

## BARGAIN BAG SCIENCE

(Presented by Jennifer Williams and Sandra Cvitanovic)  
NSTA Conference – April 2006

These are some cheap and easy science projects that I picked up from the NSTA Science Conference. The prices and everything are listed. Enjoy!!! ☺

Eldon

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**ACTIVITY** Caterpillar Camouflage

**Materials** \$0.50 Newspaper Classifieds  
\$3.00 Construction Paper  
\$0.75 Glue

**Total Cost** \$4.25 per class

**Concepts** Animal Camouflage

### **Procedure**

1. Explain camouflage and its purpose to animal survival.
2. Pass out materials students will need to create their own butterfly paper. (These can be done using the Dicut in the workroom)
3. Have students trace 2 to 5 colored butterflies on construction paper.
4. Cut out the colored butterflies and glue them onto a page from the classified section of the newspaper.
5. Using another sheet of the classified section, trace and cut out 5 to 8 newspaper butterflies.
6. Glue them onto the same sheet of newspaper as the colored butterflies. Make sure they are located in areas with similar print style.

**Literature Link** *The Very Hungry Caterpillar* by Eric Carle

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**ACTIVITY** Aluminum Foil Boats

**Materials** \$3.00 Large roll of aluminum foil  
FREE Crayon from supply box  
FREE Bucket or large container filled with water

**Total Cost** \$3.00 per class

**Concepts** Buoyancy

## Procedure

1. Fill each container  $\frac{3}{4}$  full with tap water.
2. Give each student a 10" by 12" sheet of aluminum foil
3. Instruct half of the class to roll the foil into a ball. The others will leave their foil as a sheet.
4. Construct a boat shape object. Make sure it has room to hold cargo.
5. Ask students if they think the aluminum foil boats will sink. Ask them to justify their responses.
6. Test the boats. Give additional sheets of aluminum foil for those that sink without cargo.
7. Explain how the shape of the foil influences whether it floats or sinks.
8. Question students on how many crayons their boats can hold before sinking. Test their predictions by placing one crayon into the boat, increasing one at a time until the boat sinks.
9. Have students observe the boats that held the most cargo and have them look for similarities in design.

**Literature Link**     *First Sail* by Richard Henderson

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<b>ACTIVITY</b>	Parachute building and testing
<b>Materials</b>	Free Plastic grocery bag (pre cut to 12" X 12" squares) \$1.50 Box of fold over sandwich bags \$1.50 Transparent packing tape \$0.99 Roll of cotton yarn \$1.00 Bag of candy
<b>Total Cost</b>	\$4.99 per class
<b>Concepts</b>	Air as a force

## Procedure

1. Measure and cut 4 – 12" pieces of yarn.
2. Tear off 4 – 1" pieces of packing tape
3. Attach the yarn to each corner of the grocery bag square with tape.
4. Place two pieces of candy inside the sandwich bag.
5. Tie the 4 strings to the open end of the sandwich bag, closing the bag.
6. Stand on your chair and allow your parachute to fall.

**Literature Link**     *Bernie Magruder and the Parachute Peril* by Phyllis Reynolds Naylor

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<b>ACTIVITY</b>	Easy Slime
<b>Materials</b>	\$8.00 Gallon size bottle Elmer's School Glue (makes 50-100 batches) \$2.50 Mule Team Borax (found in laundry aisle) \$2.00 Paper or Styrofoam cups \$4.00 Food coloring (one box only) FREE – Medicine cups from your local pharmacy or student's homes
<b>Total Cost</b>	\$20.50 (for 50-100 batches)
<b>Concepts</b>	Polymers

**Procedure**

1. Measure 1 tablespoon of glue and pour into cup.
2. Add 2 drops of food coloring and stir with a craft stick until well blended.
3. Add 1 tablespoon of sodium borate solution (see Teacher hints) to the colored glue and stir.
4. Stir for 1 minute.
5. Remove from cup and knead.
6. Stretch, roll, and bounce your slime to witness its properties

**Literature Link**     *Bartholomew and the Oobleck* by Dr. Seuss

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<b>ACTIVITY</b>	Amazing Ziploc Bag
<b>Materials</b>	\$2.00 Ziploc sandwich or quart size bags FREE – Sharpen pencil from the classroom supply box FREE – Water to fill bag

**Total Cost**     \$2.00 per class

**Concepts**     Water pressure and polymers

**Procedure**

1. Fill a Ziploc bag with water and seal it.
2. Carefully push a sharpened pencil into one side of the bag slowly.
3. Continue to push the pencil through and out the other side.
4. Stick several pencils through the bag. Have students observe the results and speculate on why the water does not leak.
5. Discuss the cohesion properties of water. The water pressure pushes against the bag and seals the hole; thus, keeping the water from leaking.

**Literature Link**     *The Lemonade Trick* by Scott Colbert

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**ACTIVITY** Colors inside of colors  
**Materials** \$1.50 Coffee filters  
\$1.50 Box of straws  
\$1.00 Styrofoam or paper cups  
FREE – Non-permanent markers from the classroom supply box  
FREE – Water

**Total Cost** \$4.00 per class

**Concepts** Chromatography and capillary action

**Procedure**

1. Cut coffee filters into 2" strips.
2. Place the first digit of your finger on the end of the coffee filter strip and draw a thick line with green marker on the filter.
3. Use a straw to drop a single drop of water on the green line.
4. Observe how the color changes as the water spread through the filter.
5. Discuss how new colors are created by mixing different primary colors.
6. Repeat steps #2-4 using other marker colors, (especially purple, orange, black, and brown) and brands.

**Literature Link** *My Many Colored Days* by Dr. Seuss

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**ACTIVITY** Rain in a Jar  
**Materials** \$3.00 Case of canning jars (Big Lots or Wal-Mart)  
FREE – Ice from school cafeteria  
FREE – Hot water (preferably boiling)  
FREE – Pan from home  
\$2.50 Flashlight and batteries

**Total Cost** \$5.50 per class

**Concepts** Water Cycle

**Procedure**

1. Pack the jar lid or pie pan with crushed ice.
2. Boil water to a temperature of 214°F or use very hot tap water. (The school microwave in the teacher's lounge or the work room works for this)
3. Fill half of the glass jar with boiling water.



**Total Cost**            \$4.50 per class

**Concepts**             Weathering and chemical reactions

**Procedure**

1. Break a new piece of chalk into 2 pieces. Put on the side.
2. Add 1/3 cup of vinegar to the plastic cup.
3. Drop one half of a piece of chalk into the cup.
4. Observe what happens as the acid from the vinegar deteriorates the limestone within the chalk. Notice the carbon dioxide bubbles that form as the limestone is changed in the reaction.
5. Continue to watch the chalk until it completely deteriorates.
6. Alter this experiment by changing the size and color of the chalk.

**Literature Link**     *Let's Go Rock Collecting* by Roma Gans

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**ACTIVITY**            Balloon Rockets  
**Materials**            \$3.00 Fishing line  
                             \$1.00 Box of straws  
                             \$0.50 Tape  
                             \$5.00 Balloons (check dollar stores)  
                             \$1.00 Clothes pins  
                             FREE -- Two chairs or desks

**Total Cost**            \$10.50 per class

**Concepts**             Newton's 3<sup>rd</sup> law of Action and Reaction

**Procedure**

1. Divide students into groups.
2. Give each group 1 clothes pin, 1 balloon, 1 straw, and a roll of tape. Ask students to design a rocket using the materials given.
3. Tie one end of the string to a chair or desk.
4. Put the other end of the string through the straw.
5. Pull the string tight and tie it to the other chair or desk.
6. Blow up the balloon (but don't tie it). Pinch the end of the balloon using a clothes pin.
7. Tape the balloon to the straw.
8. You're ready for launch. Let go and watch the rocket fly!

**Literature Link**     *It's True! Pigs Do Fly (It's True!)* by Terry Denton

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**ACTIVITY**            The Amazing Growing Bean Stalk

**Materials**            \$2.00 Ziploc – sandwich sized  
                              \$.080 x 3 Lima, pinto, and kidney beans (per bag)  
                              \$1.00 Paper towels  
                              \$0.75 Spray bottle  
                              FREE – Water

**Total Cost**            \$6.15 per class

**Concepts**             Lifecycle of plants, observation

**Procedure**

1. Place a crumpled paper towel inside of a Ziploc bag.
2. Spray paper towel with water until moistened but not soaked.
3. “Plant” one of each of the beans within the paper towel.
4. Blow air into the bag and seal.
5. Lay the bag flat in a sunny location.
6. Observe bags once a week and chart growth rate of each.

**Literature Link**      *June 29, 1999* by David Weisner

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**ACTIVITY**            Dancing Pasta  
**Materials**            \$1.25 Bag of corkscrew pasta  
                              FREE -- Water  
                              \$0.35 Baking Soda  
                              \$2.00 Gallon of Vinegar  
                              \$1.00 Box of Teaspoons  
                              \$2.00 Clear Plastic Cups

**Total Cost**            \$5.60 per class

**Concepts**             Chemical Reactions and buoyancy

**Procedure**

1. Fill cup  $\frac{3}{4}$  full of warm water.
2. Add one, two teaspoons of vinegar to the cup.
3. Add  $\frac{1}{2}$  teaspoon of baking soda.
4. Add a few noodles to the cup and watch them dance.

**Literature Link**      *Stregna Nona* by Tomie dePaola

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**ACTIVITY** "Super Dome" Pennies  
**Materials** \$0.50 Roll of pennies  
\$5.00 Box of pipettes (from Carolina Biological or supplies)  
FREE -- Water  
\$1.00 Paper Towels

**Total Cost** \$6.50 per class

**Concepts** Surface Tension and Cohesion

**Procedure**

1. Place penny on the center of a dry paper towel.
2. Fill pipette with water.
3. Place one drop of water on the surface of the penny. Observe.
4. Predict how many drops will fit on top of the penny.
5. Continue placing drops on the penny's surface, counting as you go.
6. Test 3 to 6 times to see if the pattern changes.

**Literature Link** *Benny's Pennies* by Pat Brisson

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**ACTIVITY** Watercolor Polymers  
**Materials** \$1.00 Baking Soda (2 Tbsp. per child)  
FREE Water (1 Tbsp.)  
\$1.00 Cornstarch (1 Tbsp.)  
\$2.00 Corn Syrup (1/4 to 1/2 Tbsp.)  
\$4.00 Food coloring  
FREE Styrofoam egg carton – cut into individual cups

**Total Cost** \$8.00 per class

**Concepts** Polymers

**Procedure**

1. Combine water and baking soda in egg cup.
2. Mix in 2 drops of food coloring
3. Add cornstarch and corn syrup. Stir well. \*\*This will be difficult to stir\*\*
4. Allow to "dry" over night
5. Play with polymer to observe properties. Then create a polymer painting.

**Literature Link** *Color Dance* by Ann Jonas OR *Book of Slime* by Ellen Jackson

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**ACTIVITY** Decay or not to Decay  
**Materials** \$0.50 Knee high hose  
FREE – Trash from home  
\$1.25 Fruit Roll-Ups \*This should be Teacher’s Junk\*  
FREE Twist ties  
FREE Poster paper  
FREE Shovel from home

**Total Cost** \$1.75 per class

**Concepts** Decomposition of organic and inorganic matter.

**Procedure**

1. Discuss decay in class. For homework, ask students to bring to school an object they think will decay and one they think will not decay.
2. Have students present their objects and reasons they chose them.
3. Have students place “decaying” matter in one knee high and “non-decaying” matter in the other knee high. Separating each item with a twist tie. Be sure to add your fruit roll-up to the “decaying” knee high.
4. Draw each item as it is added to the knee high as documentation on poster paper.
5. Bury knee high in school yard.
6. Create map to the treasure.
7. Unearth at end of school year to discover which items are decomposed.

**Literature Link** *Archaeologists Dig for Clues* by Kate Duke

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**ACTIVITY** Baby Diaper Polymer  
**Materials** \$6.00 Diapers (Works best with Extra-large)  
\$1.00 Plastic cups  
\$2.00 Polypropylene measuring cups (Flinn)  
\$3.00 Gallon-sized Ziploc bags  
FREE Centimeter ruler (one for each group)  
FREE Water  
FREE Scissors  
\*\*\*Wear safety goggles for this experiment\*\*\*

**Total Cost** \$12.00 per class

**Concepts** Polymers, absorption, and saturation

## Procedure

1. Cut off the elastic section of the diaper.
2. Place the center section of the diaper in the Ziploc bag.
3. Shake the bag vigorously for two minutes causing the crystals and cotton to come out.
4. Remove cotton "innards" and plastic casing from the Ziploc.
5. Stand ruler up in cup. Pour crystals into cup.
6. Measure 10mL of water. Slowly pour water onto the crystals.
7. Observe the crystal expansion.
8. Touch and record how much the polymer has expanded!!!
9. Continue to add water in 5mL increments until polymer becomes watery. Touch and record growth each time.
10. Graph results.

**Literature Link**     *My Great-Grandmother's Ground* by Christine Kessler

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## ACTIVITY

Oh, Baby...Beetle!

## Materials

\$5.45 500 mealworms (PetSmart or Petco)  
\$1.00 Oatmeal (cheapest possible)  
\$3.00 Ziploc plastic storage containers (Small food size)  
\$0.80 Carrots  
FREE Rulers

## Total Cost

\$10.25 per class

## Concepts

Metamorphosis and lifecycles

## Procedure

1. Fill each Ziploc container with oatmeal and a small piece of carrot for the mealworms home.
2. Introduce students to mealworms by holding one and allowing them to touch and observe.
3. Give each group of students 3 mealworms. These will be "their babies" to care for and raise to adulthood.
4. Have students measure the length of their mealworms and write the measurement on their data chart.
5. Create a "First" drawing of "their babies."
6. Chart the progress of the mealworms weekly. Notice changes in length, shape, and color.
7. Introduce students to metamorphosis to help explain the changes the mealworms are going through.
8. Continue tracking progress for 4 – 5 weeks

**Literature Link**     *A Mealworm's Life* by John Himmelman

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**ACTIVITY**

Big, Big Bubble Fun

**Materials**

\$2.00 1 cup Dawn or Joy dishwashing liquid

FREE 8 cups of water

\$2.00 4 tablespoons of glycerin

\$1.50 Chenille sticks

FREE Plastic straws (from restaurants)

\$1.00 small toy car

**Total Cost**

\$6.00 per class (can be used by more than one class)

**Concepts**

Surface Tension

**Procedure**

1. Measure 1 cup of dishwashing liquid. (Dawn works the best)
2. Pour the dishwashing liquid into the empty and clean container.
3. Add 8 cups of tap water to the bottle.
4. Measure 4 tablespoons of glycerin. Add this to solution.
5. Mix well. Allow the bubble juice to sit for 24 hours.
6. Soak a toy car in bubble juice and place it on the side.
7. Using a plastic straw, blow a large bubble in the bubble juice on the baking tray.
8. Slowly roll the toy car through the bubble. It should go in without popping the bubble.
9. Repeat step 1 to 3 with another toy car.
10. Repeat this experiment using other items (pencils, fingers, chenille sticks, etc.) soaked in bubble juice.

**Literature Link**

*Pop! A Book About Bubbles* by Kimberly Brubaker Bradley

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**ACTIVITY**

Alka-Seltzer Rockets

**Materials**

\$1.59 – Box of Alka-Seltzer (Wal-Mart Brand)

\$2.10 – Polypropylene measuring cups (30mL size)

FREE – Fuji film canister (from local drug store or camera shop)

FREE – Water

\*\*\*Wear Safety Goggles for this Experiment\*\*\*

**Total Cost**

\$3.69 per class

**Concepts**            Chemical reactions, air as a force

**Procedure**

1. Break Alka-Seltzer tablet into two, equal pieces. Set aside.
2. Fill half of the film canister with tap water.
3. Drop in one piece of the tablet into the water.
4. Snap the top of the canister and back away.
5. Observe how the top of the canister flies off.
6. Repeat steps # 2-5 but alter th temperature or amount of water inside the canister.

**Literature Link**     *Roaring Rockets (Amazing Machines)* by Tony Mitton

- Shop at your local dollar store – it's CHEAP and you'd be amazed at the things you'll find!
- Amazon.com and bn.com (Barnes and Noble) sell used books at amazingly discounted rates – much lower than the publisher's price. Another perk is that the books are available in "new" condition from most sellers.
- Barnes and Noble and Borders provide teachers with a 20% in-store discount on all school related purchases. Be sure to sign up for your card at the beginning of each school year.
- When students are finished with the experiment, have them "restock" the "bargain bags" with necessary supplies. Organize your "bargain bag" experiments in plastic or cardboard shoe boxes labeled with the name of the experiment. Pull it off of the shelf when it's needed.
- Sodium borate solution recipe: Fill a 2 liter soda bottle with hot water. Add 1 cup of Mule Team Borax. Cap the top of the bottle and shake well. Allow the solution to sit for 24 hours. Shake well before using. Some of the Mule Team Borax crystals will settle at the bottom of the bottle.
- Bribery can be a great thing!! At the end of each year, I purchase special "big" treats for a supply exchange. IN exchange for the treat the children

- donate their “gently used” (supplies) to the class supply box. “Big” treat can be anything from full-sized candy bars from COSTCO/SAM’s warehouse to glittery pencils from the dollar store.
- IF you don’t receive the Oriental Trading catalog, do yourself a favor and have it mailed to you. They sell anything from classroom prizes and candy to costumes and school supplies, all of which are sold at amazing prices that fit a teacher’s limited budget.  
Please contact us if you would like more information on this workshop.

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