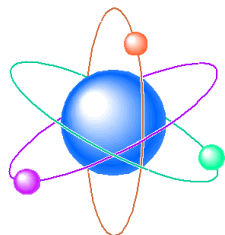


SCIENCE SOLUTIONS



*Quality workshops that will make a difference in the way you teach science
and more importantly, the education of your students!*

Angie Kornele

P.O. Box 669 Natalia, Texas 78059
(830)665-5830 (210)859-7920

Science.Solutions@yahoo.com

I am proud to be a presenter for the Texas Gifted and Talented Association at their 30th Annual Professional Development Conference for educators and parents *Gifted Students: Carrying the Torch of Excellence*.

There are movements to improve the current system of American science, technology, engineering, and mathematics education (often abbreviated as STEM). Despite the spread of such movements, the vast majority of the nation's annual supply of new teachers graduate from more traditional programs that offer less rigorous instruction in science and math. For them, and for the more than 3 million teachers already in the K-12 workforce, learning more math and science means in-service professional development or a graduate degree. That is tough due to the time constraints of teachers, as well as the fact that most teach more than one subject.

As the parent of three gifted children and one very ordinary child, and as an educator in various capacities over the years, I recognize the challenges of education today. I hope to share some new ideas and resources, as well as some of the facts about the state of science in America.

I will be presenting the following sessions:

***"How Did You Do That?!" - Presenting Demonstrations
And Hands-on Activities***

The Power of Polymers

Real World Connections: Science, Technology and Society.

Hope to see you there!
Angie Kornele



Angie
Kornele

Reinforcing the proven facts!

Initially, resisting the administration's directive, this very hands-on proponent of "do" versus "say", Angie Kornele rediscovered the positive and fun ways into the inquisitive nature of children, as well as teachers themselves. The first reaction of being told, "I need you in a testable grade," brought sheer panic into Angie, a Reading Specialist by trade. After several years of spills and mishaps, tried and true experiments, and just plain ol' messin' 'round, Angie has encouraged both girls and boys to **LEARN** - to be **motivated**, to provide **content and subject matter**, to **explore**, to **apply** - to **build that real world experience with a lesson**, and . . . **viola!** Now, Angie is teaching people to be amazing by providing them with products and innovations that are educational, entertaining, and inspire the imagination. And, by working with **Steve Spangler** . . . make that **WOW factor** . . . **unforgettable!**

Under the tutelage of **Steve Spangler**, nationally known motivational speaker, Emmy-award winning host of NBC television's News for Kids, and Denver television host, Angie is offering to share her experiences and activities with other teachers, whom she hopes will share a desire to make a difference just as she does. Her fast-paced presentations are filled with her trademark high-energy enthusiasm and how-to techniques that are guaranteed to get the creative ideas flowing!

(Nope, not Angie, but close . . .)



Welcome to Science Solutions - your guide to increasing your students' potential!

Learning objectives:

- *Hands-on science does not always equal hands-on learning.
- *Children need to discover the lost art of wondering through guided inquiry and questioning.
- *The purpose of a presentation is to enthrall a child's attention and stimulate further inquiry.
- *When appropriately designed, hands-on activities provide children with the essential tools to discover something "new" on their own.
- *Never miscalculate the power of presentation.
- *Demonstrate, captivate, motivate, and stimulate further inquiry.

Why science demonstrations are so important . . .

We, as teachers, ask students to write about so many things children have never encountered. To write about an elephant when the only exposure to the five-toed mammal with the prehensile tusk is to have watched *Dumbo* is a daunting task for students. A common goal among science teachers today is to arouse the students' curiosity and peak their interest in science. Undoubtedly, more and more teachers are turning to science demonstrations and hands-on activities as a way to reach this goal. Why are demonstrations and hands-on activities the answer? These teaching tools give students the chance to experiment, explore, and ask questions on their own. Science gives children the means by which to explain remarkable events that take place in their daily lives. Teachers can take advantage of a child's curious nature by demonstrating an unusual phenomena, and then by asking the student to come up with a clarification. Science demonstration not only exemplify key concepts, but also provide an avenue for further inquiry.

Color Changing Milk

It's an explosion of color! Some really cool things happen when you mix a little milk, food coloring, and a drop of liquid soap! This activity uses common items found around the house. You can use the experiment to amaze your friends and uncover the scientific secrets of soap!

Materials:

- * Milk
- * Aluminum pie plate
- * Food coloring (red, yellow, green, blue)
- * Dish-washing soap (Regular blue Dawn works well)
- * Cotton swabs

Directions:

1. Pour enough milk in the pie pan to completely cover the bottom and allow it to settle.
2. Add one drop of each of the four colors of food coloring - red, yellow, blue, and green - to the milk. Keep the drops close together in the center of the pan of milk.
3. Use a clean cotton swab (duh!) for the next part of the experiment. Predict what will happen when you touch the tip of the cotton swab to the center of the milk. It's important not to stir the mix just touch it with the tip of the cotton swab!
4. Place a drop of liquid dish soap on the tip of the cotton swab. Place the soapy end of the cotton swab back in the middle of the milk and hold it there for 10 to 15 seconds. Look at that burst of color! Your own fireworks show in a pan - mini-explosions of color!
5. Add another drop of soap to the tip to the cotton swab and try it again. Experiment with placing the cotton swab at different places in the milk. Observe that the colors in the milk continue to move even when the cotton swab is removed. What makes the food coloring in the milk move?

Explanation:

Milk is mostly water but it also contains vitamins, minerals, proteins, and tiny droplets of fat suspended in solution. Fats and proteins are sensitive to changes in the surrounding solution (the milk).

When you add soap, the weak chemical bonds that hold the proteins in solution are changed. It's a free for all! The molecules of protein and fat bend, roll, twist, and contort in all directions. The food color molecules are bumped and shoved everywhere, providing an easy way to observe all the invisible activity. At the same time, soap molecules combine to form a micelle, or cluster of soap molecules. These micelles dispense the fat in the milk.

This briskly mixing fat and soap causes swirling and churning where a micelle meets a fat droplet. When there are micelles and fat droplets everywhere the motion stops, but not until after you've enjoyed the demonstration!

There's another reason the colors burst the way they do. Because milk is mostly water, it has surface tension like water. The drops of food coloring floating on the surface tend to stay put. Liquid soap wrecks the surface tension by breaking the cohesive bonds between water molecules and allowing the colors to punch throughout the milk.

Repeat the experiment using water in place of milk. Will you get the same eruption of color? Why or why not? What kind of milk produces the best swirling of color: skim, 1%, 2%, or whole milk? Why?

Additional Info

Detergent, because of its bipolar personality (hydrophilic on one end and hydrophobic on the other), weakens the milk's bonds by attaching to its fat molecules. The detergent's hydrophilic end dissolves in water and its water-fearing end attaches to a fat globule in the milk.

The Magic Can

With this demonstration, you will reinforce the concept of air pressure - the pushing force of air. The closer you are to Earth, the greater the air pressure. The farther away from Earth (in other words, the higher your altitude), less air pressure is in effect. Pressure is coming from all directions, so be on the lookout!

Materials:

- *Small coffee can with plastic lid
- *Hammer and a nail
- *Water

You will need an adult's help with the first part!

Directions:

1. Punch 3 small holes in the bottom of the coffee can, and one in the in the plastic lid.
2. Fill the coffee can half full with water, and put the lid on securely.
3. Place your hand over the hole and press down on the lid. Notice how the water streams out of the holes on the bottom because of the pressure you are exerting on the lid! Cool!
4. Slowly stop applying pressure to the lid. Check out how the stream of water stops. You can stop and start the flow of water simply by removing your finger from the hole. Now is the time to hand the can to your adult . . .

Explanation:

When you filled the can only half full with water, you also filled the top with air! Pressure on the lid exerted pressure on this air, which in turn, exerted pressure on the water forcing it out of the can. When you stop pressing on the lid, and leave your finger over the hole, the pressure of the air *outside* the can holds the water *up* from the bottom. Teamwork is so terrific!

Polymer Power!

Is it a solid? Is it a liquid? Just what is this slimy, stringy, rubbery stuff? This variation on slime will probably remind you of a similar substance found in many toy stores. This is the most popular version of "slime" among teachers because it's so easy to make and serves as a great visual tool for introducing students to the properties of polymers.

Materials:

- *Elmer's Glue® (8 oz. bottle of Elmer's Glue-All)
- *Borax (a powdered detergent)
- *Mixing bowl
- *8oz. Plastic cup
- *Spoon
- *Measuring cup
- *Food coloring (the spice of life)
- *Water
- *Paper towel (hey, you've got to clean up!)
- *Zip-lock bag (don't you want to keep it when you're done?)
- *Water

Directions:

This is the easiest way to make a batch of Elmer's Slime. The measurements do not have to be exact but it's a good idea to start with the proportions listed below. Once you've got the hang of it, then just vary the quantities of each ingredient to get a new and interesting batch of goop.

This recipe is based on using a brand new 8 ounce bottle of Elmer's Glue. Empty the entire bottle of glue into a mixing bowl. Fill the empty bottle with warm water and shake (okay, put the lid on first and then shake !). Pour the glue/water mixture into the mixing bowl, grab your spoon and mix well! Go ahead... add a drop or two of food coloring!

Measure 1/2 cup of warm water into the plastic cup and add a teaspoon of Borax powder to the water. Stir the solution - don't worry if all of the powder dissolves. This Borax solution is the secret linking agent that causes

the Elmer's Glue molecules to twist into slime.

While stirring the glue in the mixing bowl, slowly add a little of the Borax solution. Immediately you'll feel the long strands of molecules starting to connect. It's time to abandon the spoon and use your hands to do the serious mixing. Keep adding the Borax solution to the glue mixture (don't stop mixing) until you get a perfect batch of Elmer's slime. You might like your slime more stringy while others like firm slime. Hey, you're the head slime mixologist - do it your way!

When you're completed playing with your Elmer's slime, seal it up in a zip-lock bag for safety.

How does it work?

The mixture of Elmer's Glue with Borax and water produces a putty-like material called a polymer. In simplest terms, a polymer is a long chain of molecules. You can use the example of cooking spaghetti to better understand why this polymer behaves in the way it does. When a pile of freshly cooked spaghetti comes out of the hot water and into the bowl, the strands flow like a liquid from the pan to the bowl. This is because the spaghetti strands are slippery and slide over one another. After awhile, the water drains off of the pasta, the strands start to stick together. The spaghetti takes on a rubbery quality. Wait a little while longer for all of the water to evaporate, and the pile of spaghetti turns into a solid mass -- drop it on the floor and watch it bounce. Many natural and synthetic polymers act in a similar manner. Polymers are made out of long strands of molecules like spaghetti. If the long molecules slide past each other easily, then the substance acts like a liquid because the molecules flow. If the molecules stick together at a few places along the strand, then the substance behaves like a rubbery solid called an elastomer. Borax is the compound that is responsible for hooking the glue's molecules together to form the putty-like material. There are several different methods for making this putty-like material. Some recipes call for liquid starch instead of Borax soap. Either way, when you make this homemade Silly Putty you are learning about some of the properties of polymers.

Additional Info

Jeff Harken contributed this "history" of Silly Putty.

The history of silly putty is quite amusing. In 1943 James Wright, an engineer, was attempting to create a synthetic rubber. He was unable to achieve the properties he was looking for and put his creation (later to be called silly putty) on the shelf as a failure. A few years later, a salesman for the Dow Corning Corporation was using the putty to entertain some customers. One of his customers became intrigued with the putty and saw that it had potential as a new toy. In 1957, after being endorsed on the "Howdy Doody Show", silly putty became a toy fad. Recently new uses such as a grip strengthener and as an art medium have been developed. Silly Putty even went into space on the Apollo 8 mission. The polymers in silly putty have covalent bonds within the molecules, but hydrogen bonds between the molecules. The hydrogen bonds are easily broken. When small amounts of stress are slowly applied to the putty, only a few bonds are broken and the putty "flows". When larger amounts of stress are applied quickly, there are many hydrogen bonds that break, causing the putty to break or tear.

Elmer's Slime is very easy to make, but it's not exactly what you'll find at the toy or department store. So, what's the "real" slime secret? It's an ingredient called [polyvinyl alcohol \(PVA\)](#). The cross-linking agent is still Borax, but the resulting slime is longer lasting, more transparent... it's the real deal!