldenrod indicator paper to test for acids and bases.



Suggested Activity:

For over 150 years, litmus paper has been used to test the acidity of a solution. In this activity, your students will experiment with both litmus paper and goldenrod paper to create their own acid-base indicator chart.

Before class, prepare blue litmus paper by soaking the red paper in a weak basic solution such as baking soda (NaHCO_3). Let the paper dry.

In class, provide students with vinegar, baking soda solution, a sheet of goldenrod paper, a few pieces of red and blue litmus paper and the data from the litmus paper chart on the next page. Encourage them to see what happens to the paper when they apply a basic or acidic solution.



Suggested Activity

continued

	Basic Solution	Acidic Solution	Neutral Solution
<i>Red Litmus Paper</i>	turns blue	stays red	stays red
<i>Blue Litmus Paper</i>	stays blue	turns red	stays blue

Challenge students to prepare a similar acid-base indicator chart for goldenrod paper.

When they finish, compare their answers to the chart below.

	Basic Solution	Acidic Solution	Neutral Solution
<i>Yellow Goldenrod Paper</i>	turns red	stays yellow	stays yellow
<i>Red Goldenrod Paper</i>	stays red	turns yellow	stays red

Additional Activity Ideas:

Color-changing goldenrod paper has always been made with a dye that, when exposed to a base, changes from bright yellow to blood red. The student can use the Goldenrod Paper in an investigation about acids and bases.

The Goldenrod Paper can be used as indicator paper. By applying bases and then acids, students can make observations and gather evidence. It will also produce inverse reactions, when an acid is applied to the red area of the paper.

The Goldenrod Paper is to be used with the Goldenrod Electrochemistry Kit. Goldenrod paper, salt water and a little electricity make a really stunning demonstration of electrochemistry. Each sheet is useful for one lab. It can be dried and used again, but best results are with a fresh sheet.



NGSS Correlations

Our Goldenrod Paper and these lesson ideas will support your students' understanding of these Next Generation Science Standards (NGSS):

Elementary

PS1-1

The student can use the Goldenrod Paper in an investigation to plan, and conduct an investigation to describe and classify different kinds of materials by their observable properties.

5-PS1-1

The student can use the Goldenrod Paper in an investigation to develop a model to describe that matter is made of particles too small to be seen.

5-PS1-3

The student can use the Goldenrod Paper in an investigation to make observations and measurements to identify materials based on their properties.

Middle School

MS-PS1-1

The student can use the Goldenrod Paper in an investigation to develop models to describe the atomic composition of simple molecules and extended structures.

MS-PS1-4

The student can use the Goldenrod Paper in an investigation to Electrochemistry Kit to develop a model that products and describes changes in particle motion, temperature, and a state of a pure substance when thermal energy is added or removed.

MS-ETS1-4

The student can use the Goldenrod Paper to develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

High School

HS-PS1-1

The student can use the Goldenrod Paper in an investigation with the periodic table as a model to predict the relative properties of elements based on the patterns of the electrons in the outermost energy level of atoms.

HS-PS1-3

The student can use the Goldenrod Paper to plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-PS2-6

The student can use the Goldenrod Paper in an investigation to communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

HS-PS3-5

The student can use the Goldenrod Paper in an investigation to develop and use a model of two objects interacting through electric fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.

HS-ETS1-2

The student can use the Goldenrod Paper in an investigation to design a solution by breaking it down into smaller, more manageable problems that can be solved through engineering.

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Take Your Lesson Further

As science teachers ourselves, we know how much effort goes into preparing lessons. For us, *"Teachers Serving Teachers"* isn't just a slogan—it's our promise to you!

Please visit our website
for more lesson ideas:

www.TeacherSource.com

Check our blog for classroom-tested
teaching plans on dozens of topics:

<http://blog.TeacherSource.com>

To extend your lesson, consider these Educational Innovations products:

Goldenrod Electrochemistry Kit (OHM-380)



You already know that our goldenrod paper is a dramatic acid/base indicator, but did you know you can make it turn red using just salt water and electricity? With this simple, safe, easy-to-use add-on kit, you can use your goldenrod to explore the fascinating world of electrochemistry—just add foil, table salt, and water! (Goldenrod paper not included).

Red Cabbage Extract (IND-100)

A safe and easy universal acid/base indicator. As the pH of a solution increases, red cabbage juice changes gradually from red to green. By matching the color of the solution to the included chart, the pH of a solution can be determined. Safer than phenolphthalein. This 20 gram bottle of powdered extract is enough to prepare five gallons of indicator solution!



Chromatography Filter Paper (FIL-309)



Did you know that the black ink in your markers is not actually black ink? Our chromatography discs allow students to separate most water-soluble inks into their original blended pigments, revealing their hidden identities. Simply make several dots or lines of different colors in the center of the disc using water-soluble markers. Water from a cup is drawn up to the center of a disc using a paper towel. As the water is absorbed into the filter disc the pigments separate into a colorful display.

The Ultimate Paper Sample Pack (SM-575)

What dissolves in water? Reacts to fluctuations in temperature? Changes color in the presence of acids and bases? The answer is our Ultimate Paper Sample Pack! We're offering three unique types of paper in a single kit that will turn your classroom into a learning showcase for dozens of hands-on learning and discrepant events. This sample pack includes eight sheets apiece of Color-Changing Goldenrod Paper (SM-925), Dissolving Paper (SM-510), and Heat-Sensitive Paper (HEA-200).

