



MOUTH EXPERIMENTS!

A mini-book of fun science experiments you can do
right in your own mouth!

From HomeschoolFreebieOfTheDay.com

Copyright 2009, Jim Erskine, all rights reserved.

The material in this ebook is informational only, and neither the author or publisher is responsible for any misuse of the information contained herein.

Every effort has been made to make our resources as complete and accurate as possible. However, there may be mistakes both typographical and in content. Therefore, the texts should be used only as general guides and not as the ultimate sources of the subject matters covered. The author and publisher shall have neither liability nor responsibility to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information covered in this ebook.

Re-distribution of this ebook **is allowed** only as long as:

1. it is made freely available,
2. it is distributed by NON-commercial users, and
3. this file is not modified, edited or changed in any way.

Join us for FREE resources each and every weekday! Visit

HomeschoolFreebieOfTheDay.com

Experiments in your Mouth!

MAKE A TONGUE MAP

The four basic tastes we taste are: salt, sweet, bitter, and sour.

Did you know that only a certain area of your tongue can taste each of these tastes? In this experiment, you will make a map of your tongue and locate the specific areas where the four basic tastes can be tasted.

Materials:

Tongue Map (copy drawing on next page)

Cotton Swabs Twisted to a Point

Salt

Sugar

Pure Lemon Juice

Tonic Water or Black Coffee

4 Small Dixie Cups

Four Different Colored Pencils

Distilled Water

Spoons

Prepare weak solutions of the four basic tastes. Fill the four dixie cups with distilled water. Stir a small amount of sugar into one of the containers until it can be slightly but definitely tasted. Repeat procedure for the salt, lemon juice, and coffee .

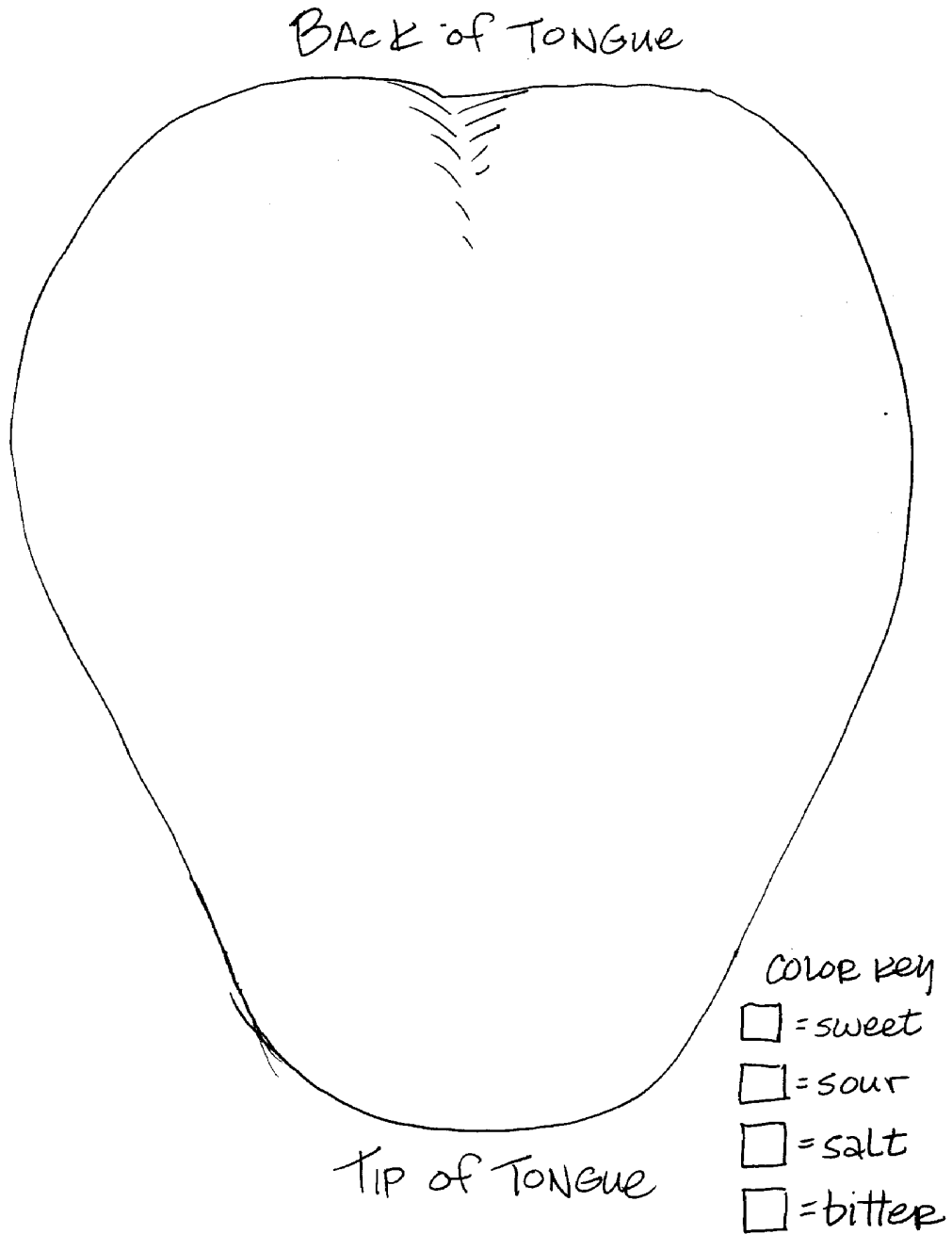
Dip the pointed end of the cotton swab into the salt solution and then gently dab a tiny amount to a spot on your tongue. If you taste salt in the solution, mark the spot with a small colored X (a different color should be used for each solution) on the Tongue Map. If you do not taste salt in the solution, do not mark that spot. Continue until the entire tongue is tested.

(Be careful when you dab close to the back of the tongue. You might gag yourself!)

When you have tested the whole surface of your tongue with one solution, rinse with distilled water and repeat with each of the remaining solutions.

Once you have completed the testing, you will have several small colored "x'es" on your tongue map. The "x'es" should show very specific areas of your tongue that are sensitive to sweet, salt, sour and bitter. Draw a circle around each section to differentiate the areas of taste.

A Map of My Tongue!



ROCK BREATH!

Materials:

Lime (not the fruit, but the pickling chemical available at your grocery)

straw

2 pint jars

Fill jar with water. Add one tablespoon of lime and stir. Screw on the lid and let the solution stand for 12 or more hours. Pour off half of the clear liquid into the second jar very carefully. Don't let any of the settled lime sneak in.

Use the straw to exhale your breath slowly into the limewater, until the clear limewater turns a milky color.

Why does this happen -- and what is in the jar?

Limewater always turns milky when carbon dioxide (CO₂) is mixed with it. The chemical in the limewater is dissolved calcium oxide (CaO). This combines with the CO₂ gas to form a white powder that will not dissolve in water. This white powder is actually limestone! Limestone is calcium carbonate (CaCO₃). If the solution is able to stand for several hours, the powdery limestone should settle to the bottom of the jar.

STUFFY SMELLERS

Materials:

Blindfold

Swimmer's Nose Plug (or hold nose with fingers)

Small peeled cubes of potato, apple, and onion

Put on a blindfold and plug your nose. Have another person put one of the cubes into your mouth. Try to guess what food it is. Repeat with the other samples.

What effect does your sense of smell have on your sense of taste?

HOT AND COLD

Materials:

orange juice

Pour some orange juice in an ice tray and let freeze. Pour some more in a cup and heat in microwave until very warm (not burning hot). Hold the frozen orange juice cube in your mouth for fifteen seconds. How strong is the taste? Next, take a drink of the warm juice and hold in your mouth for fifteen seconds. What effect does temperature have on your sense of taste?

A TASTY SCIENCE FACT:

The number of taste buds in our mouths changes throughout your life. Babies and children have many more taste buds than adults and adults lose more and more taste buds as they grow older. That's why many older people often eat less, and like spicier foods than kids.

DISAPPEARING GUM

Can you make a portion of a stick of gum disappear (without swallowing it)? This experiment will show you how this happens every time you chew a stick of gum -- and just what it is that disappears!

Materials:

2 sticks of chewing gum or bubble gum
small kitchen or postage scale

Remove the wrapper from your gum. Weigh it on your scale and record. Put it in your mouth and chew it for ten minutes, until the flavor is about gone. Take out gum and let dry for 24 hours. Now weigh the wad of gum.

You should find that it weighs only about $\frac{2}{3}$ of its original weight. Take your second piece of gum and tear off a portion of that piece until it weighs the same as your chewed gum wad. This will show you just how much mass the gum has lost.

Can you guess what part of the gum disappeared when you chewed it?

Your gum lost the sugar that was mixed in the gum to sweeten it. Just think -- a piece of gum is over $\frac{1}{3}$ sugar! Makes it easy to see where cavities come from, doesn't it?

FIREWORKS IN YOUR MOUTH

Did you know that crushing certain flavored Life Savers candies in your mouth can set off sparks? This experiment will demonstrate how light can be given off by a simple chemical reaction.

Materials:

A roll of "Wint-O-Green" mint Life Savers
a very dark room, a hand mirror or partner

Give your eyes a few minutes to adjust to the dark room before starting experiment. With a partner (or looking in the mirror) in a dark room, crunch the mint with your teeth with your mouth open. Your partner should see sparks of light generated when you bite on the candy.

Reverse the roles so that you can see the sparks in your partner's mouth. You can also achieve the same results by hitting the Life Savers with a hammer on a hard surface to observe the same quality of sparks.

Why does it do this?

When the candy is crushed, the friction of unlike charges (positive and negative, or + and -) causes loose particles called electrons to start a series of interactions between the nitrogen in the air, sugar, and candy molecules. This type of light is called "triboluminescence".

A TASTY SCIENCE FACT:

Insects like house flies and butterflies have taste buds on their feet. How would a meal be in your house if everyone's taste buds were on their feet?

A TASTY SCIENCE FACT:

Taste buds have a life span of less than ten days. They are then replaced by new ones.

AWFUL ORANGE JUICE

Materials:

toothbrush
toothpaste
orange juice

Take a sip of orange juice and note the different strengths of sweet, bitter and sour flavor on different parts of your tongue. Rinse your mouth out with water.

Next, brush your teeth briskly for one minute. Rinse your mouth. Now take a sip of orange juice again. For about 1/3 of people, the orange juice will still taste the same. But for 2/3 of people, it will taste very bitter.

Why?

About 2/3 of us have a "taste gene" on our tongue that greatly enhances our ability to detect bitter tastes. 1/3 of us do not have this gene. Almost all toothpastes contain an ingredient called sodium lauryl sulfate (SLS). SLS causes sweet tastes (sugar) to decrease, and at the same time causes bitter tastes to be strengthened almost ten times their original intensity. The sour/bitter taste of orange juice comes from citric acid. After brushing your teeth, you are tasting 10 times the amount of citric acid as normal! Yuck!

ELECTRIC ALUMINUM "GUM"

Materials: aluminum foil

Wad up a small piece of aluminum foil and chew it for a few moments. Notice any discomfort -- or is it just another wad in your mouth? Ask your parents to chew a wad of foil for a few moments. Does it cause them any discomfort? If so, why?

Aluminum decomposes in acidic environments, which means it's atoms tend to lose their electrons very easily. When chewed in our mouth, our slightly acidic saliva acts as a catalyst to increase this movement. In essence, our mouth becomes a primitive electric battery. Many people have silver fillings in their teeth. The electrons flow from the aluminum to the silver fillings. The current is felt by the nerves inside our teeth and -- zap! we feel an unpleasant "electric shock".

Another quick experiment: Pour a small glass of cola (a liquid lots more acidic than our saliva!) and drop a piece of aluminum foil in it. Let it sit for a day, then examine. The aluminum will have decomposed greatly, and will turn into a black sludge. (PS. Don't drink the coke -- yuck!) (So why doesn't a full aluminum cola can dissolve? It is coated with a thin protective coating of plastic!)

CHEMICAL REACTIONS IN YOUR MOUTH

Did you know that chemical reactions are going on all the time in your mouth, especially when you chew? Let's see what happens to starch in our mouths.

Materials:

piece of white bread

iodine (poison alert! use caution)

wax paper

Cut two one-inch squares from a piece of white bread. Put one square in your mouth and chew it about 30 times, making an effort to mix as much saliva as possible with the bread.

When the bread is good and squishy, spit it out onto a piece of wax paper. (Yum!) Put the other dry piece of bread onto a separate piece of wax paper. Drip four drops of iodine to each bread sample. What happens? The unchewed bread turns a dark blue-purple color. The chewed up bread-saliva mixture does not turn dark.

Why does this happen?

The starch in the bread combines with iodine to form iodine-starch molecules, which are blue-purple in color. Chewing the bread mixes it with saliva. This is where the chemical reaction occurred in your mouth: the large starch molecules were changed into completely different, smaller, sugar molecules. Sugar does not react with iodine in the same way that starch does.

Chemists can use iodine as an "indicator" for starch. Try testing for starch in other foods, like a cracker, a piece of dry cereal, or a cookie! Also remember, iodine is poisonous -- DO NOT EAT ANYTHING THAT HAS THE IODINE IN IT!

500 BUMPS AND 10,000 ORANGES

Materials: Magnifying glass, orange (peeled)

Look at your tongue using a mirror and magnifying glass. Look at your parent's or brother or sister's tongue. Describe what you see. What do you think the bumps are?

You may think the bumps on your tongue are taste buds, but they are actually "papillae". Your taste buds are actually groups of 30 or more cells that fit together just like the segments of an orange. (Peel your orange and then take a look at how the sections of your orange fit together. The top of the peeled orange looks very similar to the taste buds on your tongue!) The tastes find their way in through the hole in the top of the taste bud. There are around 500 papillae on your tongue. There are 200 taste buds on each papillae. Therefore, there are almost 10,000 total taste buds on the average adult tongue. Taste buds are located on the tongue, the back of the mouth and even down into the throat.

The End