

Children's Museum
October 21st, 2023

**The Healing Power of Chemistry
– From Coughs to Cancer**



Safety First!

- Safety glasses required for all demonstrators!
- Safety glasses for participants of Radish Writing
- Gloves for demonstrators

Color Change with Juices

- Fill a clear plastic cup 1/3 full with red cabbage juice (purple)
- Add a little acid (vinegar) at a time until it changes bright pink, swirl to mix and then add base (Sodium bicarbonate) solution until it turns green. Experiment: how does it work adding base then acid?
- Explain that red cabbage acts like a pH indicator changing natural acid color (red) to green (base)
- Try grape juice – is it an indicator too? (use very little and dilute with water)

Radish Writing

- Draw a picture using a radish
- Spray picture with base solution (quarter cup of Sodium Bicarbonate in spray bottle full of water) Turns color!
- Spray with acid (half cup of vinegar in spray bottle full of water) Turns back to red!
- Spray with bleach (half cup of bleach in spray bottle full of water) Writing disappears!

Slime!

- Mix 25ml of clear School Glue diluted 1:4 with water (preprepared)
- Add a couple drops of the food color the child likes and stir
- Add 10 ml of borax solution (a saturated solution of 20 Mule Team Borax in water)
- Stir completely – watch reaction!
- Place slime in a plastic baggie for child to take home

Play Doh Table

- Kids can create molecules and designs using Play Doh play kits and plastic coffee stir sticks.
- Make beautiful flowers out of Play Doh! Prize for the best each hour!
- Make sure babies don't put Play Doh or stir sticks in their mouths



The Healing Power of Chemistry

Theme Table

- Willow bark to Aspirin
- 3500 year old Ebers Papyrus recommended treating inflammation with a concoction made from the white willow tree
- Hippocrates championed willow bark for the pain of childbirth, Roman doctor Celcius described the treatment of inflammation (redness, swelling, pain with willow leaves)

Willow bark to aspirin

- In 1763, Reverend Edward Stone treated 50 patients with fevers with powdered willow bark. It worked!
- By 1828, salicin was isolated from willow bark. It could be converted to salicylic acid in the laboratory which irritated the stomach
- .In 1897, Felix Hoffmann, working for Bayer, synthesized acetylsalicylic acid producing what we know today as aspirin

Willow Bark

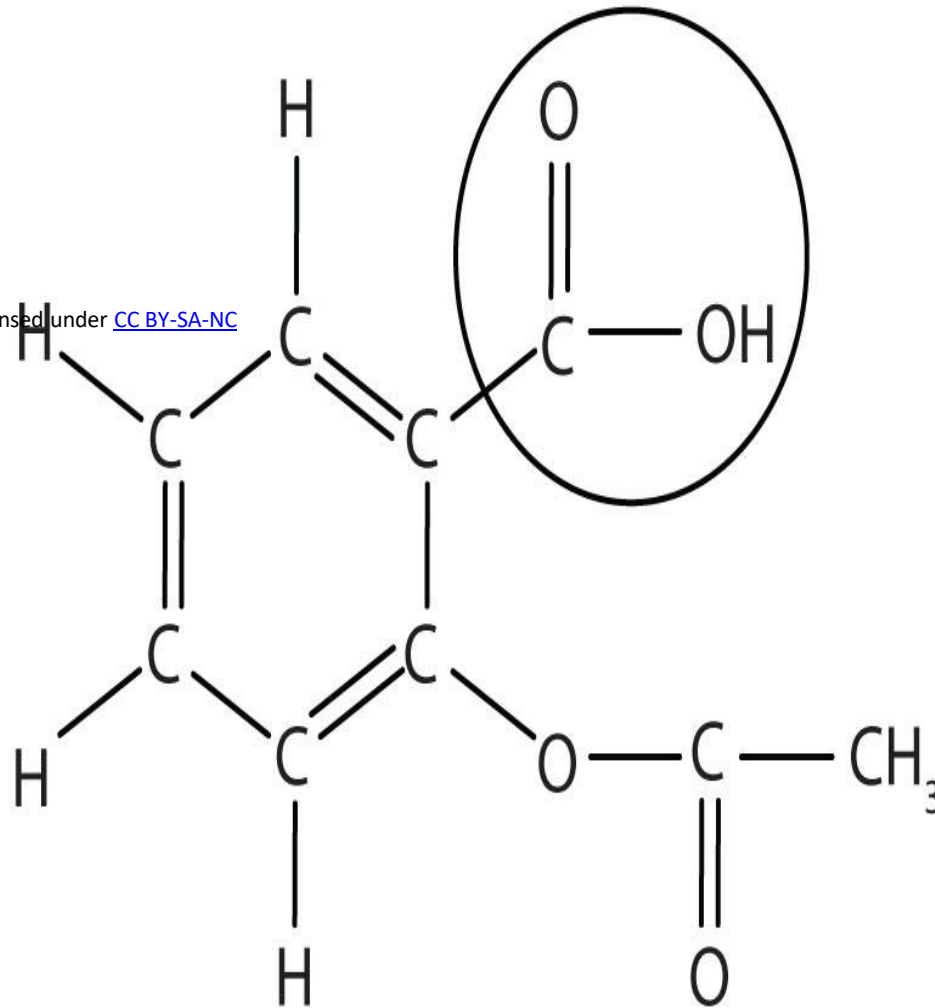


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Acetylsalicylic Acid

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Aspirin



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Benefits of Aspirin



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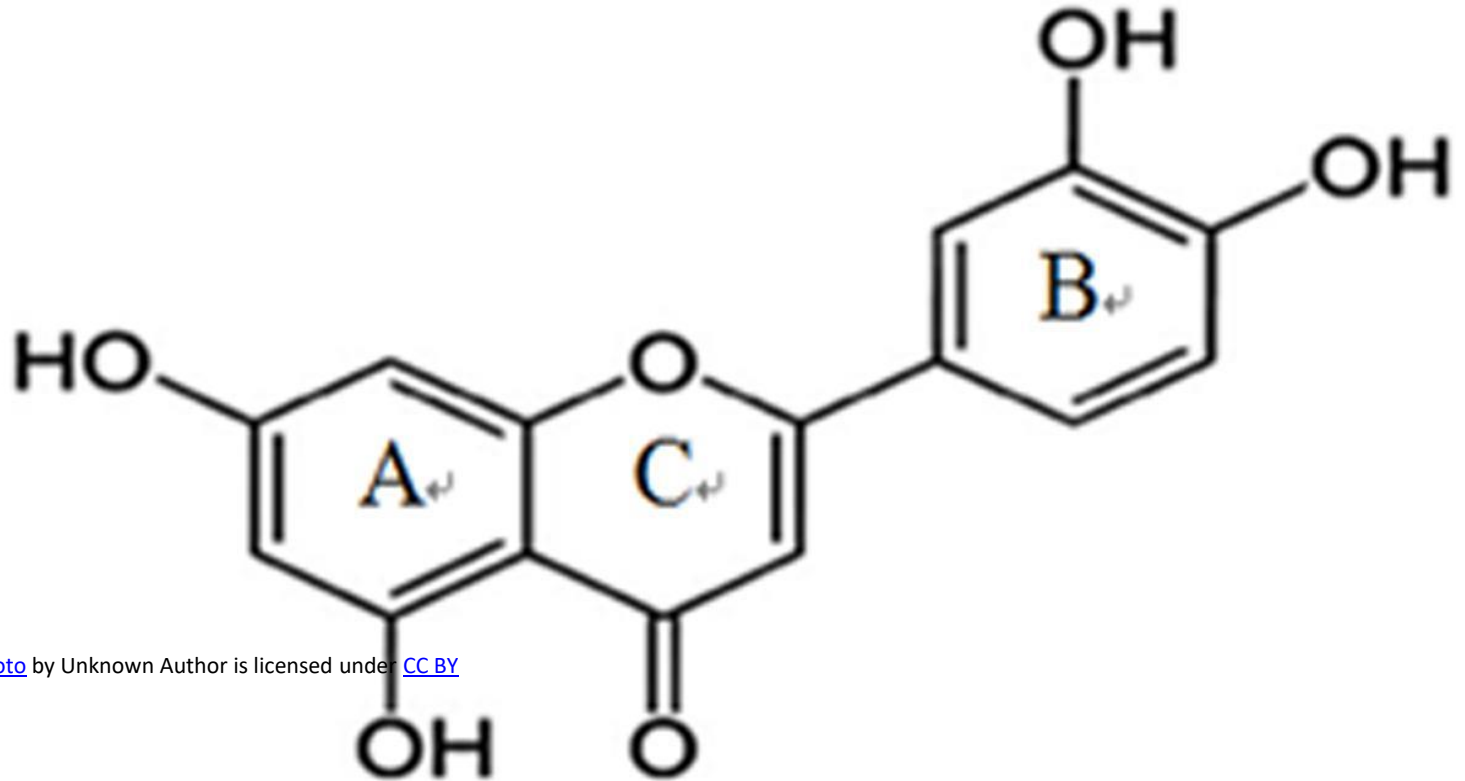
- Pain reliever
- Fever reducer
- Anti-inflammatory
- Anti-coagulant (prevents blood clots)
- Can help prevent heart attack and stroke
- Can reduce brain plaque causing Alzheimer's disease
- Lowers cancer risk

Hawthorn Berries



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Active Ingredient in Hawthorn Berries



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3', 4, '5, '7'-tetrahydroxyflavone

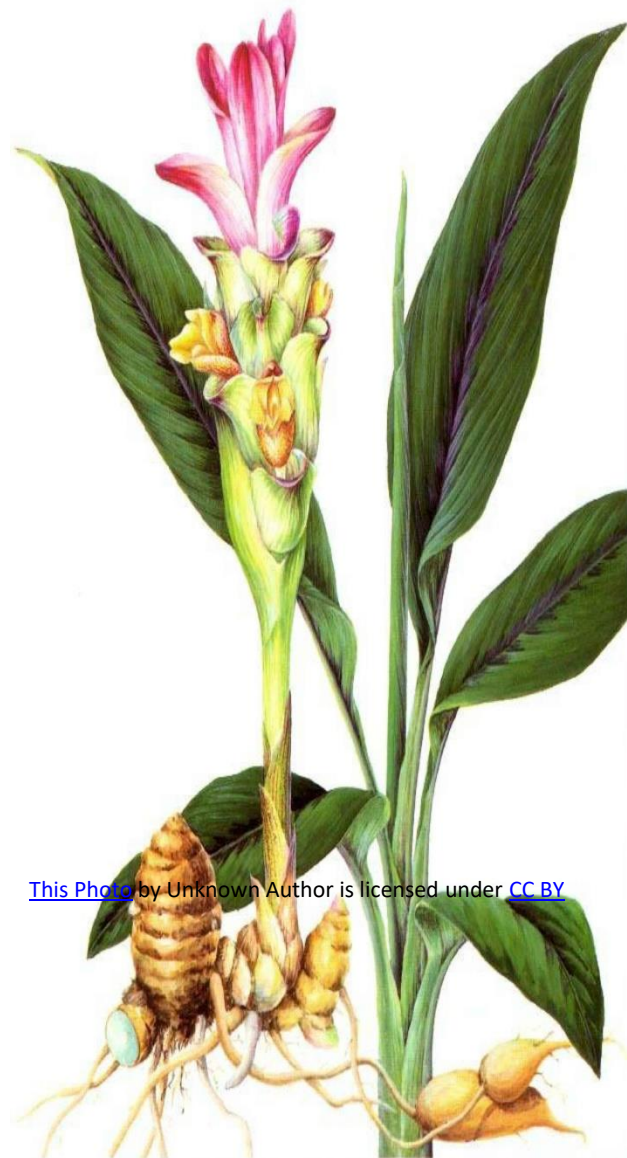
Hawthorne Berries Capsules



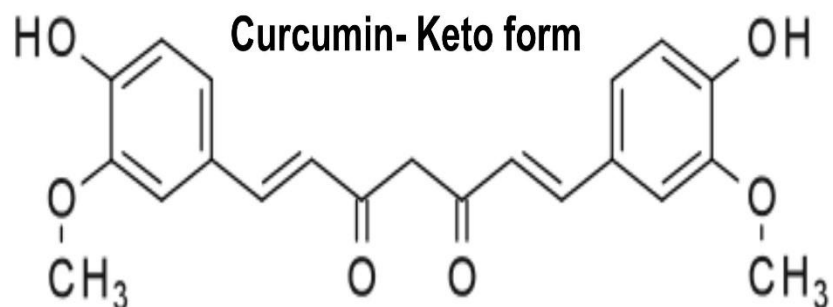
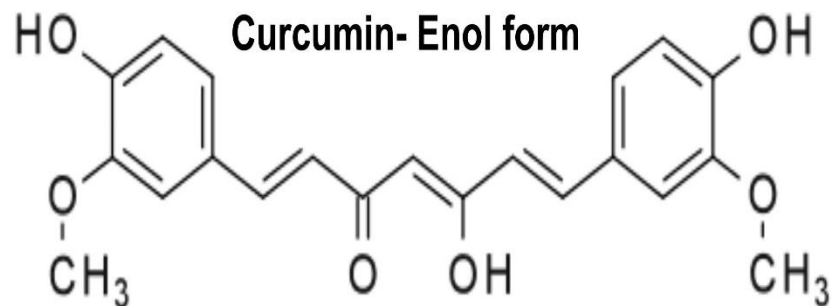
Benefits of Hawthorn Berries

- Used to protect against heart disease
- Increases coronary blood flow
- Decreases effects of heart failure
- Helps control high blood pressure
- Helps control high cholesterol
- Treats boils and skin sores
- The plant grows in East Texas!

Curcumin/Turmeric



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Turmeric/Curcumin



Benefits of Curcumin/Turmeric

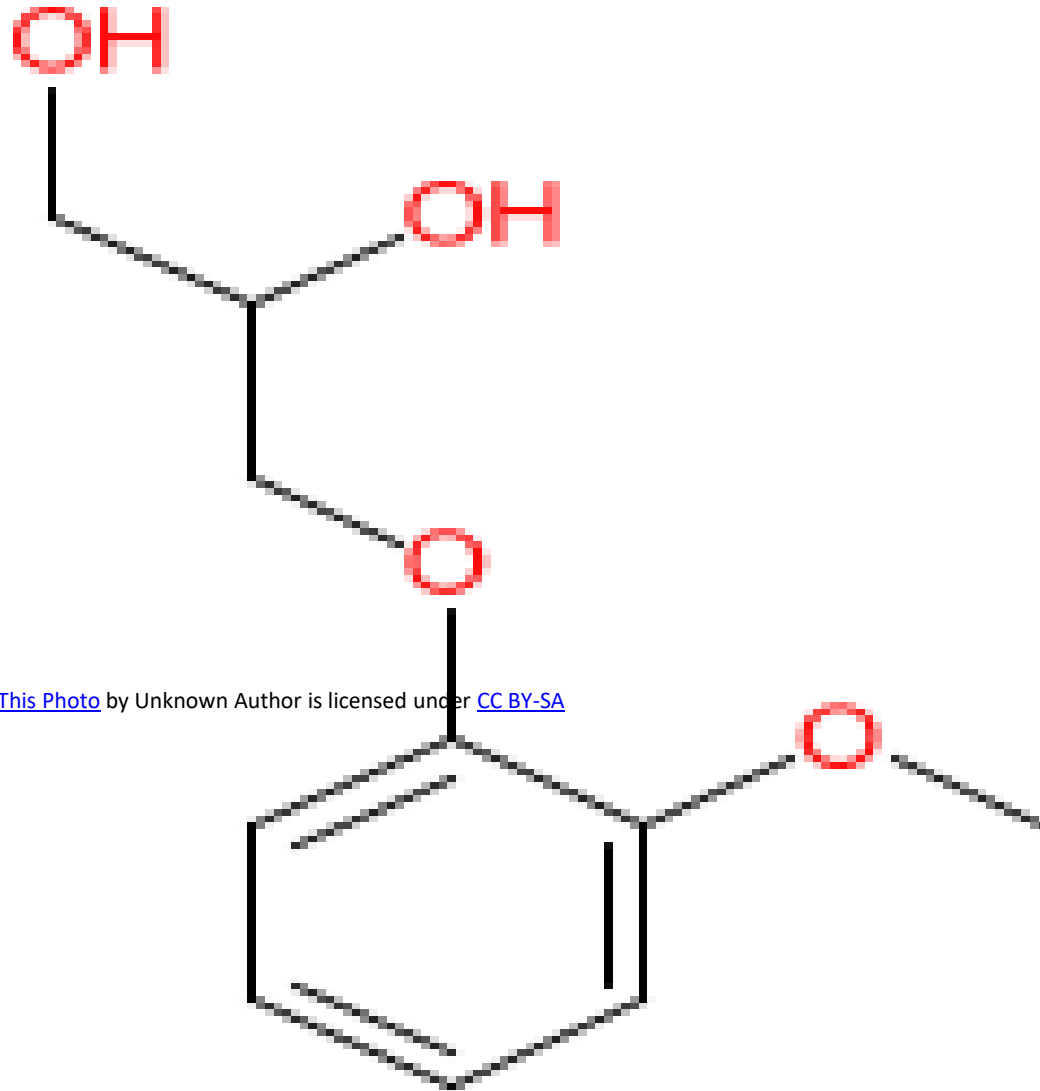
- Anti-cancer herb
- Antioxidant
- Anti-inflammatory
- Improves heart health
- Helps manage metabolic syndrome
- Helps manage arthritis, anxiety
- Anti-bacterial, anti-fungal

Guaiac tree/Guaifenesin



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Guaifenesin structure



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Guaifenesin Cough Syrup



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Benefits of Guaifenesin

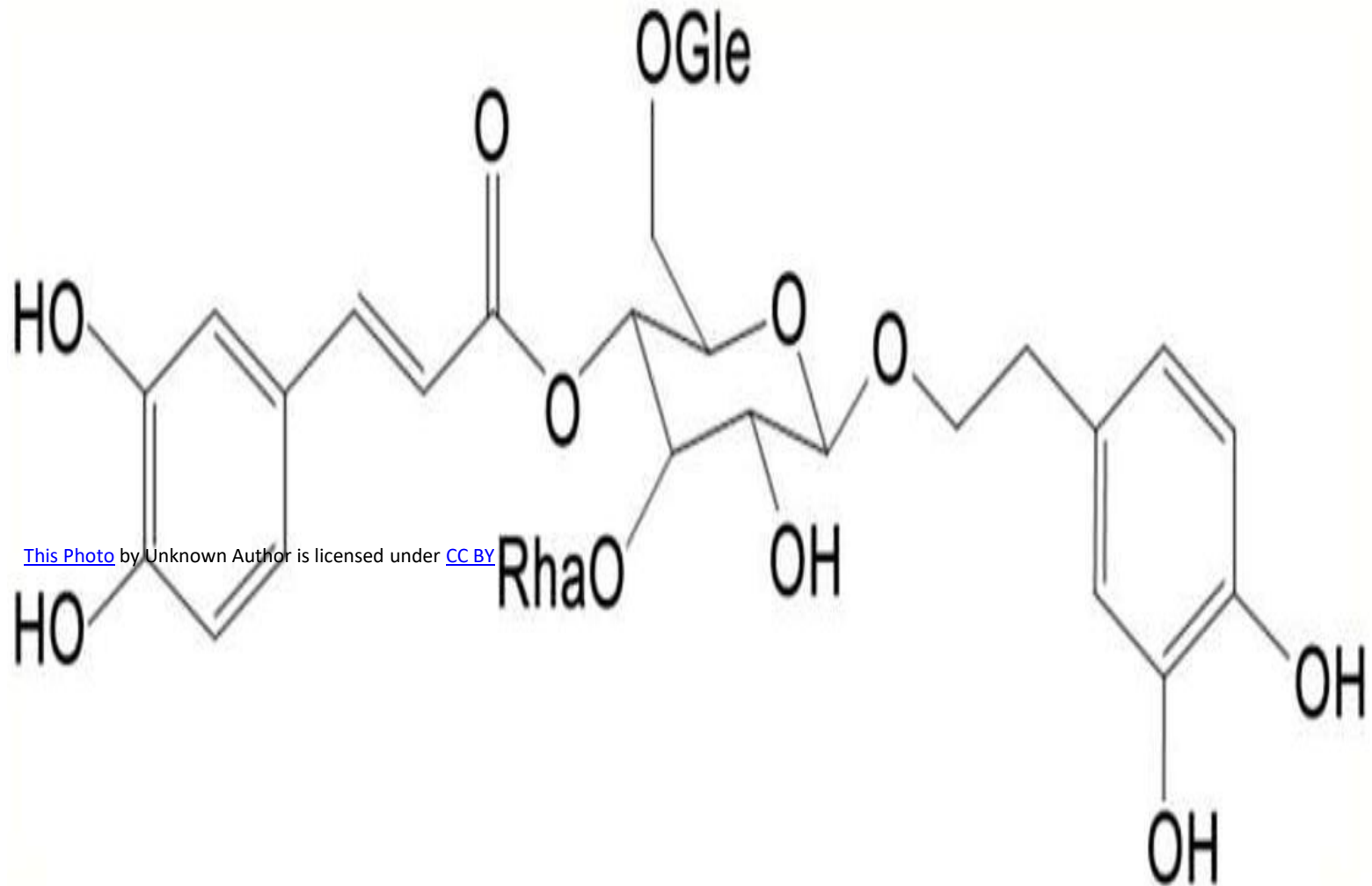
- Ancient Native American remedy for cough
- Clears mucus/phlegm from the chest
- Promotes healing of cold/flu
- Expectorant to expel mucus easily
- Clears airways for better breathing

Echinacea/Coneflower



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Echinacea structure



Echinacea Tea



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Echinacea benefits

- Immune system booster
- Shortens duration of colds, flu
- Reduces symptoms such as sore throat, cough and fever
- Helps the body fight infections