

# ARISE Curriculum Guide

## Chemistry: Topic 21—Organic Chemistry

### ChemMatters

[Order a CD with 25 years of ChemMatters](#), \$30

#### Articles for Student Use

The Absorbing Story of the Thirsty Polymer: Oct. 1999, pp. 4-5.  
Alcohol: Feb. 1985, pp. 8-11.  
Antifreeze Antidote: Oct. 1996, pp. 4-6.  
Artificial Sweeteners: Feb. 1988, pp. 4-8.  
Aspirin: Feb. 1993, pp. 4-7.  
A calorie-free fat? April 1999, pp. 9-11.  
Carnivorous Plants: Dec. 1993, pp.4-5.  
The Case of the Missing Caffeine: April 1999, pp. 12-13.  
Detergents: April 1985, pp. 4-6.  
Dissolving Plastic: Oct. 1987, pp. 12-15.  
Distance Running: Feb. 1989, pp. 4-7.  
Egg Cookery: Dec. 1984, pp. 4-9.  
Fabric of Steel: Oct. 1999, pp. 7-8.  
Fats: Fitting them into a Healthy Diet: Oct. 2000, p. 6.  
Fireside Dreams: Dec. 1988, pp. 13-15.  
Fossil molecules: April 1988, pp.4-7.  
Hydrogen and Helium: Oct. 1985, pp. 4-7.  
Insect Arsenals: Oct. 1993, pp. 8-10.  
Killing for Oil: Oct. 1988, pp. 4-8.  
Lava Lite: A Chemical Juggling Act: April 1997, pp. 4-7.  
Luminol. Casting a Revealing Light on Crime: Dec. 2001, pp. 12-13.  
Making Ice Cream: Dec. 1995, pp. 4-7.  
Mirror Molecules: April 1989, pp. 4-7.  
Mouthwash: What's in it for you? Dec. 1996, pp. 6-8.  
Natural Dyes: Dec. 1986, pp. 4-8, 12.  
Non-Safety Glass: Oct. 1987, pp. 10-11.  
Nylon: Dec. 1990, pp. 4-6.  
Peanut Brittle: Dec. 1991, pp. 4-7.  
Penicillin: April 1987, pp. 10-12.  
Permanent Waves: April 1993, pp. 8-11.  
Perfume: Feb. 1992, pp. 8-11.  
Plants Fight Back: April 1996, pp. 9-11.  
Polysaccharides: April 1986, pp. 12-14.  
Polymers: April 1986, pp. 4-7.  
Real Leather: April 1990, pp. 4-6.  
Silly Putty: April 1986, pp. 15-19.  
Sizing up Paper: April 1998, pp. 10-12.

Skunk Non-scents: Oct. 1996, pp. 7-9.  
The Smell of Danger: Oct. 1988, pp.9-13.  
Spider Silk: Spinning a Strong Thread: Feb. 2001, pp. 10-11.  
Sports Drinks: Don't Sweat the Small Stuff: Feb. 1999, pp. 11-13.  
Soap: Feb. 1985, pp. 4-7, p. 12.  
A Successful Failure: Feb. 1998, p. 12.  
Swimming Pools: April 1994, pp. 10-12.  
Wastewater: April 1992, pp. 12-15.  
Zombies: Oct. 1987, pp. 4-9.

### **Articles for Teacher Use**

**Number and Topic:** 2. Measurement  
3. Problem Solving  
17. Water, Aqueous Solutions  
20. Acids/Bases/pH  
21. Organic Chemistry

Source: *ChemMatters*, April 1994, pp. 10-12, "Swimming Pools"

Type of Material: Student Journal Article

Building on: Quantitative calculations, ppm

Leading to: Acids, bases, pH, organic chemistry

Links to Physics:

Links to Biology:

Good Stories:

Activity Description: Article discusses the chemistry involved in keeping a swimming pool clean and safe. It does a good job of illustrating the complexity of the trying to balance different requirements that are often in conflict.

  

**Number and Topic:** 4. Atomic Structure  
8. Chemical Reactions  
21. Organic Chemistry

Source: *ChemMatters*, Dec. 2001, pp. 12-13, "Luminol. Casting a Revealing Light on Crime"

Type of Material: Student Journal Article

Building on: Atomic structure, chemical reactions

Leading to: Organic chemistry

Links to Physics: Electromagnetic spectrum

Links to Biology: Living matter, composition of blood

Good Stories: Luminol can be used to detect the possible presence of blood at a crime scene.

Activity Description: Article describes how luminol reacts with blood (and other substances) and how the reaction produces a product whose electrons are in a high energy state but then fall to a lower state with the emission of visible light.

**Number and Topic:** 8. Chemical Reactions  
15. Ionic and Metallic Bonds  
16. Covalent Bonds, Molecular Shapes and Intermolecular Forces  
20. Acids/Bases/pH  
21. Organic Chemistry  
22. Redox/Electrochemistry

Source: *ChemMatters*, April 1993, pp. 8-11, "Permanent Waves"  
Type of Material: Student Journal Article  
Building on: Molecular structures, acids and bases  
Leading to: Hydrogen bonds, amino acids, proteins,  
Links to Physics:  
Links to Biology: Structure of human hair, proteins  
Good Stories:  
Activity Description: Article details the complex structure of human hair and how permanent waves act on hair to produce their effect.

**Number and Topic:** 5. Radioactivity, Fusion, Fission  
21. Organic Chemistry

Source: *ChemMatters*, Oct. 1985, pp. 4-7, "Hydrogen and Helium"  
Type of Material: Student Journal Article  
Building on: Basic properties of hydrogen and helium, atomic and molecular weights, Archimedes' Principle  
Leading to: Abundance of hydrogen and helium in the universe, gravity, the sun  
Links to Physics:  
Links to Biology:  
Good Stories: The Hindenburg disaster  
Activity Description: This article discusses the properties uses and potential uses of hydrogen and helium.

**Number and Topic:** 6. Chemical Names and Formulas/Compounds and Elements  
10. Phases, Solids, Liquids and Gases (States of Matter)  
17. Water, Aqueous Solutions  
21. Organic Chemistry

Source: *ChemMatters*, Dec. 1995, pp. 4-7, "Making Ice Cream"  
Type of Material: Student Journal Article and Activity  
Building on: Basic chemical knowledge of molecular structures  
Leading to: Colloids, lipids, emulsifiers, sugars, colligative properties  
Links to Physics:  
Links to Biology: Food, lipids, proteins  
Good Stories: Relates the history of ice cream and some government regulations regarding the labeling of the product.  
Activity Description: Article discusses the composition of ice cream and the science behind its preparation and ends with a student activity to make home-made ice cream.

**Number and Topic:** 6. Chemical Names and Formulas/Compounds and Elements  
8. Chemical Reactions  
20. Acid/Bases/pH  
21. Organic Chemistry

Source: *ChemMatters*, April 1990, pp. 4-6, "Real Leather"

Type of Material: Student Journal Article

Building on: Names and formulas, chemical reactions, acids, bases, pH

Leading to: Organic chemistry

Links to Physics:

Links to Biology: Structure of collagen, amino acids

Good Stories: Relates the history of leather tanning from ancient times to the present.

Activity Description: Article describes various techniques that can be used to tan leather, going into the chemical reactions involved in different processes.

**Number and Topic:** 6. Chemical Names and Formulas/Compounds and Elements  
17. Water, Aqueous Solutions  
20. Acids/Bases/pH  
21. Organic Chemistry

Source: *ChemMatters*, April 1985, pp. 4-6, "Detergents"

Type of Material: Student Journal Article

Building on: Basic knowledge of molecular structures and ions

Leading to: Discussion of anionics, cationics, nonionics, emulsions, micelles, hard water

Links to Physics:

Links to Biology: Eutrophication caused by the presence of phosphates in detergents, bacterial action on surfactants

Good Stories:

Activity Description: Article discusses detergents, what they contain, the function of each ingredient and how they are different from soaps.

**Number and Topic:** 8. Chemical Reactions  
21. Organic Chemistry

Source: *ChemMatters*, Oct. 2000, pp. 6-8, "Fats: Fitting them into a Healthy Diet"

Type of Material: Student Journal Article

Building on: Molecular structures and names and chemical reactions

Leading to: Organic chemistry, isomerism

Links to Physics:

Links to Biology: Food, lipids

Good Stories: Gives some details about the amount of fat in some common fast-food meals.

Activity Description: The article presents basic information about fats, what they are and how they are formed from glycerol and fatty acids. It goes on to discuss different kinds of fats, such as saturated and unsaturated as well as cis-trans isomers. Various types of fat substitutes are also discussed.

**Number and Topic:** 8. Chemical Reactions  
21. Organic Chemistry

Source: *ChemMatters*, April 1999, pp. 9-11, "A Calorie-Free Fat?"

Type of Material: Student Journal Article

Building on: Organic chemistry

Leading to: Triglycerides, enzymes, carbohydrates, proteins

Links to Physics: Energy

Links to Biology: Food, lipids

Good Stories:

Activity Description: Article describes fats, their structures and formation and then moves on to fat substitutes. It describes how their structures differ from normal lipids and explains why they are "calorie free" when ingested into the human body, even though they would produce calories of heat if burned in a calorimeter.

**Number and Topic:** 8. Chemical Reactions  
21. Organic Chemistry

Source: *ChemMatters*, Oct. 1996, pp. 7-9, "Skunk Non-scents"

Type of Material: Student Journal Article

Building on: Chemical reactions

Leading to: Organic chemistry, cis-trans isomers

Links to Physics:

Links to Biology: How a skunk's defensive mechanism works

Good Stories: Tells how a researcher discovered an effective way to remove the odor from an animal that had been sprayed by a skunk.

Activity Description: Article discusses the structure of the odoriferous chemicals contained in skunk spray, a mixture that can effectively remove the odor, and the chemistry that explains how and why it works.

**Number and Topic:** 8. Chemical Reactions  
21. Organic Chemistry  
22. Redox/Electrochemistry

Source: *ChemMatters*, Oct. 1993, pp. 8-10, "Insect Arsenals"

Type of Material: Student Journal Article

Building on: Chemical reactions

Leading to: Organic chemistry, redox

Links to Physics:

Links to Biology: Numerous links to evolution, adaptations, behaviors, heredity

Good Stories: Several interesting stories of unusual methods by which some insects defend themselves against predators.

Activity Description: Article discusses the general topic of how insects utilize chemical defenses and includes several very specific examples, explaining in detail the chemical reactions involved.

**Number and Topic:** 8. Chemical Reactions  
17. Water, Aqueous Solutions  
20. Acids/Bases/pH  
21. Organic Chemistry

Source: *ChemMatters*, April 1992, pp. 12-15, "Wastewater"

Type of Material: Student Journal Article

Building on: Chemical reactions

Leading to: Acids/Bases, pH

Links to Physics:

Links to Biology: Aerobic bacterial action

Good Stories:

Activity Description: Article describes how wastewater is treated and turned into potable water. Article goes into much specific chemistry and is well written by an expert in water treatment.

**Number and Topic:** 8. Chemical Reactions  
21. Organic Chemistry

Source: *ChemMatters*, Dec. 1990, pp. 4-6, "Nylon"

Type of Material: Student Journal Article

Building on: Organic chemistry

Leading to: Polymers

Links to Physics:

Links to Biology:

Good Stories: Relates how Wallace Carothers and an assistant discovered nylon partly by insight, partly by luck.

Activity Description: Article describes both the history of nylon, the chemical reactions involved in its creation, and the specific procedures by which a useful fiber is generated.

**Number and Topic:** 8. Chemical Reactions  
21. Organic Chemistry

Source: *ChemMatters*, Feb. 1989, pp. 4-7, "Distance Running"

Type of Material: Student Journal Article

Building on: Chemical reactions

Leading to: Organic chemistry, chemical and biological processes involved in human respiration and energy production

Links to Physics:

Links to Biology: Aerobic and anaerobic processes, function of ATP, glycogen, glucose, pyruvic acid and fats in producing energy within the human body

Good Stories:

Activity Description: Article deals with the chemistry and physiology of running.

**Number and Topic:** 8. Chemical Reactions  
11. Thermochemistry  
21. Organic Chemistry

Source: *ChemMatters*, Dec. 1988, pp. 13-15, "Fireside Dreams"

Type of Material: Student Journal Article

Building on: Chemical reactions

Leading to: Combustion reactions

Links to Physics:

Links to Biology: Molecular structure of wood

Good Stories:

Activity Description: Article discusses the composition of wood, how and why it burns, and the chemical processes and reactions that are involved.

**Number and Topic:** 8. Chemical Reactions  
21. Organic Chemistry

Source: *ChemMatters*, Oct. 1987, pp. 12-15, "Dissolving Plastic"

Type of Material: Student Journal Article and Activity

Building on: Basic chemical knowledge

Leading to: Organic structures, polymers, solubility

Links to Physics:

Links to Biology:

Good Stories:

Activity Description: Article describes various types of plastic polymers and how it is possible to create a polymer (polyvinyl alcohol) that is soluble in water.

**Number and Topic:** 8. Chemical Reactions  
21. Organic Chemistry

Source: *ChemMatters*, April 1986, pp. 4-7, "Polymers"

Type of Material: Student Journal Article

Building on: Chemical reactions

Leading to: Organic reactions and the creation of polymers

Links to Physics:

Links to Biology: How the creation of plastic materials helped save the world's elephants from extinction due to poaching to obtain their tusks for the purpose of making billiard balls.

Good Stories: See above

Activity Description: The article details the creation of several different types of polymeric materials. It presents many of the equations involved in their synthesis and details about many of the processes, for example how a PET bottle is made.

**Number and Topic:** 8. Chemical Reactions  
16. Covalent Bonds, Molecular Shapes and Intermolecular Forces  
17. Water, Aqueous Solutions  
21. Organic Chemistry

Source: *ChemMatters*, Feb. 1985, pp. 4-7, p. 12, "Soap"

Type of Material: Student Journal Article and Activity

Building on: Basic chemical knowledge of structures

Leading to: Polarity, intermolecular forces, "like dissolves like," saponification

Links to Physics:

Links to Biology:

Good Stories:

Early bathing habits. Queen Isabella of Spain boasted of taking only two baths in her lifetime, once when she was born and another on her wedding day. Queen Elizabeth I of England was a "bathing enthusiast." Her chronicles record that "she hath a bath every three months whether she needeth it or no."

Activity Description: This article presents both the history of soap making, the science of soap making, including typical chemical equations, and the "art" of soapmaking. On page 12 there is a student activity relating to how soap works.

**Number and Topic:** 10. Phases, Solids, Liquids and Gases (States of Matter)  
17. Water, Aqueous Solutions  
21. Organic Chemistry

Source: *ChemMatters*, April 1999, pp. 12-13, "The Case of the Missing Caffeine"

Type of Material: Student Journal Article

Building on: Phases, organic chemistry, aqueous solutions

Leading to: Phase diagrams

Links to Physics:

Links to Biology:

Good Stories:

Activity Description:

Article discusses caffeine, its structure and presence in various beverages. It goes on to explain different methods by which caffeine can be extracted from a beverage. This leads to a discussion of the phase diagram of carbon dioxide and what is meant by the term "supercritical" fluid.



**Number and Topic:** 10. Phases, Solids, Liquids and Gases (States of Matter)  
16. Covalent Bonds, Molecular Shapes and Intermolecular Forces  
21. Organic Chemistry

Source: *ChemMatters*, April 1986, pp. 15-19, "Silly Putty"

Type of Material: Student Journal Article

Building on: Basic chemical knowledge

Leading to: Elastomers, dilatancy

Links to Physics: Forces; why silly putty will stretch if pulled slowly but snap if pulled quickly

Links to Biology:

Good Stories: How the material from which Silly Putty is made was considered just a laboratory curiosity until a person observing it just for fun saw its potential as a children's toy.

Activity Description: This article discusses Silly Putty. It explains its unusual properties and relates these properties to its molecular structure.

**Number and Topic:** 11. Reaction rates.  
21. Organic Chemistry

Source: *ChemMatters*, Oct. 1987, pp. 10-11, "Non-Safety Glass"

Type of Material: Student Journal Article

Building on: Basic chemical knowledge

Leading to: A discussion of ignition temperatures and reaction kinetics, including activation energy.

Links to Physics:

Links to Biology:

Good Stories: How a person trying to cut a piece of safety glass was seriously burned because of his lack of basic chemical knowledge.

Activity Description: Article describes an attempt to cut a piece of safety glass by using flammable alcohol and the serious accident that occurred. The article discusses the chemical principles that explain why the accident occurred.

**Number and Topic:** 16. Covalent Bonds, Molecular Shapes and Intermolecular Forces  
21. Organic Chemistry

Source: *ChemMatters*, April 1989, pp. 4-7, "Mirror Molecules"

Type of Material: Student Journal Article

Building on: Molecular structures

Leading to: Optical isomerism, chirality

Links to Physics:

Links to Biology: Chirality in nature, such as is found in some shells and umbilical cords

Good Stories:

Activity Description: Article discusses "mirror image" molecules and how chirality is found in nature.

**Number and Topic:** 16. Covalent Bonds, Molecular Shapes and Intermolecular Forces

**21. Organic Chemistry**

Source: *ChemMatters*, Feb. 1988, pp. 4-8, "Artificial Sweeteners"

Type of Material: Student Journal Article and Activity

Building on: Organic chemistry

Leading to: Hydrogen bonds, optical isomers

Links to Physics:

Links to Biology: Why some molecules taste sweet, the "sweetness triangle"

Good Stories: How the early Romans used lead acetate to sweeten their food—possibly contributing to the downfall of the Roman Empire.

Activity Description: Article discusses various kinds of natural and artificial sweeteners, their molecular structures and shapes as well as the history behind their discovery and in some cases their eventual banning by the FDA.

**Number and Topic:** 17. Water, Aqueous Solutions

**21. Organic Chemistry**

Source: *ChemMatters*, Oct. 1999, pp. 4-5, "The Absorbing Story of the Thirsty Polymer"

Type of Material: Student Journal Article

Building on: Water, aqueous solutions

Leading to: Solvation, polymers

Links to Physics:

Links to Biology:

Good Stories:

Activity Description: Discusses how super-absorbing polyacrylate polymers work.

**Number and Topic:** 17. Water, Aqueous Solutions

**21. Organic Chemistry**

Source: *ChemMatters*, Feb. 1999, pp. 11-13, "Sports Drinks: Don't Sweat the Small Stuff"

Type of Material: Student Journal Article

Building on: Water, aqueous solutions

Leading to: pH, organic chemistry

Links to Physics:

Links to Biology: Cells, Food

Good Stories: Presents the results of scientific research into the physiological value of sports drinks.

Activity Description: Article discusses sports drinks such as Gatorade—what they are, what they provide, the rationale that underlies their formulation and the results of scientific studies regarding their effectiveness compared to pure water.

**Number and Topic:** 17. Water, Aqueous Solutions  
21. Organic Chemistry

Source: *ChemMatters*, Oct. 1996, pp. 4-6, "Antifreeze Antidote"

Type of Material: Student Journal Article

Building on: Aqueous solutions

Leading to: Organic structures, colligative properties (freezing point depression)

Links to Physics:

Links to Biology: Discusses effect of ethylene glycol on organs such as the brain and kidneys.

Good Stories: Relates the incredible number of animal and human deaths that occur each year due to the ingestion of ethylene glycol antifreeze. Interestingly, the antidote for ethylene glycol poisoning is ethyl alcohol!

Activity Description: Discusses the structure of ethylene glycol and how it functions as an antifreeze. Goes on to relate its devastating biological effects if ingested and then presents safer alternatives.

**Number and Topic:** 17. Water, Aqueous Solutions  
21. Organic Chemistry

Source: *ChemMatters*, Feb. 1992, pp. 8-11, "Perfume"

Type of Material: Student Journal Article

Building on: Solutions

Leading to: Solubility—"like dissolves like"

Links to Physics:

Links to Biology: How odors and other types of sensory input are interpreted by the human brain.

Good Stories: History of perfumes and how much of the cost of a typical perfume actually is related to the perfume itself and how much is related to packaging and advertising.

Activity Description: Article describes the history of perfumes, what they contain, and how they are typically prepared.

**Number and Topic:** 17. Water, Aqueous Solutions  
21. Organic Chemistry

Source: *ChemMatters*, Dec. 1991, pp. 4-7, "Peanut Brittle"

Type of Material: Student Journal Article and Activity

Building on: Chemical Reactions, Solubility

Leading to: Supersaturated solutions, amorphous solids, organic compounds and reactions

Links to Physics:

Links to Biology:

Good Stories:

Activity Description: Article describes what peanut brittle is, how it is made, the chemical reactions involved, and its structure. After the formal article there is a student activity to make peanut brittle.

**Number and Topic:** 19. Equilibrium  
21. Organic Chemistry  
Source: *ChemMatters*, April 1988, pp.4-7. "Fossil Molecules"  
Type of Material: Student Journal Article  
Building on: Basic chemical knowledge  
Leading to: Hydrogen bonds, organic chemistry, use of radioactive tracers  
Links to Physics:  
Links to Biology: Evolution, collagen, antibodies, amino acids, proteins  
Good Stories: The Piltdown Man hoax  
Activity Description: Article discusses how antibody binding to proteins can be used to identify and characterize different kinds of fossils.

**Number and Topic:** 20. Acid/Bases/pH  
21. Organic Chemistry  
Source: *ChemMatters*, Dec. 1993, pp.4-5, "Carnivorous Plants"  
Type of Material: Student Journal Article  
Building on: Chemical names and formulas  
Leading to: Organic structures, enzymes, proteins, acids, pH  
Links to Physics:  
Links to Biology: Plants, enzymes, DNA, evolution, diversity, adaptations, food  
Good Stories: Relates the myriad different ways by which about 500 species of plants consume insects and animals for food.  
Activity Description: Although this is a biology topic, the article contains a fairly significant amount of chemistry relating to enzymes, proteins, pH and other topics.

**Number and Topic:** 21. Organic Chemistry  
Source: *ChemMatters*, Feb. 2001, pp. 10-11, "Spider Silk: Spinning a Strong Thread"  
Type of Material: Student Journal Article  
Building on: Basic chemical structures  
Leading to: Protein synthesis  
Links to Physics: Motion and forces  
Links to Biology: Amino acids, proteins, adaptations, evolution, behavior—several strong links, including gene manipulation  
Good Stories: Spider silk genes have been implanted into goats so proteins used to make spider silk can be recovered from their milk.  
Activity Description: A description of the remarkable properties of spider silk and current efforts to obtain this amazing material in larger quantities than can be obtained from spiders themselves

**Number and Topic:** 16. Covalent Bonds, Molecular Shapes and Intermolecular Forces

17. Water, Aqueous Solutions

21. Organic Chemistry

Source: *ChemMatters*, April 1997, pp. 4-7, "Lava Lite: A Chemical Juggling Act"

Type of Material: Student Journal Article

Building on: Polar and nonpolar bonds and compounds, "like dissolves like"

Leading to: Organic molecules and their structures

Links to Physics:

Links to Biology:

Good Stories:

Tells story of the invention of the lava lamp and its high popularity during the "Age of Aquarius" 1960s. A highly guarded secret, the composition of the materials inside the lamp were determined when an alcoholic drank a lamp's contents and the composition of the contents needed to be ascertained in order to save the man's life.

Activity Description:

Article describes the structure of lava lamps and how their operation is related to the molecular structures and densities of the materials inside the lamp.

**Number and Topic:** 21. Organic Chemistry

Source: *ChemMatters*, Oct. 1999, pp. 7-8, "Fabric of Steel"

Type of Material: Student Journal Article

Building on: Organic chemistry

Leading to: Polymers, liquid crystals

Links to Physics: Motion and forces

Links to Biology:

Good Stories:

Activity Description:

Article describes what Kevlar is, how it is made, and how it operates when it stops a bullet that strikes a bulletproof vest.

**Number and Topic:** 21. Organic Chemistry

Source: *ChemMatters*, April 1998, pp. 10-12, "Sizing up Paper"

Type of Material: Student Journal Article

Building on: Student's personal experience with different kinds of paper

Leading to: Organic chemistry, pH

Links to Physics:

Links to Biology:

Good Stories:

Activity Description:

Article discusses different kinds of paper, how they differ in their absorbency, and how this is controlled. There are a lot of organic structures presented in the article as well as a discussion of pH and how it affects the lifespan of a paper document.

<b>Number and Topic:</b>	<b>21. Organic Chemistry</b>
Source:	<i>ChemMatters</i> , Feb. 1998, p. 12, "A Successful Failure"
Type of Material:	Student Journal Article
Building on:	Organic Chemistry
Leading to:	Discussion of elastomers and dilatancy
Links to Physics:	
Links to Biology:	
Good Stories:	Entire article is the fascinating story of how the material from which Silly Putty is made was considered to have absolutely no practical use, eventually because a very popular "toy," earning hundreds of millions of dollars for the person who purchased the rights to the product.
Activity Description:	Article not only tells the human side of the Silly Putty story, but also discusses how it is made and some of its properties.
<b>Number and Topic:</b>	<b>21. Organic Chemistry</b>
Source:	<i>ChemMatters</i> , Dec. 1996, pp. 6-8, "Mouthwash: What's in it for You?"
Type of Material:	Student Journal Article
Building on:	Organic chemistry
Leading to:	Discussion of the action of difference chemicals on bacteria
Links to Physics:	
Links to Biology:	Bacteria
Good Stories:	
Activity Description:	Article discusses difference types of mouthwashes, the different kinds of chemicals they contain, and their modes of operation at reducing plaque formation and bad breath.
<b>Number and Topic:</b>	<b>21. Organic Chemistry</b>
Source:	<i>ChemMatters</i> , April 1996, pp. 9-11, "Plants Fight Back"
Type of Material:	Student Journal Article
Building on:	Organic Chemistry
Leading to:	Biological adaptations using organic molecules
Links to Physics:	
Links to Biology:	Plants, adaptations,
Good Stories:	Entire article is a story.
Activity Description:	Article discusses how plants utilize various organic molecules as natural defense mechanisms against the onslaught of different types of insects.
<b>Number and Topic:</b>	<b>21. Organic Chemistry</b>
Source:	<i>ChemMatters</i> , Feb. 1993, pp. 4-7, "Aspirin"
Type of Material:	Student Journal Article
Building on:	Organic structures
Leading to:	Synthesis of aspirin
Links to Physics:	
Links to Biology:	Discusses action of aspirin on production of prostaglandins
Good Stories:	History of the creation of modern aspirin
Activity Description:	Article relates the history of the use of salicylates to reduce fever and pain and how these natural compounds were modified to produce modern aspirin. It goes on to explain the mechanism by which aspirin works along with some dangers that are associated with its use.

**Number and Topic:** 21. Organic Chemistry,  
**Source:** *ChemMatters*, Oct. 1988, pp. 4-8, "Killing for Oil"  
**Type of Material:** Student Journal Article  
**Building on:** Density  
**Leading to:** Organic chemistry  
**Links to Physics:** Density  
**Links to Biology:** The internal processes that allow a sperm whale to remain neutrally buoyant  
**Good Stories:** History of the hunting of sperm whales and efforts to protect them  
**Activity Description:** Article discusses the rather unique substances that are found within the sperm whale, the properties, high value and uses of these substances as well as their specific molecular structures.

**Number and Topic:** 21. Organic Chemistry  
22. Redox/Electrochemistry  
**Source:** *ChemMatters*, Oct. 1988, pp.9-13, "The Smell of Danger"  
**Type of Material:** Student Journal Article  
**Building on:** Chemical reactions, molecular structures  
**Leading to:** Organic chemistry  
**Links to Physics:**  
**Links to Biology:** Anosmia—the inability to detect odors  
**Good Stories:** How propane stored in tanks can lose its ethyl mercaptan odor and thus not protect people in the event of a leak.  
**Activity Description:** The article deals with the addition of mercaptans to propane so as to provide the gas with an odor that can be detected in the event of a gas leak and how and why these mercaptans can be destroyed by reactions that may occur within the storage tank.

**Number and Topic:** 21. Organic Chemistry  
**Source:** *ChemMatters*, Oct. 1987, pp. 4-9, "Zombies"  
**Type of Material:** Student Journal Article  
**Building on:** Basic chemical and biological knowledge  
**Leading to:** Structures and biological effects of certain organic molecules  
**Links to Physics:**  
**Links to Biology:** The effect of tetrodotoxin, a poison contained in the Puffer fish with a toxicity greater than 1000 times that of cyanide, and how it plays a key role in the creation of "zombies." It also deals with the effects of bufotoxin, a toxic material found in some toads. In discussing the effects of these types of substances the article delves into the mechanisms of several bodily functions and organs.  
**Good Stories:** How a person who was declared clinically dead returned eighteen years later, having been transformed into a "zombie" by drugs and forced to work as a slave for that entire time.  
**Activity Description:** This article covers the myth of "zombies," the creation of actual "zombies" in Haitian society and the chemical and biological mechanisms that underlie such a transformation.

**Number and Topic:** 21. Organic Chemistry  
Source: *ChemMatters*, April 1987, pp. 10-12, "Penicillin"  
Type of Material: Student Journal Article  
Building on: Basic chemical knowledge  
Leading to: Organic structures and syntheses  
Links to Physics:  
Links to Biology: How penicillin destroys bacteria by preventing the formation of their cellular walls  
Good Stories: How penicillin was discovered many years before any attempt was made to develop it for use.  
Activity Description: Article discusses the discovery of penicillin and the attempts made to synthesize it in the laboratory so sufficient quantities could be manufactured.

**Number and Topic:** 21. Organic Chemistry  
Source: *ChemMatters*, Dec. 1986, pp. 4-8, 12, "Natural Dyes"  
Type of Material: Student Journal Article and Activity  
Building on: Basic chemical knowledge, chemical formulas  
Leading to: Organic functional groups, chromophores, mordants  
Links to Physics:  
Links to Biology: How various insects, plants and mollusks have been used to make dyes over the centuries.  
Good Stories: The history of dyes.  
Activity Description: Article discusses the history of dyes from as far back as 180,000 BC. It then discusses several common dyes and how they work, going into fairly high detail about their structures and functional groups.

**Number and Topic:** 21. Organic Chemistry  
Source: *ChemMatters*, April 1986, pp. 12-14, "Polysaccharides"  
Type of Material: Student Journal Article  
Building on: Basic chemical knowledge  
Leading to: Viscosity, the structure of polysaccharides  
Links to Physics:  
Links to Biology: The presence of polysaccharides in natural substances  
Good Stories:  
Activity Description: This article discusses common polysaccharides, both natural and artificial. It presents many of their structures, sources, and uses.



**Number and Topic:** 21. Organic Chemistry  
**Source:** *ChemMatters*, Feb. 1985, pp. 8-11, "Alcohol"  
**Type of Material:** Student Journal Article  
**Building on:** Basic chemical knowledge  
**Leading to:** Organic structures and reactions  
**Links to Physics:**  
**Links to Biology:** How the body metabolizes alcohol, Krebs cycle  
**Good Stories:**  
**Activity Description:** This article discusses the chemical reactions that occur in the human body when we consume alcohol. It goes on to state some of the effects of blood alcohol levels on car accident rates and the effects of alcoholism.

**Number and Topic:** 21. Organic Chemistry  
**Source:** *ChemMatters*, Dec. 1984, pp. 4-9, "Egg Cookery"  
**Type of Material:** Student Journal Article and Activity  
**Building on:** Basic chemical knowledge  
**Leading to:** Organic reactions and structures of proteins  
**Links to Physics:**  
**Links to Biology:** Composition and structure of eggs, lysozymes  
**Good Stories:** Why eggshells tend to crack when boiled.  
**Activity Description:** This article discusses the structure and composition of eggs and goes on to discuss what happens when eggs are boiled, poached or fried. It is followed by a student activity relating to the effect of acid on eggs.

## **Flinn ChemTopic Labs**

[Order Flinn ChemTopic Labs](#)

Demo: Acid in the Eye – Safety  
Demo: A Burning Candle - Observations  
Demo: Classifying Matter  
Demo: Flaming Vapor Ramp—Safety Demo  
Lab: Observation and Experiment - Introduction to the Scientific Method  
Lab: Separation of a Mixture - Percent Composition  
Lab: What is a Chemical Reaction - Evidence of Change  
Lab: Common Gases—Physical and Chemical Properties  
Lab: Preparing and Testing Hydrogen Gas—A Microscale Approach  
Lab: Carbon Dioxide - What a Gas—Microscale Gas Chemistry

## ICE LABS

### [Online Descriptions and Experiments](#)

<b>Number and Topic:</b>	<b>21. Organic Chemistry</b>
Source:	ICE Laboratory Leadership
Type of Material:	Lab 12. Soaps vs. Detergents
Building on:	8. Chemical reactions 17. Water, aqueous solutions
Leading to:	
Links to Physics:	Energy (?)
Links to Biology:	Soaps and detergents are designed to interact with both inorganic and organic molecules.
Good Stories:	
Activity Description:	To investigate the chemical action of soap vs. detergents in hard water and the use of a precipitation reaction to soften hard water. Water that contains calcium ions, $\text{Ca}^{2+}$ , and magnesium ions, $\text{Mg}^{2+}$ , is said to be hard water. These ions are leached from ground water flowing over rock formations containing limestone and other minerals. Hard water interferes with the cleaning action of soaps. When soap is added to hard water, insoluble compounds form which appear as sticky scum. This scum leaves a deposit on clothes, skin, and hair. You could have ring around the collar! When boiled, hard water leaves a deposit of calcium carbonate, $\text{CaCO}_3$ . This scale builds up inside tea kettles and water heaters. Detergents have replaced soap for many cleaning jobs around the home. The development of synthetic detergents by chemists was a great advantage for people with relatively hard tap water in their homes. Do you know whether the tap water used in your home is soft or hard? How could you test it to find out? Why do you use detergents for many household cleaning jobs? These are some of the questions you will be able to answer after completing this laboratory investigation.

### Technology-Adapted Labs

No activities for this topic.