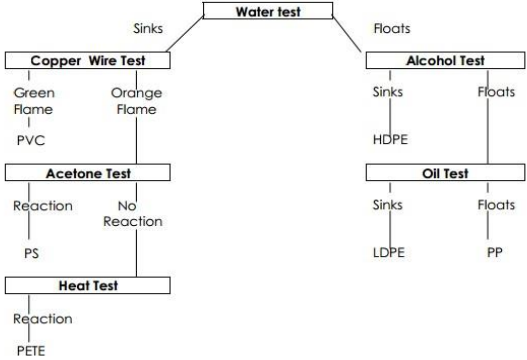


Metals	Visual	Reaction w/ H2O	Reaction w/ HCL	Uses/Other
Aluminum (Al)	Silvery-white, bigger pellets, foily	No Reaction	Very delayed Slight fizz	Cans, construction, packaging, Power lines, bike frames, mail boxes, ladders, sinks and faucets, pots
Copper (Cu)	Shiny, copper colored	No reaction	No reaction	Pennies, wiring, construction, alloys, pipes
Iron (Fe) <i>Magnetic</i>	Silver-blackish	No reaction	Slight fizz	Cookware, kitchen cutlery, in hemoglobin, steel buildings, machinery, tools, stainless steel appliances and household items
Magnesium (Mg)	Dark silver specks, rough surface	Slight reaction	Immediate, violent reaction	Batteries, paint, pigment, medicine, chlorophyll, camera flash bulbs
Tin (Sn)	Like little bells, shiny silver w/ slight gold tinge	No reaction	No reaction or Little fizz (not sure yet)	Cans, solder, bronze (alloy w/ copper and tin)
Zinc (Zn)	Dark silvery w/ smooth surface in some parts	No reaction	Immediate bubbling (use flashlight)	Nickel, silver, paints, rubber, cosmetics, pharmaceuticals, plastics, inks, soaps, batteries, textiles, electrical equipment

Liquids	Visual	Odor	pH	Conductivity	Uses
Water(H2O)	Clear	None	7	83µsiemens	Drinking, bathing
Ammonia (NH3)	Relatively clear	Strong, pungent	11	1670µsiemens Changes a little	Clean oven, repel moths, help paint smell, clean metals, household cleaning agent, bleach
Hydrogen Peroxide(H2O2) <i>Fizzes w/ iodine</i>	Clear	slight sweet, almost none	5	Always changing	Mouthwash, disinfectant, bleach hair, help teeth, whiten nails, clear acne
Lemon juice	Yellow, cloudy	Citrus	2		high blood pressure, cooking, lemonade, freshen fridge, mental health
Rubbing alcohol	Clear	Alcohol	7	0 µsiemens	Disinfectant, stain remover, shoe polisher
Vinegar	Clear	Strong and salty	2.2	1175 µsiemens Changes a little	Cooking, remove carpet stains, help w/ brick and woodwork, unclog drains

DODGEN SCIENCE OLYMPIAD: CRIME BUSTERS A TEAM

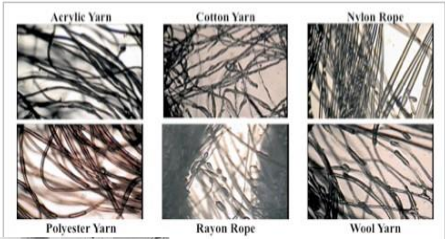
Polymer & Densities	Name	Float or Sink in Water	Burning Color/Behavior	Appearance	Uses
PETE (1) 1.37 g/ml	Polyethylene terephthalate	Sink	Yellow flame, Slow burn w/ dripping plastic, Light smoke	clear-ish, opaque & white	soda, water, shampoo, & mouthwash bottles, peanut butter jars,
HDPE (2) 0.95 g/ml	High-density polyethylene	Float	Blue w/ yellow tipped flame, Slow burn w/dripping plastic, smells like candle wax	translucent & dull white, opaque	milk, water, & juice jugs, detergent bottles, yogurt & margarine tubs, grocery bags
PVC (3) 1.38 g/ml	Polyvinyl Chloride	Sink	Yellow flame w/ green spurts, No drip, Self-extinguishing, Smells like HCl, Chars	sometimes rubbery but opaque	PVC pipes,
LDPE (4) 0.92 g/ml	Low-density polyethylene	Float	Blue w/ yellow tipped flame, Slow burn w/dripping plastic, smells like candle wax	translucent & white (less than HDPE),	bread & frozen food bags, squeezable bottles,
PP (5) 0.90 g/ml	Polypropylene	Float	Blue w/ yellow tipped flame, Slow burn w/dripping plastic, smells sweet	usually opaque, translucent w/ small bit of white	ketchup bottles, yogurt & margarine tubs,
PS (6) 1.05 g/ml <i>Softens in acetone</i>	Polystyrene	Slowly Sink/Inconclusive Result	Yellow flame, Fast burn w/ dripping plastic,	naturally transparent (looks a little like glass), colored to be opaque	disposable cutlery, styrofoam, CD/DVD cases, packaging material, meat trays. egg cartons, cups & plates, electric cables, signs, healthcare, flooring
PMMA	Polymethyl Methacrylate	Sinks	Bright flame, no smoke	slightly translucent but more opaque	substitute for glass in: shatterproof windows, skylights, illuminated signs, & aircraft canopies TMD as Plexiglas, Lucite, & Perspex



Powder	Shape/color	pH	Reaction w/ water	Reaction w/ iodine	Reaction w/ HCL	Uses	Other
Alka-Seltzer (C16H17NaO14)	Powdery white	9	Fizzes, releases CO2	Fizzes	Fizzes	Medicine, safely unclog drains, clean, soothe insect bites	Fishing bait, remove burnt food off cookware
Baking soda (NaHCO3) Aka as sodium bicarbonate	Fine, powdery white	9	Soluble	None	Fizzes	Fire extinguishers, medicine, cooking, hygiene, cleaning esp. of animals	Unclog drains, exfoliate skin, make toothpaste, remove stains, deodorize,
Calcium carbonate (CaCO3)	Dull, creamy, white, often little balls	7	No reaction	None	Fizzes	Dietary supplement, relieves heartburn, acid indigestion, upset stomach, can be used to separate ores	Found in rocks, eggshell, seashells, help stomach issues(diahhrea and ulcers), swimming pools, construction material
Cornstarch (C27H48O20)	Fluffy, white powder	7	Turns like oobleck	Blackens	None	Cooking, thickens food, polish silver, clean windows	Soothe sunburn, smell better, take away grease stain
Flour	Off-white, light tan-ish, fluffy	7	Become paste like, sticky	Blackens , iodine clumps together	None	Cooking, baking, adhesives, doughs, fabric stiffener	Dry shampoo, skin care
Gelatin (C6H12O6)	Off-white	7	Turns jelly-like and thickens	None	None	Gummies, jelly, cosmetics	Sparkles w/ light, pill capsules, pharmaceuticals, photography
Gypsum/calcium sulfate (CaSo4-2H2O)	Dull, light tan, grayish white color, variable textures	7	Not soluble	None	Bubbles slightly	Drywall, construction, plaster, baking, hair products	Also known as “Plaster of Paris”, used in casts, toothpaste, soil additive, color additive in drugs, cosmetics, certain foods, wines
Salt (NaCl)  Conductivity: 1999 $\mu$ siemens	Uniform cubes, translucent	7	Soluble, slower than sugar	None	Doesn’t dissolve as much as sugar	Used to salt roads in winter, cooking, medicine	Connected to high blood pressure, industrial processes, agriculture, removes carpet stains, relieve stings, bites, and poison ivy
Sugar (C12H22O11)	Irregular sized crystals, translucent, reflective	7	Soluble, faster than salt	None	Dissolves more than salt	Sweetener, preservative, treat wound	Sparkles w/ light, ease burnt tongue
Sand	Larger grains	7	Not soluble	None	None	Agriculture, building materials, glass, paint, nature, clean up oil	Can be differentiated from sugar b/c luster is duller
Sodium acetate* (C2H3NaO2)	More granular than baking soda, white	8, 9	Soluble	None	None	Industrial, concrete	Prevents bacterial growth, food additive(salt and vinegar chips), heating pads
Vitamin C* (C6H8O6)	Tan powder	2	Soluble	Turns clear	None	Medicine, anti-aging, low-blood pressure	Aka ascorbate
Yeast*	Large distinct pellet-like shapes	7	Not soluble	None	None	Alcohol, baking	Nutritional supplement

\*Can’t be in mixtures

Fingerprints	Characteristics	Sub-Categories
Arch	Hill shape w/o deltas	Tented & Plain Arch
Loop	Bean-shaped w/ 1 delta	Ulnar & Radial Loop
Whorl	Circle-like shape w/ 2 or more deltas	Plain Whorl, Central Pocket, Double Loop, & Accidental Whorl
Hairs	Medulla	Appearance
Human	Fragmented; Slight Breaks in Between Medulla	Thin Scales on Outer Layer
Cat	Beaded	Braid-Like Scales
Dog	Wide & Continuous	Large, Rectangle-Like Scales, ovoid bodies
Soil Analysis	Appearance	Particle Size
Clay	Reddish-Yellow	Fine: <0.002 mm
Silt	Dull Tan/Brown	Very Small: 0.05-0.002 mm
Sand	White-Light Tan w/ Large Grains	Medium-Large: 0.05-2 mm
Loam Soil	Dark Brown/Black	Varies

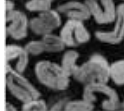


-most common pigment in hair is melanin (color)



Human Dog Cat

Cotton



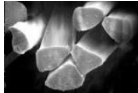
Linen



Wool



Silk



Ravon



Nylon



Fiber Analysis	P, A, or S	Appearance	Burning
Cotton	Plant	wide fibers, tangled & twisted together	Burns quickly, gray ash
Wool	Animal	scaly fibers	Strong odor, burns orange, shrinks from flame
Rayon	Synthetic	blotted spots on fibers, looks like plastic	Like cotton, burns slowly
Acetate	Synthetic	long independent fibers	Hard, black bead, burns quick
Polyester	Synthetic	tangled & straight fibers, looks like plastic	Shrinks from flame, burn slowly