

Cat Chemistry – Would Your Cat Eat This Stuff?



Annotation

This research lab is a worksheet filled out by students, and the purpose is to analyze food labels for inorganic compounds, to gain practice writing and recognizing inorganic formulas, and converting between chemical formulas and chemical names. A table of common ions is attached, but this lab builds upon lectures of inorganic ions and other ions can be selected.

Hypothesis

Every inorganic compound has a standard name and formula and conversions can be made between the two.

Primary Learning Outcome

1. Students should learn to be critical thinkers and analyzers of food labels, and recognize that not all chemicals are bad.
2. Students should also be able to distinguish between organic and inorganic compounds.
3. Students should learn to be organized in their presentation of information.
4. Students should recognize that critical analysis is part of the scientific method and should be applied to all aspects of scientific work.

Assessed GPS

SCSh3. Students will identify and investigate problems scientifically.

- c. Collect, organize and record appropriate data.

SCSh6. Students will communicate scientific investigations and information clearly.

SPS2. Students will explore the nature of matter, its classifications, and the system for naming types of matter.

- b. Predict formulas for stable binary ionic compounds based on balance of charges.
- c. Use IUPAC nomenclature for transition between chemical names and chemical formulas of
 - binary ionic compounds (containing representative elements).
 - binary covalent compounds (i.e. carbon dioxide, carbon tetrachloride).

Total Duration

5 minutes for explanation of lab

2 days for at home completion of table

Materials and Equipment

1. common household items found in the home or at the grocery store

Technology Connection

Idea source: <http://chem.lapeer.org/Chem1Docs/CatTookChem.htm>.

Procedures

1. Conduct quick review of the characteristics and binding of inorganic elements
2. Explain worksheet layout and expectations for accuracy and neatness
3. Set deadline for students to return the assignment

Lesson Materials To Be Attached

1. ion sheet (optional- can use other ions or have students already know the common ions)
2. Cat Chemistry Student Data Page
 - a. Annotation- instructions, example ingredient list, and table for 20 ions

Assessment

Worksheet will be graded based on completeness, neatness and accuracy. Repetitive ions will be deducted from total score, as will organic ions and any elements.

Extension

For students who readily grasp current concepts, they can also be asked to predict the type of bond formed and the electron movement.

Remediation

A list of common ions is attached and can be distributed to these students to remind them of what inorganic compounds look like.

Cat Chemistry Student Data Pages

Inorganic compounds are found in all processed food (for humans and animals), and are generally used for flavoring and preservation. The following are the listed ingredients for Puss'n'Boots *Pounce* shrimp flavor cat treats:

Flour, liver, dried whole egg, glycerin, pregelatinized wheat flour, shrimp by-products, wheat gluten, torula dried yeast, calcium sulfate, cheese meal, phosphoric acid, animal fat (preserved with butylated hydroxyanisole, otherwise known as BHA), potassium chloride, salt, potassium sorbate (a preservative), wheat middlings, color, choline chloride, calcium carbonate, ferrous sulfate, vitamin E supplement, zinc oxide, BHA (again!), cupric oxide, cobalt carbonate, manganous oxide, vitamin A supplement, potassium iodide, D-calcium pantothenate, vitamin B-12 supplement, vitamin D-3 supplement, water sufficient for processing.

Student Procedure

1. Look at food labels in the grocery store, drugstore, and at home for inorganic compounds.
2. Complete the data table using the ions on the attached sheet.
3. The data table should have at least 20 different compounds, not elements.
4. Keep data table organized and legible!

NAME:

CHEMICAL NAME	CHEMICAL FORMULA	PRODUCT FOUND IN
1		
2		
3		
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20		

Ions List

Cations					
Ion	Formula	Ion	Formula	Ion	Formula
Aluminum	Al^{+3}	Hydrogen	H^{+1}	Potassium	K^{+1}
Ammonium	NH_4^{+1}	Magnesium	Mg^{+2}	Sodium	Na^{+1}
Calcium	Ca^{+2}	Nickel (II)	Ni^{+2}	Zinc	Zn^{+2}
Monoatomic Anions					
Bromide	Br^{-1}	Fluoride	F^{-1}	Oxide	O^{-2}
Chloride	Cl^{-1}	Iodide	I^{-1}	Sulfide	S^{-2}
Polyatomic Anions					
Acetate	$\text{C}_2\text{H}_3\text{O}_2^{-1}$	Hydrogen sulfate (bisulfate)	HSO_4^{-1}	Phosphate	PO_4^{-3}
Bromate	BrO_3^{-1}	Hydrogen sulfite (bisulfite)	HSO_3^{-1}	Sulfate	SO_4^{-2}
Carbonate	CO_3^{-2}	Hydroxide	OH^{-1}	Sulfite	SO_3^{-2}
Chlorate	ClO_3^{-1}	Hypochlorite	ClO^{-1}	Tetraborate	$\text{B}_4\text{O}_7^{-4}$
Hydrogen Carbonate (bicarbonate)	HCO_3^{-1}	Nitrate	NO_3^{-1}		
Alternate Names					
Chromium (II)	Chromous	Iron (III)	Ferric	Tin (II)	Stannous
Chromium (III)	Chromic	Manganese (II)	Manganous	Tin (IV)	Stannic
Copper (I)	Cupric	Mercury (I)	Mercurous		
Iron (II)	Ferrous	Mercury (II)	Mercuric		