I AM A CHEMIST

What to Know About This Kit

Everything is made of chemicals. Sugar is a chemical. Your skin, hair and bones are made of chemicals. Your bed, the sidewalk, and even the air are made of chemicals. Chemistry is the science that asks the questions “What will happen if I mix some chemicals together?” and studies the result. Chemists are the scientists who specialize in this area.

Did you know—Cooking is a form of chemistry that we do every day!

This kit contains science equipment including child-friendly test tubes, a beaker, flask, and more. It also contains a lab coat and goggles so that your child and you can dress up as chemists.

Your child can wear the lab coat and goggles and simply pour water back and forth between the test tubes, beakers and flask. We’ve also included several activities within this binder, as well as activity books filled with fun, simple chemistry experiments that you and your child can share.

Hands-on activities included in the kit offer suggested vocabulary, fun facts, and further reading. The chart below provides an overview of language, science, and math literacy skills highlighted in each activity.

Suggested Ages: 3-5 years

	Activity #1: Color Mixing	Activity #2: Shiny Pennies	Activity #3: Bubbles	Activity #4: Baker’s Balloon	Activity #5: What’s That Smell?	Activity #6: Sink Float	Activity #7: Mixing Impossible	Activity #8: Dancing Raisins	Activity #9: Crystals	Activity #10 Mini Volcano
Language	color names following directions	Shiny, dull Chemical reaction	Round, circle, Following directions	Yeast, carbon dioxide Following direction	Descriptive names	Weights	Liquid, mix, separate	Directions, rise and fall, cycle	Solid, liquid, crystals, Dissolve, evaporate	Solid, liquid, gas, reaction
Math	Counting, one-to-one correspondence	minutes	Shapes, measuring	Measuring		Sorting, Comparing		Cycles, time	Shapes	Measuring, counting, one-to-one correspond-dence
Science	Observa-tion, Science tools	Compari-ng, Experim-enting	Experime-nting	Gas, Experim-enting	Senses	Predicting, Experime-nting	Observing	Observing	Observing, comparing	Experime-nting, Reaction
Physical	Fine motor	Fine motor	Whole body	Fine motor	Fine motor	Whole body	Fine motor	Fine motor Whole body	Fine motor	Fine motor

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Activity #1: Color Mixing

SUMMARY: By mixing red, blue, and yellow water you can make new colors.

WORDS TO USE:

Solution—a mixture that contains two unlike substances combined evenly
Goggles—large eyeglasses that chemists use to protect their eyes
Test Tube—a thin tube used by chemists to conduct experiments
Eyedropper—a tube with a squeeze bulb on the end that can suck up liquids
Primary color—Colors that can't be made by mixing other colors: red, yellow, and blue.
Secondary color—Colors that can be made by mixing primary colors: orange, green, purple

MATERIALS NEEDED:

Test tubes
Eyedropper
Water
Food coloring

ACTIVITY:

- Put on your goggles and lab coat
- Follow the directions on the Color Mixing Activity Card
- Clean your equipment when done

OBSERVATIONS:

- What happens when you mix red and yellow? What do you call this color?
- What happens when you mix yellow and blue? What do you call this color?
- What happens when you mix blue and red? What do you call this color?

DID YOU KNOW?

- The primary colors of light are different than the primary colors of art.
- The primary colors of light are red, blue, green.
- White light is a mixture of all colors of light.

SUGGESTED READING:

E Jones (concept)	Purple Pride
E Schachne (concept)	Skippyjon Jones Color Crazy
E Seeger (concept)	Lemons Are Not Red
E Yolan (concept)	How Do Dinosaurs Learn Their Colors?
ICR E Rey	Curious George Colors Eggs
J 590 S	Orange Animals

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Activity #2: Shiny Pennies

SUMMARY: Over time, bright shiny pennies become dull and dark. You can use a chemical reaction to make the pennies shiny again.

WORDS TO USE:

Reaction—an action or response to mixing chemicals
Shiny—having a gloss
Dull—not shiny
Acid—a chemical substance that dissolves in water, having a sour taste, and turns blue litmus paper red
Tarnish—to dull the luster or color

MATERIALS NEEDED:

Test Tubes
Eyedropper
Beaker
Tweezers
Dull Pennies
Water
Lemon Juice
Paper Towels

ACTIVITY:

- Put on your goggles and lab coat
- Follow the directions on the Shiny Pennies Activity Card
- Clean your equipment when done
- Going Further: The same activity is done in a slightly different way in the book found in the kit called “The Budding Scientist.” Compare the two methods.

OBSERVATIONS:

- Compare the penny left in water to the penny left in lemon juice.
- Which is shinier?

DID YOU KNOW?

- The acid found in lemon juice is called citric acid.
- Citric acid is also found in oranges and limes.
- Citric acid makes things taste tart.
- Vinegar is another kind of acid called acetic acid.

SUGGESTED READING:

E Harris	Jenny Found a Penny
E Jenkins	Lemonade in Winter
E Judge	Pennies for Elephants
PTC J 507.8 B	The Budding Scientist—in the kit

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Activity #3: Bubbles

SUMMARY: You can make your own inexpensive bubble solution by using dish detergent

WORDS TO USE:

Solution – a mixture that contains two or more substances evenly combined. A bubble solution is a mixture of soap and water.
Mix – stir substances together so that all are evenly combined
Measure – use a special cup or spoon to add a precise amount
Circle - a shape that is a closed curve made of points that are the same distance from the middle. It has no corners.
Round – shaped like a circle

MATERIALS NEEDED:

Dish soap
Water
Sugar or Glycerin (available at a pharmacy)
Drinking straw
Pipe cleaners/Chenille stems
Funnel

ACTIVITY:

- Measure 1/2 cup dish soap
- Mix it with 2 cups of water
- Add 1 tablespoon sugar or glycerin
- Bubble solution gets better with time, so let it sit for at least an hour
- Twist a pipe cleaner to make a loop at the end.
- Dip the loop into the bubble solution and blow.
- Pour some bubble solution onto a table top and blow bubbles onto the table using a drinking straw
- Use a funnel to blow a very large bubble
- Clean your equipment when done

OBSERVATIONS:

- What shape are the bubbles?
- Can you make a square bubble if you have a square bubble blower? Try it!
- What happens to a bubble? How long does it last?
- Blow 2 bubbles. Pop one. How many are left?

DID YOU KNOW?

- A scientist once kept a bubble from popping for 108 days
- One of the largest bubbles ever made was 105 feet long

SUGGESTED READING:

E Frazier	Lots of Dots
E MacKinnon (concept)	Eye Spy Shapes
E Mahy	Bubble Trouble—in the kit
ICR Krensky	Bubble Trouble
	Apples, Bubbles, and Crystals: A Science ABC
PTC J 507.8 B	The Budding Scientist—in the kit

Did You Ever See a Bubble? (to the tune of "Did You Ever See a Lassie?")

Did you ever see a bubble (make a circle with your fingers)
a bubble (circle with 2nd hand), a bubble,
Did you ever see a bubble go floating around? (wave your hands, move your body as though floating)
Go floating, go floating, go floating, go floating (continue floating)
Did you ever see a bubble go floating around?

Repeat a 2nd time, but change the last line to:
Did you ever see a bubble suddenly go POP! (clap your hands together)

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Activity #4: Baker's Balloon

SUMMARY: Bubbles aren't just made from soap. You can watch yeast make bubbles of carbon dioxide gas.

WORDS TO USE:

Yeast – living fungi (related to mushrooms) that are used in making bread and other foods
Carbon dioxide – one of the gases in the air we breathe. Carbon dioxide is produced by plants and some chemical reactions.
Gas—one of the three forms of matter (solid, liquid, gas). The individual pieces of a gas (the molecules) are more spread out than the other forms. Air is a gas.

MATERIALS NEEDED:

Balloon
Bowl
Dry yeast (from the grocery store)
Funnel
Magnifying glass
Measuring cup
Measuring spoons
Sugar
Tall narrow bottle (clean, empty 16 oz soda bottle)
Warm water
Piece of bread
Magnifying glass

ACTIVITY:

- Follow the directions on page 13 of ***The Budding Scientist*** book from the kit.
- If you don't have a thermometer, just make certain the water feels warm to the touch, but not HOT.
- Clean your equipment when done

OBSERVATIONS:

- Do you see bubbles in the bottle?
- What is inside the bubbles? (Carbon dioxide)
- What happens to the balloon?
- Look at the piece of bread using a magnifying glass. Can you see bubble shapes?

DID YOU KNOW?

- Yeast is added to bread and allowed to grow for a few hours.
- The bubbles of carbon dioxide made by the yeast make the bread light and fluffy.
- When we bake the bread the yeast dies and the bubbles are hardened into place.
- Quick breads use a chemical reaction to make the gas bubbles. You will learn more about the reaction between baking soda and acid in Activity # 10.

SUGGESTED READING:

E Galdone	The Little Red Hen
J 641.815 S	The Children's Baking Book
PTC J 507.8 B	The Budding Scientist—in the kit

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Activity #5: What's That Smell?

SUMMARY: Talking about scents and smelling can be a way to realize that something we can't see (a gas) is still made of chemicals.

WORDS TO KNOW:

Sense—any of 5 ways to understand or experience your surroundings
Scent—a smell
Gas—one of the three forms of matter (solid, liquid, gas). The individual pieces of a gas (the molecules) are more spread out than the other forms.
Molecule—a teeny, tiny piece of an object

MATERIALS:

Test tubes
Tweezers
Cotton balls
Variety of items with distinctive smell such as coffee, cinnamon, vanilla, perfume

ACTIVITY:

- Follow the directions on Activity Card #5
- Clean your equipment when done

OBSERVATIONS:

- Can you correctly identify each scent?
- Which smells were sweet?
- Which smells were sour?
- Which smells were strong?
- Which smells were weak?
- How did the scent get from the object to your nose?

DID YOU KNOW?

- The scent molecules move off the original object and drift through the air, finally reaching your nose.
- Smell and taste are closely related senses.
- People who have a cold and can't smell have trouble tasting

SUGGESTED READING

E Jenkins	Skunkdog
E Johnstone	Farley Follows His Nose
E Palatini	Gorgonzola, a Very Stinkysaurus
ICR E 612.86 G	Smelling
J 612.86 R	Sniff, Sniff, a Book About Smell
PTC J 372.35 B	Bubbles, Rainbows & Worms: Science Experiments for Preschool Children

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Activity #6: Sink and Float

SUMMARY: Water is a special chemical. Some objects sink when they are put in water, while others float.

WORDS TO USE:

Surface—the top of the water
Sink—move downward in water
Float—stay on the surface of the water
Prediction—the guess a scientist makes before doing an experiment

MATERIALS:

Beaker
Tweezers
Water
Small objects such as coins, bar of soap, cotton balls, cereal pieces, rocks, raisins, etc.

ACTIVITY:

- Follow the instructions on Activity Card #6.
- Clean your equipment when done

OBSERVATIONS:

- Which items sank? What did they have in common?
- Which items floated? What did they have in common?

DID YOU KNOW?

- Fats and oils float on water because of their chemical nature.
- Some items float because they contain air.
- Some objects, such as boats, float because they push more water away.
- Try taking a ball of clay and testing it. Does it sink or float? If it sinks, try flattening it out and making a canoe shape. Does it float now?

SUGGESTED READING

E Barton	Boats
E Burningham	Mr. Gumpy's Outing
E De Seve	The Toy Boat
E Gibbons	Boat Book
ICR E Rey	Curious George: The Boat Show
PTC 372.5 A	Math and Science Investigations

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Activity #7: Mixing Impossible

SUMMARY: Even though they are both liquids, oil and water are chemically different.

WORDS TO USE:

Liquid—one of the three forms of matter (solid, liquid, gas). Liquids take the shape of the container into which it is poured. Water is a liquid.
Separate—to become divided
Mix—to put different things together so that the parts become one.

MATERIALS:

Beaker
Test tube
Funnel
Eyedropper
Water
Cooking oil
Blue food coloring
Dish soap

ACTIVITY:

- Follow the directions on Activity Card #7
- Clean your equipment with soap and water when done
- Going farther: Do the same experiment but this time add some drops of soap before shaking. What happens?

OBSERVATIONS:

- Which liquid ends up on top—oil or water? Which is heaviest?
- Why do you think we use soap? What does soap do to help things get clean?

DID YOU KNOW?

- Soap is made of chemicals that act somewhat like water and somewhat like oil.
- Because of this, soap can mix with either oil or water.
- Soap lets us use water to wash away oily dirt on our hands, cloths, or dishes.
- Without soap, water would just roll off oily dirt without removing it.

SUGGESTED READING:

E Brown	The Dirty Little Boy
E Hamsa	Dirty Larry
J 428.1 G (emergent)	Just the Opposite: Dirty Clean
J 530.078 S	How to Make a Liquid Rainbow
J 551.55	How to Build a Tornado in a Bottle

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Activity #8: Dancing Raisins

SUMMARY: Bubbles of carbon dioxide gas will form around the raisins, causing them to rise to the surface of the soda. When the bubbles break the raisins will sink again. The cycle will repeat.

WORDS TO USE:

Gas—one of the three forms of matter (solid, liquid, gas). The individual pieces of a gas (the molecules) are more spread out than the other forms. Air is a gas.
Carbon dioxide—the gas we release when we breathe out. It is added to soft drinks to give them fizz.
Rise—to move upward
Sink—to move downward
Cycle—an event that is repeated

MATERIALS:

Beaker
Magnifying Glass
Raisins
Clear Soda

ACTIVITY:

- Follow the directions on Activity Card #8
- Clean your equipment with soap and water when done

OBSERVATIONS:

- What happened to the raisins?
- Why did they move up and down?
- Where do you see bubbles?
- What happens to the bubbles when the raisin gets to the top?
- Where did the bubbles come from?
- How many times does the cycle repeat?
- When the cycle repeats does it take longer for the raisins to rise? Why?

DID YOU KNOW?

- People have used giant balloons to raise sunken boats off the ocean floor

SUGGESTED READING:

PTC 372.7 P Jump into Math: Active Learning for Preschool Children

Dancing Raisins—to the tune of *Frere Jacques*

Dancing raisins, Dancing Raisins (start crouched low to the ground)
Up we rise (slowly straighten up)
Up we rise
Then our bubbles pop (clap hands)
Then our bubbles pop (clap)
Down we sink (return to starting position)
Down we sink

Repeat

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Activity # 9: Make Crystals

SUMMARY: You can grow solid crystals from a liquid solution.

WORDS TO USE:

Liquid—one of the three forms of matter (solid, liquid, gas). Liquids take the shape of the container into which it is poured. Water is a liquid.
Solid—one of the three forms of matter (solid, liquid, gas). Solids have a firm shape. Ice is a solid.
Evaporate—to turn from liquid into gas
Dissolve—to turn from solid into liquid, to mix completely with liquid
Precipitation—the process of a solid forming out of a liquid solution
Solution – a mixture that contains two or more substances evenly combined.
Compare—to see how alike or different things are
Cube—a solid figure with 6 faces that are all the same size.
Crystal—a solid with a regular shape.

MATERIALS NEEDED:

Heat resistant bowl or cup
Coarse salt
Hot water
Magnifying glass
Shallow, dark-colored dishes
Spoon
Sugar (optional)
Epsom salt (optional)

ACTIVITY:

- Follow the directions on page 16 of ***The Budding Scientist*** book (in kit).
- Compare the salt crystals you grow to salt from a shaker.
- Compare salt crystals to sugar or Epsom salt crystals.
- Go for a walk when it is snowing and catch snowflakes on dark cloth or paper. What do the crystals look like?

OBSERVATIONS:

- What shape are the salt crystals?
- What color are the crystals?
- Look at sugar crystals with the magnifying glass. Are they the same shape?
- Look at a book about crystals to see the different shapes and colors. Don't worry about the details—just have fun looking and talking about the colors and shapes you see.

DID YOU KNOW?

- Crystals come in many different shapes
- Salt crystals are cubes (squares).
- Sugar crystals have six sides of different lengths.
- Some salt is dug out of the ground in mines.
- Some salt is collected from the oceans, using a process that is very similar to the experiment you just did.
- Geologists, the scientists who study rocks, call salt halite. The largest halite crystals known are over a yard across (about 39 inches).

SUGGESTED READING:

E Watts	The Smallest Snowflake
J 551.5784 C	The Story of Snow
J 552 R	Rocks and Minerals: Facts at Your Fingertips
JB Bentley M	Snowflake Bentley

US Department of Education website:
http://www2.ed.gov/pubs/parents/Science/crystals.html

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Activity #10: Mini Volcano

SUMMARY: Sometimes when chemicals are mixed a new chemical is created. This is called a chemical reaction. Mixing baking soda and vinegar creates carbon dioxide gas.

WORDS TO USE:

Chemical reaction—an action or response to mixing chemicals
Baking soda—a white powder used to make dough bubbles while baking
Vinegar—a tart white liquid used in cooking
Carbon dioxide—the gas we release when we breathe out.
Solid—one of the three forms of matter (solid, liquid, gas). Solids have a firm shape. Ice is a solid.
Liquid—one of the three forms of matter (solid, liquid, gas). Liquids take the shape of the container into which it is poured. Water is a liquid.
Gas—one of the three forms of matter (solid, liquid, gas). The individual pieces of a gas (the molecules) are more spread out than the other forms. Air is a gas.

MATERIALS:

Test tubes
Eyedropper
Beaker
Goggles
Baking soda
Vinegar
Paper towels
Red food coloring
Water

ACTIVITY:

- Conduct the experiment on Activity Card #10.
- Clean your equipment with soap and water when done

OBSERVATIONS:

- Is baking soda a solid, liquid, or gas?
- Is vinegar a solid, liquid, or gas?
- What happens when you mix solid baking soda with liquid vinegar?
- How can you tell a gas is produced?

DID YOU KNOW?

- The reaction between baking soda and vinegar is what makes some kinds of cakes and quick breads light and fluffy. The carbon dioxide bubbles cause the cake to “rise.”

SUGGESTED READING

J 507.8 L	Kitchen Science
PTC 372.35 B	Bubbles, Rainbows & Worms: Science Experiments for Preschool Children