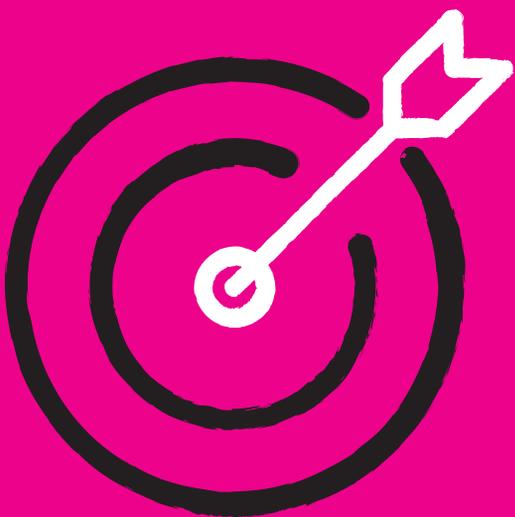


Lesson One:

Tobacco 101 - Introduction to Tobacco

Before students can work to create change, they must understand the root of the problem. Tobacco has a long and complicated history in the United States, and the health consequences of using tobacco are extensive. After today's lesson, the students will have a deeper understanding of how tobacco impacts the lives of Americans. Throughout the upcoming lessons, students will dive into more specific issues surrounding tobacco use in the United States.



Learning Objectives

After Lesson One, students will be able to:

- 1 Explain how tobacco use impacts the lives of Americans;
- 2 Identify key ingredients in tobacco products and how they affect the human body; and
- 3 Restate key facts about tobacco products and the tobacco industry.

Materials Needed

- Whiteboard markers
- Post-It notes
- Agree/Disagree signs
- Copies of Tobacco 101 factsheet
- “What’s in a cigarette?” cards
- “What’s in a cigarette?” activity kit
- Tobacco ingredient list
- Half sheets of paper for exit ticket

Overview of Lesson

- Warm-up Activity and Discussion: **5 minutes**
- Agree/Disagree Activity: **15 minutes**
- Tobacco 101 Factsheet and Discussion: **10 minutes**
- “What is in a cigarette?” Activity: **15 minutes**
- Debrief: **10 minutes**
- Exit Ticket: **5 minutes**



TOTAL TIME: 60 minutes

Before the Lesson

- Put up the Agree/Disagree signs.
- Draw the number line for the warm-up activity.
- Write out two or three long ingredients from the tobacco list. Tape a piece of paper over these words until the activity starts.
- Write the discussion questions on the board or make a PowerPoint slide to project.

Agree/Disagree Activity

TOTAL TIME: 15 minutes



- Give the students the following directions: “On one side of the room, you will see a piece of paper that says “Agree.” On the other side of the room there is a sign that says “Disagree.” I’m going to read a statement and you will move to the side of the room that matches your view. If you are touching the Agree or Disagree wall, that means that you feel very strongly about what I just said. If you’re on one side of the room but not touching the wall, it means that you have an opinion about the topic, but it might not be a strong opinion. If you’re standing in the middle of the room, that means you have no opinion about what I just said.”
- If there are many English language learners in the class, you should move to the different parts of the room as you explain how this activity works. The visual reference will reinforce your verbal instructions.
- Instruct students to stand up and move to the middle of the room.
 - **Statement 1:** “Hard drugs, like heroin or cocaine, kill more people in a year than cigarettes. Agree or disagree?” Students will move to their spot. Ask three students (one in the middle and one on each end of the spectrum) to explain their thinking.
 - **Statement 2:** “If a substance is legal, it must not be that dangerous. Agree or disagree?” Students will move to their spot. Ask three students (one in the middle and one on each end of the spectrum) to explain their thinking.
 - **Statement 3:** “In order to keep making money, the tobacco industry needs 5,000 new people to become smokers every single day. Agree or disagree?” Students will move to their spot. Ask three students (one in the middle and one on each end of the spectrum) to explain their thinking.
- Ask students to sit back down at their desks.
- Teacher will say the following to the class:

“We’ve all heard that tobacco is harmful. Typically, we think other things, such as hard drugs and alcohol, are more deadly. Every day, 128 people die from using hard drugs, such as heroin or cocaine. Alcohol kills people too. Each day, 241 people die from alcohol-related causes. However, tobacco is the biggest killer in the United States. Every single day, in the United States alone, 1,315 people die from tobacco use. That’s 480,000 people in a year. Three out of the four people who die from tobacco started using before they were 18. About half of them started using tobacco before they were 13. Tobacco kills. Not instantaneously, like hard drugs or alcohol. Tobacco kills people slowly. The tobacco industry must recruit 5,000 new smokers every day to replace the people that die or quit. This means the tobacco industry needs to recruit youth. Simply put, tobacco is the only legal consumer product that when used for its intended purpose will kill you.”



Tobacco 101 Factsheet and Discussion



- Ask for a different student to read aloud each fact from the Tobacco 101 Facts handout (pg 6).
- In classrooms with many English language learners, the concept of secondhand smoke may need to be explained. Give a straightforward explanation such as “secondhand smoke is when someone who is not smoking breathes in cigarette smoke.”
- After the students have finished reading the document, ask them to turn and tell their neighbor one thing they learned from the factsheet that surprised them. Allow two minutes for this mini-discussion.
- Call the students back together and ask for volunteers to share with the large group what they learned.

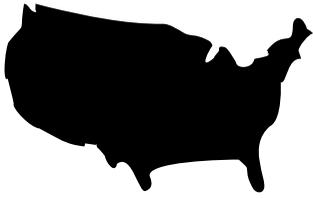
If students aren't giving a lot of responses, ask the following questions to elicit more responses. Give the students some time to think before you jump in with a response.

1. Are you surprised that so many people continue to smoke even though we are aware of the dangers of tobacco use?
2. How do you feel about the fact that Minnesota spends \$3 billion a year to take care of people who smoke?
3. What steps do you think we should take to break the cycle of people becoming addicted to tobacco?

NOTES

Tobacco 101 Facts

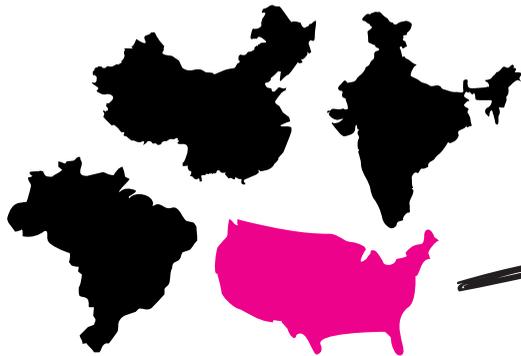
In 2013, tobacco companies spent **\$9.6 billion** marketing cigarettes and smokeless tobacco in the United States alone. ^{1,2}



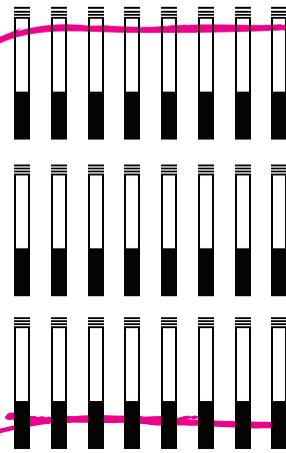
This amount translates to about: ^{1,2}



The United States is the **fourth largest tobacco-producing country** in the world, following China, India and Brazil. ³



In 2014, nearly **264 billion** cigarettes were sold in the United States. ³



264,000,000,000

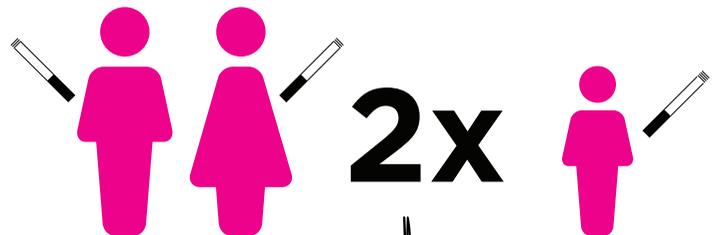
Each year, smoking costs Minnesota **\$3 billion** in health care costs. ⁴



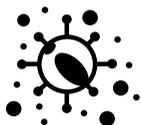
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3,000,000,000



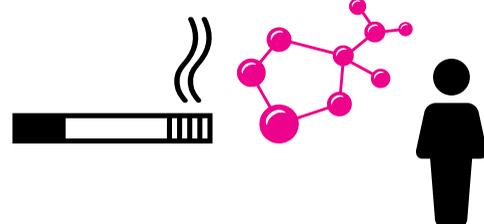
Children of smokers are almost **twice as likely** to smoke as children of nonsmokers. ⁵



Smoking **harms nearly every organ of the body**, causing **many diseases** and **life-long health problems** including **harming lung function** and **various cancers**. ⁶



Secondhand smoke can cause cancer. It contains more than **7,000 chemicals**, at least **69 that can cause cancer**. ⁷





What's in a cigarette? Activity



Introduction

Cigarettes contain approximately 600 ingredients and additives (they get into the tobacco plant from fertilizers, the soil, the curing process, etc.). In cigarette, cigar, and pipe smoke, there are more than 7,000 chemicals, including 69 known carcinogens and about 400 other toxins.⁹ Some of these chemicals are found naturally in unburned tobacco and release as it burns, while other chemicals are created while it burns. Spit tobacco contains more than 3,000 chemicals, including 28 known carcinogens.¹⁰

Ingredient Names

- Show the students the long list of ingredients included in cigarettes. Write the name of three of the ingredients in cigarettes on the board.
 - o Phenethyl Phenylacetate
 - o 2-aminonaphthalene
 - o 5-Methyl-2-Thiophenecarboxaldehyde
- Ask for student volunteers to try to pronounce the three ingredients.
- Ask the students if they would want to eat something that had these long ingredients. Tell the students: "Cigarettes have hundreds of ingredients, and many of them are toxic. Some people think that since tobacco is a crop that we can grow, tobacco is a safe product to use. However, commercial cigarettes have many different chemicals in them. We are going to learn about some of the things that are in cigarettes."

Ingredient Cards

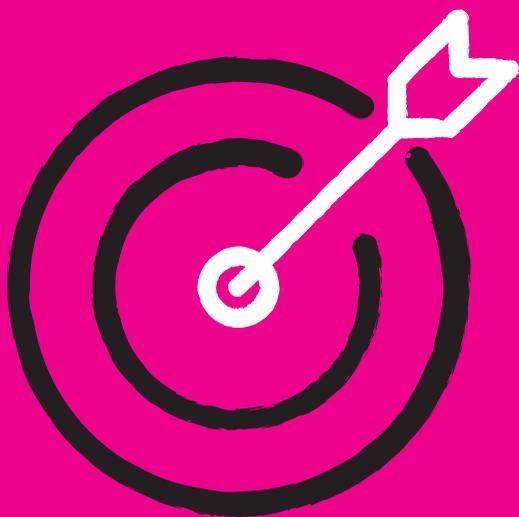
- Ask for nine volunteers to come to the front of the room and give each volunteer one of the ingredient cards.
- Have the students read the card to the class. The card explains what the ingredient does to the human body and what other products contain that ingredient.

Lesson One:

Tobacco

Ingredient

Cards





Acetone

Where do you find it?

- Nail polish remover
- Paint thinner
- Degreaser

What are some of the health effects?

This substance causes skin irritation, headaches, light-headedness, confusion, nausea, vomiting, and increased heart rate. High levels irritate noses, lungs, throats, and eyes. Extreme levels cause unconsciousness and coma. Long-term exposure causes liver and kidney damage.



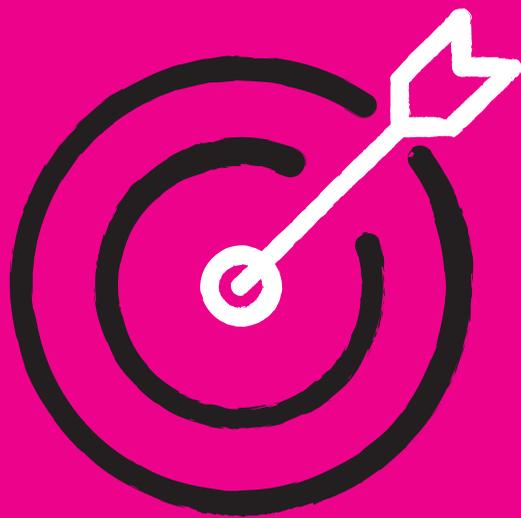
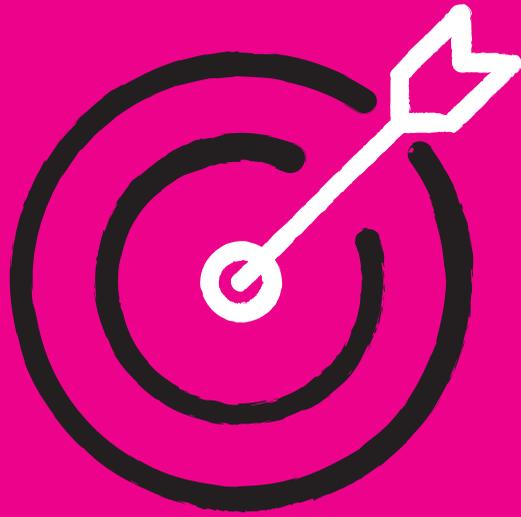
Acrylonitrile (vinyl cyanide)

Where do you find it?

- Fumigants
- Synthetic resins
- Plastics
- Rubber

What are some of the health effects?

This substance is suspected to cause cancer.





Ammonia

Where do you find it?

- Explosives
- Fertilizers
- Refrigerants
- Household cleaning fluids
- Fuel

What are some of the health effects?

This substance increases the addictiveness of tobacco by making the nicotine absorb through the lungs more quickly, meaning the brain gets a higher dose of nicotine with each puff. This causes irritation to the respiratory tract, coughing, irritation to the nose and throat, cramps, diarrhea, elevated blood pressure, anemia, asthma, paralysis, and cancerous skin tumors.



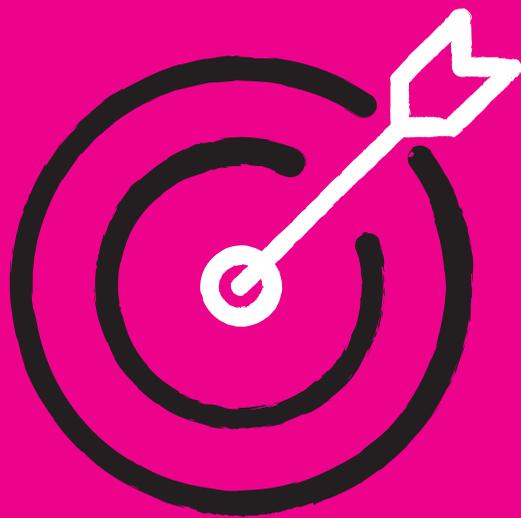
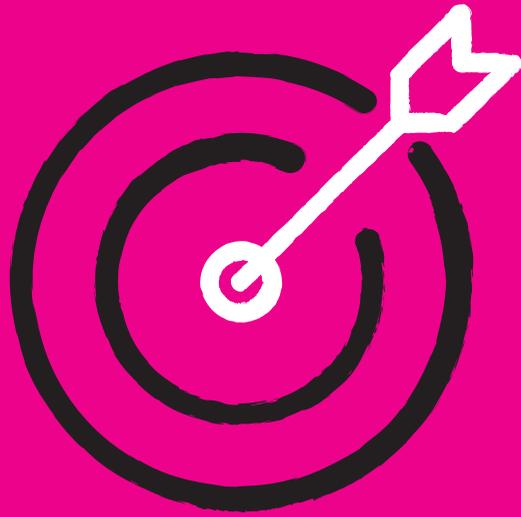
Arsenic

Where do you find it?

- Pesticides
- Rat Poison

What are some of the health effects?

This substance is used as a pesticide on tobacco plants around the world and is absorbed into the plant. Low levels cause nausea, vomiting, decreased production of red and white blood cells, damage to blood vessels, a sensation of pins and needles in hands and feet, and an abnormal heart rhythm. High levels of arsenic causes throat and lung irritation, and increases the risk of cancer.





Benzene

Where do you find it?

- Explosives
- Napalm
- Pesticides
- Industrial solvents
- Paint remover
- Gasoline
- Lubricants
- Adhesives
- Plastics
- Rubber
- Rubber cement
- Tire repair
- Nylon
- Detergents
- Dyes
- Inks

What are some of the health effects?

This substance causes extreme bleeding and problems with the immune system thus increasing the risk for infection. High levels cause drowsiness, dizziness, headaches, rapid heart rate, tremors, confusion, unconsciousness, and death. Benzene can also cause cancer.



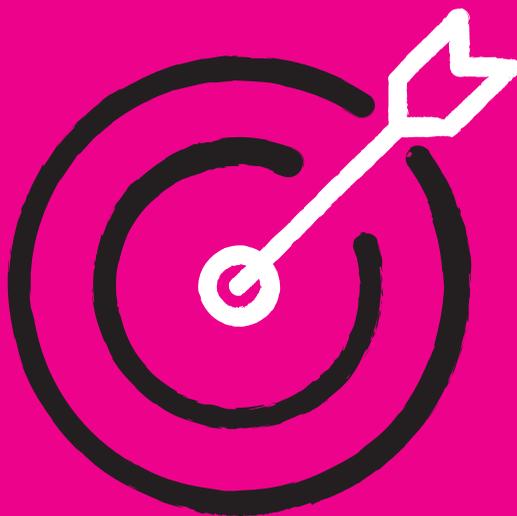
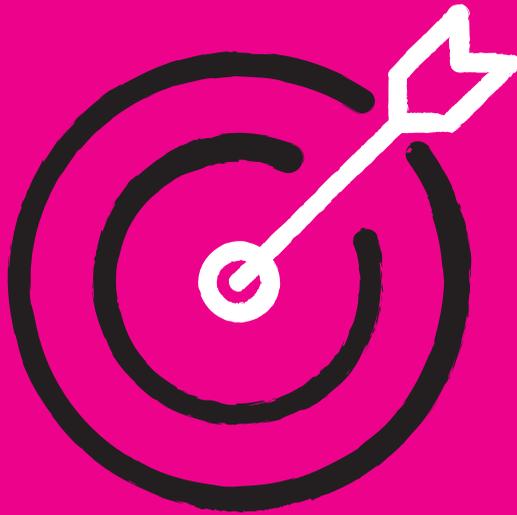
Butane

Where do you find it?

- Lighter fluid
- Gasoline
- Aerosol propellant

What are the health effects?

This substance is used to keep the tip of a cigarette burning at an extremely hot temperature, allowing nicotine to turn into a vapor so lungs may absorb it easier. Long term exposure to butane can cause damage to the nervous system, fatigue, and mental impairment.





Formaldehyde

Where do you find it?

- Embalming fluid
- Disinfectants
- Foam insulation
- Dyes
- Nail polish
- Photographic supplies

What are some of the health effects?

This substance causes irritation to the nose, eyes, skin, and throat, and damages the lungs, skin, and digestive system. People suffering from asthma are more sensitive to formaldehyde. It also causes nasal cancer and is linked to lung cancer.



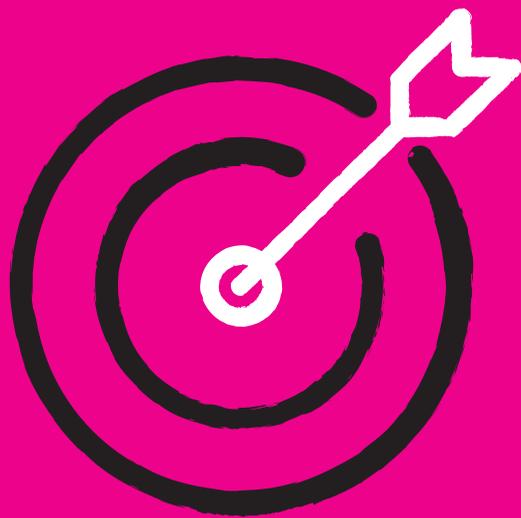
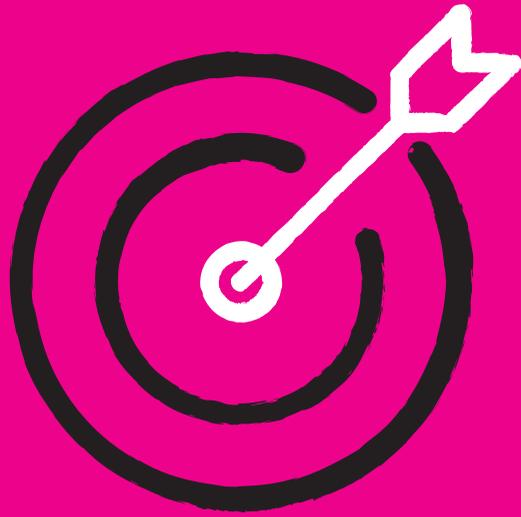
Isoprene

Where do you find it?

- Rubber

What are the health effects?

This substance causes cancer, irritation to the skin, eyes, and mucous membranes.





Lead

Where do you find it?

- Lead-acid batteries
- Coolant
- High voltage power cables
- Roofing materials
- Glass
- Paint
- Bullets
- Weights

What are some of the health effects?

This substance causes stomach problems, stunts growth, delays puberty in girls, disrupts the male reproductive system, damages the central nervous system, negatively affects memory (brain damage), and causes dementia. It is also linked to schizophrenia and can cause death. It is more toxic to children, resulting in cognitive deficits and other health problems.



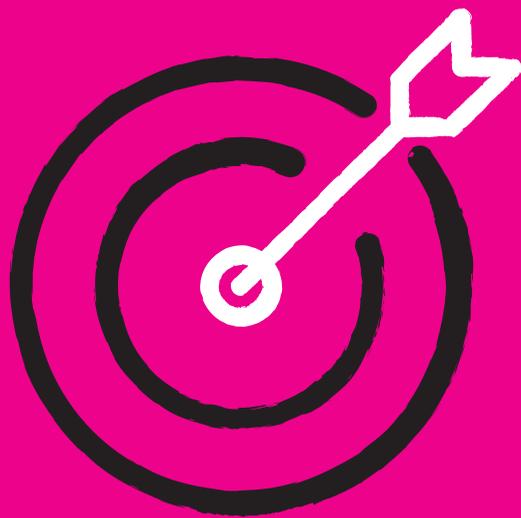
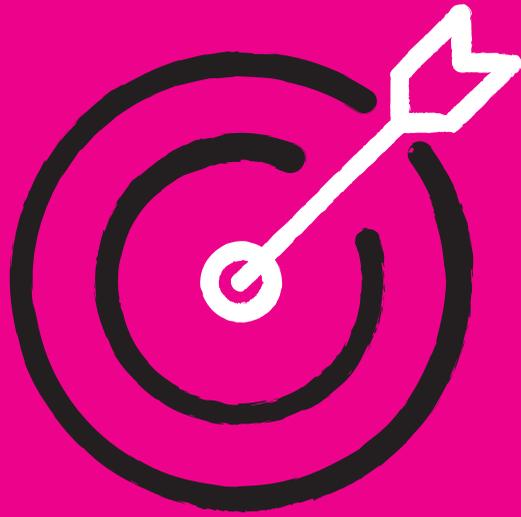
Nickel

Where do you find it?

- Alkaline batteries
- Stainless steel and other metal alloys
- Magnets
- Coins

What are some of the health effects?

This substance causes allergic reactions or skin rashes. People sensitive to nickel suffer upper respiratory irritation, asthma attacks, increased susceptibility to lung infections, chronic bronchitis, and reduced lung function. Lung and nasal sinus cancer may result from breathing dust containing high levels.





1,3-Butadiene

Where do you find it?

- Rubber
- Latex
- Neoprene products
- Automobile tires

What are some of the health effects?

This substance causes cancer.



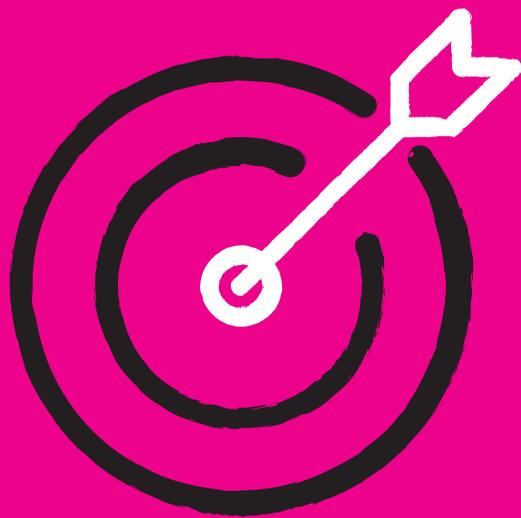
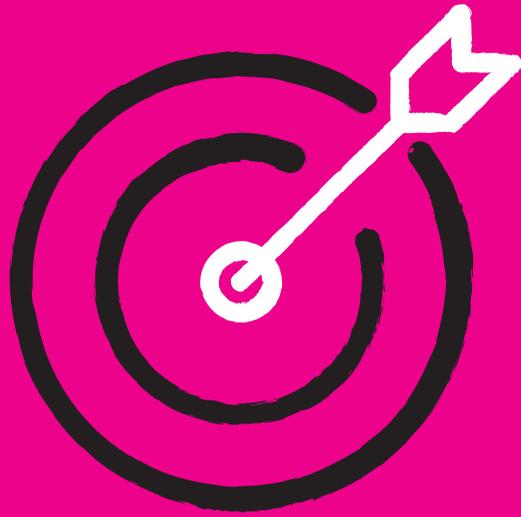
Vinyl Chloride

Where do you find it?

- PVC pipes
- Packaging materials
- Garbage bags

What are some of the health effects?

This substance causes cell mutations that may lead to cancer. High exposure causes headaches, dizziness, loss of coordination, and sleepiness, with severe cases progressing to hallucinations, unconsciousness, and death by respiratory failure.





Acetate Acid

Where do you find it?

- Vinegar
- Hair dye
- Photographic supplies

What are some of the health effects?

This substance irritates the skin, eyes, and nose.



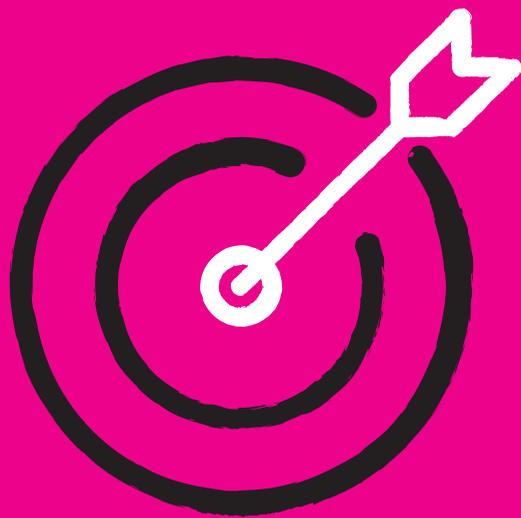
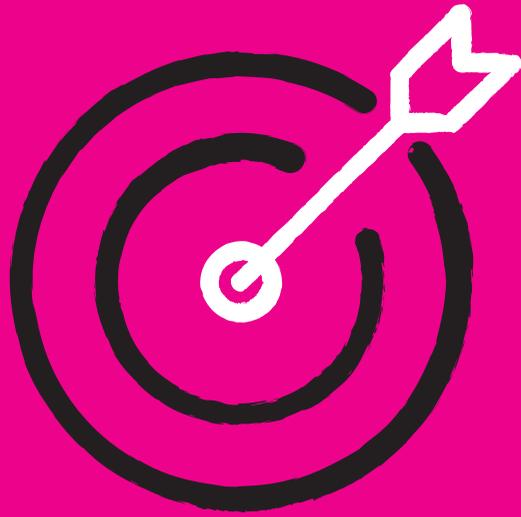
Phenol

Where do you find it?

- Herbicides
- Disinfectants
- Surgeries to prevent re-growth of ingrown nails
- Oral anesthetics
- Resins for plywood and other construction materials
- Epoxy resins
- Plastics

What are some of the health effects?

This substance causes skin, mucus membrane, and eye irritation. Exposure leads to diarrhea, dark urine, and hemolytic anemia. High levels affect the liver, kidney, respiratory, cardiovascular, and central nervous system.





Cadmium

Where do you find it?

- Non-corrosive metal coatings
- Bearings
- Pigments
- Oil paints
- Car batteries
- Storage batteries

What are some of the health effects?

This substance causes damage to the liver, kidneys, and brain, and stays in the body for years. High levels severely damage lungs, kidneys, and even cause death. It is a possible carcinogen, linked to kidney, lung, and prostate cancer.



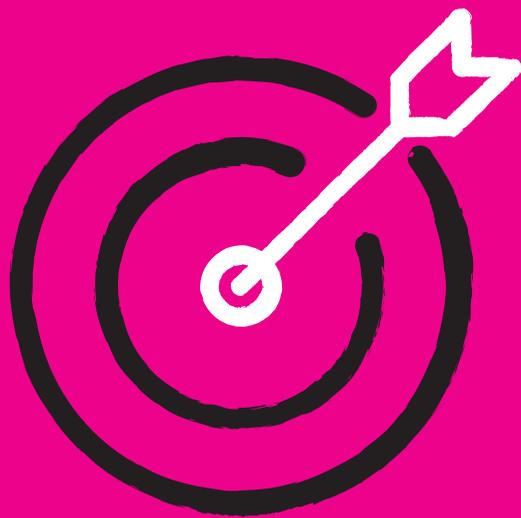
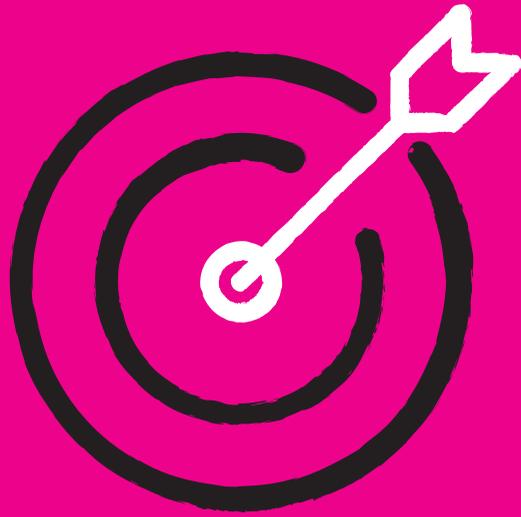
Steric Acid

Where do you find it?

- Plastics
- Oil pastels
- Candles
- Soaps
- Cosmetics
- Coating for metal powders in fireworks

What are some of the health effects?

This substance's long term effects are still being studied, although early studies suggest negative effects on cell function.





Cigarette Ingredients

- Acetaldehyde (Glues and resins)
- Acetanisole
- Acetic Acid (Vinegar, hair dyes, and photo developing fluids)
- Acetone (Nail polish remover, solvents, and paint thinners)
- Acetophenone
- 6-Acetoxydihydrotheaspirane
- 2-Acetyl-3-Ethylpyrazine
- 2-Acetyl-5-Methylfuran
- Acetylpyrazine
- 2-Acetylpyridine
- 3-Acetylpyridine
- 2-Acetylthiazole
- Aconitic Acid
- Acrolein (Polyester resins, herbicides, tear gas, and chemical weapons)
- Acrylonitrile (Vinyl Cyanide) (Synthetic resins, plastics, rubber, and fumigants)
- dl-Alanine
- Alfalfa Extract
- Aluminum
- Allspice Extract, Oleoresin, and Oil
- Allyl Hexanoate
- Allyl Ionone
- Almond Bitter Oil
- Ambergris Tincture
- 1-aminonaphthalene (Weed control)
- 2-aminonaphthalene
- Ammonia (Floor/toilet cleaners, explosives, and fertilizers)
- Ammonium Bicarbonate
- Ammonium Hydroxide
- Ammonium Phosphate Dibasic
- Ammonium Sulfide
- Amyl Alcohol
- Amyl Butyrate
- Amyl Formate
- Amyl Octanoate
- alpha-Amylcinnamaldehyde
- Amyris Oil
- trans-Anethole
- Angelica Root Extract, Oil, and Seed Oil
- Anise
- Anise Star, Extract, and Oils
- Anisyl Acetate
- Anisyl Alcohol
- Anisyl Formate
- Anisyl Phenylacetate
- Apple Juice Concentrate, Extract, and Skins
- Apricot Extract and Juice Concentrate
- 1-Arginine
- Arsenic (Rat poison, pesticides, oil paints, and tempera paints)
- Asafetida Fluid Extract and Oil
- Ascorbic Acid
- 1-Asparagine Monohydrate
- 1-Aspartic Acid
- Balsam Peru and Oil
- Basil Oil
- Bay Leaf, Oil, and Sweet Oil
- Beeswax White
- Beet Juice Concentrate
- Benzaldehyde
- Benzaldehyde Glyceryl Acetal
- Benzene (Pesticides, solvents, gasoline, lacquers, paint removers, and rubber cement)
- Benzo[a]pyrene (Automobile exhaust fumes; emissions from coal, oil and wood burning stoves and furnaces; coal tar pitch; creosote; and asphalts)
- Benzoic Acid
- Benzoin
- Benzoin Resin
- Benzophenone
- Benzyl Alcohol
- Benzyl Benzoate
- Benzyl Butyrate
- Benzyl Cinnamate
- Benzyl Propionate
- Benzyl Salicylate
- Bergamot Oil
- Beryllium
- Bisabolene
- Black Currant Buds Absolute
- Borneol
- Bornyl Acetate
- Buchu Leaf Oil
- 1,3-Butadiene (Rubber, latex, and neoprene products)
- 1,3-Butanediol
- 2, 3-Butanedione
- 1-Butanol
- 2-Butanone
- Butane (Lighter fluid)
- 4(2-Butenylidene)-3,5,5-Trimethyl-2-Cyclohexen-1-One
- Butter, Butter Esters, and Butter Oil
- Butyl Acetate
- Butyl Butyrate
- Butyl Butyryl Lactate
- Butyl Isovalerate
- Butyl Phenylacetate
- Butyl Undecylenate
- 3-Butylideneephthalide
- Butyraldehyde (Solvents and resins)
- Butyric Acid
- Cadinene
- Cadmium (Heavy metal – NiCad storage batteries, non-corrosive metal coatings, bearings, pigments, and oil paints)
- Caffeine
- Calcium Carbonate
- Camphene
- Cananga Oil
- Capsicum Oleoresin
- Caramel Color
- Caraway Oil
- Carbon Dioxide
- Carbon Monoxide (Automobile exhaust fumes)
- Cardamom Oleoresin, Extract, Seed Oil, and Powder
- Carob Bean and Extract
- beta-Carotene
- Carrot Oil
- Carvacrol
- 4-Carvomenthenol

- 1-Carvone
- beta-Caryophyllene
- beta-Caryophyllene Oxide
- Cascarilla Oil and Bark Extract
- Cassia Bark Oil
- Cassie Absolute and Oil
- Castoreum Extract, Tincture, and Absolute
- Catechol (Antioxidant in dyes, inks and oils)
- Cedar Leaf Oil
- Cedarwood Oil Terpenes and Virginiana
- Cedrol
- Celery Seed Extract, Solid, Oil, and Oleoresin
- Cellulose Fiber
- Chamomile Flower Oil and Extract
- Chicory Extract
- Chromium (Steel, metal platings, alloys, wood treatments, preservatives, and pigments)
- Chocolate
- Cinnamaldehyde
- Cinnamic Acid
- Cinnamon Leaf Oil, Bark Oil, and Extract
- Cinnamyl Acetate
- Cinnamyl Alcohol
- Cinnamyl Cinnamate
- Cinnamyl Isovalerate
- Cinnamyl Propionate
- Citral
- Citric Acid
- Citronella Oil
- dl-Citronellol
- Citronellyl Butyrate
- Citronellyl Isobutyrate
- Civet Absolute
- Clary Oil
- Chloroform (Anesthetic)
- Clover Tops, Red Solid Extract
- Cocoa
- Cocoa Shells, Extract, Distillate, and Powder
- Coconut Oil
- Coffee
- Cognac White and Green Oil
- Copaiba Oil
- Copper
- Coriander Extract and Oil
- Corn Oil
- Corn Silk
- Costus Root Oil
- Creosote (Coal tar, cleaning solvents, disinfectants, laxatives, and cough treatments)
- Cresol (Solvents, disinfectants, and wood preservatives)
- Crotonaldehyde (Warning agent in fuel gases)
- Cubeb Oil
- Cuminaldehyde
- para-Cymene
- 1-Cysteine
- Dandelion Root Solid Extract
- Davana Oil
- DDT/Dieldrin (Insecticides)
- 2-trans 4-trans-Decadienal
- delta-Decalactone
- gamma-Decalactone
- Decanal
- Decanoic Acid
- 1-Decanol
- 2-Decenal
- Dehydromenthofuro lactone
- Diethyl Malonate
- Diethyl Sebacate
- 2,3-Diethylpyrazine
- Dihydro Anethole
- 5,7-Dihydro-2-Methylthieno(3,4-D) Pyrimidine
- Dill Seed Oil and Extract
- meta-Dimethoxybenzene
- para-Dimethoxybenzene
- 2, 6-Dimethoxyphenol
- Dimethyl Succinate
- 3,4-Dimethyl-1,2-Cyclopentanedione
- 3,5- Dimethyl-1,2-Cyclopentanedione
- 3,7-Dimethyl-1,3,6-Octatriene
- 4,5-Dimethyl-3-Hydroxy-2,5-Dihydrofuran-2-One
- 6,10-Dimethyl-5,9-Undecadien-2-One
- 3,7-Dimethyl-6-Octenoic Acid
- 2,4-Dimethylacetophenone
- alphapara-Dimethylbenzyl Alcohol
- alphaalpha-Dimethylphenethyl Acetate
- alphaalpha Dimethylphenethyl Butyrate
- 2,3-Dimethylpyrazine
- 2,5-Dimethylpyrazine
- 2,6-Dimethylpyrazine
- Dimethyltetrahydrobenzofuranone
- delta-Dodecalactone
- gamma-Dodecalactone
- para-Ethoxybenzaldehyde
- Ethyl 10-Undecenoate
- Ethyl 2-Methylbutyrate
- Ethyl Acetate
- Ethyl Acetoacetate
- Ethyl Alcohol
- Ethyl Benzoate
- Ethyl Butyrate
- Ethyl Cinnamate
- Ethyl Decanoate
- Ethyl Fenchol
- Ethyl Furoate
- Ethyl Heptanoate
- Ethyl Hexanoate
- Ethyl Isovalerate
- Ethyl Lactate
- Ethyl Laurate
- Ethyl Levulinate
- Ethyl Maltol
- Ethyl Methyl Phenylglycidate
- Ethyl Myristate
- Ethyl Nonanoate
- Ethyl Octadecanoate
- Ethyl Octanoate
- Ethyl Oleate
- Ethyl Palmitate
- Ethyl Phenylacetate
- Ethyl Propionate

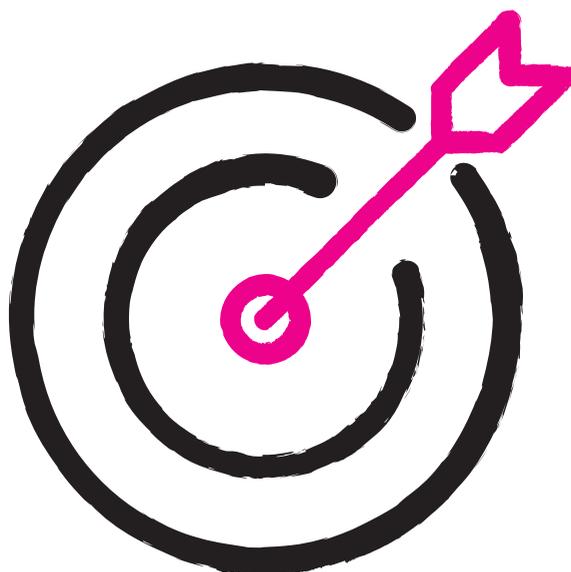
- Ethyl Salicylate
- Ethyl trans-2-Butenoate
- Ethyl Valerate
- Ethyl Vanillin
- 2-Ethyl (or Methyl)-(3, 5 and 6)-Methoxypyrazine
- 2-Ethyl-1-Hexanol 3-Ethyl-2-Hydroxy-2-Cyclopenten-1-One
- 2-Ethyl-3 (5 or 6)-Dimethylpyrazine
- 5-Ethyl-3-Hydroxy-4-Methyl-2(5H)-Furanone
- 2-Ethyl-3-Methylpyrazine
- 4-Ethylbenzaldehyde
- 4-Ethylguaiacol
- para-Ethylphenol
- 3-Ethylpyridine
- Eucalyptol
- Farnesol
- D-Fenchone
- Fennel Sweet Oil
- Fenugreek, Extract, Resin, and Absolute
- Fig Juice Concentrate
- Food Starch Modified
- Formaldehyde (Embalming fluid – a preserver of bodies, tissue, and fabric; resin in particleboard, fiberboard, and plywood; foam insulation)
- Furfuryl Mercaptan
- 4-(2-Furyl)-3-Buten-2-One
- Galbanum Oil
- Genet Absolute
- Gentian Root Extract
- Geraniol
- Geranium Rose Oil
- Geranyl Acetate
- Geranyl Butyrate
- Geranyl Formate
- Geranyl Isovalerate
- Geranyl Phenylacetate
- Ginger Oil and Oleoresin
- 1-Glutamic Acid
- 1-Glutamine
- Glycerol
- Glycyrrhizin Ammoniated
- Gold
- Grape Juice Concentrate
- Guaiac Wood Oil
- Guaiacol
- Guar Gum
- 2,4-Heptadienal
- gamma-Heptalactone
- Heptanoic Acid
- 2-Heptanone
- 3-Hepten-2-One
- 2-Hepten-4-One
- 4-Heptenal
- trans-2-Heptenal
- Heptyl Acetate
- omega-6-Hexadecenlactone
- gamma-Hexalactone
- Hexamine (Barbecue lighter fluid)
- Hexanal
- Hexanoic Acid
- 2-Hexen-1-Ol
- 3-Hexen-1-Ol
- cis-3-Hexen-1-Yl Acetate
- 2-Hexenal
- 3-Hexenoic Acid
- trans-2-Hexenoic Acid
- cis-3-Hexenyl Formate
- Hexyl 2-MethylbutyrateHexyl Acetate
- Hexyl Alcohol
- Hexyl Phenylacetate
- 1-Histidine
- Honey
- Hops Oil
- Hydrazine (Jet and rocket fuels)
- Hydrogen Cyanide (Chemical weapons, gas chambers, fumigants, resins, and acrylic plastics)
- Hydrolyzed Milk Solids
- Hydrolyzed Plant Proteins
- Hydroquinone (Paints, varnishes, and motor fuels)
- 5-Hydroxy-2,4-Decadienoic Acid delta-Lactone
- 4-Hydroxy-2,5-Dimethyl-3(2H)-Furanone
- 2-Hydroxy-3,5,5-Trimethyl-2-Cyclohexen-1-One
- 4-Hydroxy-3-Pentenoic Acid Lactone
- 2-Hydroxy-4-Methylbenzaldehyde
- 4-Hydroxybutanoic Acid Lactone
- Hydroxycitronellal
- 6-Hydroxydihydrotheaspirane
- 4-(para-Hydroxyphenyl)-2-Butanone
- Hyssop Oil
- Immortelle Absolute and Extract
- alpha-Ionone
- beta-Ionone
- alpha-Irone
- Isoamyl Acetate
- Isoamyl Benzoate
- Isoamyl Butyrate
- Isoamyl Cinnamate
- Isoamyl Formate Isoamyl Hexanoate
- Isoamyl Isovalerate
- Isoamyl Octanoate
- Isoamyl Phenylacetate
- Isobornyl Acetate
- Isobutyl Acetate
- Isobutyl Alcohol
- Isobutyl Cinnamate
- Isobutyl Phenylacetate
- Isobutyl Salicylate
- 2-Isobutyl-3-Methoxypyrazine
- alpha-Isobutylphenethyl Alcohol
- Isobutyraldehyde
- Isobutyric Acid
- d,l-Isoleucine
- alpha-Isomethylionone
- Isoprene (Rubber)
- 2-Isopropylphenol
- Isovaleric Acid
- Jasmine Absolute, Concrete, and Oil
- Kola Nut Extract
- Labdanum Absolute and Oleoresin
- Lactic Acid
- Lauric Acid

- Lauric Aldehyde
- Lavandin Oil
- Lavender Oil
- Lead (Metal alloys – solder, brass, bronze; and paints)
- Lemon Oil and Extract
- Lemongrass Oil
- 1-Leucine
- Levulinic Acid
- Licorice Root, Fluid, Extract, and Powder
- Lime Oil
- Linalool
- Linalool Oxide
- Linalyl Acetate
- Linden Flowers
- Lovage Oil and Extract
- 1-Lysine
- Mace Powder, Extract, and Oil
- Magnesium
- Magnesium Carbonate
- Malic Acid
- Malt and Malt Extract
- Maltodextrin
- Maltol
- Maltol Isobutyrate
- Mandarin Oil
- Maple Syrup and Concentrate
- Mate Leaf, Absolute, and Oil
- para-Mentha-8-Thiol-3-One
- Menthol
- Menthone
- Menthyl Acetate
- Mercury
- Methane (Swamp gas)
- Methanol (Rocket fuel)
- dl-Methionine
- Methoprene
- 2-Methoxy-4-Methylphenol
- 2-Methoxy-4-Vinylphenol
- para-Methoxybenzaldehyde
- 1-(para-Methoxyphenyl)-1-Penten-3-One
- 4-(para-Methoxyphenyl)-2-Butanone
- 1-(para-Methoxyphenyl)-2-Propanone
- Methoxypyrazine
- Methyl 2-Furoate
- Methyl 2-Octynoate
- Methyl 2-Pyrrolyl Ketone
- Methyl Anisate
- Methyl Anthranilate
- Methyl Benzoate
- Methyl Cinnamate
- Methyl Dihydrojasmonate
- Methyl Ethyl Ketone (Solvents)
- Methyl Ester of Rosin, Partially Hydrogenated
- Methyl Isovalerate
- Methyl Linoleate (48%)
- Methyl Linolenate (52%) Mixture
- Methyl Naphthyl Ketone
- Methyl Nicotinate
- Methyl Phenylacetate
- Methyl Salicylate
- Methyl Sulfide
- 3-Methyl-1-Cyclopentadecanone
- 4-Methyl-1-Phenyl-2-Pentanone
- 5-Methyl-2-Phenyl-2-Hexenal
- 5-Methyl-2-Thiophenecarboxaldehyde
- 6-Methyl-3-5-Heptadien-2-One
- 2-Methyl-3-(para-Isopropylphenyl) Propionaldehyde
- 5-Methyl-3-Hexen-2-One
- 1-Methyl-3Methoxy-4-Isopropylbenzene
- 4-Methyl-3-Pentene-2-One
- 2-Methyl-4-Phenylbutyraldehyde
- 6-Methyl-5-Hepten-2-One
- 4-Methyl-5-Thiazoleethanol
- 4-Methyl-5-Vinylthiazole
- Methyl-alpha-Ionone
- Methyl-trans-2-Butenoic Acid
- 4-Methylacetophenone
- para-Methylanisole
- alpha-Methylbenzyl Acetate
- alpha-Methylbenzyl Alcohol
- 2-Methylbutyraldehyde
- 3-Methylbutyraldehyde
- 2-Methylbutyric Acid
- alpha-Methylcinnamaldehyde
- Methylcyclopentenolone
- 2-Methylheptanoic Acid
- 2-Methylhexanoic Acid
- 3-Methylpentanoic Acid
- 4-Methylpentanoic Acid
- 2-Methylpyrazine
- 5-Methylquinoxaline
- 2-Methyltetrahydrofuran-3-One
- (Methylthio)Methylpyrazine (Mixture of Isomers)
- 3-Methylthiopropionaldehyde
- Methyl 3-Methylthiopropionate
- 2-Methylvaleric Acid
- Mimosa Absolute and Extract
- Molasses Extract and Tincture
- Mountain Maple Solid Extract
- Mullein Flowers
- Myristaldehyde
- Myristic Acid
- Myrrh Oil
- Napthalene (Moth balls, explosives, and paint pigments)
- beta-Naphthyl Ethyl Ether
- Nerol
- Neroli Bigarde Oil
- Nerolidol
- Nickel (Alkaline batteries, stainless steel, and metal alloys)
- Nicotine (Insecticides and drug – more addictive than Heroin)
- Nitrobenzene (Gasoline additive and cleaning solvents)
- Nitrous Oxide Phenols (Disinfectants, created by combustion of gasoline)
- Nona-2-trans,6-cis-Dienal
- 2,6-Nonadien-1-ol
- gamma-Nonalactone
- Nonanal
- Nonanoic Acid
- Nonanone

- trans-2-Nonen-1-Ol
- 2-Nonenal
- Nonyl Acetate
- Nutmeg Powder and Oil
- Oak Chips Extract and Oil
- Oak Moss Absolute
- 9,12-Octadecadienoic Acid (48%) and 9,12,15-Octadecatrienoic Acid (52%)
- delta-Octalactone
- gamma-Octalactone
- Octanal
- Octanoic Acid
- 1-Octanol
- 2-Octanone
- 3-Octen-2-One
- 1-Octen-3-Ol
- 1-Octen-3-Yl Acetate
- 2-Octenal
- Octyl Isobutyrate
- Oleic Acid
- Olibanum Oil
- Opoponax Oil and Gum
- Orange Blossoms Water, Absolute, and Leaf Absolute
- Orange Oil and Extract
- Origanum Oil
- Orris Concrete Oil and Root Extract
- Palmarosa Oil
- Palmitic Acid
- Parsley Seed Oil
- Patchouli Oil
- omega-Pentadecalactone
- 2,3-Pentanedione
- 2-Pentanone
- 4-Pentenoic Acid
- 2-Pentylpyridine
- Pepper Oil, Black and White
- Peppermint Oil
- Peruvian (Bois De Rose) Oil
- Petitgrain Absolute, Mandarin Oil, and Terpeneless Oil
- alpha-Phellandrene
- 2-Phenethyl Acetate
- Phenethyl Alcohol
- Phenethyl Butyrate
- Phenethyl Cinnamate
- Phenethyl Isobutyrate
- Phenethyl Isovalerate
- Phenethyl Phenylacetate
- Phenethyl Salicylate
- Phenol (Disinfectants, anesthetics, resins in plywood and other construction materials, epoxy resins, and plastics)
- 1-Phenyl-1-Propanol
- 3-Phenyl-1-Propanol
- 2-Phenyl-2-Butenal
- 4-Phenyl-3-Buten-2-Ol
- 4-Phenyl-3-Buten-2-One
- Phenylacetaldehyde
- Phenylacetic Acid
- 1-Phenylalanine
- 3-Phenylpropionaldehyde
- 3-Phenylpropionic Acid
- 3-Phenylpropyl Acetate
- 3-Phenylpropyl Cinnamate
- 2-(3-Phenylpropyl) Tetrahydrofuran
- Phosphoric Acid
- Phosphorus (Mineral – laundry detergents and fertilizers)
- Pimenta Leaf Oil
- Pine Needle Oil, Pine Oil, and Scotch
- Pineapple Juice Concentrate
- alpha-Pinene
- beta-Pinene
- D-Piperitone
- Piperonal
- Pipsissewa Leaf Extract
- Plum Juice
- Polonium-210 (Radioactive element)
- Potassium Sorbate
- 1-Proline
- Propenylguaethol
- Propionaldehyde (Disinfectants)
- Propionic Acid
- Propyl Acetate
- Propyl para-Hydroxybenzoate
- Propylene Glycol
- 3-Propylideneophthalide
- Prune Juice and Concentrate
- Pyridine (Solvents)
- Pyroligneous Acid and Extract
- Pyrrole
- Pyruvic Acid
- Quinoline (Corrosion inhibitor and solvent for resins)
- Raisin Juice Concentrate
- Resorcinol (Laminates, resins, and adhesives)
- Rhodinol
- Rose Absolute and Oil
- Rosemary Oil
- Rum
- Rum Ether
- Rye Extract
- Sage, Sage Oil, and Sage Oleoresin
- Salicylaldehyde
- Sandalwood Oil, Yellow
- Sclareolide
- Silicon
- Silver
- Skatole
- Smoke Flavor
- Snakeroot Oil
- Sodium Acetate
- Sodium Benzoate
- Sodium Bicarbonate
- Sodium Carbonate
- Sodium Chloride
- Sodium Citrate
- Sodium Hydroxide
- Solanone
- Spearmint Oil
- Stearic Acid (Candle wax)
- Styrax Extract, Gum, and Oil

- Styrene (Insulation, fiberglass, pipes, and plastics)
- Sucrose Octaacetate
- Sugar Alcohols
- Sugars
- Tagetes Oil
- Tannic Acid
- Tar (Asphalt and dandruff shampoos)
- Tartaric Acid
- Tea Leaf and Absolute
- alpha-Terpeneol
- Terpinolene
- Terpinyl Acetate
- 5,6,7,8-Tetrahydroquinoxaline
- 1,5,5,9-Tetramethyl-13-Oxatricyclo (8.3.0.0(4,9) Tridecane
- 2,3,4,5 and 3,4,5,6-Tetramethylethyl-Cyclohexanone
- 2,3,5,6-Tetramethylpyrazine
- Thiamine Hydrochloride
- Thiazole
- 1-Threonine
- Thyme Oil, White and Red
- Thymol
- Titanium
- Tobacco Extracts
- Tochoferols
- Tolu Balsam Gum and Extract
- Tolualdehydes
- Toluene (Industrial cleaning solvents, oils, resins, embalming glue, and paint thinners)
- para-Tolyl 3-Methylbutyrate
- para-Tolyl Acetaldehyde
- para-Tolyl Acetate
- para-Tolyl Isobutyrate
- para-Tolyl Phenylacetate
- Triacetin
- 2-Tridecanone
- 2-Tridecenal
- Triethyl Citrate
- 3,5,5-Trimethyl-1-Hexanol
- para, alpha, alpha-Trimethylbenzyl Alcohol
- 4-(2,6,6-Trimethylcyclohex-1-Enyl)But-2-En-4-One
- 2,6,6-Trimethylcyclohex-2-Ene-1, 4-Dione
- 2,6,6-Trimethylcyclohexa-1, 3-Dienyl Methan
- 4-(2,6,6-Trimethylcyclohexa-1, 3-Dienyl)But-2 En-4-One
- 2,2,6-Trimethylcyclohexanone
- 2,3,5-Trimethylpyrazine
- 1-Tyrosine
- delta-Undercalactone
- gamma-Undecalactone
- Undecanal
- 2-Undecanone
- 10-Undecenal
- Urea
- Valencene
- Valeraldehyde
- Valerian Root, Extract, Oil and Powder
- Valeric Acid

- gamma-Valerolactone
- Valine
- Vanilla Extract and Oleoresin
- Vanillin
- Veratraldehyde
- Vetiver Oil
- Vinegar
- Vinyl Chloride (PVC pipes and packaging materials)
- Violet Leaf Absolute
- Walnut Hull Extract
- Water
- Wheat Extract and Flour
- Wild Cherry Bark Extract
- Wine and Wine Sherry
- Xanthan Gum
- 3,4-Xylenol
- Yeast
- Zinc





Debrief

- Have the students sit in groups of four to answer the discussion questions.
- Post the discussion questions on the board or on a PowerPoint slide. Move around the room as students discuss these questions in small groups for 5-7 minutes to ensure students are on-task.

1. Why are there so many chemicals in tobacco?
2. Were you surprised by any of the chemicals found in tobacco?
3. How would you respond if someone told you tobacco is safe to use because it is natural?

- After 5-7 minutes, call the students back together and ask for a group spokesperson to share their answers for the questions.

TOTAL TIME: 10 minutes



Exit Ticket Activity

- Ask the students to come to the front of the room where they posted their “rating” at the beginning of class. Ask students to move their number if their opinion has changed at all.
- Call on three students to give reasons for why they moved their number.

TOTAL TIME: 5 minutes



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