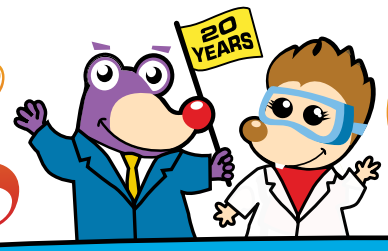
Celebrating Chemistry



The Many Faces of Chemistry

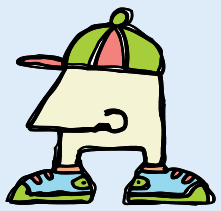
National Chemistry Week • American Chemical Society

You can be a chemist!

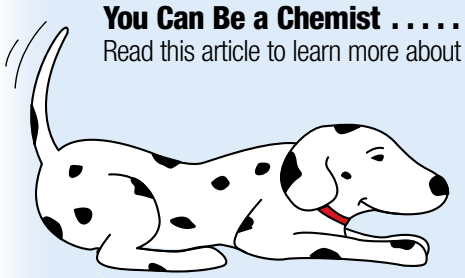
WHAT'S INSIDE

Featured Chemists

More Faces of Chemistry



Activities and Articles



Puzzles and Games

PRODUCTION TEAM

Judith Jankowski, Editor
Marisa Burgener, Assistant Editor
Jonathan Walker, Writer
Elaine Diggs, Writer
Amy Meyer Phifer, Design & Production, Plum Creative
Elizabeth Manning, Copyeditor, The Fine Line
James Kapin, Safety Reviewer, Advanced Chemical Safety

DIVISION OF MEMBERSHIP AND SCIENTIFIC ADVANCEMENT

Denise Creech, Director
John Katz, Director, Member Communities
LaTrease Garrison, Assistant Director, Local Section and Community Activities
Tiffany Williams, Membership Assistant

COMMITTEE ON COMMUNITY ACTIVITIES

NATIONAL CHEMISTRY WEEK THEME TEAM

Ruth Woodall
Al Ribes
Helen Free

ACKNOWLEDGEMENTS

Much gratitude and thanks to the chemists who took the time to answer the interview questions and agreed to appear in the publication.

The activities described in this publication were modified from WonderNet, *a publication of the ACS Education Division. They are intended for elementary school children under the direct supervision of adults. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.*

1155 SIXTEENTH STREET, NW
WASHINGTON, DC 20036

If you were to draw a picture of a chemist, what would that person look like? Perhaps he would be wearing a lab coat and safety goggles; perhaps she would be holding a test tube. But people who work in laboratories are not the only ones who use chemistry every day in their jobs.

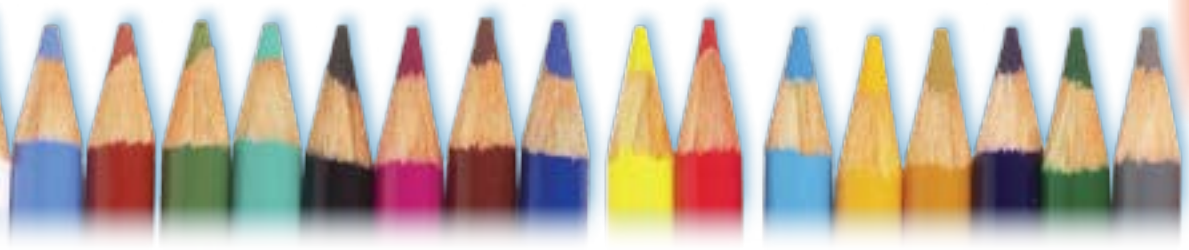
From water to wood and pizza to plastic, everything you touch, see, taste, or feel is made of chemicals—including us! Chemistry is the study of chemicals and the changes down to the smallest and most basic level. So there is no limit to the kinds of things chemists study or to the kinds of jobs they can do.

Some chemists invent new types of clothing, makeup, and shampoo. Others work to create healthier foods. There are even chemists developing devices that work like artificial noses!

And chemists don't just create new things. Some work as teachers and others work to understand the environment. Chemists can explore the jungle or dive in the ocean, searching for new medicines!

In this edition of *Celebrating Chemistry*, "The Many Faces of Chemistry", you will explore how different types of chemists use their scientific knowledge. You will learn what sparked their interest in a chemistry career and what advice they can offer you to become a scientist too.

After you have finished reading, ask your teacher or family members if they know a chemist or any other types of scientists, like biologists or geologists. Perhaps you can talk with them about their jobs and learn about how science is important in everyday life!



Milli's Safety Tips

Safety First!

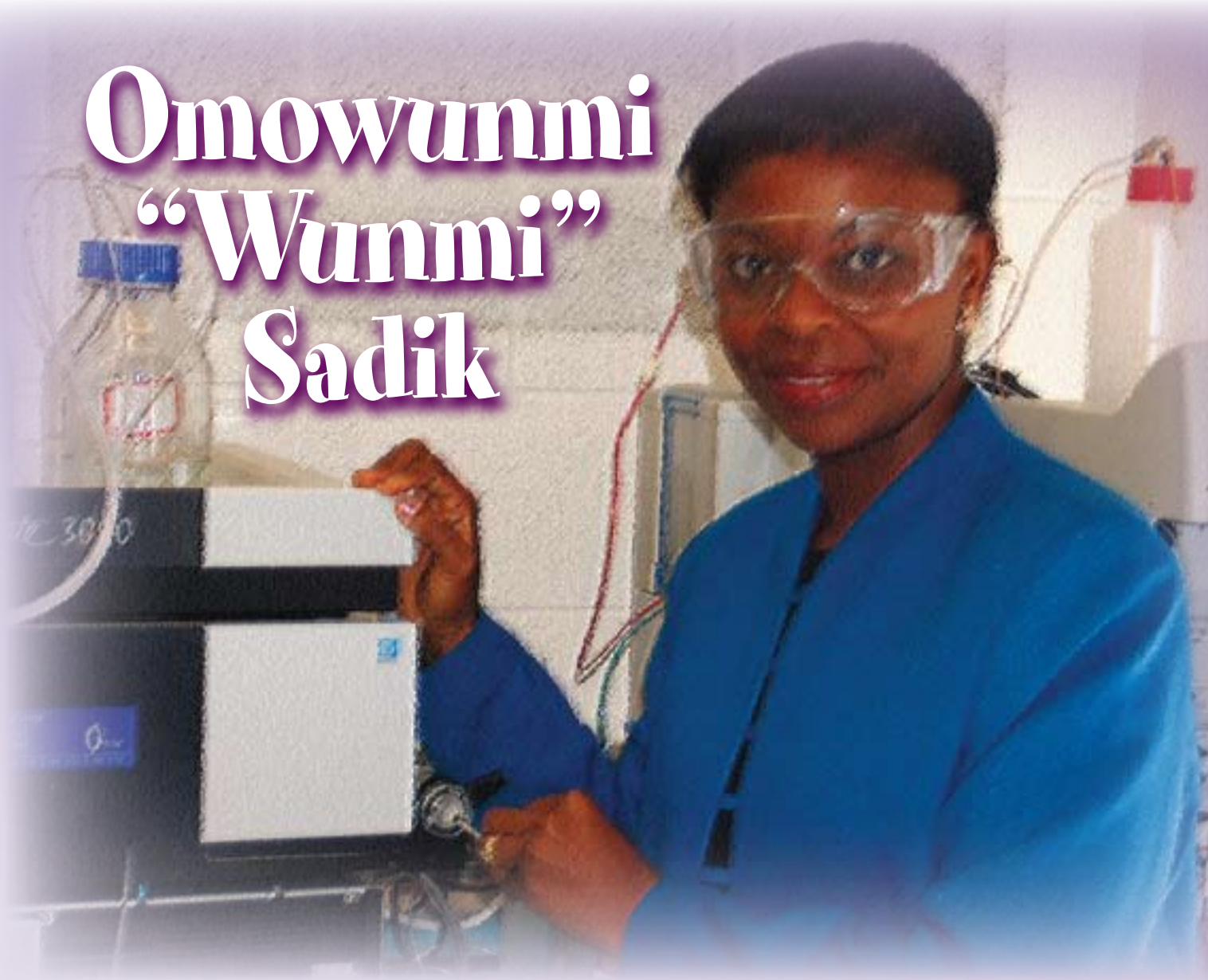
ALWAYS:

- Perform the activities with adult supervision.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection, specifically splash and impact-resistant goggles.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

NEVER eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

NEVER experiment on your own!

For more detailed information on safety go to chemistry.org/ncw and click on "Safety Guidelines".



Omowunmi "Wunmi" Sadik

Biosensors Chemist

What is your title and where do you work?

Professor of Chemistry, State University of New York at Binghamton

What is your job?

My work involves creating chemical sensors. These sensors can be used to find drugs and bombs, to help dentists find cavities or diagnose gum disease, and to find chemical/biological weapons. The sensors are very small chips made from polymers (tiny chemical units that are hooked together to form very long chains).

What is the coolest part about what you do?

I like that we help make the world a safer place. The most exciting part is that we are using chemistry and biochemistry, the field of chemistry that studies how chemicals act in the body. We address real-life problems such as monitoring oral health or detecting unsafe chemicals in the air or drinking water.

What made you first interested in science?

My parents emphasized the importance of science as I was growing up.

What was your favorite subject in school?

History

Do you have tips for future chemists?

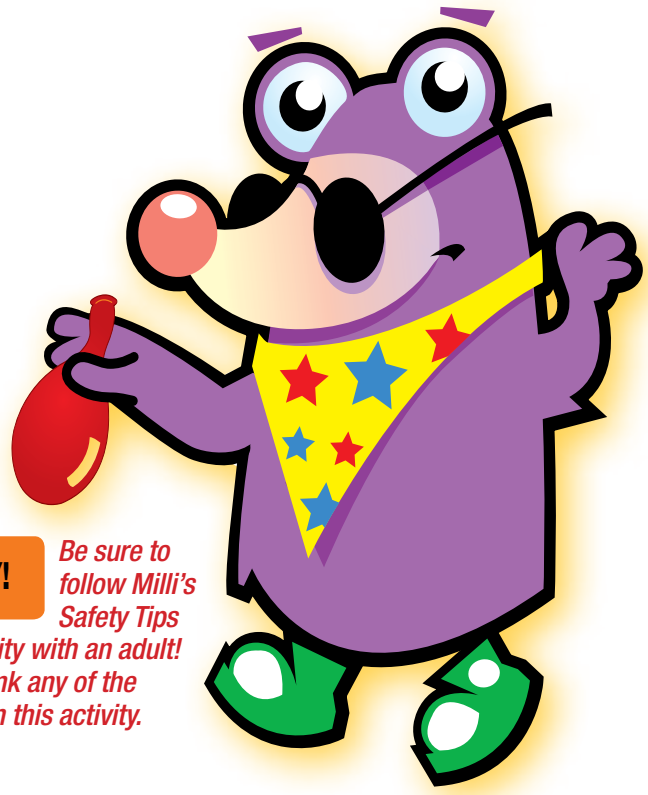
Be flexible and willing to learn about new areas. It's important to extend your basic learning beyond the school books.

Do you have any other advice for students?

Chemistry is everywhere. It affects people's lives in very real and positive ways. If you want to become a chemist, you can make a real impact in people's lives as well.

The Nose Knows

Chemists who make "sensors" create them to find certain chemicals. These sensors must be able to detect the smallest amount of a chemical. Your nose is a sensor that detects different types of odors. An odor is lots of very tiny chemical units floating in the air. When you smell, your nose picks up the floating odor molecules. In this activity, you will use your nose to see if tiny odor molecules can pass through the rubber of a balloon.



Materials

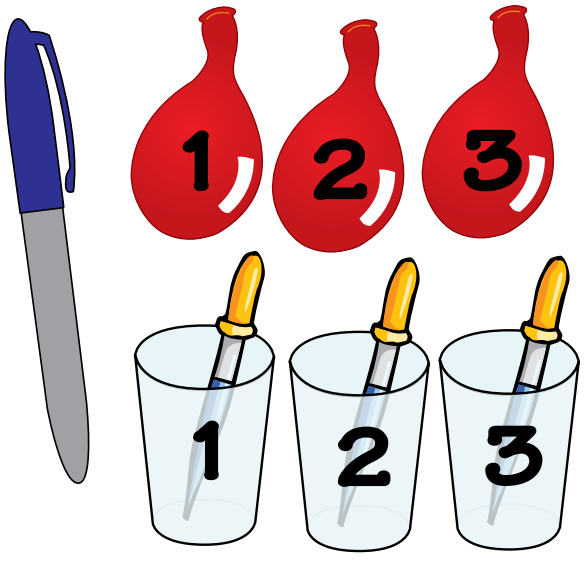
- 3 small rubber balloons (same size)
- Permanent marking pen
- 3 disposable plastic cups (3 oz.)
- 3 droppers
- 3 different flavoring extracts (vanilla, peppermint, and orange extracts work well)
- Blunt-end scissors for adult partner (optional)
- Balloon pump (optional)

ADAPTATION A balloon pump can be used to inflate the balloons. Visually impaired people may use balloons of various shapes or small pieces of masking tape to mark the balloons.

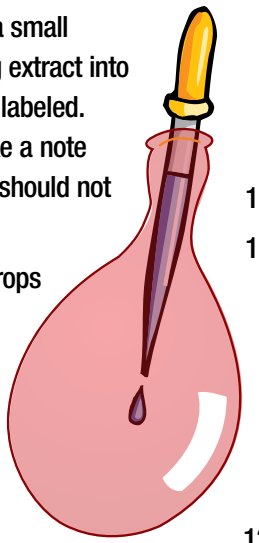
SAFETY! *Be sure to follow Milli's Safety Tips and do this activity with an adult! Do not eat or drink any of the materials used in this activity.*

Procedure

1. Look closely at the three balloons that you will use in this activity to make sure that they do not have any visible holes in them.
2. Use the marking pen to write "1" on one of your balloons.
3. Repeat step 2, labeling the second balloon "2", and the third balloon "3".
4. Label three plastic cups "1", "2" and "3" as you did for the balloons, and place a dropper in each one.



5. Have your adult partner pour a small amount of a different flavoring extract into each of the cups that you just labeled. Your adult partner should make a note of which extract is which, but should not share the list with you.
6. Use the dropper to place 10 drops of the extract in cup "1" into balloon "1". Be sure to place the tip of the dropper as far into the balloon as possible before you squeeze the dropper bulb so the extract does not get into the neck of the balloon. Be careful not to get the extract on your hands. If you do, wash your hands before going on to the next step.



7. After making sure that there is no extract solution on the lip or neck of the balloon, blow it up, tie a knot in the neck, and shake it a few times.
8. Repeat steps 6 and 7 for extracts and balloons "2" and "3". Blow each balloon up to about the same size.
9. Try to smell the extract inside balloon 1 by holding the balloon about 30 cm (1 foot) in front of your face in one hand, and using your other hand to fan the air around the balloon towards you. Slowly move the balloon towards your nose until you begin to smell the extract. Record the odor you smell in the column labeled "Odor Detected" in the "What Did You Observe?" section.
10. Repeat step 9 for balloons 2 and 3.
11. When you have finished recording the scents in the column labeled "Odor Detected", ask your adult partner to tell you the names of the extracts used in each numbered balloon and write them in the "Extract" column of the table in the "What Did You Observe?" section. Were your observations correct?
12. One by one hold each balloon over a sink, and ask your adult partner to cut the knot off of the balloon to drain its contents. Pour any excess extracts left in cups down the drain, and throw away the deflated balloons and any trash. Thoroughly clean the work area and wash your hands.

What Did You Observe?

Balloon	Odor Detected	Name of Flavoring Extract
1		
2		
3		

Try this...

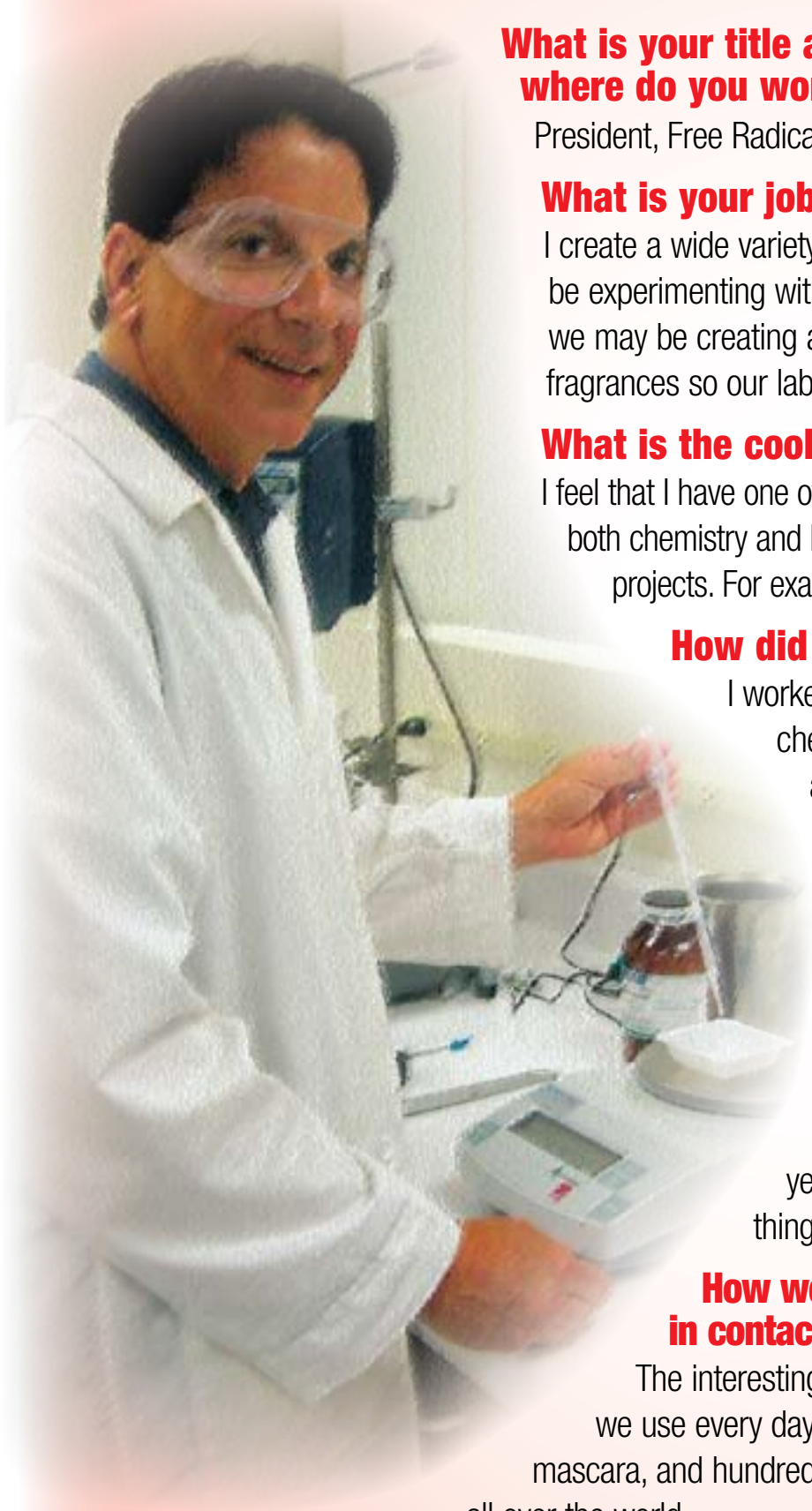
Compare natural and artificial vanilla flavorings to see if you can tell a difference. Try inserting cloves or pieces of garlic, nutmeg or onion inside balloons to see if their scents will pass through the rubber membrane of the balloon. Try substituting snack-size zip-closing plastic bags for the balloons.

Where's the Chemistry?

At the beginning of this activity, you checked each of the balloons for any holes, and found none. But somehow, the odor molecules made it out of the balloons and to your nose. To us, the rubber wall of the balloon looked solid and without any holes, but it actually had many. They were just too small for us to see. The scents of the flavoring extracts passed through these very small holes to make it to the outside of the balloon.

John Garruto

Cosmetic Chemist



What is your title and where do you work?

President, Free Radical Technology

What is your job?

I create a wide variety of everyday personal care products. One day we may be experimenting with the ingredients of a sunscreen lotion while the next day we may be creating a detangling shampoo. We also work with many different fragrances so our laboratory smells pretty interesting.

What is the coolest part about what you do?

I feel that I have one of the coolest jobs in science. Cosmetic chemistry combines both chemistry and biology. We often get to work on some very interesting projects. For example, I invented a lotion that can make you swim faster.

How did you get there?

I worked for a cosmetic company after I graduated with my chemistry degree from college. It was a summer position, and I was intrigued. I asked if I could stay permanently. They accepted and I've been doing it ever since.

What was your favorite subject in school?

Chemistry and biology. I loved lab time!

What made you first interested in science?

My parents gave me a chemistry lab kit when I was 11 years old. It made me want to learn more about what other things around my home involved chemistry.

How would someone come in contact with your work?

The interesting aspect of this work is that it involves products that we use every day: toothpaste, shampoo, soap, sunscreen, lotion, lipstick, mascara, and hundreds of other products that are made by cosmetic chemists all over the world.

Do you have any other advice for students?

If you want to learn more about being a cosmetic chemist, some personal care companies offer tours for interested students. Cosmetic chemistry is exciting, highly creative, and a unique way to use your chemistry knowledge.

Release the Grease

Cosmetic chemists create formulas, like recipes, for hand soaps, shampoos, lipsticks and many other items you or your family use every day. In this activity you will test whether water or liquid detergent is better to clean up a greasy substance like lipstick.

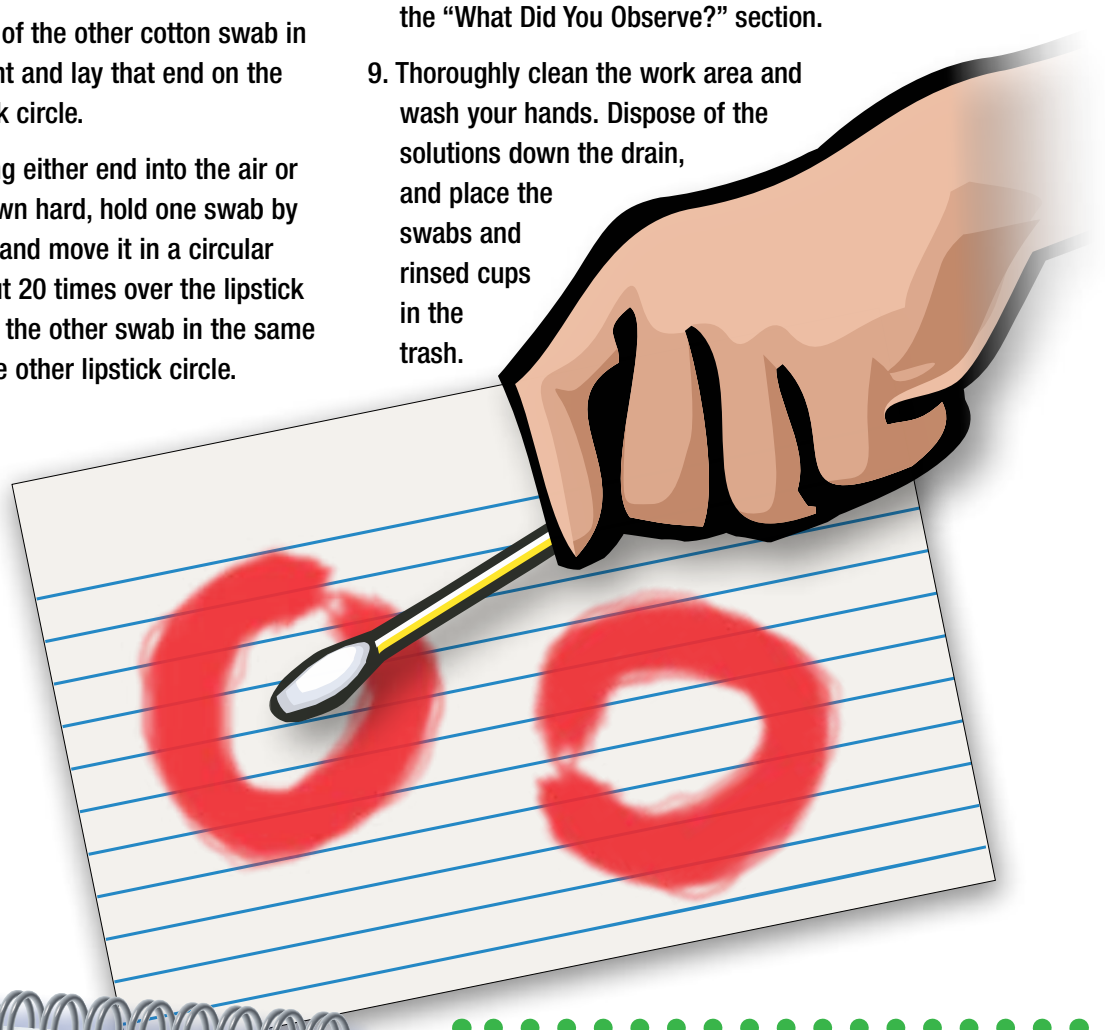
Materials

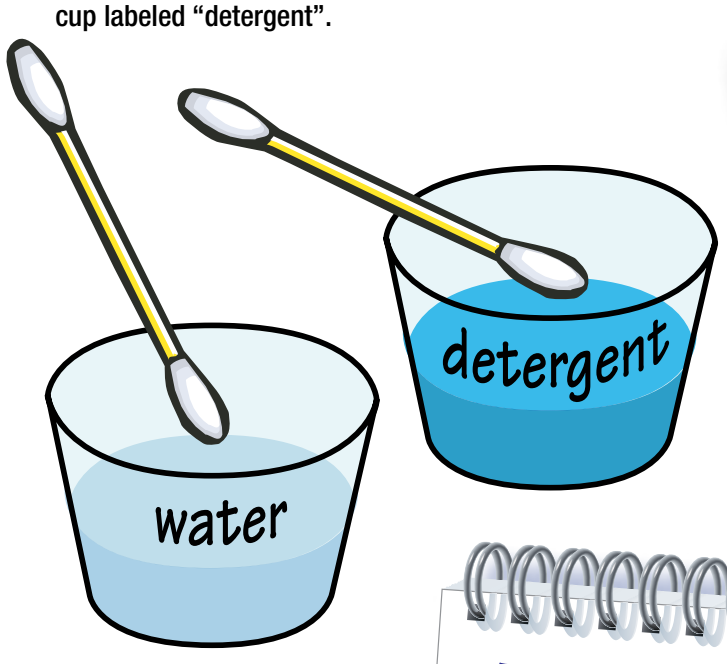
- White index card
- Lipstick
- Masking tape
- Pen
- 2 small cups (3 oz.)
- Measuring spoons
- Water
- Liquid dishwashing detergent
- 2 cotton swabs

SAFETY! *Be sure to follow Milli's Safety Tips and do this activity with an adult! Do not eat or drink any of the materials used in this activity.*

Procedure

1. Place the white index card flat on the work surface.
2. Use the lipstick to make two separate circles of color on the index card that are about the size of a quarter.
3. Use masking tape and a pen to label one cup "water" and the other cup "detergent".
4. Place about 1 tablespoon of water in the cup labeled "water", and about 1 tablespoon of dishwashing detergent in the cup labeled "detergent".
5. Dip one end of a cotton swab in the water and lay that end on top of one of the lipstick circles.
6. Dip one end of the other cotton swab in the detergent and lay that end on the other lipstick circle.
7. Without lifting either end into the air or pressing down hard, hold one swab by the dry end and move it in a circular motion about 20 times over the lipstick circle. Move the other swab in the same way over the other lipstick circle.
8. Look closely at the way both liquids have moved with the lipstick. What did you observe? Write down any differences in the "What Did You Observe?" section.
9. Thoroughly clean the work area and wash your hands. Dispose of the solutions down the drain, and place the swabs and rinsed cups in the trash.





What Did You Observe?

Washing with Water

Washing with Detergent

Where's the Chemistry?

Lipstick is greasy, which means it keeps water away and helps the color stay on lips longer. Water alone does not mix well with grease and cannot wash it away. The chemicals in dishwashing detergent have two jobs: to attract grease, and to attract water. This double role allows the detergent to mix with the greasy lipstick and carry it away.

More Faces of

John P. O'Brien
Materials Chemist

John O'Brien studies natural materials like spider silk and seashells to figure out ways to make new, more environmentally friendly products. One of his biggest projects was to help develop a way to make threads and plastics out of renewable corn sugar. An example is a new fiber for clothing called Sorona. He works at DuPont's Central Research and Development Department. Read more about him in *The Adventures of Meg A. Mole, Future Chemist.*

Recommended reading:

"Recycling—Chemistry Can!", Chemists Celebrate Earth Day 2007

"Choose role models from people who are making a lasting difference in the world."

Haile Mehansho
Nutritional Chemist

Haile Mehansho invents new foods and drinks at Procter & Gamble. His inventions contain important vitamins and minerals to help solve world health problems, like iron deficiency. They have helped millions of malnourished people around the world get the vitamins they need to become and to stay healthy.

Recommended reading:

"Health and Wellness", NCW 2004

"My goal has always been to study science and apply it to improving people's lives."

Visit chemistry.org/kids to find the recommended readings and activitie

Chemistry...

Dianne D. Gates-Anderson
Environmental Process Engineer

Dianne Gates-Anderson creates ways to clean up dangerous wastes. She works hard to make the environment safer by eliminating pollution. She is busy at work at Lawrence Livermore National Laboratory, one of the Department of Energy's research centers. Read more about her in *The Adventures of Meg A. Mole, Future Chemist.*

Recommended hands-on activity:

"Cleaning Water with Dirt", NCW 2002

"Knowing that I could get answers by understanding science motivated me!"

Tod Alan Waldrop
Patent Agent (prior Dye Chemist)

Tod Alan Waldrop protects or patents new inventions developed within his company, Clariant Corporation. Patented products cannot be made, used, or sold by anyone other than the inventor. Before becoming a patent agent, he worked as a dye chemist coming up with new ways to make colors for different types of products. He was on a research and development team that invented a new environmentally friendly dye for denim blue jeans.

Recommended hands-on activity:

"Marker Butterflies", NCW 2001

"Allow yourself to be curious and inquisitive."

Helen Free
Inventor

Helen Free invented a self-testing strip called a Clinistix. It allows people to check the amount of glucose, a type of sugar, in their urine. Tracking glucose levels has helped millions of people with diabetes to live longer, healthier lives. For many years, she worked at BayerHealthCare, Diagnostics Division (now Siemens Medical Solutions). She is now retired. Read more about her in *The Adventures of Meg A. Mole, Future Chemist.*

Recommended hands-on activity:

"Urine the Know", NCW 2004

"Chemistry is fun and exciting!"

es, along with *The Adventures of Meg A. Mole, Future Chemist.*

Liangli "Lucy" Yu

Food Chemist

What is your title and where do you work?

Associate Professor of Food Chemistry, University of Maryland at College Park

What is your job?

My research group has developed ways to enrich foods such as pizza and muffins with natural antioxidants. Antioxidants may help reduce the risk of cancer and heart diseases.

What is the coolest part about what you do?

We love knowing that our research may make people healthier. Our research has been reported around the world.

How did you get to where you are today?

I have a B. S. in pharmaceutical chemistry, an M. S. in medicinal and organic chemistry, and a Ph. D. in food science/food chemistry.

What should someone do if they wanted to become a food chemist?

Get a solid chemistry background and training in food chemistry. It will help to study other sciences such as nutrition, biochemistry, or biological science.

How would someone come in contact with your work?

People today should be more aware of the types of foods that they eat. We hope our research is helping restaurants, food companies, and people make the food they eat healthier. Hopefully our work will result in future generations leading better and longer lives.

Healthy Eating

Your body needs the nutrients from food to grow and stay healthy. If you look at a nutrition label on a food package, you will see the words “carbohydrate”, “fat”, “protein”, and “vitamins”. These are examples of nutrients.

A carbohydrate is a sugar. There are two kinds of carbohydrates: simple sugars (such as glucose and fructose) and complex long chain sugars, known as polysaccharides (starch and fiber). Your body needs to eat carbohydrates, in proper amounts, for energy.

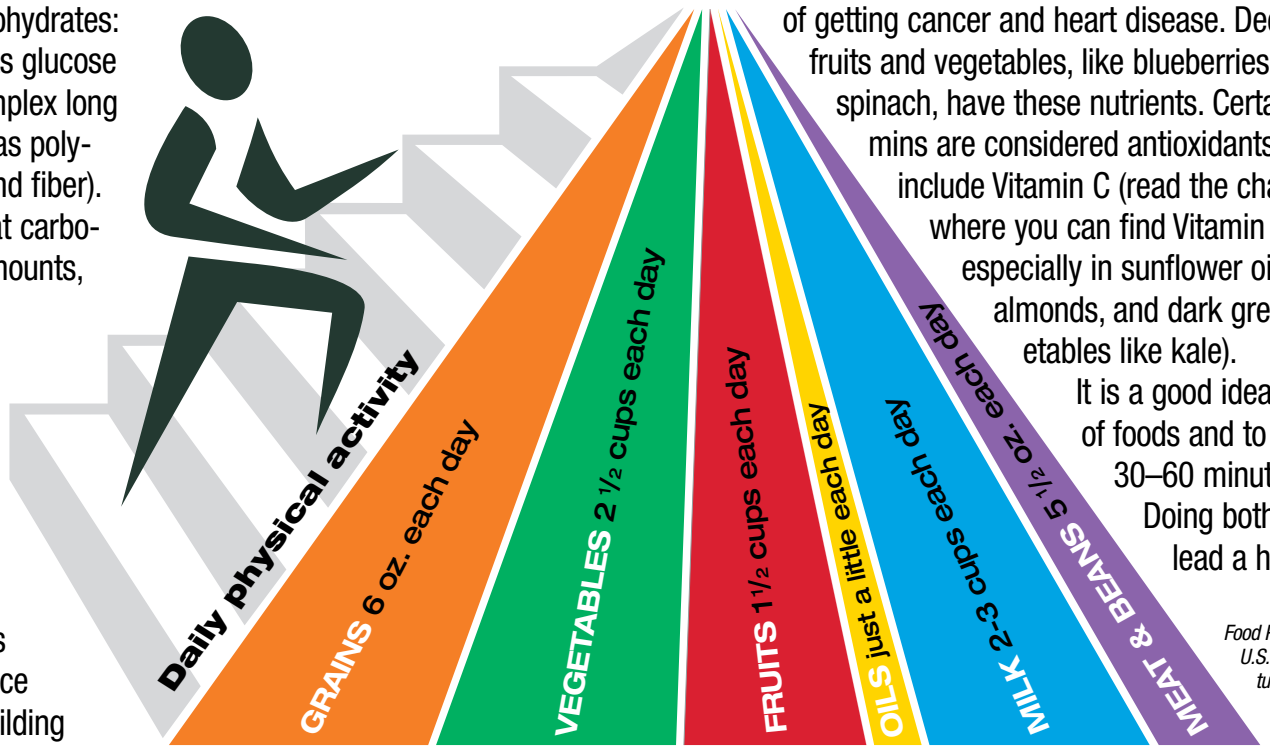
Plants and animals make fats because fats store a lot of energy. Your body uses carbohydrates and fats as its two main sources of fuel.

Your body also uses protein both as a source of energy and as a building block to make other substances your body needs. Proteins are very important for growth. For example, your skin, hair, muscles, and fingernails are all made of proteins.

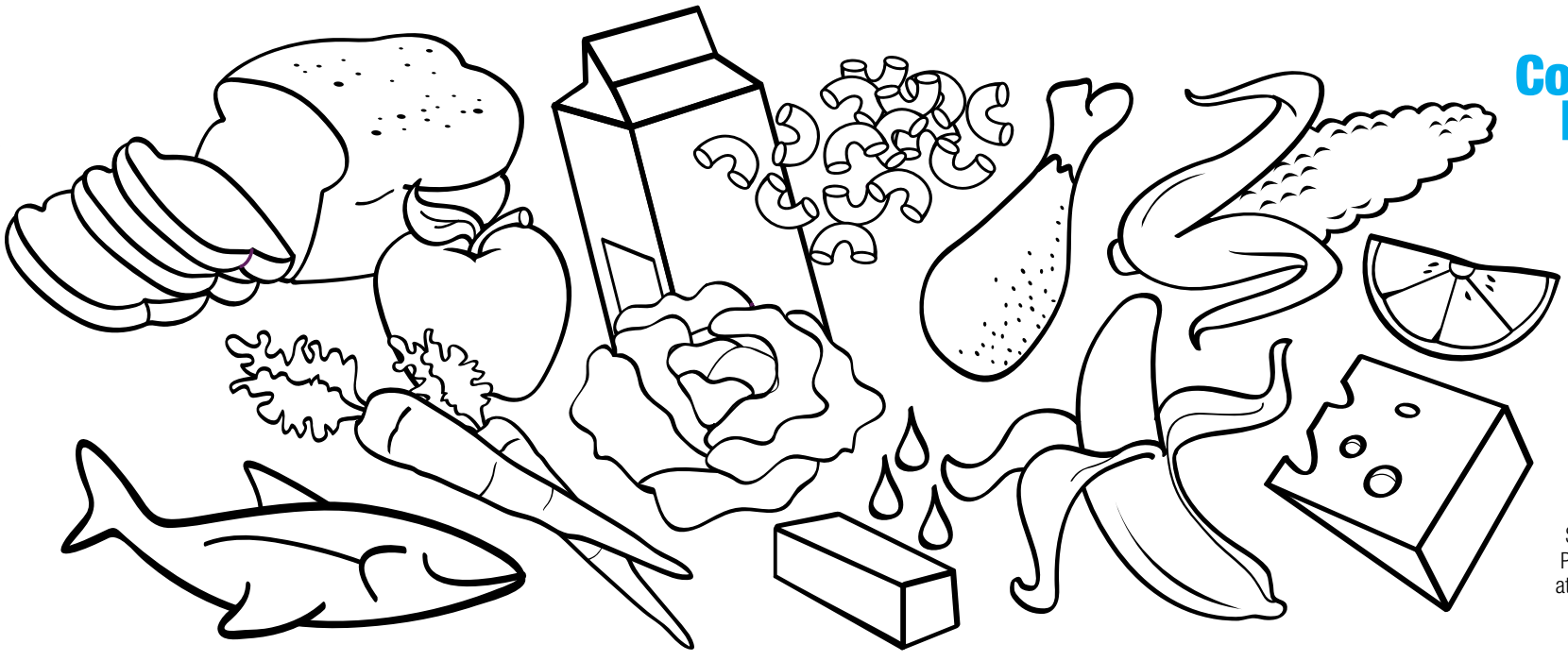
In addition to carbohydrates, fats, and proteins, vitamins and minerals are also essential for a healthy lifestyle. Your bones are made from a mineral called calcium. Your eyes need vitamin A to be able to see at night. Fruits and vegetables contain lots of vitamins and antioxidants.

Antioxidants are believed to help reduce your chance of getting cancer and heart disease. Deep-colored fruits and vegetables, like blueberries, tomatoes, and spinach, have these nutrients. Certain types of vitamins are considered antioxidants too. Examples include Vitamin C (read the chart below to see where you can find Vitamin C) and E (found especially in sunflower oil, nuts like almonds, and dark green leafy vegetables like kale).

It is a good idea to eat a variety of foods and to be active for 30–60 minutes every day. Doing both will help you lead a healthier life.



Food Pyramid derived from U.S. Department of Agriculture Food Pyramid. For more information go to www.MyPyramid.gov.



Color Pyramid

Using the picture above as your guide, color in the foods to match their category.

Solution to Color Pyramid can be found at chemistry.org/ncw

	Found in	What it does	If you don’t get enough
Vitamin A	Green and yellow vegtables	Helps you see, helps skin cells grow	Problems seeing at night, flaky skin
Vitamin K	Cabbage, spinach, leafy green vegetables	Protects blood cells, important for muscles	Weak blood cells and muscles
Vitamin C	Citrus fruits, tomatoes	Helps fight infection and heal wounds; needed to make collagen found in muscle and bone	Weakness (anemia), cuts that do not heal well
Calcium	Spinach, milk	Helps grow strong bones and teeth, important for muscles	Poor bones and teeth
Potassium	Bananas, vegetables	Assists in muscle-building, muscle movement, and sending messages through the nerves	Muscle and nerve weakness, dry skin
Antioxidants	Chocolate, dark-colored fruits and vegetables	Helps lower cholesterol, reduces risk of heart disease and infection	Weakened immune system

Eloy Rodriguez

Natural Products Chemist

What is your title and where do you work?

Professor and Research Scientist, Cornell University in Ithaca, New York

What is your job?

I take students to the jungle to collect and study samples such as small frogs, spiders, ants, birds, and plants. In the laboratory, students help me identify the chemicals found from the samples and test how they work against diseases like cancer and diabetes.

What is the coolest part about what you do?

I think it is cool to talk to the Amazon Indians and learn how they use plants to cure malaria and other jungle diseases. But what I like most is finding how a natural medicine actually cures.

How did you get there?

I received a B. A. in chemistry and biology and then earned my Ph. D. in natural products chemistry and biology.

What was your favorite subject in school?

Math, biology, and anthropology of Latin America

What made you first interested in science?

I enjoyed walking and being in nature with my grandpa. I especially liked trying to find giant tarantulas, snakes, raccoons, and opossums.

How would someone come in contact with your work?

My pictures and research have appeared in many elementary school books and magazines. If students have a computer, they can also read about my research through the internet, www.plantbio.cornell.edu/people.html.

Do you have any other advice for students?

Nature is fascinating and beautiful. You should learn more about science because it affects all aspects of your life, from what foods you eat to what medicines you take. Read more to learn more about science and nature.

Starch Search

Natural products chemists use or test resources found in nature, like plants. Plants contain many types of chemicals and use a type of chemical called starch to store their food. Starch is a carbohydrate that your body needs, in proper amounts, for energy. In this activity, you will use a chemical called iodine to test whether certain foods contain starch.

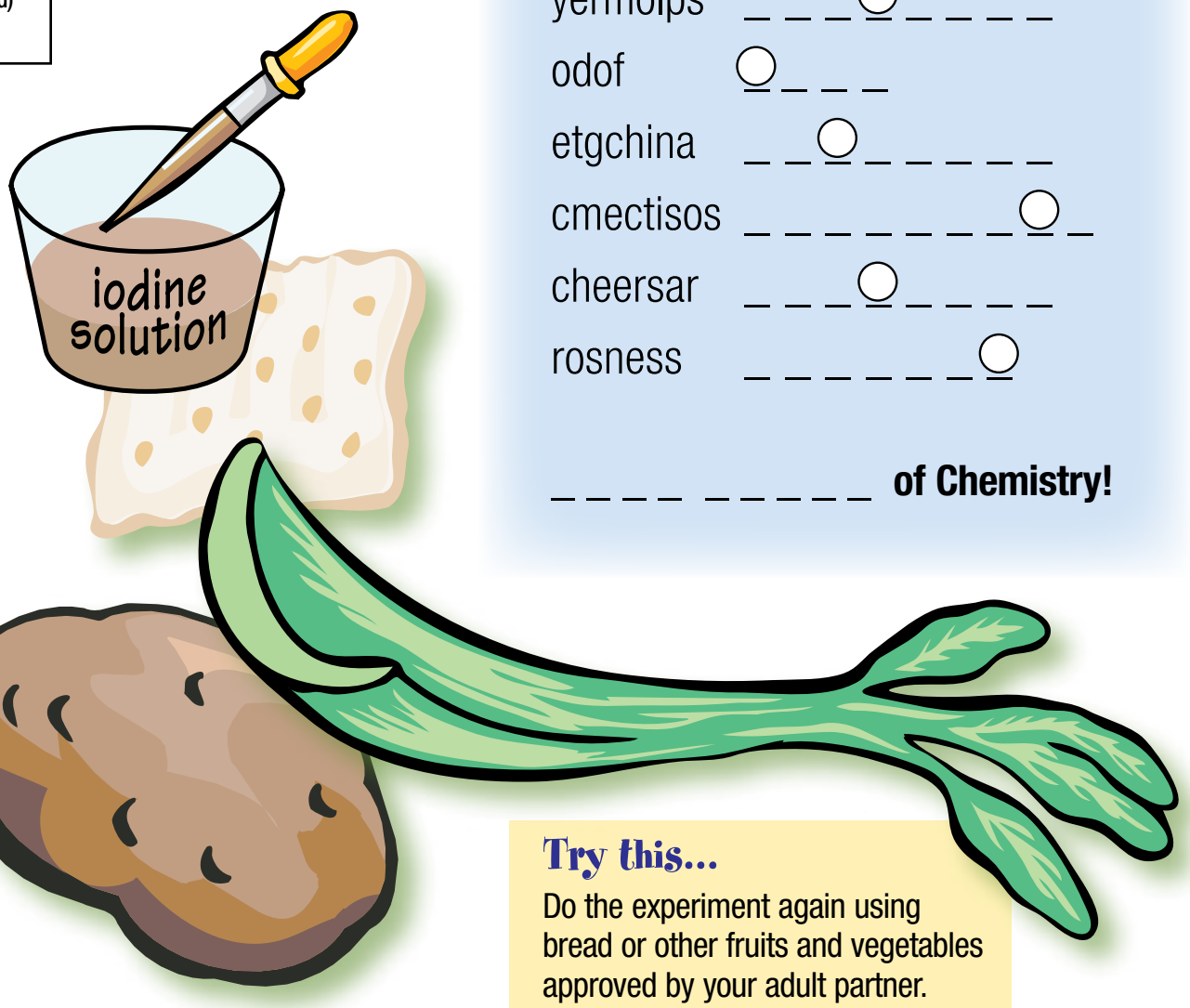
Materials

- Newspaper
- Sheet of white paper
- Marking pen
- Measuring spoons
- Tincture of iodine
- Water
- Clear plastic cups (4 oz.)
- Paring knife (for adult partner use only)
- Eye dropper
- Celery
- Crackers (light-colored)
- Potato

SAFETY! *Be sure to follow Milli's Safety Tips and do this activity with an adult! Do not eat or drink any of the materials used in this activity.*

Procedure

1. Cover your work area with newspaper. On the sheet of white paper, label three areas as follows: celery, cracker, and potato.
2. Using the marking pen, label the cup "iodine solution".
3. Have an adult partner add ¼ teaspoon of iodine and 2 teaspoons of water to the "iodine solution" cup (the liquid should be brownish yellow).
4. Have an adult partner cut a thin piece of potato and ½" piece of celery (make sure to clean the knife for each to avoid carrying any starch from one to the other).
5. Place the potato and celery pieces, as well as ½ a cracker on its area of the white paper.
6. Use the eyedropper to place 2-3 drops of iodine solution on each type of food. What did you observe? Which foods turned a different color? Write your observations in the "What Did You Observe?" section.
7. Throw all food items away, thoroughly clean the work area, and wash your hands.



What Did You Observe?

Which color did the foods turn the iodine solution?

Food	Celery	Cracker	Potato
Color			

Word Scramble

Unscramble the words in the list, which are related to the profiled chemists and their careers. Place each letter in its blank to the right. When you have unscrambled all the words, the circled letters will reveal a secret message.

scindeime ◯_ _ _ _ _ _ _ _

sarfregnca _ _ ◯_ _ _ _ _ _ _

runttsien _ _ _ _ _ _ ◯_ _ _

yermolps _ _ _ ◯_ _ _ _

odof ◯_ _ _ _

etgchina _ _ ◯_ _ _ _ _

cmectisos _ _ _ _ _ _ _ ◯_

cheersar _ _ _ ◯_ _ _ _

rosness _ _ _ _ _ _ ◯

_ _ _ _ _ _ _ _ _ of Chemistry!

Try this...

Do the experiment again using bread or other fruits and vegetables approved by your adult partner.

Where's the Chemistry?

If the food sample turned a blue-black color, it contained starch. A chemical reaction happened between the iodine and the starch to make the color change.

Loreni Gonzalez-Kerecman

High School Chemistry Teacher

What is your title and where do you work?

High school chemistry teacher, Liberal Arts and Science Academy at Lyndon B. Johnson High School, Austin, Texas

What is your job?

I teach chemistry to sophomores, juniors, and sometimes seniors. I ask my students to design chemistry experiments to show me what they understand. We play games to review concepts, have cool chemistry demonstrations with food, colorful reactions, and light to show the chemistry that we are studying.

What is the coolest part about what you do?

My job is flexible, but structured. I enjoy choosing which chemical activities I will do with the students. These activities must follow a set of rules that were created by the state of Texas. Plus I get to work with young people. They are fun, bring great energy, and make our lessons different each day!

How did you get there?

I worked as a research chemist after I earned my B. S. in industrial chemistry and M. S. in analytical chemistry. I really wanted to work with people, so I earned my teaching certificate.

Do you have any advice for those who want to become chemistry teachers?

You need to enjoy the age group you teach and be very patient with them. You will need to know chemistry, but most importantly, to be able to "show it" to others so that they will become interested in it too.

What was your favorite subject in school?

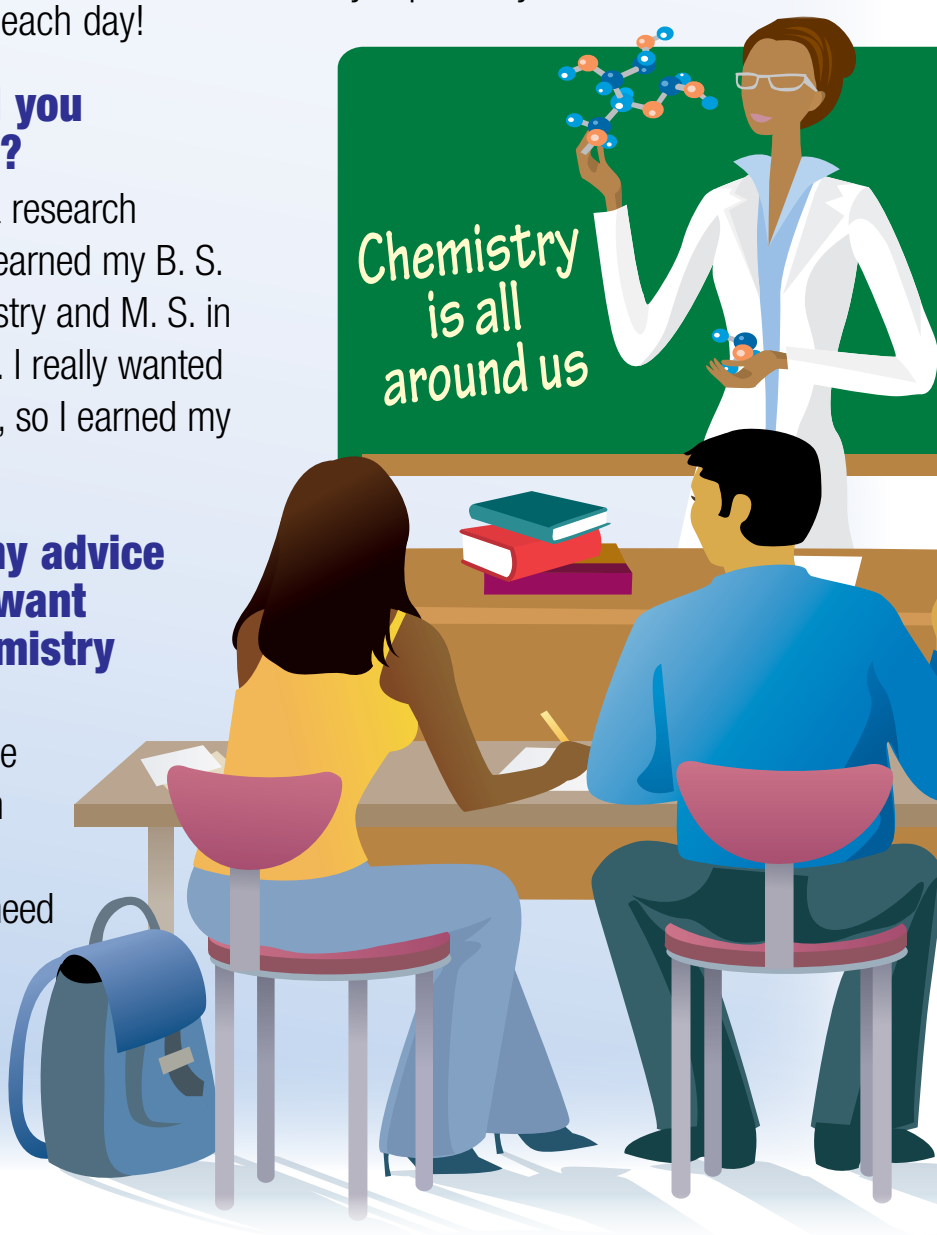
Spanish literature

What made you first interested in science?

One of my college chemistry teachers invited me to participate in a summer research position. It excited me and I have been hooked ever since.

Do you have any other advice?

Don't be afraid of chemistry. Give it a chance, since it will come up in every aspect of your life.



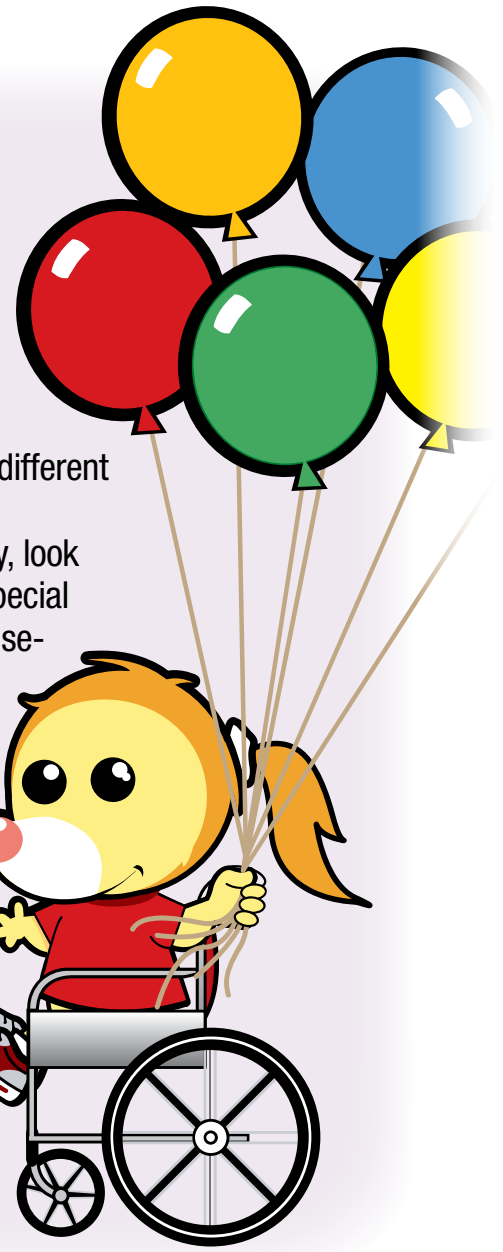
You Can Be a Chemist!

Chemistry is the science that helps us learn what the world is made of and how it all works together. Everything is made of chemicals—our bodies, our pets, our houses, the toys we play with, the medicines we take, and the food we eat.

Many chemists work in laboratories to solve problems and to make new materials. Laboratory chemists are often inventors. They invent new types of plastics and fibers, for example. They also develop medicines, cosmetics, and high-tech products like bright colors for computer screens. Some chemists are teachers, and help students learn about the world around them. There are chemists who restore old works of art and others who work as attorneys and writers. Because chemistry is part of everything, chemists work in many different fields and have a wide variety of jobs.

If you want to learn more about chemistry, look for summer camps, field days, and other special events and projects. Local colleges and museums frequently sponsor programs for K-12 students with an interest in science. Your school guidance counselor or science teacher can also talk to you about these programs and possible careers in chemistry.

The exciting work of chemists will never end. We always need new products, better ways to protect the environment, and more information about the world around us. For articles and other information about chemistry, visit the ACS website, chemistry.org.



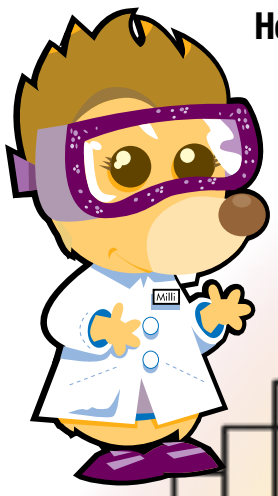
The Many Faces of Chemistry WORD SEARCH

D	Q	R	U	V	G	P	D	Q	T	T	V	B	T	U	N	I	Q	M
G	G	T	E	R	W	W	Q	Z	A	E	C	C	M	I	H	P	Z	D
Z	F	E	N	H	C	N	T	Q	T	S	Z	P	R	R	R	X	M	O
Z	L	J	O	R	C	P	W	E	P	P	E	Q	U	E	C	D	V	K
R	T	O	Q	L	D	A	R	T	J	F	Q	W	L	H	X	D	V	G
O	L	F	R	V	O	I	E	V	T	Y	K	D	Y	C	I	U	R	Q
T	P	P	E	P	N	G	R	T	L	Q	H	L	B	R	L	I	M	P
C	V	F	Q	A	W	L	I	V	Y	I	O	S	X	A	O	Q	H	A
O	A	C	R	Q	A	I	P	S	E	Q	Z	E	A	E	O	X	T	N
D	S	I	K	A	W	Z	Z	O	T	Q	W	B	C	S	U	H	A	B
T	A	R	E	H	P	A	R	G	O	T	O	H	P	E	D	I	O	D
N	S	K	O	I	X	J	G	Y	I	K	J	Z	I	R	C	T	K	U
W	H	I	T	S	I	T	N	E	D	Q	W	S	Y	I	A	R	P	A
J	F	C	C	E	C	O	L	O	G	I	S	T	N	N	E	H	J	T
D	Y	L	Q	A	P	X	R	T	Y	F	A	H	I	T	D	A	O	T
K	M	P	R	V	M	E	R	C	W	J	C	S	I	F	T	I	A	O
K	M	D	C	O	H	R	C	E	J	E	T	R	W	U	G	A	N	R
X	K	A	I	Z	M	B	A	Z	T	Z	W	T	O	O	H	D	W	N
Z	Q	U	V	I	N	O	K	H	E	J	B	B	B	I	J	V	Z	E
O	G	I	L	Y	A	I	J	M	P	X	T	O	Y	N	E	P	Z	Y

ATTORNEY
BOTANIST
DENTIST
DOCTOR
ECOLOGIST
GEOLOGIST
PHARMACIST
PHOTOGRAPHER
RESEARCHER
TEACHER
TECHNICIAN
VETERINARIAN
WRITER

answers on back page

Milli's Maze



Help Milli get through the maze to school.

START HERE

FINISH HERE

Solution to Milli's Maze can be found at chemistry.org/ncw

Celebrating Chemistry is a publication of the American Chemical Society's (ACS) Office of Community Activities in conjunction with the Committee on Community Activities. The Office of Community Activities is part of the ACS Division of Membership and Scientific Advancement. The National Chemistry Week (NCW) edition of *Celebrating Chemistry* is published annually and is available free of charge through your local NCW Coordinator. NCW is a combined effort among the Office of Community Activities, the Committee on Community Activities, and several ACS Technical Divisions. Please visit chemistry.org/ncw to learn more about National Chemistry Week.

Solution to Word Scramble on page 13

scindeime (m)e d i c i n e s
sarfregnca f r (a)g r a n c e s
runttsien n u t r i e (n)t s
yermolps p o l (y)m e r s
odof (f)o o d
etgchina t e (a)c h i n g
cmectisos c o s m e t i (c)s
cheersar r e s (e)a r c h
rosness s e n s o r (s)

(M)a(n)y (F)a(c)e(s) of Chemistry!

Solution to Word Search on page 15

D Q R U V G P D Q T T V B T U N I Q M
G G T E R W W Q Z A E C C M I H P Z D
Z F E N H C N T Q T S Z P R R R X M O
Z L J O R C P W E P P E Q U E C D V K
R T O Q L D A R T J F Q W L H X D V G
O L F R V O I E V T Y K D Y C I U R Q
T P P E P N G R T L Q H L B R L I M P
C V F Q A W L I V Y I O S X A O Q H A
O A C R Q A I P S E Q Z E A E O X T N
D S I K A W Z Z O T Q W B C S U H A B
T A R E H P A R G O T O H P E D I O D
N S K O I X J G Y I K J Z I R C T K U
W H I T S I T N E D Q W S Y I A R P A
J F C C E C O L O G I S T N N E H J T
D Y L Q A P X R T Y F A H I T D A O T
K M P R V M E R C W J C S I F T I A O
K M D C O H R C E J E T R W U G A N R
X K A I Z M B A Z T Z W T O O H D W N
Z Q U V I N O K H E J B B B I J V Z E
O G I L Y A I J M P X T O Y N E P Z Y

What is the American Chemical Society?

The American Chemical Society (ACS) is the largest scientific organization in the world. ACS members are mostly chemists, chemical engineers, and other professionals who work in chemistry or chemistry related jobs. The ACS has more than 160,000 members. The majority of ACS members live in the United States, but others live in different countries around the world. Members of the ACS share ideas with each other and learn about important discoveries in chemistry during meetings that the ACS holds around the United States several times a year, through the use of the ACS website, and through the journals the ACS publishes. The members of the ACS carry out many programs that help the public learn about chemistry. One of these programs is National Chemistry Week, held annually the fourth week in October. Another of these programs is Chemists Celebrate Earth Day, held annually April 22nd. ACS members celebrate by holding events in schools, shopping malls, libraries, science museums, and even train stations! Activities at these events include carrying out chemistry investigations and participating in contests and games. If you would like more information about these programs, please contact us at ncw@acs.org!