

Chem Catalyst =

Q: If you added NaCl to water what would happen? a gold ring?

Q: What do you think is different about the atoms of these substances?

Notes :

- How are atoms of a substance held together?
 - through a chemical bond : the force that holds 2 atoms together
 - may form by the attraction btwn a (+) nucleus & (-) electrons or
 - the attraction btwn a (+) ion & a (-) ion = electrostatic attraction
- What characteristics contribute to bonding?
 - * an atom's valence electrons are involved in bonding
 - an atom's ionization energy (energy needed to remove an e^- from an atom) affects bonding ability
 - increases from left to right on P.T.
 - decreases from top to bottom on P.T.
 - an atom's electronegativity / electron affinity (ability to attract e^-) also affects bonding
 - increase from left to right on P.T.
 - decreases from top to bottom

You Light Up My Life



Name: _____

Period: _____ Date: _____

Purpose: This lesson allows you to collect evidence regarding some of the properties of substances, and look for patterns.

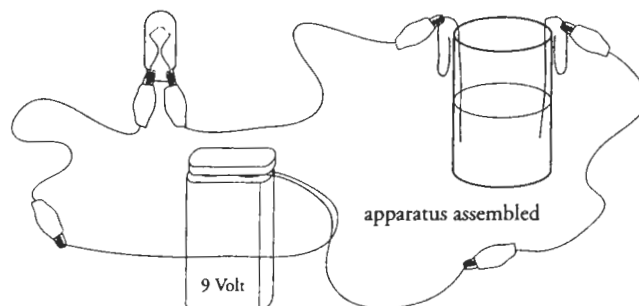
Predict: Make some predictions regarding the following substances. Predict: 1) whether the substance will conduct electricity, 2) whether the substance will dissolve in water. Put your predictions in the left hand portion of the table.

Substances	Predictions		Test Results		
	Conduct? Yes/No	Dissolve? Yes/No	Conduct? Yes/No	Dissolve? Yes/No	Conduct when dissolved?
H ₂ O (l), water,		Yes	N	Y	N
Al (s) foil aluminum			Y	N	N/A
C ₁₂ H ₂₂ O ₁₁ (s) sucrose (sugar)			N	Y	N
NaCl (s), salt, sodium chloride			N	Y	Y
SiO ₂ (s), sand, silicon dioxide			N	N	—
C ₂₀ H ₄₂ (s) paraffin (wax)			N	N	—
C ₂ H ₆ O (l) ethanol			N	Y	N
Cu (s) copper			Y	N	—
CaCl ₂ (s) calcium chloride			N	Y	Y
CuSO ₄ (s) copper sulfate			N	Y	Y

Test 1: Conductivity Assemble your conductivity apparatus according to the following diagram. Use this apparatus to test the conductivity of the various substances in the table. Enter your results in the right hand portion of the table. Rinse the paper clip probes and wet beaker with distilled water after each use.

Equipment needed for conductivity apparatus:

- 2 paper clips
- 1 bulb with base
- 1 battery snap connector
- 3 wires with alligator clips
- 100-mL beakers – one wet, one dry
- 1 9-volt battery



Test 2: Dissolving Take a very small portion of each substance and try to dissolve it in 25-30 mL of water. Enter your results in the right hand portion of the table. Before proceeding to the next substance, test any dissolved substances for conductivity.

Test 3: Conducts When Dissolved If the substance dissolves in water, test this liquid with the conductivity apparatus. Enter your results in the final column of the table. When a substance does not dissolve enter N/A in the last column for Not Applicable.

Answer questions:

1. Make a list of those substances that conduct electricity but do not dissolve in water. What other things do these substances have in common? (Think about their properties and their chemical formulas.)
2. Divide the substances that dissolve in water into two categories. Those that conduct electricity once they are dissolved, and those that don't.

Substances that dissolve in water	
Conduct	Don't conduct

3. What do the substances that conduct electricity once they are dissolved have in common?
4. What do the substances that do not conduct electricity once they are dissolved have in common? (Leave water out.)

Summarize: Examine your test results and fill in the following table. Remember the symbol (aq) stands for aqueous, and refers to a substance dissolved in water.

5. Write a generalizing statement about the substances that do not light up the bulb.
6. Write a generalizing statement about the substances that do light up the bulb.
7. Predict whether isopropanol, $C_3H_8O(l)$, will conduct electricity. State your reasoning.

Making Sense

If it is dangerous to take a bath with a blow dryer, what must also be true about the water in the bathtub?

Making Sense Notes:

• What is a solute vs. solvent?

- Solute: substance of lower quantity that is being dissolved (ex: salt ^{NaCl})
- solvent: substance of higher quantity that is doing the dissolving (ex: water ^{H₂O})

• What kind of substance light/don't light the bulb?

• Do NOT light bulb

- made up of C, H, O
- nonmetals
- metal-nonmetals in solid form

DO light bulb

- pure metals
- metal-nonmetals when dissolved

• Summary Chart

• Ask your self these Q's : follow the chart:

Q#1: Does it Dissolve?

Yes

No

Q#2: Does it conduct electricity?

Q#2: Does it conduct electricity?

Yes

No

NaCl

H₂O

CaCl₂

C₁₂H₂₂O₁₁

CuSO₄

C₂H₆O

* metal-nonmetal compounds (salts)

* pure nonmetals (l, g, soft s)

Ionic bond

e⁻ transfer

Molecular Covalent Bond

e⁻ shared

Yes

No

Au

SiO₂

Cu

C₂₀H₄₂

Al

* pure metals

* pure nonmetals (hard s)

Metallic Bond

e⁻ "sea"

Covalent Network Bond

e⁻ shared

Check In:

Q: Does MgSO₄(aq) conduct electricity?

A: Yes b/c metal-nonmetal compound conduct when dissolved