

SUPERMARKET CHEMISTRY

Purpose –

- To identify ionic compounds found in products at the supermarket, drugstore or at home, and to write their correct ionic formulas.
- To research the properties and uses of one ionic compound and present the information to the class.

Background – Many of ingredients found in foods and other products are ionic compounds. Since you have been learning to write ionic formulas in class, you should be able to identify ionic compounds as ingredients in many of the products around your home.

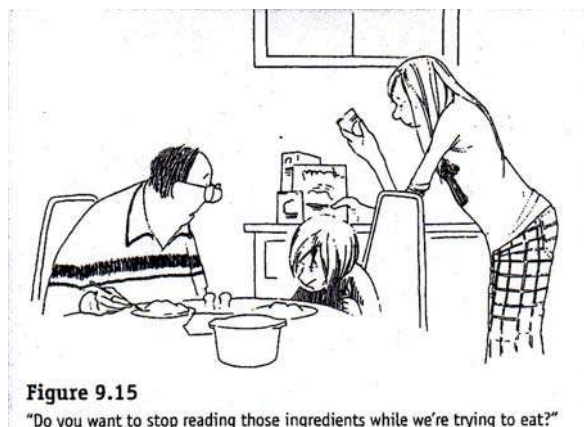


Figure 9.15

"Do you want to stop reading those ingredients while we're trying to eat?"

PART I – SCAVENGER HUNT

On the back of this sheet is a list of ions. Read the ingredients section of product labels to find ionic compounds **FORMED ONLY FROM THE IONS FOUND ON THE LIST**. (i.e. you are looking for compounds that are composed of **ONLY ONE CATION AND ONE ANION** from the list.)

- ✓ You **DO NOT** want to include:
 - compounds that are composed of more than two ions ex.) sodium chloride oxide
 - compounds that have prefixes like "mono", "di", or "tetra" ex.) dicalcium phosphate
 - elements ex.) iron
- ✓ For each compound, the following information is required:
 - Name of compound as it appears on the label
 - Chemical formula
 - Name of the product in which it is found
- ✓ The information must be **TYPED** and presented in a table in the following format:

Compound Name	Formula	Product
1. potassium chloride	KCl	Pounce Cat Treats
2. sodium chloride	NaCl	Pounce Cat Treats
Etc.		

- The list should be numbered
- Lists should be alphabetized by compound name. (-2 points if not alphabetized)
- You need at least **20 DIFFERENT** compounds. (Duplicates will not receive credit.)
- You need at least 10 different products. (Some products may contain 20 ionic compounds but that would not help you find the range of products that contain ionic compounds.)

Ions List for Supermarket Chemistry Project

Cations		Anions	
name	symbol	name	symbol
aluminum	Al ³⁺	acetate	C ₂ H ₃ O ₂ ⁻
ammonium	NH ₄ ⁺	benzoate	C ₇ H ₅ O ₂ ⁻
barium	Ba ²⁺	bicarbonate	HCO ₃ ⁻
calcium	Ca ²⁺	bisulfate	HSO ₄ ⁻
chromium (II) or chromous	Cr ²⁺	bisulfite	HSO ₃ ⁻
chromium (III) or chromic	Cr ³⁺	bromide	Br ⁻
cobalt (II) or cobaltous	Co ²⁺	carbonate	CO ₃ ²⁻
cobalt (III) cobaltic	Co ³⁺	chlorite	ClO ₂ ⁻
copper (I) or cuprous	Cu ⁺	chlorate	ClO ₃ ⁻
copper (II) or cupric	Cu ²⁺	chloride	Cl ⁻
hydrogen	H ⁺	chlorite	ClO ₂ ⁻
iron (II) or ferrous	Fe ²⁺	chromate	CrO ₄ ²⁻
iron (III) or ferric	Fe ³⁺	cyanide	CN ⁻
lead (II) or plumbous	Pb ²⁺	dichromate	Cr ₂ O ₇ ²⁻
magnesium	Mg ²⁺	fluoride	F ⁻
manganese (II)	Mn ²⁺	hydride	H ⁻
mercury (II) or mercuric	Hg ²⁺	hydroxide	OH ⁻
nickel (II)	Ni ²⁺	hypochlorite	ClO ⁻
potassium	K ⁺	iodate	IO ₃ ⁻
silver	Ag ⁺	iodide	I ⁻
sodium	Na ⁺	nitrate	NO ₃ ⁻
tin (II) or stannous	Sn ²⁺	nitrite	NO ₂ ⁻
tin (IV) or stannic	Sn ⁴⁺	oxide	O ²⁻
zinc	Zn ²⁺	perchlorate	ClO ₄ ⁻
		permanganate	MnO ₄ ⁻
		peroxide	O ₂ ²⁻
		phosphate	PO ₄ ³⁻
		sulfate	SO ₄ ²⁻
		sulfide	S ²⁻
		sulfite	SO ₃ ²⁻
		tetraborate	B ₄ O ₇ ⁴⁻

PART II – RESEARCH & PAPER

- ✓ Choose **one** of the ionic compounds from your list and do some research to gather information on the compound:

- What products is the compound found in?
- What physical properties does the compound have?
- What chemical properties does the compound have?
- What uses are there for the compound?
- Why might it have been used in the product you found it in?

- ✓ Write a 2 page paper (typed, 12 point font, double spaced, 1.25 inch margins) of your results in the following format:

1st paragraph – Introduction

2nd paragraph - Properties

- describe several chemical and physical properties of your compound
- be sure to pick properties that you understand and can explain
- try to place each property in a meaningful context (for example – is a boiling point of 225°C high or low? Can you compare it to something found in everyday life that people are familiar with?)

3rd paragraph – Uses

- Describe the various uses your compound has, including, but not limited to the product you found it in
- Elaborate on how people depend on these uses in every day life
- For at least one of the products (found in your research), explain why the compound is in the product: What properties does it have that make it a useful or necessary ingredient?

4th paragraph – Conclusion

- Based on the properties and common uses of your compound, why do you think it was found in the product(s) you found it in? Is it a necessary ingredient, just helpful, or not needed?
- Other closing thoughts you have

- ✓ You will also be graded on:

Ethical use of information

- Paraphrasing information in your own words
- Using quotations where necessary
- Citing all your sources of information (Noodlebib)
- Using information to construct your own knowledge

Writing quality

- clarity
- understanding of audience
- mechanics

SUPERMARKET CHEMISTRY - RUBRIC

PART I – CHART (20 points)

Grading Criteria	Points Available	Points Earned by Student
<ul style="list-style-type: none">• ½ point for each compound name• Must be an ionic compound composed of one cation and one anion	10	
<ul style="list-style-type: none">• ½ point for each correct ionic formula• Must be correctly balanced	10	
<ul style="list-style-type: none">• Information is presented neatly in table format• List is numbered• List is alphabetized	-3 (if not done)	
<ul style="list-style-type: none">• Extra credit – 1 point each for up to 5 additional compounds	+5	
	TOTAL: ____ / 20	

PART II – RESEARCH & PAPER (20 points)

Grading Criteria	Points Available	Points Earned by Student
Introduction	3	
Properties	5	
Uses	5	
Conclusion	3	
Ethical use of information	3	
Use of Information to Construct Knowledge	3	
Clarity	3	
Understanding of Audience	3	
Mechanics	3	
	TOTAL: ____ / 31	

TOTAL GRADE FOR PROJECT:

____ / 51

	3 points	2 points	1 point	0 points
	Meets the expectations	Approaches the expectations	Does not meet the expectations	Produces little or no evidence to evaluate the expectations
Ethical Use of Information <ul style="list-style-type: none"> . Paraphrasing . Quotations . Citations . Bibliography 	Produces authentic work and distinguishes paraphrasing from use of direct quotations appropriately citing sources with adequate accuracy of format.	Disproportionate and inconsistent use of paraphrasing and direct quotations with minimal attempt at citation.	Inappropriate use of information (plagiarism) and/or failure to cite sources.	Direct plagiarism.
Use of Information to Construct Knowledge and/or Problem Solve	Analyze, explain, connect and compare information to construct knowledge.	Examines, describes or categorizes, information that is general knowledge.	Inaccurate interpretation or misuse of information.	Irrelevant or invalid relationship to the task.
Clarity	Provides distinct introduction, well-developed paragraphs, frequent use of transitions* in topic sentences, and a conclusion that summarizes content.	Provides introduction, support, and conclusion, but provides limited transitions* and/or limited development of ideas through meaningful paragraphs.	Does not provide clear beginning, middle and/or end, lacks transitions*, and limits development of paragraphs, leaving reader with only general sense of topic.	Does not provide enough information to evaluate.
Understanding of Audience	Ensures authenticity of writing by adjusting voice, style and vocabulary; provides background and terminology necessary for audience understanding.	Makes some adjustment in voice, style and/or vocabulary; but lack of background information and age-appropriate terminology weaken audience understanding.	Identifies audience, makes limited adjustment in voice, style, vocabulary; provides minimal background, leaving audience confused and unsure of author's contribution to writing.	No evidence of author's voice; audience unable to determine who, what, where, when and why.
Mechanics	Shows evidence of careful revision, resulting in some minor errors of Standard Written English that have little to no effect on meaning.	Shows sincere attempt at revision, yet accumulation of minor errors of Standard Written English result in effect on meaning.	Shows little attention to revision, leaving significant and numerous errors in Standard Written English that interfere with meaning.	No evidence of revision, producing work that is seriously flawed.