

Bite of Science Presentation

Bringing science to life

Dr. Michelle K. Waddell
Dept. of Chemistry and
Biochemistry
Hampton University
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Overview

- ❖ Undergraduate Students
- ❖ Real life Scenarios and Science
- ❖ Technology and Science

Hampton University Mission

- ❖ Hampton University is a comprehensive institution of higher education, dedicated to the promotion of learning, building of character, and preparation of promising students for positions of leadership and service. Its curricular emphasis is scientific and professional with a strong liberal arts undergirding. In carrying out its mission, the University requires that everything it does be of the highest quality.

Hampton University Top Majors

- ❖ 1. Biology
- ❖ 2. Psychology
- ❖ 3. Pre-pharmacy
- ❖ 4. Business
- ❖ 5. Journalism

STEM college majors

- ❖ Problem solvers
- ❖ Strong mathematics
- ❖ Reading comprehension
- ❖ Build knowledge base
- ❖ Laboratory experience
- ❖ Scientific curiosity
- ❖ Advanced science courses
- ❖ Keeping a laboratory notebook

Millennial students

- ❖ Short attention span
- ❖ Tethered to technology
- ❖ Short on patience
- ❖ Do not read or take notes
- ❖ Over stimulated
- ❖ Need to connect course content to the current culture
- ❖ Readily makes personal connections with others

Engaging Science

- ❖ Hands on participation
- ❖ Relate to real life
- ❖ Utilize technology (youtube and websites)
- ❖ Science fair projects

Passionate about Science

- ❖ Enthusiasm translates easily
- ❖ Engage students individual interests
- ❖ Expand horizons
- ❖ Impact on society
- ❖ Highlight interdisciplinary topics

Research in the classroom

- ❖ Dragomabin
- ❖ Iron nanoparticles from green tea leaves
- ❖ Molecular Modeling using iPad apps
- ❖ CSI style lab experiment
- ❖ Exploring how students learn science



Kitchen Chemistry

- ❖ 1. Green slime~polymers
- ❖ 2. Paper chromatography with M &M's ~ polarity
- ❖ 3. Extracting DNA from wheat germ ~ macromolecules
- ❖ 4. Crushed can~ Ideal gas law
- ❖ 5. Ozone layer~environment



CheMagic website

CheMagic is...

A Molecular
Model Kit

Virtual Molecular
Model Kit
VMK

An Editable
Chem Worksheet

CheMagic Editable
Worksheet with
VMK

The Birds of
Anna Maria Island

Birding
Photo Journal
and More

A Chemical
Calculator

CheMagic
Music Videos

Send
Email to
CheMagic

A Really Magic
Stoichiometric
Calculator

Classic CheMagic
Chem Demo
Videos

Touch a Circle to Explore CheMagic

Your Browser has HTML5 and Local Storage turned ON.
You're good to go on all CheMagic pages!

CheMagic 2

The screenshot displays the CheMagic VMK Mini software interface. A central dialog box titled "CheMagic VMK Mini: Load Model from Data Sources" is open, prompting the user to enter a search term. The dialog lists several data sources and their corresponding input formats: PubChem (e.g., aspirin), Protein Data Bank (e.g., 1smd), NIH/CADD Resolver (e.g., \$aspirin), and COD database (e.g., 1000118). A checkbox is present for appending the model to existing ones. The input field contains the text "aspirin". The background interface includes several panels: "Atom and Bond Edit" with a grid of atom types (H, B, C, N, P, O, F, Cl, Xx, Q+, Q-, redo, Single, Double, Xatm, Xbnd, Wire, Ball, sp, sp2); "Load Models" with a table of model names; "Other Model Actions" with a grid of actions (Zoom In, Zoom Out, Length, Angle, Rotation, Mark & R/S, Mass, Calculator, Bond, Move, Rotate, Compare, Share, Get Share, Share ID, Fast Share ID, Mod, Restore Mod, View Mods, Get Image, Google, NIST Direct, Chem, NMRDB, Jmol, InChI App, Identifiers, Get Model File, Clear/Reset, Reload, Jmol Script, Stories & Help, Info & Email, Stereo On/Off); and a "Show Help Slides" button at the top center. The text "CheMagic Virtual Molecular Model Kit" is visible at the bottom of the interface.

Atom and Bond Edit

H	B	C
N	P	O
F	Cl	Xx
Q+	Q-	redo
Single	Double	
Xatm	Xbnd	
Wire	Ball	
sp	sp2	

Load Models

Name	Dr
CheMagic	Fi

Other Model Actions

Charge	Dip
Dipole-Net	Ene
vdW	MEP
MO	CIF Symop
Correct H	Optimize

Show Help Slides

Other Model Actions

Zoom In	Zoom Out
Length	Angle
Rotation	Mark & R/S
Mass	Calculator
Bond	Move
Rotate	Compare
Share	Get Share
Share ID	Fast Share ID
Mod	Restore Mod
View Mods	Get Image
Google	NIST Direct
Chem	NMRDB
Jmol	InChI App
Identifiers	Get Model File
Clear/Reset	Reload
Jmol Script	Stories & Help
Info & Email	Stereo On/Off

CheMagic VMK Mini: Load Model from Data Sources

Enter:

- A name to load from PubChem (e.g. aspirin)
- An ID to load from Protein Data Bank (e.g. 1smd)
- A \$name to load from NIH/CADD Resolver(e.g. \$aspirin)
- An ID to load from COD database (e.g. 1000118)
- A single \$ to reload window model from Resolver

Check this box to append model to model(s) already in window.

aspirin

Cancel OK

CheMagic Virtual Molecular Model Kit

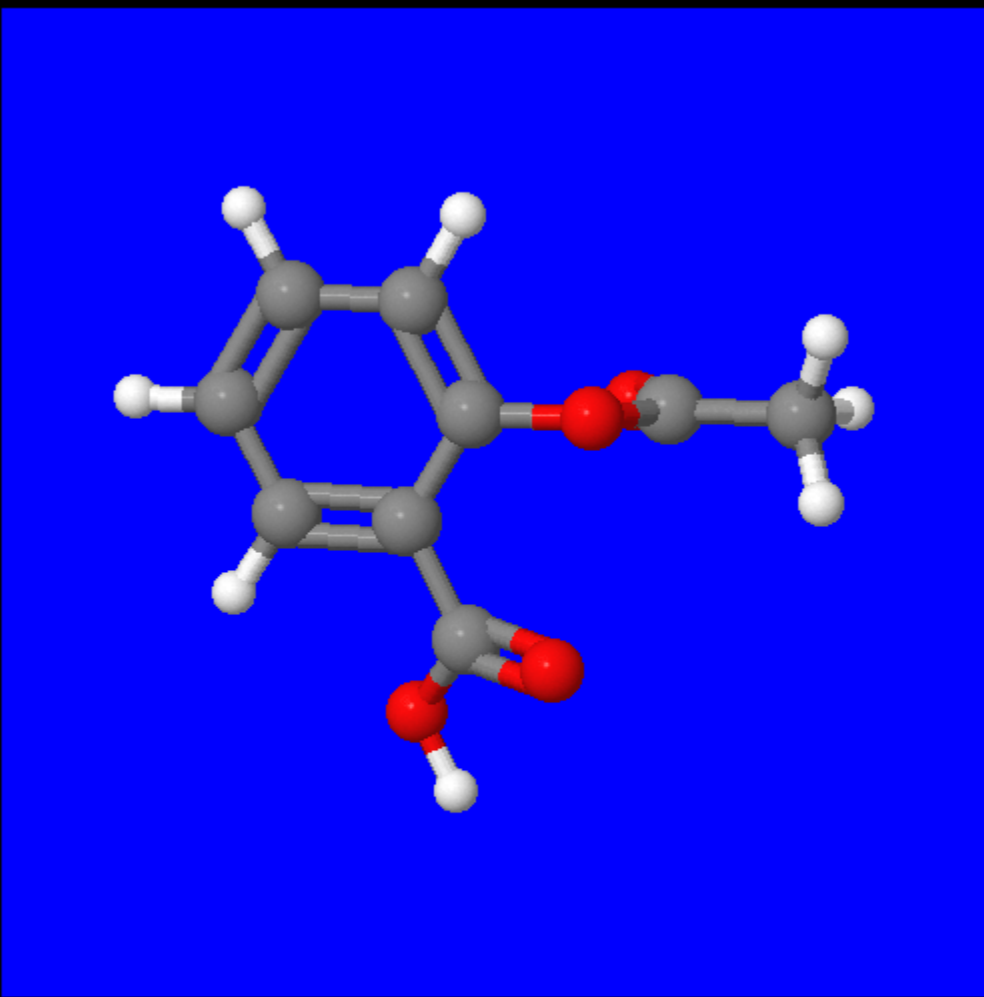
CheMagic 3

Show Help Slides

Atom and Bond Edit			
H	B	C	Si
N	P	O	S
F	Cl	Xx	inv
Q +	Q -	redo	undo
Single	Double	Triple	
Xatm	Xbnd	Xmol	
Wire	Ball	Space	
sp	sp2	sp3	

Load Models	
Name	Draw
CheMagic	File

Other Model Actions	
Charge	Dipoles
Dipole-Net	Energy
vdW	MEP
MO	CIF Symop
Correct H	Optimize



Other Model Actions	
Zoom In	Zoom Out
Length	Angle
Torsion	Mark & R/S
Mass	Calculator
Rotate Bond	Move
Duplicate	Compare
Put Share	Get Share
Share ID	Fast Share ID
Save Mod	Restore Mod
Review Mods	Get Image
NIST Google	NIST Direct
PubChem	NMRDB
Google	InChI App
Get Identifiers	Get Model File
Clear/Reset	Reload
Jmol Script	Stories & Help
Info & Email	Stereo On/Off

CheMagic Virtual Molecular Model Kit

CheMagic 4

Show Help Slides

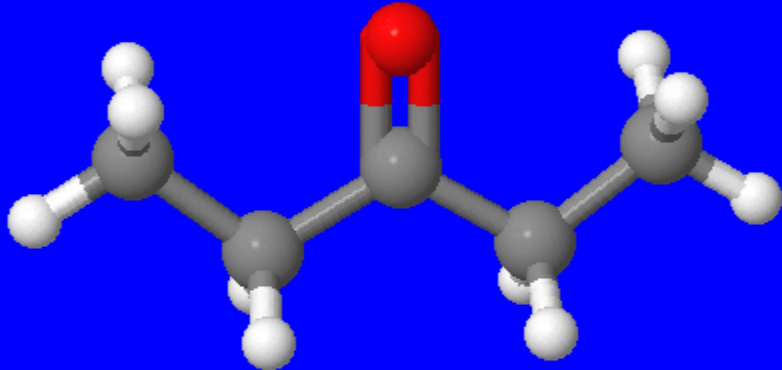
Turn Reaction Mode On Get JME File

C
N
O
S
F
Cl
Br
I
P
X

Draw a single model to load in the model window.

Load Model	Append Model	Model > Draw	Put Share	Get Share
Save Draw	Restore Draw	Review Draw	Get PNG	Close Editor

CheMagic 5

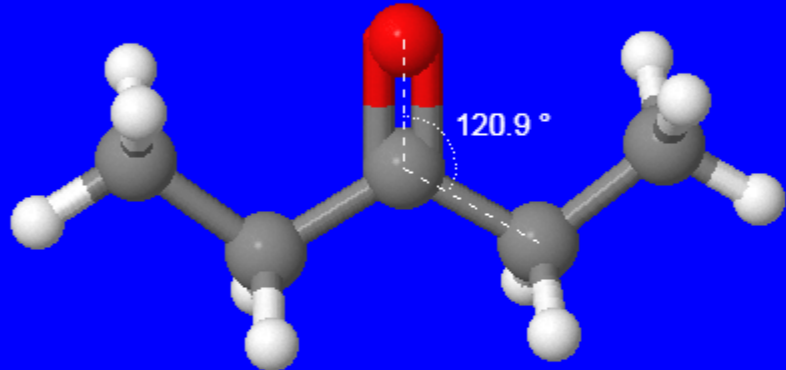
Atom and Bond Edit				Show Help Slides		Other Model Actions	
H	B	C	Si	<p>A partial MMFF94 optimization is complete. Click optimize again if needed.</p> 		Zoom In	Zoom Out
N	P	O	S			Length	Angle
F	Cl	Xx	inv			Torsion	Mark & R/S
Q +	Q -	redo	undo			Mass	Calculator
Single	Double	Triple				Rotate Bond	Move
Xatm	Xbnd	Xmol				Duplicate	Compare
Wire	Ball	Space				Put Share	Get Share
sp	sp2	sp3				Share ID	Fast Share ID
Load Models						Save Mod	Restore Mod
Name	Draw					Review Mods	Get Image
CheMagic	File			NIST Google	NIST Direct		
Other Model Actions				PubChem	NMRDB		
Charge	Dipoles			Google	InChI App		
Dipole-Net	Energy			Get Identifiers	Get Model File		
vdW	MEP			Clear/Reset	Reload		
MO	CIF Symop			Jmol Script	Stories & Help		
Correct H	Optimize			Info & Email	Stereo On/Off		

CheMagic Virtual Molecular Model Kit

CheMagic 6

[Show Help Slides](#)

Click 3 atoms to measure an angle.



120.9 °

CheMagic Virtual Molecular Model Kit

Atom and Bond Edit			
H	B	C	Si
N	P	O	S
F	Cl	Xx	inv
Q +	Q -	redo	undo
Single	Double	Triple	
Xatm	Xbnd	Xmol	
Wire	Ball	Space	
sp	sp2	sp3	
Load Models			
Name	Draw		
CheMagic	File		
Other Model Actions			
Charge	Dipoles		
Dipole-Net	Energy		
vdW	MEP		
MO	CIF Symop		
Correct H	Optimize		

Zoom In	Zoom Out
Length	Angle
Torsion	Mark & R/S
Mass	Calculator
Rotate Bond	Move
Duplicate	Compare
Put Share	Get Share
Share ID	Fast Share ID
Save Mod	Restore Mod
Review Mods	Get Image
NIST Google	NIST Direct
PubChem	NMRDB
Google	InChI App
Get Identifiers	Get Model File
Clear/Reset	Reload
Jmol Script	Stories & Help
Info & Email	Stereo On/Off

Science on a budget

- ❖ Free websites
- ❖ Gum drops and tooth picks
- ❖ Large lab groups
- ❖ Incorporate your research interest into class
- ❖ Relay real life events into discussion
 - ❖ Flint water crisis
 - ❖ Green water in olympic pools
 - ❖ Arkema TX chemical plant fire



Summer Science Programs for students

- ❖ Inroads summer internships
- ❖ Young doctors
- ❖ Nano HU Scholars
- ❖ PREM
- ❖ LSAMP
- ❖ Business of Engineering
- ❖ HU Summer National Travel Institute

Women in Science

- ❖ Majority of students in college are female (6:4 or 7:3)
- ❖ Mentorship key~workplace is the opposite
- ❖ Society prejudice
- ❖ Professional organizations
- ❖ Emotional adjustment

Professional Apps

- ❖ ACS Mobile
 - ❖ C&EN, Articles ASAP, journals
- ❖ ChemWorks
 - ❖ Save, share literature articles
- ❖ C&EN
 - ❖ Weekly magazine
- ❖ ACS Central Science
 - ❖ magazine

General Chemistry Apps

- ❖ Periodic Table (RSC)
 - ❖ Info, videos
- ❖ Valence (\$0.99)
 - ❖ Practice with Lewis structures
- ❖ Molarity
 - ❖ Dilution calculator
- ❖ Ideal Gas Laws (KET) (\$2.99)
 - ❖ Simulation

General Chemistry Apps 2

- ❖ Chemists Virtual Lab
 - ❖ Simulated Labs
 - ❖ Preparation and Properties of CO_2
 - ❖ Redox Reactions
 - ❖ Factors that Affect Reaction Rate
 - ❖ Concentration
 - ❖ Temperature
 - ❖ pH and Color Change
 - ❖ Ammonia Fountain
 - ❖ Soap Making
 - ❖ Zinc-Copper Battery
 - ❖ Dehydration of Sugar with Sulfuric Acid
 - ❖ Carbon Dioxide
 - ❖ Simple Filtration
 - ❖ Fractional Distillation

General Chemistry Apps 3

- ❖ Odyssey (Wavefunction) (\$3.99)
<http://www.wavefun.com/products/odyssey/odyssey.html>
- ❖ Elements
- ❖ Ionic Bonding
- ❖ Electron Sharing
- ❖ VSEPR
- ❖ Polarity
- ❖ Substances
- ❖ Water

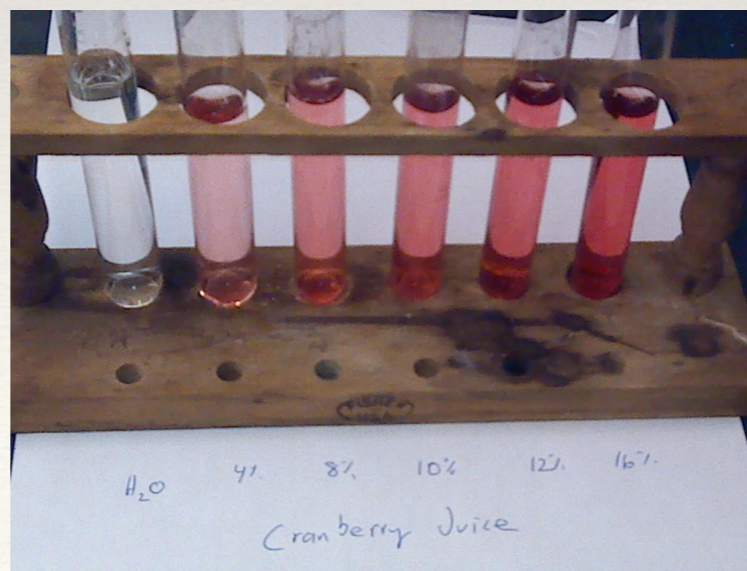
Quant Apps 1

- ❖ Titrate (Susan Kohler)
 - ❖ Titrate mono or diprotic acid (vol. vs. pH)
- ❖ Pixel Picker
 - ❖ RGB values from photos
 - ❖ iPad / camera = colorimeter



Quant Apps 2

- ❖ Cell phone colorimeter
 - ❖ “Introducing Colorimetric Analysis with Camera Phones and Digital Cameras: An Activity for High School or General Chemistry”, Eric Kehoe and R. Lee Penn, J. Chem. Educ., (2013), 90, 1191-1195



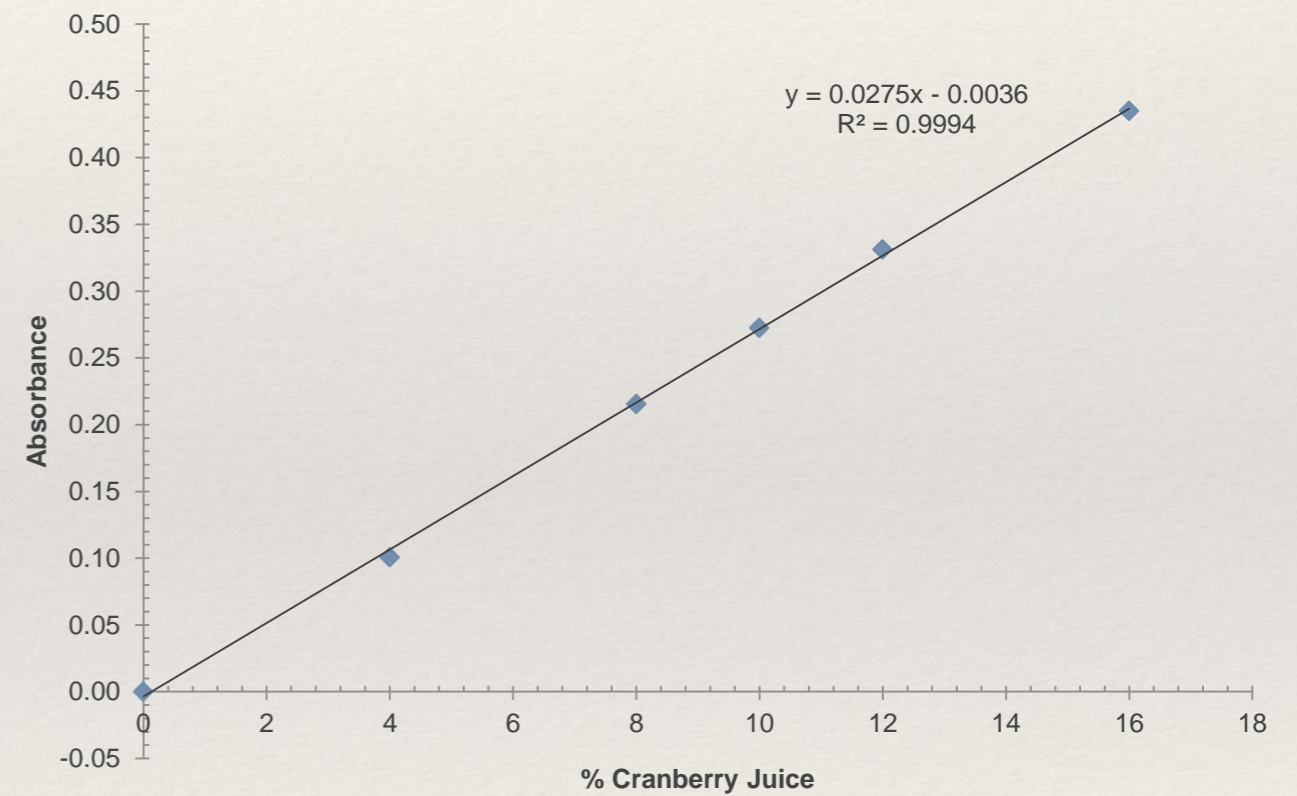
Quant Apps 3

❖ Data

RGB Analysis of Cranberry Juice



Cranberry Juice - Blue



Summary

- ❖ Making science interesting yields more engagement
- ❖ Several methods to engage the classroom
- ❖ Using common technology to explore new ways to learn

Questions

