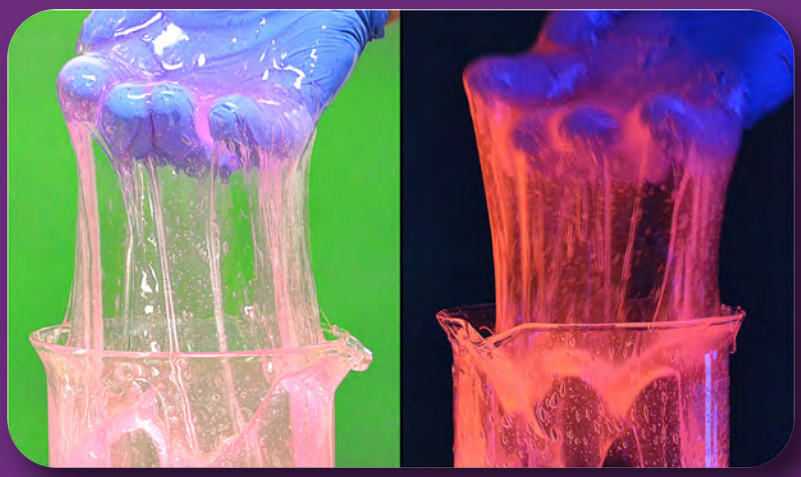
Innovating Science®

by Aldon Corporation

"cutting edge science for the classroom"



AP CHEMISTRY

AP BIOLOGY

LIFE SCIENCE/ BIOLOGY

ENVIRONMENTAL SCIENCE

FORENSIC SCIENCE

CHEMISTRY DEMONSTRATIONS

NANOTECHNOLOGY

GREEN CHEMISTRY

Fisher Science Education

2014
Teacher Resource Manual

Fisher Science Education
4500 Turnberry Drive
Hanover Park, IL 60133
(ph) 1-800-955-1177
(fax) 1-800-955-0740
info@fisheredu.com
www.fisheredu.com

Table of Contents

New AP® Chemistry Products
Reflect the Updated AP® Chemistry Curriculum!

Lab #1: Effect of Concentration on Transmitted Light

Students will be guided through an investigation to study food dyes and determine how the absorbance of light can be used to study color and determine concentrations of chemicals in solutions. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. This lab meets Big Idea 1, Investigation 1, and Primary Learning Objective 1.15.

Kit Includes:

10 ml	Food Dye Blue #1, 0.5%
8	Test Tubes
4	Graduated Cylinders

DOT: non-regulated

S07310

$26.00

Lab #2: Beer's Law - Mass Percent of Copper in Brass

Students will design a laboratory procedure to analyze the amount of copper in brass using a spectrophotometer. Students identify the correlation among wavelength, absorbance, and concentration for each of three possible ions that may be obtained from brass: copper, zinc, and iron. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. This lab meets Big Idea 1, Investigation 2, and Primary Learning Objective 1.16.

Kit Includes:

50ml	Cupric Nitrate 0.1M	50ml	Cupric Sulfate 0.1M
50ml	Ferric(III) Nitrate 0.1M	50ml	Ferric Sulfate 0.1M
50ml	Zinc Nitrate 0.1M	50ml	Zinc Sulfate 0.1M
100ml	Cupric Nitrate 0.4M	100ml	Nitric Acid, 70%
20g	Brass Pellets		

DOT Info: Corrosive
UN2031, Nitric acid,8(5.1),II

S07311

$39.00

Lab #3: What Makes Water Hard?

Students will investigate the suitability of gravimetric analysis for determining the amount of water hardness in the form of calcium carbonate found in various water samples. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 1, Investigation 3, Primary Learning Objective 1.19.

Kit Includes:

40g	Calcium chloride
50g	Sodium carbonate
500ml	Sodium Carbonate, 0.5M
2	Filter paper, pk/100
200ml	Water Sample #1 (0.75M calcium chloride)
200ml	Water Sample #2 (0.2M calcium chloride)
200ml	Water Sample #3 (0.5M calcium chloride)
200ml	Water Sample #4 (0.1M calcium chloride)
200ml	Water Sample #5 (0.05M calcium chloride)
200ml	Water Sample #6 (0.9M calcium chloride)

DOT: Non Regulated

S07312

$28.50

New AP® Chemistry Products

Lab #4: Acid in Fruit Juices and Soft Drinks

Study how the concentration of acids in various consumer beverages may be determined by titration with sodium hydroxide. Students will determine the proper indicator to use in the titration of a weak acid. Students will create an experiment to calculate the molar concentration of acid in a beverage. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. This lab meets Big Idea 1, Investigation 4, Primary Learning Objective 1.20.

Kit Includes:

10g	Potassium hydrogen phthalate	4 X 25g	Sodium Hydroxide
100ml	Hydrochloric Acid, 0.1M	100ml	Acetic Acid 0.1M
500ml	Sodium Hydroxide, 0.1M	25ml	Phenolphthalein, 1%
25ml	Methyl Red 0.02%	25ml	Bromothymol Blue 0.04%
1	pH Strips 1-14 Pkg/100		

DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

S07313

$38.50

Lab #5: Separation of Molecules

Students collect data using different solvents to identify the optimal solvent for separation. They will then illustrate the intermolecular forces that are acting on the molecules in the separation. Students evaluate the chromatograph with different solvents and establish a connection between molecular structure and intermolecular attraction to the solvent. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 2, Investigation 5, Primary Learning Objective 2.10.

Kit Includes:

30ml	Food Dye Blue #1, 0.5%
30ml	Food Dye Yellow #5, 0.5%
30ml	Food Dye Red #40, 0.5%
200ml	9:1 Petroleum ether/Acetone
200ml	Ethyl Alcohol, 95%
200ml	Isopropyl Alcohol, 99%
200ml	Acetone
200ml	Deionized Water
15	Chromatography Paper
30	Glass Vials
4	Capillary Tubes

DOT Info: Limited Quantity
UN1170, Ethanol,3,II,Ltd Qty
UN1219, Isopropanol,3,II,Ltd Qty
UN1993, Flammable liquid, n.o.s.,(Petroleum ether, Acetone),3,II,Ltd Qty
UN1090, Acetone,3,II,Ltd Qty

S07314

$51.50

Lab #6: What's In That Bottle?

Students will identify unknown chemicals based on laboratory testing of their physical and chemical properties. Students will identify the 4 different kinds of bonds that exist in chemicals: ionic, polar covalent, nonpolar covalent and metallic. Students review the properties of each solid using various tests. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 2, Investigation 6, Primary Learning Objective 2.22.

Kit Includes:

10g	Ammonium Chloride	10g	Calcium Carbonate
10g	Magnesium Oxide	10g	Potassium Nitrate
10g	Benzoic Acid	10g	Salicylic Acid
10g	Aluminum Metal	10g	Calcium Metal
10g	Paraffin Wax	10g	Zinc Metal
10g	Sodium Acetate	10g	Cupric Sulfate, anhydrous
10g	Sodium Carbonate	10g	Sucrose
10g	Copper Metal	10g	Sodium Bicarbonate
10g	Cupric Sulfate, pentahydrate	10g	Magnesium metal
10g	Sodium Chloride	10g	Urea
30ml	Universal Indicator	30ml	Hydrochloric Acid 0.1M
30ml	Sodium Hydroxide 0.1M	30ml	Ethanol, 95%
30ml	Hexane	30ml	Phenolphthalein, 1%
30ml	Deionized Water	32	Melting Point Tubes

LED Conductivity Tester

DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

S07315 **$59.00**

New AP® Chemistry Products

Lab #7: Green Chemistry and Purification

First, students will design their own experiment to separate two substances using green chemistry principles. Students will also design and perform an experiment to quantitatively measure the weight percent of the mixture. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 3, Investigation 7, Primary Learning Objectives 3.5 and 3.3.

Kit Includes:
300g 85% Sodium Bicarbonate/ 15% Sodium Carbonate Mixture

DOT Info: Non-regulated

S07316

$20.00

Lab #8: Determination of the Actual Percentage of Hydrogen Peroxide

Students will determine the actual concentration of the hydrogen peroxide in the bottle by titration and determine if it is lower than the value on the label. Hydrogen peroxide will degrade over time, and students will determine how much it degrades. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 3, Investigation 8, Primary Learning Objective 3.9.

Kit Includes:
1000ml Iron Ammonium Sulfate 0.1M
1000ml Potassium Permanganate 0.02M
1000ml Sulfuric Acid, 6M
250ml Hydrogen Peroxide 3%
250ml Hydrogen Peroxide 6%
500ml Deionized Water

DOT Info: Limited Quantity
UN2796, Sulfuric acid,8,II,Ltd Qty

S07317 **$29.00**

Lab #9: Examining the Composition of a Pain Reliever

Students will test the solubility of each possible component of a commercially available pain reliever in an organic solvent, ethyl acetate, and in a basic aqueous solution of sodium bicarbonate. These results will help the student create a procedure that will be used to separate components in a mixture and determine percent composition. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 3, Investigation 9, Primary Learning Objective 3.10.

Kit Includes:
750 ml Ethyl Acetate
250 ml 6.0M Hydrochloric Acid
100g Acetaminophen
1 Ph Strips 1-14 Pkg/100
750 ml Sodium Bicarbonate 10%
50g Sucrose
100g Acetylsalicylic Acid

DOT Info: Limited Quantity
UN1173, Ethyl acetate,3,II,Ltd Qty

S07318 **$51.50**

Lab #10: How Long Will That Marble Statue Last?

Students will observe and measure the evolution of carbon dioxide gas from the decomposition of calcium carbonate when mixed with an acid. Students will also create experiments to determine the rate of reaction with different concentrations of hydrochloric acid. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 4, Investigation 10, Primary Learning Objective 4.1.

Kit Includes:
200g Marble Chips
500ml Hydrochloric Acid, 1.0M
2x500ml Hydrochloric Acid, 3.0 M
500ml Hydrochloric Acid, 6.0M
15 Silicone Tubing
15 Syringe,10ml

DOT Info: UN1789, Hydrochloric Acid, 8,III Ltd Qty.

S07319 **$71.50**

New AP® Chemistry Products

Lab #11: Rate Law of the Fading of a Dye Using Beer's Law

Students will determine the rate law for the reaction of crystal violet and sodium hydroxide. Students will also prepare dilutions of stock crystal violet solutions to generate a Beer's law calibration curve. This lab will require students to integrate prior chemistry knowledge involving spectroscopy, Beer's law, solution dilution, calibration curves, and chemical kinetics. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 4, Investigation 11, Primary Learning Objective 4.2.

Kit Includes:

1500ml	Crystal Violet, 1%
1500ml	Sodium Hyroxide 0.2M
1000ml	Deionized Water

DOT Info: Limited Quantity
UN1824, Sodium hydroxide solution,8,II,Ltd Qty

S07320 $28.25

Lab #12: Designing an Effective Hand Warmer

Students study the various energy changes that occur with the formations of solutions for laboratory salts. From this data they will create the best and safest hand warmer. Students will determine the heat of solutions for each solid and analyze the cost and safety information with provided safety data sheet. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 5, Investigation 12, Primary Learning Objective 5.7.

Kit Includes:

100g	Calcium Chloride	100g	Sodium Carbonate
100g	Lithium Chloride	100g	Sodium Acetate
100g	Ammonium Nitrate	100g	Sodium Chloride
200g	Magnesium Sulfate		

DOT Info: Limited Quantity
UN1942, Ammonium nitrate,5.1,III,Ltd Qty

S07321 $36.50

Lab #13: Le Chatelier and the Colors of the Rainbow

Students will investigate Le Chatelier's principle and why it works. They will also investigate this principle by testing several systems at equilibrium and then selecting specific ones to produce the colors of the rainbow based on specific applications of Le Chatelier's principle. Students will then be challenged by selecting which reaction system to use for which color in producing the rainbow while trying to only use a given "stress" once. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 6, Investigation 13, Primary Learning Objective 6.9.

Kit Includes:

3 X 30ml	Bromothymol Blue 0.04%	3 X 15ml	Hydrochloric Acid 0.1N	3 X 15ml	Sodium Hydroxide 0.1N
3 X 15ml	Sodium Chloride 0.1M	3 X 250ml	Potassium Thiocyanate 0.1M	3 X 15ml	Ferric Nitrate 0.2M $Fe(No)_3$
3 X 10g	Potassium Thiocyanate	3 X 10g	Iron(III)Chloride	3 X 10g	Sodium Phosphate Tribasic
3 X 15ml	Potassium Nitrate 0.1M	3 X 250ml	Copper (II) Sulfate	3 X 15ml	Hydrochloric Acid 1.0 N
3 X 15ml	Ammonium Hydroxide Acs 28-30%	3 X 10g	Copper(II)Chloride	3 X 15ml	Hydrochloric Acid T/G 32%
3 X 10g	Cobalt Chloride Hexahydrate	3 X 250ml	Ethyl Alc R/G 95% Denat	3 X 30ml	Deionized Water
3 X 30ml	Acetone	3 X 10g	Sodium Chloride		
3 X 15ml	Methyl Red Indicator 0.3%	3 X 15ml	Silver Nitrate 0.1M		

DOT Info: Limited Quantity/Small Quantity
UN1170, Ethanol,3,II,Ltd Qty

S07322 $61.00

New AP® Chemistry Products

Lab #14: Structure & Concentration In Acid and Base Titrations

Students will conduct a series of acid–base titrations and determine the concentrations of two unknowns. They will create a procedure to collect quantitative titration data using a buret and pH meter. Using titration data that they collected, they will determine the concentration of each unknown. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 6, Investigation 14, Primary Learning Objective 6.13.

Kit Includes:

4 X 500ml	Hydrochloric Acid 0.2M,Part A
4 X 500ml	Sulfuric Acid 0.1M, Part B
2 X 1 L	Nitric Acid 0.05M, Part C
4 X 500ml	Calcium Hydroxide 0.1M
4 X 500ml	Ammonium Hydroxide 0.2M, Part E
4 X 500ml	Acetic Acid 0.1N, Part F
4 X 500ml	Sodium Hydroxide 0.1N

DOT Info: Corrosive
UN2031, Nitric acid,8,II
UN2796, Sulfuric acid,8,II,Ltd Qty
UN1824, Sodium hydroxide,8,II,Ltd Qty

S07323 **$38.25**

Lab #15: Buffering Activity of Common Household Products

Many household products contain buffering chemicals. Students will design a procedure to determine the buffering agents that are in different household products such as foods, beverages and over the counter drugs. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. Meets Big Idea 6, Investigation 15, Primary Learning Objective 6.20.

Kit Includes:

4 X 500ml	Hydrochloric Acid 0.1N
4 X 500ml	Sodium Hydroxide 0.1N
500ml	Citric Acid Solution 0.02M
2 X 500ml	Isopropyl Alcohol 90%

DOT Info: Limited Quantity
UN1824, Sodium hydroxide solution,8,II,Ltd Qty
UN1219, Isopropanol solution,3,II,Ltd Qty

S07324

$40.00

Lab #16: Preparation of Effective Buffers

Students will design a buffer that can maintain a pH within a narrow range when certain amounts amounts of acid and base are added. The activity contains enough materials for 15 groups of students as well as a Teacher's Guide and Student Study Guide Copymasters. This lab meets Big Idea 6, Investigation 16, Primary Learning Objective 6.18.

Kit Includes:

1000ml	0.1M acetic acid	25g	Sodium acetate
1000ml	0.1M ammonia	25g	Sodium hydrogen phosphate
1000ml	0.1M sodium dihydrogen phosphate	25g	Ammonium chloride
1000ml	0.1M citric acid	50g	Sodium dihydrogen citrate
1000ml	0.1M sodium monohydrogen citrate	50g	Sodium citrate
1000ml	0.2M sodium hydroxide	25g	Sodium chloride
1000ml	0.2M hydrochloric acid		
1000ml	pH 7 buffer		

DOT Info: Non-regulated

S07325 **$41.50**

Complete Set of 16 NEW AP Chemistry Kits

IS8117
contact your representative for more information

Featured Products

Aldon Chemical Inventory Management System

S05461 - One year site license - $203.00 **S05859 - Five year site license - $796.00**

Our new Inventory Management System allows customers to login to their own home page and set up a database that helps track inventory at different locations, such as buildings or even classrooms. You can easily add, modify, or delete chemical inventory items, and view information about each chemical. This data is easily accessible from any computer using a web browser, helping you reach your safety goals!

- Available anywhere, from any web browser.
- Access your chemical inventory during an emergency.
- Add your own inventory into the database
- Track all of your chemicals by Building, Room and Cabinet location
- Find MSDS, Storage codes and more.

Free Trial Version Available

Good for up to 20 buildings in one school district.

Inventory

Cabinet 1, Room 205, Building 110

Add Inventory

Print Inventory

Chemical Name	Date Received	Amount Stored	Storage Code	CAS#	Formula	MSDS	Delete
Ammonium Chloride	08/15/2009	100 g	Green	12125-02-9	NH_4Cl		
Bromothymol Blue, sodium salt	12/13/2008	125 g	Green	34722-90-2	$C_{27}H_{27}Br_2O_5SNa$		
Luminol powder	11/02/2009	1 g	Green	521-31-3	$C_8H_7N_3O_2$		
Potassium Chloride 1.0M Aq soln	03/07/2010	50 ml	Green		Mixture		
Sodium Chloride	08/22/2009	425 g	Green	7647-14-5	$NaCl_2$		

Submit Changes Reset

AP® Biology Investigation #1: Artificial Selection

Students will study the process of artificial selection using Innovating Science fast growing plants. Students will identify phenotypic differences to observe. They will then use selective cross pollination to examine the prevalence of that phenotype in successive generations. Meets AP Science Practices 2, 5, and 7, and Big Idea 1. Materials provided for 32 students in eight lab groups.

Kit Includes:

1 Bag	Potting Soil
1 Bag	Vermiculite
1 pkg	7 oz cups
1 pkg	5 oz cups
8	Magnifers
1	Nutrient Quick Solution to make 1 Liter
1 pkg	Innovating Science Fast Growing Plant Seeds
1 pkg	Cotton Swabs
1 pkg	Hydroponic Wicks

DOT Info: Non regulated

S07063 **$70.00**

AP® Biology Investigation #4: Diffusion and Osmosis

Students will study the movement of water and nutrients across a cell membrane and observe osmosis in living tissue. They will then investigate the relationship between surface area and volume as it relates to cells and diffusion. They will also examine the concept of molarity and how it relates to osmotic potential and the movement of water. Students will be able to explain how cell size and shape affect the overall rate of nutrient intake and water elimination. Students will use plant tissue to determine the molarities of unknown solutions based on the direction and degree of water movement. This kit contains enough materials for 8 groups. Teacher's manual and Student Study Guide copymasters are included. Meets AP® Science Practices 2, 4, and 5, and Big Idea 2.

Kit Includes:

45g	Agar
15ml	Bromothymol blue concentrate
2x25ml	2.0M Hydrochloric acid
8	Agar block casting trays
8	Plastic cups, 5oz
8	Plastic knives
8	Plastic stirrers
40 pc.	Dialysis tubing
48	Plastic cups, 7oz
	Microscope slides, pkg/72
	Coverslips
	Cork borer
8	Metric rulers

Sucrose QuickSolution (to make 1L of 1.0M solution)
Sodium chloride QuickSolution (to make 1L of 1.0M solution)
Glucose QuickSolution (to make 1L of 1.0M solution)
Ovalbumin QuickSolution (to make 1L of 5.0% solution)
Food coloring set (red, blue, yellow, green)
Sucrose QuickSolution set to make:
- 1L of 0.2M solution (Solution #3)
- 1L of 0.4M solution (Solution #2)
- 1L of 0.6M solution (Solution #5)
- 1L of 0.8M solution (Solution #1)
- 1L of 1.0M solution (Solution #4)
- 1L distilled water (Solution #6)

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S07056 **$140.00**

AP® Biology Investigation #5: Photosynthesis

Students will learn the necessary components and conditions for photosynthesis to occur while using leaf disks to measure the accumulation of oxygen and relate it to the rate of photosynthesis. Students will then use guided inquiry to design and conduct an experiment to examine the effects of a chosen variable on the rate of photosynthesis. Teachers manual and Student Study Guide copymasters are included. There are enough materials provided for 8 lab groups. This lab meets AP Science Practices 1, 2, 3, 6, and 7, and Big Idea 2.

Kit Includes:

1	Hole Punch
16	Syringes 10mL
16	Plastic Cups
30mL	Dilute Soap Solution
50g	Sodium Bicarbonate

DOT: Non-regulated

S07045
$50.00

AP® Biology Investigation #6: Cellular Respiration

Students will use a respiration chamber to measure and record the rate of oxygen consumption (cellular respiration) using germinating seeds versus a non-germinating control sample. Teachers manual and Student Study Guide copymasters are included. There are enough materials provided for 8 lab groups. Meets AP Science Practices 1, 2, 3, 6, and 7, and Big Idea 2.

Kit Includes:

1 pkg. pea seeds	1 pkg. plastic beads
24 respiration chambers	24 rubber stoppers
48 washers	24 graduated pipets, 1 ml
1 pkg. non-absorbent cotton	1 pkg. absorbent cotton
1 btl. 15% KOH, 30 ml	8 trays
1 tube petroleum jelly sealant	

DOT: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S07057 **$200.00**

AP® Biology Investigation #7: Cell Division: Mitosis and Meiosis

Students will study the cellular steps involved in DNA replication and cell division in both mitosis and meiosis. This investigation will allow students to examine the stages of mitosis in the preparation of plant root tips. Crossing over in meiosis will also be investigated through the use of Sordaria cultures. Meets AP Science Practices 1, 5, 6, and 7, and Big Idea 3. Materials provided for 32 students in eight lab groups.

Kit Contains coupon for perishable materials. Redeem by fax, phone or e-mail.

10	Disposable scalpels, sterile	8	Forceps
20	Petri dishes, sterile	16	Plastic pipettes
	Sordaria agar, 200ml	1	Coverslips
	Sordaria mating agar, 200ml	1	Sand, 500g
1	Microscope slides	8	Plastic cups
8	Disposable inoculating loops, sterile		
1	Hydrochloric acid, 6.0M, 30ml		
1	Toluidine blue, 1%, 30ml		

DOT: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S07062 **$180.00**

AP® Biology Investigation #8: Biotechnology: Bacterial Transformation

Students will genetically engineer bacteria through transformation with a plasmid that confers antibiotic resistance. They will then examine the number of resistant bacteria to determine the efficiency of the transformation procedure. Teachers manual and Student Study Guide copymasters are included. Materials provided for 8 lab groups. Meets AP Science Practices 1, 3, 5, 6, and 7, and Big Idea 3.

Kit Includes:

30ml Sterile Calcium Chloride 0.05M	16 Sterile Volumetric Pipet
8 Pipet Bulb	8 Micropipet w/Plunger 10ul
16 Microcentrifuge Tube 1.5ml	8 Sterile Inoculating Loop
40 Petri Dish	4 Luria Agar 200ml
1 Luria Broth 9ml Tube	

Kit Contains coupon for perishable materials. Redeem by fax, phone or e-mail.
Materials sent upon redemption of coupon:

2 btls 0.02g Ampicillin	1000 ng pUC 19 Plasmid
1 Tryptic Soy Broth Tube 9ml	1 Tryptic Soy Agar Slant 6ml
1 Pipet, Sterile, Disposable	1 E. Coli Culture (freeze dried)

DOT: Non Regulated

S07058 **$190.00**

AP® Biology Investigation #9: Biotechnology: Restriction Enzyme Analysis of DNA

In this lab students will understand the action and specificity of restriction enzymes, while learning the components involved in the process of DNA electrophoresis and the role of each component as it applies to the entire process of electrophoresis. Students will perform the electrophoresis process on DNA samples treated with different restriction enzymes and construct a standard curve using a known DNA sample while determining the approximate size of the DNA fragments in unknown samples. Meets AP Science Practices 3 and 6, and Big Idea 3. Materials provided for eight lab groups.

Kit Includes:
Prepared agarose, 0.8%, 200ml
TBE buffer, 5X, 500ml
DNA Stain, 20X, 60ml
DNA Samples, 100ul each:
- DNA Marker (Lambda DNA HindIII digest)
- Sample #1 (Lambda DNA)
- Sample #2 (Lambda DNA BstEII digest)
- Sample #3 (Lambda DNA EcoRI digest)
- Sample #4 (Lambda DNA BstEII digest)

DOT: Non Regulated

S07059 **$100.00**

AP® Biology Investigation #11: Transpiration

Students will study the process of transpiration/transpiration pull and the role it plays in water/nutrient movement in plants. They will study the role of stomata in relation to the transpiration process using a potometer to examine the rate of transpiration in a bean seedling under a select set of environmental conditions. They will also examine the location/density of stomata on a leaf surface by preparing a stomatal peel. Lastly students will design and conduct an experiment to show how altering an environmental condition may affect the rate of transpiration. Meets AP Science Practices 1, 2, 4, 6, and 7, and Big Idea 4. Materials provided for 32 students in eight lab groups.

Kit Includes:

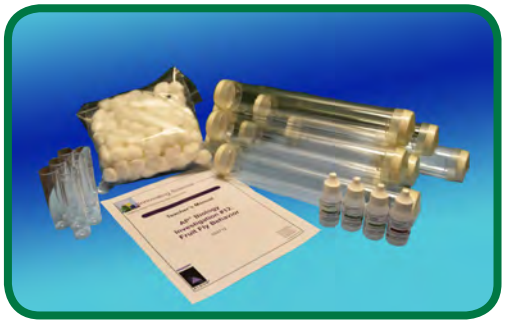
8 pc	Clear tubing, 12”	8	Tubing clamps
8	Pipettes, 1ml	8	Syringes, 10ml
8	Planting trays, 6 cell	1 bag	Potting soil
1 pkg	Bean seeds	1 tube	Petroleum jelly
1 btl	Nail polish	1 pkg	Microscope slides

DOT: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S07061 **$100.00**

AP® Biology Investigation #12: Fruit Fly Behavior

Students will study whether fruit flies will move toward or away from important chemicals and food that aid in their survival. Using the Innovating Science choice behavior chamber, behaviors of the fruit-flies are observed and any pattern can be identified. Students will formulate their own theories based on the fruit flies' response to the chemicals and foods, and then determine what materials and experiments should be tested further. Meets AP Science Practices 1, 3, 4, 5, 6, and 7, and Big Idea 4. Materials provided for eight lab groups.

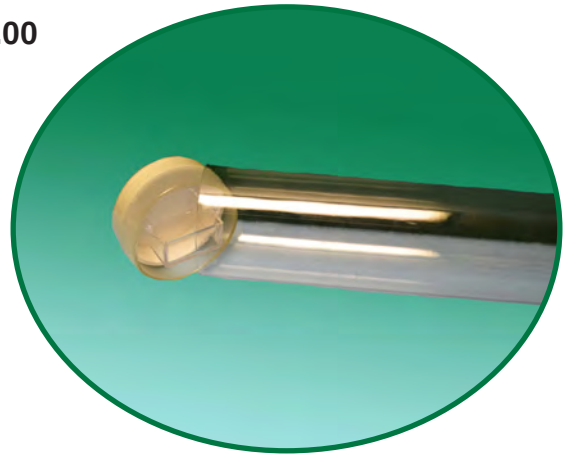


Kit Includes:
30ml Ethyl Alcohol
30ml Ammonia 5%
30ml De-ionized Water
30ml Vinegar
8 Innovating Science® Behavior Choice Chambers
Fruit Fly Vials

Kit Contains coupon for perishable materials. Redeem by fax, phone or e-mail.
Materials sent upon redemption of coupon: 8 Fruit Fly Cultures

S07060 **$200.00**

IS3712-CHOICE
Innovating Science
Behavior Choice Chambers
pkg/8
contact your representative for more information



AP® Biology Investigation #13: Enzyme Activity

Students will learn the nature and specificity of enzyme-catalyzed reactions. Students will then use an extract of turnips to examine the reaction between hydrogen peroxide and the enzyme peroxidase while testing one or more factors that influence the rate of enzyme reactions. In this lab students will develop data collection strategies and analyze their results. This kit contains enough materials for 8 groups. Teachers manual and Student Study Guide copymasters are included. Meets AP Science Practices 4, 5, 6, and 7, and Big Idea 4.

Kit Includes:

1.5mL	Guaiacol concentrate
50ml	1.0% Hydrogen peroxide
100ml	pH 3 Buffer
100ml	pH 5 Buffer
100ml	pH 6 Buffer
100ml	pH 7 Buffer
100ml	pH 8 Buffer
100ml	pH 10 Buffer

DOT: Non-regulated

S07044 **$40.00**

With ***Innovating Science's***® 46 comprehensive lab activities, you will find everything to satisfy the AP Chemistry® laboratory requirements. Each lab activity includes all the chemicals you will need for each experiment plus a full Teacher's Guide and Student Study Guide copymasters. All activities contain enough materials for 15 groups of students.

Thermochemistry and Hess' Law

Employ Hess's Law of enthalpy based on the observed data for two reactions. Students can measure the temperatures of the reaction in a calorimeter and analyze the data calculating the enthalpy of each reaction.

Kit Includes:

8 x 250 ml	Hydrochloric Acid, 2M/2N Solution UN1789
8 x 250 ml	Sodium Hydroxide, 2M/2N Solution UN1824
2 x 500 ml	Ammonium Chloride, 2M Solution
2 x 500 ml	Ammonium Hydroxide, 2M Solution

DOT Info:
UN1789, Hydrochloric acid, 8, PG II, Ltd Qty
UN1824, Sodium hydroxide solution, 8, PG II, Ltd Qty

S90726 **$52.75**

Mole Ratio of Reactants

Using the method of continuous variation, two solutions are combined in various ratios. To select the ratio that produces the most product or consumes the most reactants, students must find an empirical method which is proportional to the amount of reaction that occurs. The reaction selected for this experiment is exothermic and the optimum ratio produces the greatest temperature change.

In this experiment the total numbers of moles of reactants are kept constant while varying each reactant. The measurements are made on each different ratio until the optimum ratio, the stoichiometric ratio in the equation, is made which consumes the greatest amount of reactants, produces the greatest amount of product and produces the greatest amount of heat.

Kit Includes:

3 X 250ml	Sodium hypochlorite 13% concentrate UN1791
1 X 237g	Sodium thiosulfate, anhydrous

DOT Info:
UN1791, Hypochlorite solutions, 8,
PG III, Ltd Qty

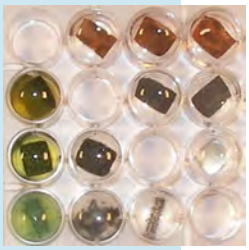
S90728 **$43.50**

Activity Series

An activity series of metals is a table of metals arranged in the order of their decreasing chemical activity or the ease at which the metal will give up one or more electrons to form positive ions. This table is similar to the electrochemical series of elements. For example if you take the group of metals magnesium, mercury and nickel, magnesium is the most reactive and mercury the least. To empirically determine which of these metals is more reactive, place a piece of the metal in a salt solution of the other. The more reactive metal will replace the less reactive metal and the less reactive will appear in the solid form. The reactive metal has been oxidized; the less reactive metal has been reduced.

Kit Includes:

45 pieces	Copper Metal
45 pieces	Zinc Metal
45 pieces	Magnesium Metal
45 pieces	Lead Metal
1 x 50 ml	Copper Nitrate, 0.1M
1 x 50 ml	Zinc Nitrate, 0.1M
1 x 50 ml	Magnesium Nitrate, 0.1M
1 x 50 ml	Lead Nitrate, 0.1M
1 x 2.15g	Potassium Bromide
1 x 0.6g	Potassium Bromate
1 x 25 ml	Sulfuric Acid, 1.0M
2 x 25 ml	Chlorine Water
2 x 25 ml	Iodine Water
2 x 25 ml	Sodium Bromide, 0.1M
2 x 25 ml	Potassium Iodide, 0.1M
2 x 25 ml	Sodium Chloride, 0.1M
2 x 75 ml	Mineral Oil
1	Empty Bottle (for bromine water)



DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S90727 **$115.00**

Le Chatelier's Principle

Le Chatelier's Principle is a qualitative rule, which allows the prediction of the effect of temperature, pressure and concentration changes on chemical reactions. The principle states: A chemical system at equilibrium when stressed by external forces will adjust in such a way as to minimize that stress. For example when a system is subjected to increased pressure it adjusts so that it will occupy less volume. This offsets the pressure increase. If ice is placed under an increased pressure, it melts because the water obtained from a given mass of ice occupies less volume. In the formation of ammonia (the Haber process) from hydrogen and nitrogen, the product of the reaction (NH_3) occupies less volume than the two uncombined gases. The increase in pressure favors the production of ammonia.

This experiment is divided into three separate reactions demonstrating how different types of stress effect equilibrium. Students are asked to predict the outcome of each situation and then prove or disprove their predictions.

Kit Includes:

1 X 25ml	Bromothymol blue pH indicator solution 0.04%
1 X 10g	Potassium thiocyanate crystal
1 X 25ml	Ferric nitrate solution 0.2M
1 X 200ml	Potassium thiocyanate solution 0.002M
1 X 10g	Sodium phosphate, dibasic
1 X 25ml	Concentrated hydrochloric acid, 36%
2 X 25ml	Sodium hydroxide solution 0.1N
1 X 50g	Sodium chloride

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S90729 **$51.25**

Reaction Kinetics

In a chemical reaction, reactants are converted to product at a given rate. This rate can be changed by altering either the temperature of the reaction, the form of the reactants, the concentration of reactants or products or by adding a catalyst. The time it takes for a reaction to occur is monitored by observing a color change. By varying concentration of reactants the rate law is determined. By varying the temperature the activation energy is determined. The data should be graphed and analyzed during the lab so additional measurements can be made if necessary.

Ester Formation

The yield of ester can be increased either by removing one of the products of the reaction as it is formed or by increasing the concentration of one of the reactants. The normal procedure is to remove water using the dehydrating agent sulfuric acid, which also acts as the catalyst. In this experiment, we will combine various alcohols with acetic and butyric acids to form esters. The esters can be identified by their distinctive odors.

Kit Includes:

2 X 25ml	Acetic acid
2 X 25ml	n-Butyric acid
1 X 25ml	n-Butyl alcohol
1 X 25ml	Octyl alcohol
1 X 25ml	Methyl alcohol
1 X 25ml	Ethyl alcohol
1 X 25ml	Concentrated sulfuric acid
7 ea.	Glass droppers

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S90730 **$66.75**

Acids and Bases

A solution of sodium hydroxide which is approximately 0.01M will be standardized with a solid acid, potassium hydrogen phthalate, to determine the exact molarity of the base. The standardized base will then be titrated against a monoprotic unknown acid to determine the molarity of the acid. A pH indicator and/or a pH meter will be used to determine the equivalence point.

Kit Includes:

2 X 25ml	Hydrochloric acid, 1.0M
1 X 30ml	Sodium hydroxide, 6.0M
1 X 5g	Potassium hydrogen phthalate
1 X 25ml	Phenolphthalein, 1.0%

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S90731 **$34.75**

Kit Includes:

2 x 100 ml	Potassium Iodide, 0.1% Solution (0.006M)
2 x 100 ml	Sodium Thiosulfate, 0.001M Solution
2 x 100 ml	Hydrogen Peroxide, 3% Solution (0.88M)
5 capsules	Starch Soluble (5 caps per bottle)
2 x 100 ml	Hydrochloric Acid, 0.1M Solution UN1789
Pkg. of 150	Pipettes

DOT Info:
Non Regulated

S90732 **$77.75**

Dissociation Constants of Weak Acids

Students determine the equilibrium constant of three unknown acids and compare the data to known values to identify them.

Kit Includes:

1 x 10 g	Benzoic Acid Crystals
1 x 10 g	Potassium Hydrogen Phthalate
1 x 10 g	Sodium Bisulfate (Sodium Hydrogen Sulfate) UN1759
10 x 250 ml	Sodium Hydroxide, 0.1M Solution UN1824
4 x 25 ml	Phenolphthalein, 1% in IPA Solution UN1219

DOT Info:
UN1824, Sodium hydroxide solution, 8, PG II, Ltd Qty

S90733 **$63.75**

Beer Lambert Law

The probability that a photon of light will be absorbed by a solution is directly proportional to the concentration of the absorbing molecules, the thickness of the sample and the degree to which the molecules absorbs light. This relationship is called the Beer-Lambert Law and is used in analytical chemistry to determine concentrations of various compounds spectrophotometrically. A series of 5 solutions with different concentrations of iron are prepared and analyzed using the spectrophotometric assay for iron.

Kit Includes:

1 X 25ml	Ferric chloride, 0.1M UN2582
1 X 5g	Ascorbic acid
1 X 50ml	1,10 Phenanthroline
1 X 100ml	Acetate buffer

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S90735 **$38.15**

Qualitative Analysis

Colorimetric or turbidimetric methods of analysis have been developed for most of the elements and ionic species. These methods can be employed to quickly determine the chemical composition of an unknown substance. Before attempting to analyze an unknown it is useful to develop a logical process to follow. Care must be taken in sampling, collecting and washing precipitates, performing confirmatory tests and most importantly, recording data. It is also good laboratory practice to always analyze a known with each unknown as a double check on the reagents being used.

The unknowns will be analyzed for one of six possible anions: Cl^-, Br^-, I^-, PO_4^{2-}, NO^{3-}, and SO_4^{2-}. A standard solution for each anion will also be run.

Kit Includes:

1 X 100ml	Sodium bromide, 0.1M
1 X 100ml	Sodium chloride, 0.1M
1 X 100ml	Sodium iodide, 0.1M
1 X 100ml	Sodium nitrate, 0.1M
1 X 100ml	Sodium phosphate, 0.1M
1 X 100ml	Sodium sulfate, 0.1M
1 X 200ml	Nitric acid, 6M UN2031
1 X 50ml	Ammonium hydroxide, 6M UN2672
2 X 100ml	Mineral oil
1 X 75ml	Ammonium molybdate 0.1M
1 X 75ml	Diphenylamine reagent UN1830
1 X 75ml	Barium chloride 0.1N
1 X 100ml	Potassium permanganate 2%
1 X 100ml	Ferric nitrate 0.1M
1 X 50ml	Silver nitrate 0.1M

DOT Info:
UN2031, Nitric acid, 8, PG II
UN2672, Ammonia solutions, 8, PG III, Ltd Qty
UN1830, Sulfuric Acid solution, 8, PG II, Ltd Qty
Single shipper packaging surcharge applies
UPS HAZARD CHARGE APPLIES

S90734 **$96.25**

Stoichiometry in the Synthesis of an Ionic Compound

Many combinations of mono and trivalent cations yield crystals of the same stoichiometry and structure. The crystals are normally in the form of an octahedron. Sodium, potassium and ammonium ions are often the monovalent species whereas aluminum and chromium are examples of the trivalent ions. Potassium alum, $KAl(SO_4)_2 \cdot 12H_2O$, is the most common and is used in water purification, paper manufacturing and as a mordant in dyeing. In this experiment we will perform a series of chemical reactions which lead to the synthesis of the ionic compound potassium alum.

Kit Includes:

2 x 25 g	Aluminum Metal Powder UN1396
2 x 250 ml	Potassium Hydroxide, 3.0M Solution UN1814
4 x 250 ml	Sulfuric Acid, 3M Solution UN2796
4 x 250 ml	Ethanol/Water V/V 50/50% Solution UN1170

DOT Info:
UN1814, Potassium hydroxide, solution, 8, PG II, Ltd Qty
UN2796, Sulfuric acid, 8, PG II, Ltd Qty
UN1170, Ethanol, 3, PG III, Ltd Qty

S90736 **$55.75**

Equilibrium Constant of an Ionic Compound

The idea of the reversibility of chemical reactions was first stated by C. Berthollet in 1799. He noted deposits of sodium carbonate in certain salt lakes in Egypt and concluded that they were produced by the high concentration of sodium chloride and dissolved calcium carbonate. This is the reverse of the standard laboratory procedure in which calcium carbonate is produced from the reaction on sodium carbonate and calcium chloride.

A standard curve will be established for the absorbance of a colored species and then used to determine the concentrations of unknown solutions. The results will allow us to determine the equilibrium constant for the formation of the colored species.

Kit Includes:
1 X 500ml Iron (III) nitrate, 0.2M
2 X 100ml Potassium thiocyanate, 0.002M
1 X 100ml Nitric acid, 0.5M UN2031

DOT Info:
UN2031, Nitric acid, 8, PG II
Single shipper packaging surcharge applies
UPS HAZARD CHARGE APPLIES

S90737 **$29.00**

Oxidation-Reduction Reactions

The term oxidation can mean the chemical combination of a substance with oxygen and reduction can be the removal of oxygen from a compound. When oxygen reacts with any other element (except fluorine) it acquires electrons from that element. The element that donated the electrons is said to be reduced. Three experiments will be run where a compound, which is colorless in solution when reduced, is converted to a deeply colored solution when oxidized. The complete balanced reactions for each step should be written showing the transfer of electrons during oxidation and reduction.

Kit Includes:

1 X 10g	Ferrous ammonium sulfate
1 X 100ml	Sulfuric acid, 6.0M UN2796
2 X 100ml	Potassium thiocyanate 1.0M
1 X 25ml	Potassium permanganate
1 X 25ml	Hydrogen peroxide, 3%
3 X 100ml	Stannous chloride 0.1M
1 X 25ml	Methylene blue 1%
3 X 250ml	Potassium hydroxide 1.0M UN1814
1 X 100g	Dextrose

DOT Info:
UN1814, Potassium hydroxide, solution, 8, PG II, Ltd Qty
UN2796, Sulfuric acid, 8, PG II, Ltd Qty

S90738 **$51.00**

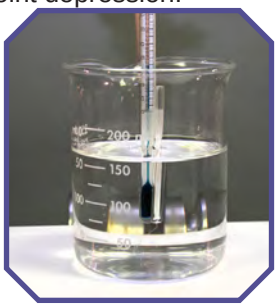
Freezing Point Depression

Molecular mass is a parameter, which is useful in determining the identity of an unknown compound. One technique to determine the molecular mass of an unknown is to measure the effect the compound has on the freezing point of a solvent in which the unknown is dissolved. The freezing point of a solution is a colligative property. That is, it is a property which varies based on the number of particles (solute) dissolved in the solvent and not on the chemical makeup of the particles themselves. Other colligative properties, which also can be used to determine molecular mass, are osmotic pressure, vapor pressure and boiling point.

The nonpolar solvent 2,6-di-tert-butyl-4-methylphenol has a freezing point of approximately 70°C. A quantity of para-dichlorobenzene will be dissolved in the solvent and the effect on the freezing point determined. The freezing point depression constant will be calculated for the solvent. The experiment will be repeated with each of two unknowns and the molecular weight of the unknowns will be determined from the freezing point depression.

Kit Includes:

2 x 25 g	Di-Tert-Butyl-4-Methylphenol Crystals
1 x 25 g	p-Dichlorobenzene Crystals
1 x 25 g	Stearic Acid Flakes
1 x 25 g	Naphthalene Flakes UN1334



DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S90739 **$52.00**

Vapor Pressure

Raoult's Law can be proven empirically by measuring the change in vapor pressure as solute is added to a solvent. The measurements will be taken at different temperatures to demonstrate the effect of temperature on vapor pressure.

Kit Includes:
2 x 2.5 kg Sodium Chloride Crystals

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S90740
$33.25

Electrochemical Cells

The tendency of oxidation-reduction reactions is to proceed to an equilibrium state. These reactions occurring in electrochemical cells provide another way for us to express the driving force in chemical reactions. When reagents that accept or donate electrons are arranged so that the electrons can enter or leave the reaction through a metallic conductor, an electrochemical cell is established. A half-cell contains a metal in contact with a solution of its salt. Each metal will develop a different electrical potential based on its electron configuration. The standard reduction potential listed in various references is the voltage that a half-cell develops when combined with a hydrogen half-cell. First, construct a simple chemical battery and determine from the standard reduction potentials what the output of the battery will be (if a voltmeter is available the actual and theoretical voltages can be compared). Second, construct an electrolysis cell and demonstrate how hydrogen and oxygen can be produced from the electrolysis of water.

Kit Includes:

2 x 500 ml	Cupric Sulfate, 0.5M Solution
1 x 25 ml	Bromothymol Blue, 0.04% Solution
8 x 500 ml	Sodium Sulfate, 1M Solution
Pkg. of 15	Copper Metal Strips
Pkg. of 15	Magnesium Metal Strips 5"UN1869
Pkg. of 15	Dialysis Tubing Strips 6"

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S90741 **$59.00**

Thin Layer Chromatography

Chromatography is an analytical tool used to separate similar compounds. Thin-layer chromatography utilizes a sheet coated with silica gel. The samples are applied to the silica gel sheet and separated by migrating an appropriate solvent up the sheet. This type of separation is called adsorption chromatography because the separation of similar compounds is based on the selective adsorption of the compounds on the silica gel solid phase.

In this lab samples of various plant leaf materials may be extracted or the red and green leaf extracts included may be used. The samples of extracted leaf pigments are applied to a silica gel sheet and separated using a mixture of organic solvents.

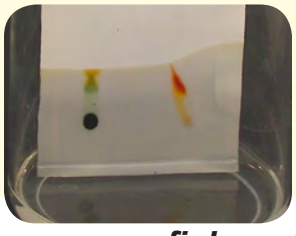
Kit Includes:

2 x 10 g	Alfalfa Powder
2 x 25 ml	Red Extract UN1219
Pkg. of 15	Chromatography TLC Sheets
6 x 250 ml	Chromatographic Solvent UN1230
2 x 50 ml	Isopropyl Alcohol, 70% UN1219

DOT Info:
UN1230, Methanol, 3, PG II, Ltd Qty
UN1219, Isopropanol, 3, PG II, Ltd Qty
UPS HAZARD CHARGE APPLIES

S90742

$127.00



Determination of the Molecular Mass of a Liquid

A volatile liquid is placed in a test tube and the tube is closed with a stopper with a hole in it. The test tube is placed in a hot water bath. The liquid vaporizes and excess vapors escape through the hole. The tube is then placed in an ice bath to quickly cool the vapor and cause it to condense. The mass of the tube is determined.

Kit Includes:

2 x 25 ml	Methyl Alcohol UN1230
2 x 25 ml	Isopropyl Alcohol UN1219

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S90743 **$53.75**

Thermochromism

The way in which light is absorbed or reflected by a crystalline material is determined by the structure of the crystal. This crystal structure can be changed by the application of heat. In some cases this change is reversible and the original structure, and therefore the original color, returns upon cooling. Two compounds are formed when metal salts are reacted with the $[HgI_4]^{2-}$ Ion. Each compound is heated on a hot plate and a change in color is noted. The initial color of the compound returns upon cooling.

Kit Includes:

3 x 25 g	Mercury (II) Chloride UN1624
3 x 25 g	Potassium Iodide
1 x 15 g	Silver Nitrate UN1493
2 x 25 g	Copper (II) Chloride, Anhydrous UN2802

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S90744 **$109.00**

Determination of the Hardness of Water

In this experiment the indicator eriochrome black T (EBT) is used to signal the presence of ions in the water sample. EBT binds with free metal ions in the water to form a pink complex. EDTA has a stronger affinity for the metal ions than EBT so when EDTA is added it replaces the EBT and the EBT returns to its blue, uncomplexed color. The blue color is used as the end point in the titration. A sample of tap water is treated with EBT indicator. If the indicator turns from blue to pink, metal ions such as calcium and magnesium are present. To determine the concentration of ions present, the sample is titrated with a known molar concentration of EDTA.

Kit Includes:

4 x 500 ml	EDTA Solution, 0.005M
2 x 200 ml	Buffer Solution
2 x 15 ml	EBT Solution (Eriochrome Black, 0.1%) UN1219

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S90745 **$47.25**

Synthesis of Aspirin

In a reaction vessel salicylic acid, acetic anhydride and sulfuric acid are mixed. The exothermic reaction will cause the temperature to increase to 70-80°C. Once the reaction is complete the vessel is cooled in an ice bath and the acetylsalicylic acid crystallizes out. This material is re-crystallized in toluene to purify the product. The product identity is confirmed by melting point. The mass of the re-crystallized product is used to determine the yield of the synthesis. In this experiment, we will perform the synthesis of acetylsalicylic acid (aspirin), purification by re-crystallization and use melting point to confirm identity.

Kit Includes:

2 x 25 ml	Acetic Anhydride UN1715
1 x 15 g	Salicylic Acid
2 x 25 ml	Sulfuric Acid Concentrate UN1830
2 x 25 ml	Toluene UN1294

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S90746 **$157.00**

Grignard Synthesis of Benzoic Acid

Once the Grignard reagent is prepared, it can be used to prepare the target compound. In this experiment the target compound is a carboxylic acid. To prepare a carboxylic acid, the Grignard reagent is carboxylated in a reaction with dry ice. After the reaction is complete, hot water is added to evaporate any remaining solvent. Acid is added to dissolve the magnesium salts and liberate the carboxylic acid. Once the solution is cooled, the acid can be collected. In this experiment, we will prepare a carboxylic acid (benzoic acid) by the Grignard method.

Kit Includes:

1 x 5 g	Magnesium Metal Turnings
2 x 25 ml	Tetrahydrofuran UN2056
1 x 20 ml	Bromobenzene UN2514
1 x 25 ml	Hydrochloric Acid, 36% UN1789
1 x 10 g	Decolorizing Carbon

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S90747 **$93.00**

Complete Set of 22 AP® Chemistry Lab Activities S90748 $1280.00

Be prepared for the entire school year with the complete set of all 22 AP Chemistry lab activities. Set includes:

IS8001	Thermochemistry and Hess's Law
IS8002	Activity Series
IS8003	Mole Ratio of Reactants
IS8004	Le Chatelier's Principle
IS8005	Ester Formation
IS8006	Acids and Bases
IS8007	Reaction Kinetics
IS8008	Dissociation Constant of Weak Acids
IS8009	Qualitative Analysis
IS8010	Beer Lambert Law
IS8011	Stoichiometry in the Synthesis of an Ionic Compound
IS8012	Equilibrium Constant of an Ionic Compound
IS8013	Oxidation-Reduction Reactions
IS8014	Freezing Point Depression
IS8015	Vapor Pressure
IS8016	Electrochemical Cells
IS8017	Thin Layer Chromatography
IS8018	Determination of the Molecular Mass of a Liquid
IS8019	Thermochromism
IS8020	Determination of Water Hardness
IS8021	Synthesis of Aspirin
IS8022	Grignard Synthesis of Benzoic Acid

Determination of the Properties of Buffer Solutions

In this experiment, you will prepare three buffer solutions having different pH values and show that the pH of these solutions does not change significantly when small amounts of acids and bases are added. You will also show that when the same amounts of acids and bases are added to water and to a non-buffer solution (e.g. NaCl solution), the pH changes are large.

Kit Includes:
1 x 30 g Sodium Acetate, trihydrate
2 x 25 g Ammonium Chloride
1 x 30 g Sodium Bicarbonate
4 x 25 g Sodium Chloride
1 x 23ml Acetic Acid EZ-Prep, to make 800ml of 0.5M Solution
1 x 27 ml Ammonium Hydroxide, EZ-Prep, to make 800ml of 0.5M Solution
1 x 15 ml Sodium Hydroxide, 1.0 N Solution UN1824
1 x 15 ml Hydrochloric Acid, 1.0 N Solution UN1789

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

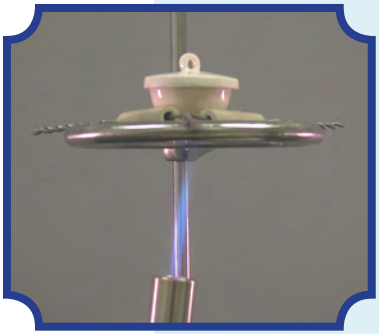
S97011 **$69.50**

Determination of the Empirical Formula of Magnesium Oxide

The quantitative stoichiometric relationships governing mass and amount will be studied using the combustion reaction of magnesium metal. Magnesium is reacted with oxygen from the air in a crucible, and the mass before and after the oxidation is measured. The resulting masses are used to calculate the experimental empirical formula of magnesium oxide, which is then compared to the theoretical empirical formula. A crucible and Bunsen burner will be used to heat magnesium metal to burning. This lab illustrates the (i) law of conservation of mass and (ii) the law of constant composition.

Kit Includes:
1 Roll Magnesium Metal, Ribbon UN1869

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only



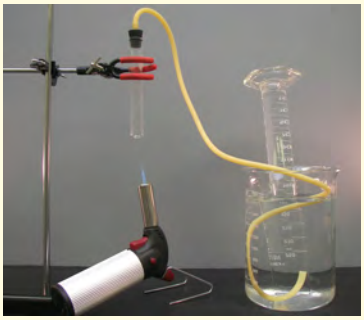
S97012 **$63.50**

The Molar Volume of a Gas

Students will determine the volume of one mole of gas. This is accomplished by generating a known mass of oxygen gas, measuring its temperature, volume and pressure, and then using the data to calculate the molar volume at STP. The oxygen is generated by the decomposition of potassium chlorate at high temperature.

Kit Includes:
2 x 25 g Potassium Chlorate UN1485
2 x 25 g Manganese Dioxide, 85% Native Powder UN1479

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only



S97013

$25.75

Acid Base Indicators

pH is the measure of the concentration of hydrogen ions in a solution. As this concentration can extend over several orders of magnitude, it is convenient to express it by means of logarithms of base ten. Certain pigments change color with a change in pH. In this experiment we will extract pigments from various sources and determine if they are sensitive to changes in pH.

Kit Includes:
1 x 25 ml Hydrochloric Acid, 32% UN1789
1 x 10 g Sodium Hydroxide UN1823
2 x 30 ml Isopropyl Alcohol, 99% UN1219
1 x 30 ml Acetone UN1090

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S97014 **$51.50**

Gravimetric Analysis

Determine the identity of a metal carbonate by gravimetric analysis. Gravimetric analysis is a technique through which the amount of an analyte (the ion being analyzed) can be determined through the measurement of mass. You will complete the analyses comparing the masses of two compounds containing the analyte. The formula weight and the identity of the unknown are determined using gravimetric analysis.

Kit Includes:
1 x 10 g Calcium Chloride, Anhydrous
1 x 5 g Silver Nitrate UN1493

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S97015

$36.00

Analysis of Potassium Aluminum Sulfate 12 Hydrate

After a compound has been synthesized, analytical tests should be carried out to confirm that the correct compound has been produced. In this lab we will perform tests to confirm that the crystals formed are in fact potassium aluminum sulfate 12 hydrate by comparing the melting point to published results, finding the number of waters of hydration, and determining the percent of sulfate in the compound.

Kit Includes:
2 x 100 g Aluminum Potassium Sulfate
4 x 25 g Barium Nitrate UN1446

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

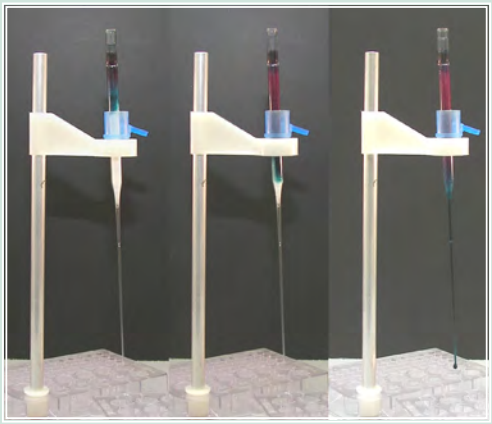
S97016 **$23.75**

Liquid (Column) Chromatography

The mixture to be analyzed by column chromatography is applied to the top of the column. The liquid solvent (the eluent) is passed through the column by gravity or by the application of air pressure. Equilibrium is established between the solute adsorbed on the adsorbent and the eluting solvent flowing down through the column. Because the different components in the mixture have different interactions with the stationary and mobile phases, they will be carried along with the mobile phase to varying degrees and a separation will be achieved. The individual components, or elutants, are collected as the solvent drips from the bottom of the column.

Kit Includes:
4 X 25ml Isopropyl Alcohol UN1219
1 X 100g Silica gel 60
2 X 15ml Dye Mixture
15 Pipettes
Glass wool

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only



S96900

$73.50

The Electrochemical Series

Students will study electrochemical series. The electrochemical series is built up by arranging various redox equilibria in order of their standard electrode potentials (redox potentials). When a strip of metal (an electrode) is placed in water the metal has a tendency to go into solution as ions, with a simultaneous build up of electrons on the metal strip. This process produces an electrical potential difference between the metal and solution which is called an electrode potential (E^o).

Kit Includes:
15 Copper Metal Strips
15 Zinc Metal Strips
15 Magnesium Metal Strips
15 Iron Metal Strips
15 Aluminum Metal Strips
75 Filter Paper Strips
1 ea EZ-Prep to make 1000ml of 0.1M Solution of:
Copper Sulfate
Zinc Sulfate
Magnesium Sulfate
Iron Sulfate
Aluminum Sulfate

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96899 **$93.00**

All Chemistry Demonstration kits come with enough reagents to complete at least 5 chemistry demonstrations. Complete with instructions.

Synthesis of Rayon

Demonstrate polymer chemistry. Newsprint is dissolved in a solution of ammonium hydroxide and cupric sulfate. The solution is then added to a sulfuric acid solution and dark strands are formed.

Kit Includes:
1 x 125 ml Copper (II) Sulfate, 25% Solution
1 x 175 ml Ammonium Hydroxide, 28-30% Solution UN2672
1 x 200 ml Sulfuric Acid, 0.5M/1.0N Solution UN2796

DOT Info:
UN2672, Ammonia solutions, 8, PG III, Ltd Qty
UN2796, Sulfuric acid, 8, PG II, Ltd Qty

S96733 **$31.25**

Autocatalysis

Catalysis is a basic principle of chemistry and biochemistry. Some reactions are autocatylic; the product of the reaction actually catalyzes further reactions. The reaction is initiated with acid and produces acid to continue the reaction.

Kit Includes:

1 x 5 ml	Toluidine Blue, 0.5% Solution
1 x 30 ml	Sulfuric Acid, 3.0M Solution UN2796
1 x 250 ml	Potassium Chlorate/Sodium Sulfite Solution

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S73005 **$24.75**

Ampholytes Chemical Demo

Ampholytes are compounds which react with both acids and bases. When zinc chloride is reacted with sodium hydroxide the soluble zincate ion is formed. When zinc hydroxide is reacted with hydrochloric acid, the soluble zinc chloride and water are formed.

Kit Includes:
1 x 100 ml Zinc Chloride, 0.5M Solution
1 x 250 ml Sodium Hydroxide, 1.0M Solution UN1824
1 x 250 ml Hydrochloric Acid, 1.0M Solution UN1789

DOT Info:
UN1824, Sodium hydroxide solution, 8, PG II, Ltd Qty
UN1789, Hydrochloric acid, 8, PG II, Ltd Qty

S96735 **$26.00**

Exothermic Reactions

Study the process of exothermic reactions. The reaction is safely carried out in a plastic bag. The students can pass the bag around to feel the result of the reaction.

Kit Includes:
5 bags of the following mixture:
25 g Iron Metal Powder, 1 g Sodium Chloride Crystals, 5 g Calcium Chloride Flakes, 1 Tbsp Vermiculite

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S96736

$26.00

Endothermic Reactions

Study the process of endothermic reactions. The reaction is safely carried out in a plastic bag. The students can pass the bag around to feel the result of the reaction.

Kit includes:
5 bags x 25g Ammonium Nitrate UN1942 + 1 Tbsp Vermiculite

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96737 **$26.00**

Exothermic/Endothermic Combination

Study both processes of endothermic and exothermic reactions. Reactions are safely carried out in plastic bags. The students can pass the bags around to feel the results of the reactions.

Combo kit includes both IS7004 and IS7005 kits.

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96738 **$39.00**

Blue Bottle Reaction

Discover the principle of oxidation-reduction. Compounds that change color as a result of a change in their pH or oxidation state are called indicators. Illustrate this principle by mixing potassium hydroxide and dextrose with methylene blue and introducing oxygen by shaking the flask.

Kit Includes:

2 x 25 ml	Potassium Hydroxide, 5.0M Solution UN1814
1 x 6 ml	Methylene Blue Chloride, 1% Solution
5 bags x 5 g	Dextrose Monohydrate (Glucose) Powder

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S73004 **$35.00**

Thin Layer Chromatography

TLC is a technique of separation chemistry, which provides a simple, rapid method of separating small amounts of compounds. A mixture of three dyes is prepared and then separated on a thin layer of the absorbent silica gel with the appropriate solvent.

Kit Includes:

250 ml	Chromatography Solvent (Acetone / Ethyl Alcohol 9:1) UN1993
Pkg of 5	Chromatography TLC Sheets (2 1/2"x4")
1 x 3 ml	Sudan IV, 0.5% Solution UN1219
1 x 3 ml	Coumarin 314, 0.1% Alcohol Solution UN1170
1 x 3 ml	Methylene Blue Chloride, 1% Solution UN1170

DOT Info:
UN1993, Flammable liquid, n.o.s.,
(Acetone, Ethyl alcohol), 3, PG II, Ltd Qty

S73006 **$36.00**

Synthetic Rubber

Show how the first synthetic rubber was made in United States by a reaction of sodium polysulfide with ethylene chloride. This produces a simple condensation polymer consisting of repeating units of ethane and polysulfide.

Kit Includes:
4 x 25 ml Sodium Polysulfide Solution UN1760
1 x 25 ml Ethylene Dichloride UN1184

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96739

$31.50

Nylon 6-10 Rope Trick

Show an example of polymer chemistry. Make your own nylon which is a synthetic compound of high molecular weight that consists of up to millions of repeated chemical units that are linked together. This polymer is referred to as Nylon 6-10.

Kit Includes:
1 x 25 ml Solution A
(1,6-Hexanediamine, Sodium Hydroxide, Water) UN1760
1 x 25 ml Solution B
(Sebacoyl Chloride, Hexane) UN1208

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S76784A **$24.25**

Formation of Silicate (Red & White Precipitates)

Show how silicates of divalent ions are insoluble in water whereas silicates of monovalent ions are soluble.

Kit Includes:

1 x 50 ml	Calcium Chloride, 1.0 Molar Solution
1 x 50 ml	Calcium Chloride, 1.0 Molar Solution with Phenolphthalein
1 x 200 ml	Sodium Silicate, 15% Aqueous Solution

DOT Info:
Non-Regulated.
NO SHIPPING
RESTRICTIONS APPLY

S73014 **$22.75**

Surface Tension of Water

Explain the principle of high surface tension as water acts like a membrane stretched across the surface preventing the sulfur particles from sinking. A wetting agent lowers the surface tension and allows the particles to fall through the surface to the bottom of the beaker.

Kit Includes:

1 x 15 g	Sulfur NA1350
1 x 5 ml	Dish Detergent, Green

DOT Info:
Non-Regulated.
NO SHIPPING
RESTRICTIONS APPLY

S96742 **$21.80**

Chemiluminescence

Explain and view chemiluminescence. Observe how luminol is converted to an excited state in the presence of an oxidizer such as hydrogen peroxide. As the excited state molecule decays or returns to the ground state, energy is produced as light.

Kit Includes:

1 x 100 ml	Luminol Solution
1 x 50 ml	Hydrogen Peroxide, 6% Solution

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S73016 **$40.00**

Eutectic Alloys

Form a metal alloy as bismuth and tin are heated to the eutectic point of the two metals which is lower than the melting point of either metal.

Kit Includes:

1 x 100 ml	Glycerin (Glycerol)
1 x 50 g	Bismuth Metal Lumps
1 x 15 g	Tin Metal Mossy

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

IS7014
contact your representative for more information

Check out our Chemistry videos on You Tube and follow us on Twitter!

http://www.youtube.com/user/innovatingscience

http://twitter.com/Aldonchem

Chemical Battery

Construct a simple wet cell battery. When complete it will generate 1.5 volts for 20-30 minutes. Several cells can be connected in series to increase the voltage or in parallel to increase the current.

Kit Includes:

1 x 100 ml	Copper (II) Sulfate, 0.5M Solution
1 x 200 ml	Sodium Sulfate, 0.5M Solution
2 x 6" long	Magnesium Metal Strips UN1869
2 x 3/4"x5"	Copper Metal Strips
2 x 15.9mm	Dialysis Tubing
1 x 25 ml	Hydrochloric Acid, 3% Solution UN1789
1 each	Light Bulb & Wire Assembly
1 each	Empty Jar with Lid

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S96744 **$36.75**

Bioluminescence

Study the concept of bioluminescence using real firefly extract.

Kit Includes:

5 x 0.01 g	Adenosine 5'-Triphosphate, Disodium Salt
5 x 0.017 g	Firefly Lantern Extract Powder

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

IS7017
contact your representative for more information

Polyurethane Foam

Make your own foam and explain how when two viscous liquids are mixed together, they initiate a reaction producing a light weight polyurethane foam which expands to 30 times the original volume of the two liquids.

Kit Includes:
1 x 500ml Polyurethane Foam System, Part A (Mixture)
1 x 500ml Polyurethane Foam System, Part B (Mixture)

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S73009

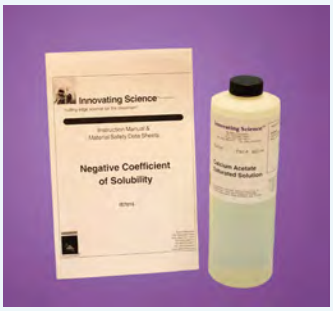
$45.75

Negative Coefficient of Solubility

Explain how there are exceptions to the rules of chemistry. Heat a solution and watch it form a precipitate. Watch it go back into solution as it cools.

Kit Includes:
1 x 500 ml Calcium Acetate, Saturated Solution

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY



S73017

$22.50

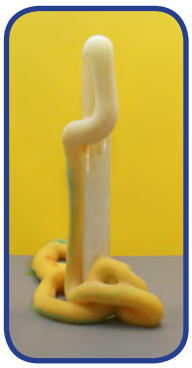
Foam City - The Catalytic Decomposition of Hydrogen Peroxide

A large quantity of foam is produced when detergent and potassium iodide are added to hydrogen peroxide.

Kit Includes:

3 x 30 ml	Hydrogen Peroxide, 30% UN2014
1 x 30 ml	Dish Detergent, Green
1 x 10 g	Potassium Iodide, Crystals

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only



S96747

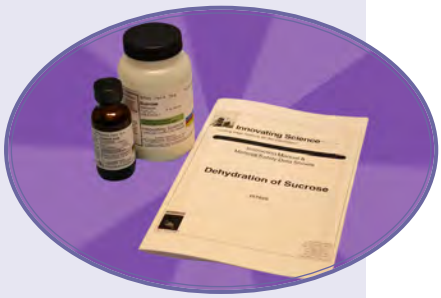
$23.25

The Dehydration of Sucrose

Sulfuric acid is poured on sucrose. The resultant reaction produces a large amount of black foam as well as steam and smoke.

Kit Includes:
1 x 75 g Sucrose, Granular
1 x 25 ml Sulfuric Acid, Concentrate UN1830

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only



S68301 **$36.75**

The Volcano - Dehydration of Sucrose

Create your own volcano for a science fair demonstration.

Kit Includes:
1 x 75 g Sucrose Crystals
1 x 25 ml Sulfuric Acid, Concentrate UN1830
1 x 50 g Sodium Carbonate, Anhydrous

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S96749 **$33.00**

Colorful Vanadium - A Multi-step Reduction Reaction

As Vanadium's oxidation state changes the solution changes color.

Kit Includes:
2 x 250 ml Vanadium Solution
1 x 25 g Zinc Amalgam

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S68302 **$53.50**

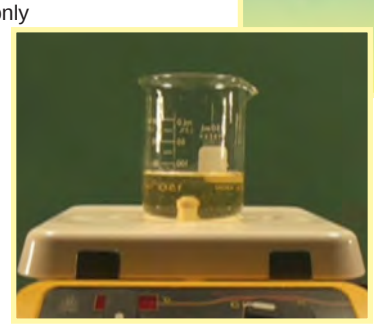
Check out the Dehydration of Sucrose video at www.aldon-chem.com

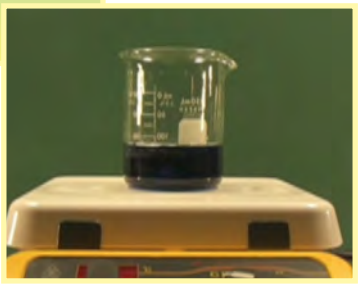
Oscillating Reactions - Yellow to Blue and Back

Prepare a flask containing a yellow solution, as you mix it on a magnetic stirrer the solution will turn from yellow to blue and back to yellow.

Kit Includes:
3 x 25 ml Hydrogen Peroxide, 12% UN2984
3 x 25 ml Potassium Iodate, 0.2M Solution UN2796
1 x 75 ml Starch Solution, 0.03%

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only





S96751 **$25.75**

Oscillating Reactions - The Traffic Light

A flask containing a yellow solution is gently swirled and the solution turns red. When the flask is shaken the solution turns green.

Kit Includes:

1 x 10 g	Sodium Hydroxide, Beads UN1823
1 x 0.5g	Indigo Carmine, makes 50ml
5 x 5 g	Dextrose (Glucose)

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96752 **$23.55**

The Oxidation-Reduction Flag (Redox Flag)

You will be able to demonstrate the principles of a redox reaction. Paint the potassium thiocyanate solution and potassium ferrocyanide solution onto a filter paper. Once they are dry you can spray the filter paper with iron (II) chloride and watch blue and red colors appear.

Kit Includes:

3 x 25 ml	Iron (III) Chloride 0.1M Solution UN2582
1 x 30 ml	Potassium Thiocyanate 0.1M Solution
1 x 30 ml	Potassium Ferrocyanide 0.1M Solution

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96754 **$29.00**

Oscillating Reactions - The REDOX Rainbow

For this demonstration, add hydrogen peroxide to a colorless solution of potassium iodide to produce a red color, or you can add the hydrogen peroxide to a purple solution of potassium permanganate to create a colorless solution.

Kit Includes:

1 x 100 ml	Hydrogen Peroxide, 3% Solution
1 x 200 ml	Potassium Iodide, 0.1M Solution
1 x 200 ml	Potassium Permanganate, 0.02M Solution
1 x 10 ml	Sulfuric Acid, Concentrated UN1830

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S68307 **$26.25**

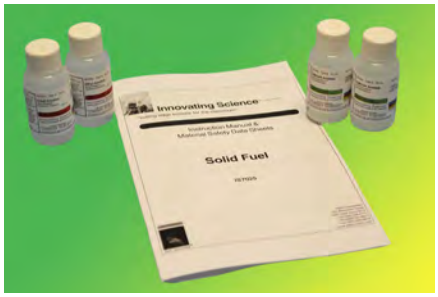
Solid Fuel

Two solutions are poured together in a beaker and form a gel. The gel can be ignited with a match. Commercially this gel is sold as Sterno®.

Kit Includes:

2 x 25 ml	Ethyl Alcohol, Denatured UN1170
2 x 25 ml	Calcium Acetate Solution

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only



S68305 **$23.75**

Oxidation of Glycerin

A small amount of potassium permanganate is placed in a petri dish. A few drops of glycerin are added and after a few seconds, a puff of smoke and violet flames are produced.

Kit Includes:

1 x 30 g	Potassium Permanganate UN1490
1 x 25 ml	Glycerin

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S68308 **$23.00**

Underwater Fireworks - The Reaction of Acetylene and Chlorine

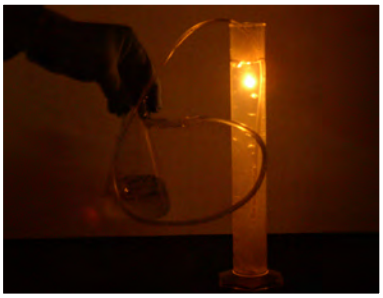
Calcium carbide is placed in a cylinder containing water. A reaction occurs producing acetylene gas bubbles. A plastic tube from a chlorine gas generator is placed in the cylinder. As the bubbles of acetylene and chlorine collide flashes of light are produced.

Kit Includes:

1 x 250 ml	Sodium Hypochlorite UN1791
1 x 30 ml	Hydrochloric Acid, 1.0M Solution UN1789
1 x 10 g	Calcium Carbide, Lumps UN1402

DOT Info:
UN1791, Hypochlorite solutions, 8, PG III, Ltd Qty
UPS HAZARD CHARGE APPLIES

S68309 **$23.00**



Oxidation-Reduction of Complex Ions

Hydrogen peroxide is added to a solution of sodium potassium tartrate and heated. Copper sulfate solution is added and the solution turns light blue. With continued heating the solution foams and turns orange-gold.

Kit Includes:

1 x 250 ml	Hydrogen Peroxide, 3% Solution
1 x 250 ml	Potassium Sodium Tartrate, 0.3M Solution
1 x 10 ml	Copper (II) Sulfate, 1.0M Solution

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S68310 **$28.75**

Formation of Tin Wool

This is a single replacement reaction in which the zinc metal dissolves in solution and tin metal is formed.

Kit Includes:

2 x 700 ml	Tin (II) Chloride, 1.0 Solution UN1789
1 x 140 g	Zinc Metal Mossy

DOT Info:
UN1760, Corrosive liquid, n.o.s.,
(Stannous Chloride, Hydrochloric Acid), 8, PGIII, Ltd. Qty

S96759

$47.00

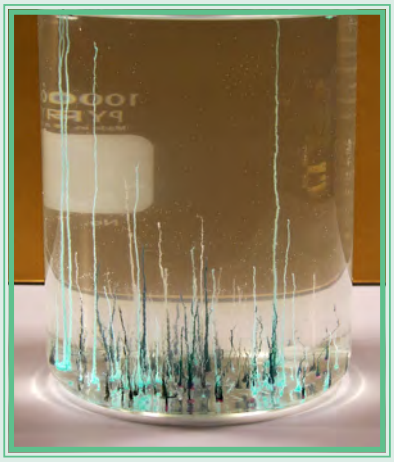
The Silicate Garden

A few colored crystals are added to a clear solution in a glass jar or beaker. Within a few minutes large plant like structures extend from the crystals.

Kit Includes:

2 x 30 ml	Sodium Silicate Solution, 40%
1 x 20 g	Iron (III) Chloride, Hexahydrate UN1759
1 x 20 g	Copper (II) Chloride, Dihydrate UN2802
1 x 20 g	Cobalt Nitrate, Hexahydrate UN1477
1 x 20 g	Zinc Sulfate, Heptahydrate

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only



S68311

$45.75

Up in Vapor! Hydrogen Peroxide Decomposition

In this experiment you will show the decomposition of the chemical hydrogen peroxide using sodium iodide.

Kit Includes:

1 x 350 ml	Hydrogen Peroxide, 30% UN2014
7 x 4 g	Sodium Iodide

DOT Info:
UN2014, Hydrogen peroxide, aqueous solutions, 5.1, (8), PG II
UPS HAZARD CHARGE APPLIES

S96760 **$37.00**

Le Chatelier's Principle: A Dynamic Demo on the Overhead

Use an overhead projector to study the reaction of Le Chatelier's principle.

Kit Includes:

1 x 140 ml	Potassium Thiocyanate, 0.002M Solution
1 x 10 ml	Iron (III) Nitrate, 0.2M Solution
1 x 5 g	Potassium Thiocyanate
1 x 5 g	Sodium Phosphate, Monobasic, Anhydrous

DOT Info:
Non-Regulated.
NO SHIPPING
RESTRICTIONS APPLY

S96761 **$29.25**

Water to Wine

Study acid base indicators and complex ions. Mixing three colored chemical solutions results in another wine colored solution. Adding the fourth chemical of sodium fluoride turns the solution clear.

Kit Includes:

1 x 10 ml	Potassium Thiocyanate, 1.M Solution
1 x 15 ml	Thymolphthalein, 0.04% Solution UN1170
1 x 15 ml	Phenolphthalein, 0.5% Solution UN1987
1 x 5 g	Iron (III) Chloride, 6-Hydrate UN1759
3 x 25 ml	Sodium Fluoride, 1.0M Solution
1 x 10 ml	Hydrochloric Acid, 32% UN1789
1 x 10 ml	Ammonium Hydroxide, 14.8M, 28-30% Solution UN2672

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96762 **$37.50**

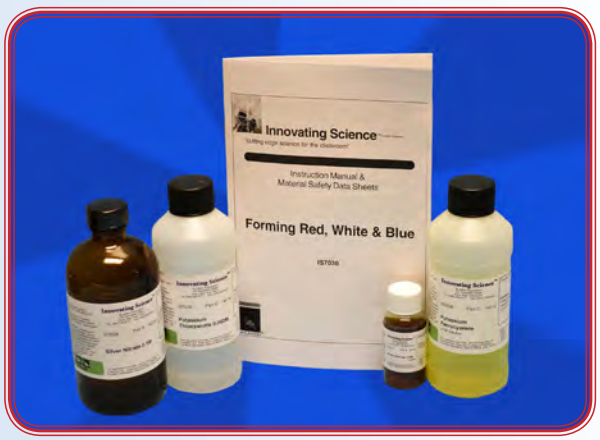
Forming Red, White & Blue

Introduce chemical reaction types. This is a patriotic demonstration that illustrates complex ion formation, double replacement while introducing chemical reaction types.

Kit Includes:

1 x 30 ml	Iron (III) Chloride, 1.0M Solution UN2582
1 x 140 ml	Silver Nitrate, 0.1M Solution
1 x 140 ml	Potassium Ferrocyanide, 0.1M Solution
1 x 140 ml	Potassium Thiocyanate, 0.002M Solution

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only



S96763 **$31.25**

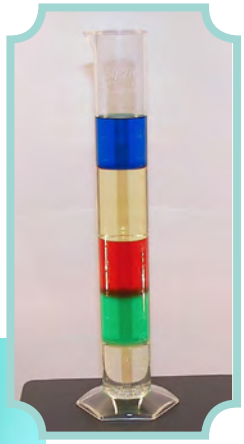
Density Of Liquids: The Color Column

Several liquids of varying color are added to a cylinder. Due to differing densities of the liquids, a density gradient is formed resulting in a layered, multi-colored column. As an optional investigation, the relative density of small solid objects may be compared by dropping them in the density column.

Kit Includes:

450 ml	Glucose syrup
400 ml	Liquid detergent
400 ml	Vegetable oil
400 ml	Ethyl alcohol UN1170
25 ml	Blue food coloring
25 ml	Red food coloring
	Graduated cylinder
5	plastic cups

DOT:
UN1170, Ethanol 3, II Ltd. Qty



S98652 **$45.50**

Thionin and Iron: A Light Induced Redox Reaction

In this lab a thionin-iron solution is prepared. Exposing the solution to light energy causes the colored thionin to be reduced by iron (II) ions, resulting in a clear solution. When half of the solution, in a single container, is exposed to light it will turn clear while the half not exposed to light will remain colored.

Kit Includes:

10g	Iron(II) sulfate
2x25 ml	Sulfuric acid solution
	Thionin Quick Solution

DOT: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S98910

$26.50

Disappearing Rainbow

Three indicators are used in conjunction with acids and bases to create a rainbow of colors. In a basic solution, phenolphthalein is red, p-nitrophenol is yellow, and thymolphthalein is blue. These can be combined in various ways to create all the colors of the rainbow. If done correctly the students only see the acid or base being poured, which adds to the impressive display. There are enough materials to complete the demonstration 7 times.

Kit Includes:

25ml	Red Indicator UN1170
25ml	Orange Indicator UN1170
25ml	Yellow Indicator UN1170
25ml	Green Indicator UN1170
25ml	Blue Indicator UN1170
25ml	Violet Indicator UN1170
2 X 30ml	Hydrochloric Acid 1.0 N UN1789
2 X 30ml	Sodium Hydroxide 1.0 N UN1824
30ml	Sodium Hydroxide Sol 6.0M (6N) UN1824

DOT: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S98653

$33.25

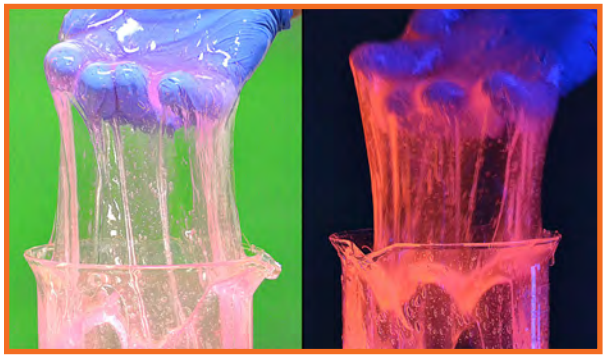
Fluorescent Slime Using Polyvinyl Alcohol

Create your own fluorescent polymers (Slime) in this great classroom demonstration. Mixture is pink under regular light and glows orange under a black light. Included pigment will make this polymer activity easy to see and memorable for your students!

Kit Includes:

100ml	Sodium Borate 4% Sol
500ml	Polyvinyl Alcohol 3% Solution
5ml	Fluorescent Pink Pigment Mixture

DOT Info: Non-Regulated.



S06820 **$18.95**

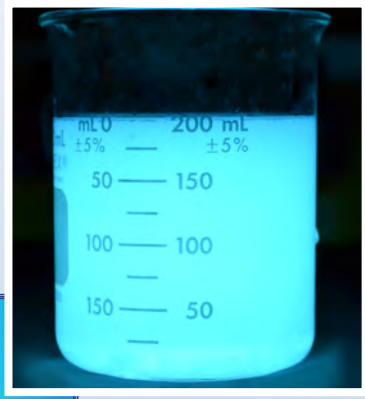
Instant Light Powder Chemiluminescence Demo

In this demonstration, students will observe an example of a chemiluminescence reaction. Instant light powder and water are placed in a beaker producing a blue light. This demonstration is designed to further help students understand the topics of chemiluminescence and kinetics. There is enough Instant Light Powder to complete 5 demonstrations.

Kit Includes:

1 btl	Instant Light Powder

DOT Info:
Non-Regulated.
NO SHIPPING
RESTRICTIONS APPLY



S06632 **$10.25**

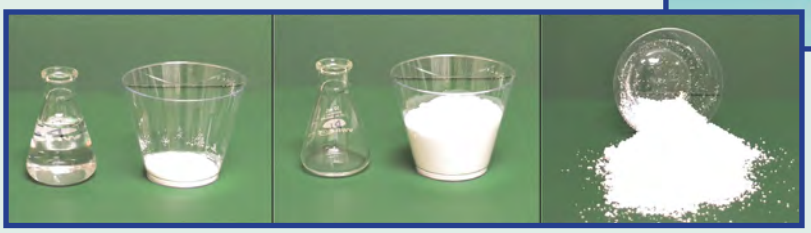
Snow Polymer Demonstration

Demonstrate the wonderful, super absorbent properties of a polymer while making snow in your classroom. As the hydrophilic polymer instantly absorbs water, it will expand to over 40 times its original volume. The end result is fluffy flakes of fake snow. Performs 5 demonstrations. Complete with instructions.

Kit Includes:

25g	Snow Polymer
5	Cups
5	Stir Sticks

DOT: Non Regulated



S06974 **$13.25**

Green Chemistry: The Production of Biodiesel

In this activity, students will be performing a two-phase process to produce small batches of crude biodiesel. The crude biodiesel produced is of sufficient quality for use in the demonstration of the burning qualities of both biodiesel and vegetable oil. Included is an optional small-scale exercise where the students will use a washing procedure to experience the full process of producing biodiesel to meet quality levels necessary for use in vehicles. Kit contains enough materials for 15 groups of students. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

4 X 500ml	Vegetable oil
15 X 25ml	Methyl alcohol
1 X 20g	Potassium hydroxide
2	Microburners

Optional: Containers with sealable caps large enough to hold 200ml of liquid (if performing the washing process)
Distilled water (if performing the washing process)

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S97621 **$79.00**

Electrochemical Remediation of Wastewater

Water pollution is one of the largest threats facing the global population. Water is a finite resource. Once polluted, it cannot be set aside in the hopes that the environment will "make" new, clean water. One procedure often employed to treat wastewater is coagulation/flocculation. While the coagulation/flocculation procedure in wastewater treatment is effective, it involves the addition of chemical components to the water being treated. Recently, a great deal of attention has been given to less traditional alternatives to the typical process of coagulation/flocculation. One such approach receiving a good deal of attention is a process called electrocoagulation. Electrocoagulation is a coagulation process carried out by an electrical charge. Kit contains enough materials for 15 groups of students. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

30	Aluminum electrodes
15	Red connectors w/alligator clips
15	Black connectors w/alligator clips
1 btl.	Sodium sulfate, 15g
1 btl.	0.1% crystal violet, 15ml

Optional:
Funnels
Filter paper

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S97622 **$68.25**

Detergents and the Environment

Understand the consequences of cultural nutrient overloading on the aquatic environment. Recognize that there may be alternative, more environmentally-friendly alternatives in typical consumer chemical goods. Demonstrate and monitor the effects of two detergent builders on natural water samples. Visually quantify the differences between phosphate and non-phosphate detergent builders on aquatic organisms. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1	Phosphate builder (10% sodium phosphate) solution, 50ml
2	Non-phosphate builder UN1760 (15% sodium silicate/5% citric acid) solution, 25ml
1	Control (deionized) water, 50ml
45	Plastic cups
1 box	Microscope slides
1 box	Coverslips

Optional: Microscopes, Plastic wrap or similar

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96401

$43.25

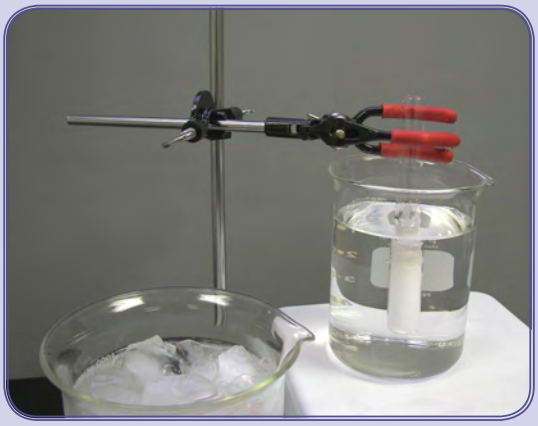
A Greener Synthesis of Acetylsalicylic Acid

Show students it is possible to produce acetylsalicylic acid from a naturally-occurring, renewable resource. Students will convert sodium salicylate to salicylic acid, collect and dry prepared salicylic acid. They may then use a quick confirmatory test to examine for the presence of salicylic acid. The prepared salicylic acid can then be used to synthesize acetylsalicylic acid. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

6	Sodium Hydroxide 3M, 25ml
6	Hydrochloric Acid 3M, 25ml
1	Methyl Salicylate, 25ml
2	Acetic Anhydride, 25ml
1	Phosphoric Acid 85%, 5ml
1	Ferric Nitrate, 5ml
15	Pipettes, Disposable

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only



S96402 **$56.50**

Determining the Composition of an Unknown Mixture

Often times, the composition of a mixture may contain a variety of unknown components. In some cases, the components of a mixture may be known but the exact amount of those components in the mixture is not. Analytical chemists often have a variety of tools and techniques to analyze unknown substances and arrive at conclusions with regards to the compounds/percentages in the mixture. In this activity, students will determine the percent composition of sodium carbonate and sodium bicarbonate in an unknown sample. The mixture is heated vigorously until the sodium bicarbonate is completely decomposed to sodium carbonate. The only other products of the reaction are carbon dioxide and water. After performing the necessary calculations, students will determine the percentage of sodium bicarbonate that was present in their original sample. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1	Sodium carbonate, 200g
1	Sodium bicarbonate, 200g
5	Pre-labeled bottles (to prepare unknowns)

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96404

$36.75

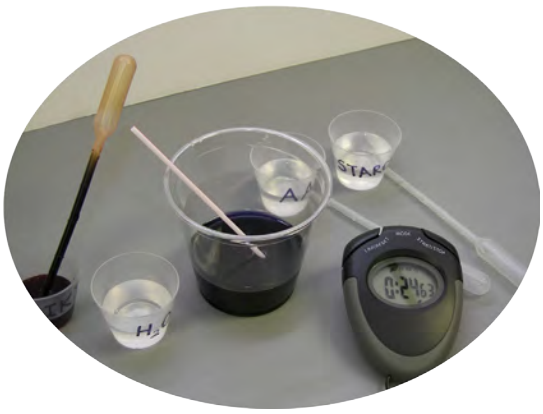
An Alternative Iodine Clock Reaction

Students will learn the mechanisms and reactions involved in one type of clock reaction and understand how a clock reaction may provide insight into reaction kinetics. After assembling, performing, and obtaining data from several clock reactions students will alter experimental conditions and investigate the effects on clock reaction data. Determination of the effects of concentration and temperature on chemical kinetics will be investigated. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

3 X 100ml	Ascorbic Acid Quick Solution, makes 100ml of 1% solution
3 X 100ml	IKI Dilute Lugol's Solution
1 X 400ml	Hydrogen Peroxide 3%
1 X 3g	Starch, Soluble
30	Plastic Cups
30	Stir Sticks
60	Measuring Cups, Disposable
60	Pipettes, Disposable

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

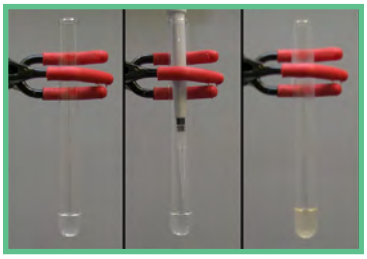


S96403

$43.00

Green Nanochemistry: Synthesis of Silver Nanoparticles

Nanotechnology is a field of technology that is described as the control and manipulation of matter in the 1 to 100 nanometer (nm) range. A nanometer is one billionth of a meter, or one millionth of a millimeter. To put it in perspective, an average sheet of copier paper is about 100,000 nanometers thick so a nanometer is 100,000th the thickness of a piece of copier paper. Certain materials, when prepared at nanoscale levels, display different physical and chemical properties than those of the same materials prepared on a larger scale. In this activity, students synthesize silver nanoparticles from silver nitrate. The particles are synthesized in glucose and starch, as opposed to the more hazardous reagents typically employed. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.



Kit Includes:

1 x 1ml	Silver nitrate, 0.1M
1 x 0.09g	Dextrose to make 5 ml of 0.1M Glucose
1 x 0.4g	Soluble starch (to make 200ml of 0.2% solution)
1 x 5ml	Sodium Hydroxide 0.1M UN1824

DOT Info: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4 for domestic highway or rail transport only

S96405 **$53.75**

The Hydrogen Fuel Cell Demonstration

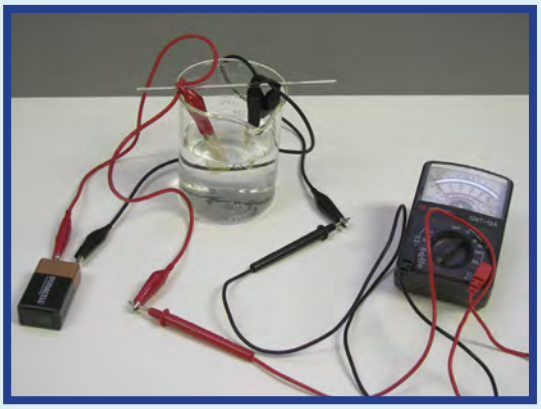
In this demonstration, energy will be produced from combining of hydrogen and oxygen to form water. Platinum will serve as the catalyst and electrodes will be prepared by coating metal mesh with platinum. The hydrogen and oxygen will come from electrolysis. After the cell is set up, a brief current is applied (with a 9-volt battery) causing the formation of hydrogen gas bubbles on one electrode and oxygen gas bubbles on the other. Using a voltmeter, electricity produced by the recombining of hydrogen and oxygen, facilitated by the platinum metal catalyst, can be observed. Kit contains enough materials for 5 demos.

Kit Includes:

15	Brass metal mesh squares
2	Red connecting wires w/alligator clips
2	Black connecting wires w/alligator clips
	D-cell battery holder w/clips
	Chloroplatinic acid 0.005M, 25ml UN3264
	Glass rod

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96400 **$39.25**

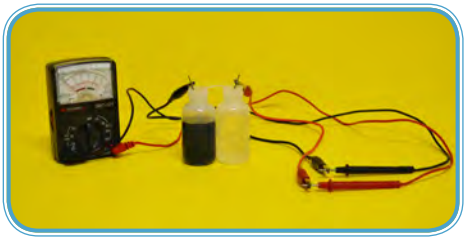


Green Fuel Cell: Energy From Yeast

The transfer of electrons is part of the metabolic process in living organisms. However, what if it were possible to capture, remove, and use some of these electrons? Could living organisms generate an electrical current? Students will set up a simple cell and using the simple-to-grow and environmentally tolerant organism yeast, as well as a special dye capable of entering yeast cells and collecting electrons, determine if the harvested electrons are capable of producing current in the cell and if so, how much current. This fun activity also serves as a great tool to stimulate discussion with regard to alternate energy sources. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

10g	Yeast Instant Dry
25g	Dextrose R/G Anhydrous (D-Glucose)
7.5g	Phosphate Buffer Ph 7.0
5ml	Potassium Ferricyanide 1.0M
5ml	Methylene Blue Chloride 1% Aq
30	15ml Bottles
15	Bottle Caps
15	Connecting Wire, Red 12" With Alligator Clips
15	Connecting Wire, Black 12" With Alligator Clips
30	Carbon Electrodes
20	1/4" X 4" strips, Filter Paper 8"X11"



DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S06971 **$55.00**

Environmental Chemistry: Water Treatment and Filtration

Students will develop a knowledge of the processes performed at a water treatment plant and understand the reasons for each process. They will perform, on a small-scale, several of the procedures that occur in a water treatment plant on “polluted” water. They will examine the changes in the water after each treatment step is performed. They will also observe physical characteristics of water, such as clarity, color, odor, and how they are affected from the beginning of the treatment process until the end. Kit contains enough materials for 15 groups of students. Teacher’s Manual and Student Study Guide copymasters are included.

Kit Includes:

1500g	Fine sand
1500g	Coarse sand
1500g	Fine gravel
300g	Activated charcoal
25g	Potassium aluminum sulfate (alum)
25g	Calcium oxide (lime)
5g	Kaolin (clay) powder
5ml	Green food coloring
25ml	White Vinegar
75	Plastic cups
15	Stirring sticks

DOT Info:
Non-Regulated
NO SHIPPING RESTRICTIONS APPLY

S97623 **$55.50**

Environmental Chemistry: Nitrates, Phosphates, and Eutrophication

Understand the importance and value of fresh water and the need to protect and conserve this valuable resource. Realize that a variety of factors, including natural ones, contribute to the overall problem of water pollution. After completing this lab, students should understand the difference between point source and non-point source pollution and understand the role of nitrates and phosphates in the process of eutrophication. They will observe and examine the effects of nitrates, the effects of phosphates, and the effects of a combination of nitrates and phosphates in miniature “ponds.” Kit contains enough materials for 15 groups. Teacher’s Manual and Student Study Guide copymasters are included.

Kit includes:

1	Nitrate solution, 50ml
1	Phosphate solution, 50ml
1	Nitrate/Phosphate solution, 50ml
1	Control (deionized) water, 50ml
60	Plastic cups
1 box	Microscope slides
1 box	Coverslips

DOT Info: Non Regulated

S96399

$52.50

Environmental Chemistry: Acid Rain, Weathering, and Erosion

Acid rain is a term used generically to describe any type of acidic moisture, be it rain, snow, or fog. Acid rain can have devastating effects on not only aquatic ecosystems but also terrestrial areas. Acid rain not only affects naturally-occurring surfaces, such as exposed rocky surfaces of mountainous regions, but also human-made surfaces as well. Different stone and metal substances used in the construction of buildings, statues, monuments, etc. may all be affected by acid rain. The rates of erosion and weathering may increase rapidly depending on the degree of acidity in the precipitation. In this activity, students expose many rock materials and metals, both naturally-occurring and common in construction, to an acidic environment and examine the reaction of these materials in contrast to the same materials exposed to “normal” rain (tap water). Kit contains enough materials for 15 groups. Teacher’s Manual and Student Study Guide copymasters are included.

Kit Includes:

1 bag	Marble chips
1 bag	Brick chips
1 bag	Granite chips
1 bag	Limestone chips
1 bag	Sandstone chips
1 bag	Steel shot
1 bag	Copper shot
1 bag	Zinc shot
3 x 25ml	Sulfuric acid concentrate (to make 500ml each)
120	Measuring cups, disposable

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96398
$54.50

Acid Rain and the Environment: Acidity and Plant Growth

The problem of acid rain is quite often associated with its effects on aquatic systems. Unfortunately, acid rain can also have devastating effects on terrestrial environments as well. In this activity, students will examine the detrimental effects of acidic conditions on plants. Plants will be grown under normal soil conditions, mildly acidic soil conditions, and very acidic soil conditions. Through physical observation, students will determine if the acidity has any impact on the growth of the plant. Kit contains enough materials for 15 groups.

Kit includes:

4 X 30ml	Hydrochloric Acid 12M UN1789
1 Bag	Potting Soil
45	5 oz Translucent cup
45	7 oz Translucent cup
45 Pcs	Absorbent Wick Pad
1 Pkg	Radish Seeds

DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

S05883 **$67.00**

Oil Spill Cleanup: Biological vs. Physical

In this activity, students will compare two methods of oil spill cleanup: biological and physical. Applying both a special blend of oil degrading microbes and a hydrocarbon encapsulating polymer to oil and examining the results, students will draw conclusions with regard to the effectiveness of each approach. The kit includes a specially prepared stained vegetable oil to simulate crude oil, eliminating any of the hazards and associated disposal costs of the real thing while still allowing the students to perform the procedures using real oil. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

15g	Oil degrading microbe blend
250ml	Simulated crude oil
1	Nutrient QuickSolution, to make 1000ml
200g	Hydrocarbon encapsulating powder
32	Plastic vials
15	Plastic cups
1 bag	Cotton balls

DOT: Non regulated

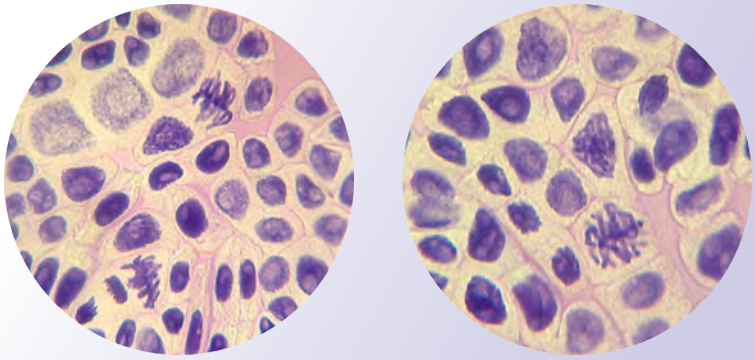
S06969 **$79.00**

DNA/Chromosome Staining

Prepare your own squashed stained slide and be able to identify the phases of plant mitosis and chromosomal development. Students will be able to prepare, stain and mount slides using specially prepared onion root tips. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 vial	Preserved root tips
2 btl.	6M Hydrochloric acid, 25ml
2 btl.	Toluidine blue 1.0% Solution, 25ml
1 box	Microscope slides
1 box	Coverslips
30	Aluminum dishes
30	Forceps



DOT Info: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S98657 **$62.00**

Osmosis and Diffusion Lab

This lab allows you to learn about two forms of passive transport: diffusion and osmosis. You will compare and contrast similarities and differences in the processes of diffusion and osmosis. Use a colorimetric test to demonstrate the movement of a solute across a semi-permeable membrane. Set up an environment likely to facilitate osmosis and gather data to determine whether or not osmosis may have occurred. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

30 pc.	Dialysis tubing
1 cpsl	Starch (to make 100ml of 1.0% solution)
1 btl.	Sucrose (to make 100ml of 0.5M solution)
1 btl.	Iodine/potassium iodide solution, 15ml
30	Plastic cups

DOT Info: Non Regulated

S98658A **$53.00**

DNA Extraction

In this lab you will learn the history of the discovery of DNA and DNA structure. Understand the nature of genetic inheritance and the role of DNA and proteins in genetic expression while using biological detergents, enzymes, and ethanol to isolate DNA from plant material. You need to supply the plant material. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

2	7.5% SDS/1.5% NaCl, 250ml
1	Pepsin (to make 25ml 0.5% solution)
2	95% ethanol, 25ml
20	Zipper bags
15	Filters
15	Plastic tubes
30	Graduated pipettes
15	Stirrers

DOT Info:
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S98659 **$41.25**

Diffusion and Cell Size

Why are cells microscopic? The answer relates to the needs for the cell to effectively move materials in and remove waste. In this activity, students will create simulated cells (agar blocks) of different sizes and examine how effectively a substance is able to diffuse into the cell in a set period of time. A special indicator in the cells will allow students to visualize the degree of diffusion. The results will clearly display the fact that a smaller volume creates a more favorable condition for the exchange of material across a cell membrane. Kit contains enough materials for 15 groups of students. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 btl.	Agar, 75g
1 btl.	Bromothymol blue concentrate, 25ml
3 btl.	2.0M Hydrochloric acid, 25ml
16	Agar block casting trays
15	Plastic cups
15	Plastic knives
15	Plastic stirrers

DOT Info: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S98650 **$50.00**

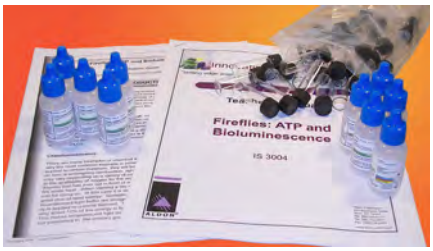
Fireflies: ATP/Bioluminescence

Learn about chemiluminescence, the production of "cool" light. Identify the major components of a chemiluminescent process in a living organism – the firefly. Students set up an actual bioluminescent reaction using firefly material and ATP while observing bioluminescence in luciferin driven by luciferase and energized by ATP. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

5	Firefly lantern extract, powdered
5	ATP (adenosine triphosphate), powdered
30	Glass vials

DOT Info: Non-regulated



S98648
$116.00

Anesthefly Kit

Anesthetize Drosophila melanogaster (fruit fly) and other small insects for at least 40-50 minutes without killing or sterilizing. Includes instructions.

Kit Includes:

25ml	Anesthefly solution UN2924
	Cotton tip swabs
	Sorting brush
	Vial

DOT: Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S98649
$23.00

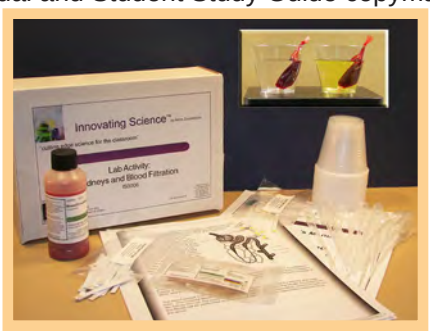
Kidneys and Blood Filtration

Learn the role of the kidney in blood filtration and waste removal along with the many functional tasks performed by nephrons, as well as nephron structure. Students will create an artificial kidney model to filter simulated blood. This will allow them to visually determine if filtration of the simulated blood may or may not have occurred. Chemically test the resulting filtrate to detect any possible waste material that may have been removed by the kidney. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 btl.	Simulated unfiltered blood, 100ml
15 pc.	Dialysis tubing
15	Plastic cups
15	Pipettes, 1ml
30	Salt test strips
30	Urea test strips

DOT Info: Not regulated for shipping



S98651 **$46.00**

Urinalysis Using Simulated Urine

Urinalysis, one of the oldest medical diagnostic tests performed, is to this day still one of the most common. In this activity, students will use simulated urine to avoid the unpleasantness of using the real thing while still performing actual tests used on real urine samples. Students will examine the simulated urine for factors such as pH, color, clarity, as well as test for the presence or absence of proteins, glucose, and calcium. The students will then examine the samples microscopically to determine if crystals may be present in any of the samples. Kit contains enough materials for 15 groups of students. Teacher's Manual and Student Study Guide copymasters are included. Needed but not supplied are a hot water bath, glass test tubes, and compound microscopes (4X/10X/40X).

Kit Includes:

4	Simulated urine samples, 250ml each Patient X Patient Y Patient Z Control
2 btl.	Benedict's Qualitative 25ml
2 btl.	Biuret Reagent, 25ml
2 btl.	Sulkowitch reagent, 25ml
1 pkg.	pH test strips, 100/vial
1 box	Microscope slides
1 pkg.	Coverslips
60	Graduated plastic cups, 30ml
60	Graduated pipettes, 1ml

DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

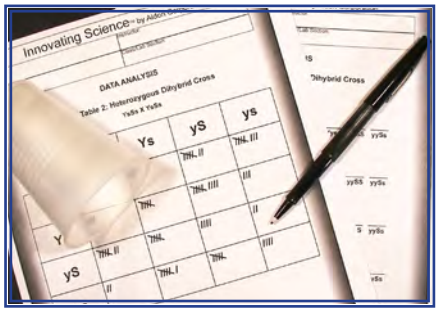
S98668A **$67.00**
IS3008-REF - Replacement Urine for IS3008 **$31.25**

Introduction to Mendelian Genetics

In this activity, students can simulate Mendel's work and determine patterns of inheritance. Using special chips and Innovating Science's exclusive "double dice," students will be able to simulate both monohybrid and dihybrid crosses. After the crosses, students will be able determine genotypic and phenotypic ratios for select traits and compare their values to the theoretical "ideal" values as put forth by Mendel. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

15	Monohybrid chips, female (red/yellow)
15	Monohybrid chips, male (red/white)
15	Dihybrid double dice, female (colored)
15	Dihybrid double dice, male (clear)
15	Plastic shaker cups



S05882 **$57.00**

Enzymes and the Process of Digestion

All the food in the world is of no use if the human body does not have the ability to extract necessary nutrients from it. With this activity, students will be able to expose three nutrients (carbohydrates, proteins, and lipids) to different digestive enzymes. These samples will be compared to nutrients to which no enzymes are added and chemical tests will be used to determine if the enzymes were effective in digesting the compounds. Upon completion, students will not only understand the importance of the digestive system but also the vital role enzymes play in releasing nutrients from food and converting them to a form usable by the body. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 X 5.25g	Pancreatin, Bile Salts
1 X 2.5g	Albumin Egg Pwd
1 X 2.5g	Starch, Soluble
1 X 1.0g	Pepsin 1:10,000
1 X 0.25g	Amylase Bacteriological Pwd
1 X 25ml	Sodium Hydroxide 0.1N
1 X 25ml	Hydrochloric Acid 0.1N
1 X 25ml	Biuret For Protein Test
1 X 25ml	Phenolphthalein 1% IPA
1 X 25ml	IKI Dilute Lugols Solution
1 X 25ml	Olive Oil, Pure
10 Per Kit	Pipette,plastic,graduated

DOT Info: Small quantity exemption 173.4
This package conforms to 49CFR 173.4
for domestic highway or rail transport only

S05800 **$64.00**

Electrophoresis: Agarose Gel Separation of Dyes

Introduce your students to this valuable separation science in a safe and colorful manner. Unlike DNA and other molecules which cannot be seen during electrophoresis, this activity uses dyes that can be observed during the actual procedure, providing visual reinforcement of the forces driving molecular movement and separation in the electrophoresis process. Kit contains enough materials to run ten 20ml agarose gels (actual number of runs may vary based on your equipment). Teacher's Manual and Student Study Guide copymasters are included. Not included but required are agarose electrophoresis chambers, electrophoresis power supplies and micropipettes capable of measuring 10µl.

Kit Includes:

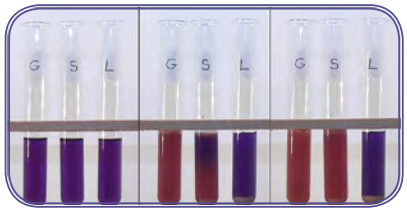
200ml	2% Melt and Pour Agarose
500 ml	5X TBE Buffer
1 set	Electrophoresis dye sample set

DOT Info– Non regulated.

S05801 $46.00

Cellular Respiration: What Sugar Does Yeast Like Best?

In this experiment you will expose living yeast cells to three different sugars. The sugars used will be glucose, sucrose, and lactose. When living yeast cells are exposed to these sugars, the cells should begin to utilize the sugars as a food source if they are capable of metabolizing them. Upon using the sugars, the yeast cells will begin to engage in aerobic respiration and/or fermentation. This lab allows students to understand that yeast may use different options for energy production. Students will expose living yeast cells to three different potential food sources and use a pH indicator to indirectly determine the effectiveness of three different sugars as a food source for yeast. Kit contains enough materials for 15 groups.



Kit Includes:

1 X 50ml	Litmus blue 0.5%
1 x 5g	Yeast instant dry
1 x 50g	Dextrose (d-glucose)
1 x 50g	Sucrose
1 x 50g	Lactose monohydrate
1 x 25ml	Sodium hydroxide 0.1N 0.1M

DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

S05881 $32.50

Testing Food For Nutrients

This experiment will help students understand the importance of proteins, carbohydrates, and lipids in living organisms. They will learn to identify a positive test result for proteins using biuret reagent and examine the reaction between Benedict's reagent and a simple sugar. Using iodine/potassium iodide they will test for the presence of starch and test for the presence of lipids using a fat-soluble dye.

Kit Includes:

1 btl	Iodine/potassium iodide solution, 25ml
1 btl	Biuret reagent, 25ml
1 btl	Benedict's solution, 25ml
1 btl	1.0% Sudan III stain, 25ml
1 btl	Vegetable oil, 25ml
10g	Soluble starch
10g	Albumin
10g	Glucose

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S05985 $60.00

Introduction To Microbiology: Bacterial Growth And Staining

Bacteria, good and bad, is all around us. In this activity students will collect and grow bacteria and then learn techniques for studying the bacteria they have grown. They will perform a simple staining technique on bacterial cells to study the morphology. They will also perform a differential staining technique, Gram staining, on bacterial cells and determine if the collected bacteria are Gram-positive, Gram-negative, or both.

Kit Includes:

20	Sterile Petri dishes
2	Prepared nutrient agar, 200ml
20	Sterile cotton swabs, pk/2
	Methylene blue, 30ml
	Crystal violet, 30ml
	Gram's iodine, 30ml
	Safranin O, 30ml
4	95% Ethanol, 30ml
	Microscope slides, pk/72

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S05984 $60.00

Plant Food – Nutrient Deficiency in Plants

Using the materials provided, students will be able to examine the effects of nutrient deficiency on plants. Specially prepared nutrient solutions (included in the kit) will allow students to deprive each plant of one of seven specific vital nutrients. Over time, students will determine the effects, if any, of the nutrient deprivation through physical observation of the plant's growth. Kit contains enough materials for 3 complete set-ups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

Solution A - 1x200ml	Calcium Nitrate 1M
Solution B - 1x200ml	Potassium Nitrate 1M
Solution C - 1x100ml	Magnesium Sulfate 1M
Solution D - 1x50ml	Potassium Phosphate 1M
Solution E - 1x25ml	Sodium Phosphate 1M
Solution F - 1x100ml	Sodium Nitrate 1M
Solution G - 1x25ml	Magnesium Chloride 1M
Solution H - 1x25ml	Sodium Sulfate 1M
Solution I - 1x50ml	Calcium Chloride 1M
Solution J - 1x 50ml	Potassium Chloride 1M
Solution K - 1x100ml	Micronutrient Solution
1 bag	Vermiculite
24	Cup 5oz. Clear Plastic
24	Cup 7oz. Clear
24 Pieces	Absorbent Wick Pad
1 Pkg	Radish Seeds

DOT Info - Non - Regulated

S05798
$62.00

Chromatography of Plant Pigments

Chlorophyll is the most prevalent and well-known plant pigment related to photosynthesis. It is not, however, the only plant pigment necessary for photosynthesis to occur. Other pigments are involved in the process. These pigments are often overlooked as they tend to be masked by the abundance of the green pigment chlorophyll. In this activity, students will extract the various pigments from green plant material and separate the pigment using chromatography. Students will not only confirm the presence and learn the role of these "hidden" pigments but also learn about chromatography as a technique for separating molecules. Kit contains enough materials for 15 groups and includes Teacher's Manual and Student Study Guide copymasters.

Kit Includes:

250ml	Chromatography solvent 9-1 (Petroleum Ether/Acetone)
100ml	Plant pigment extraction solvent (Ethanol)
15	Microscope Slides
15 pc	Chromatography paper
15	Capillary tubes

DOT Info:
UN1993 Flammable liquids, n.o.s., (Petroleum Ether, Acetone) 3, PG III Ltd Qty
UN1170 Ethyl Alcohol, 3, PG11, Ltd Qty

S06970
$49.00

Simulated ABO Blood Typing

The first blood typing system discovered, the ABO system, is the most important and widely used. In this activity, students will determine the ABO blood type of four unknown samples. Utilizing Innovating Science's new simulated blood, students will come to understand the nature and importance of antigen-antibody reactions. The most realistic simulated blood available, this activity provides the most realistic simulation of the actual blood typing procedure. Kit contains enough materials for 10 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

4	Simulated Blood Samples
	Donor #1
	Donor #2
	Donor #3
	Donor #4
1 btl	Simulated anti-A serum
1 btl	Simulated anti-B serum
40	Blood typing trays

DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

S96793 **$36.25**
S96793R ABO Blood Typing Refill **$19.95**

Simulated ABO/Rh Blood Typing

This activity provides the most procedurally accurate simulation of the blood typing technique available. Students test and determine the ABO/Rh blood types of four different simulated blood samples. Using Innovating Science's new simulated blood, the students combine blood samples and antisera, gently agitate the blood typing tray, and observe the results. No toothpicks, no stirring, and no waiting for results required. Kit contains enough materials for 10 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

4	Simulated Blood Samples
	Donor #1
	Donor #2
	Donor #3
	Donor #4
1 btl	Simulated anti-A serum
1 btl	Simulated anti-B serum
1 btl	Simulated anti-Rh serum
40	Blood typing trays

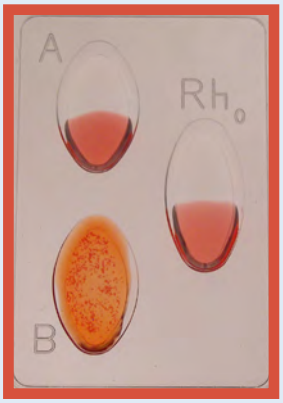
DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96792 **$44.00**
S96792R ABO/Rh Blood Typing Refill **$23.25**

Check out our handy refill kits!

Genetics of Blood Types (Simulated)

Blood type, an inherited characteristic, has use in everything from forensic investigations to medical procedures. In this activity, students will learn about the genetics that determine blood type and the possible inheritance patterns and how they express themselves. Students will use Innovating Science's new simulated blood to determine the blood type of four unknown samples and use their results to assist in the resolution of a fictional paternity dispute. Kit contains enough materials for 10 groups. Teacher's Manual and Student Study Guide copymasters are included.



Kit Includes:

4	Simulated Blood Samples
	Mother
	Child
	Sample X
	Sample Y
1 btl	Simulated anti-A serum
1 btl	Simulated anti-B serum
40	Blood typing trays

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96791 **$42.50**
S96791R Genetics of Blood Refill **$20.00**

Understanding Blood Type Interactions through Simulated Blood Typing

The earliest historical attempts at blood transfusions often had lethal results. These results led to the investigation and discovery of blood types, as well as a deeper understanding of the importance of antigen/antibody interactions. In this investigation, students will utilize Innovating Science's new simulated blood to determine the ABO/Rh blood type of four individuals, one in need of a transfusion. Based on the results, students will then determine which of three potential donors would provide the best match for the patient in need. Kit contains enough materials for 10 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

40	Blood typing trays
4	Simulated Blood Samples
	Donor #1
	Donor #2
	Donor #3
	Patient
1 btl	Simulated anti-A serum
1 btl	Simulated anti-B serum
1 btl	Simulated anti-Rh serum

DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

S96790 **$42.50** **S96790R*** **$20.00**

Forensics Using Simulated Blood

Though the use of blood type in a forensic investigation is not enough to prove guilt, it may aid in exonerating a potential suspect. In this activity, students act as lab technicians and assist investigators by examining evidence collected at a crime scene. Students first use a presumptive blood test to determine if a substance on a stained piece of cloth may be blood, and then determine the blood type of a sample collected at the scene. Students then compare their results to those of samples provided from two suspects. Kit contains enough materials for 10 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

40	Blood typing trays
10	Cotton swabs
1 pc	Cloth
1 btl	70% ethanol
1 btl	Blood detection reagent #1
1 btl	Blood detection reagent #2
4	Simulated blood samples
	Victim
	Suspect #1
	Suspect #2
	Crime Scene Evidence
1 btl	Simulated anti-A serum
1 btl	Simulated anti-B serum
1 btl	Simulated anti-Rh serum

DOT Info: Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96794
$62.00

ABO Blood Typing Sets

For blood typing using real human blood. 5 mL vials contain enough antisera for 75 students. Sample will keep over one year with proper refrigeration. Antisera is pooled from many registered human donors and is defibrinated.

FOR EDUCATIONAL USE ONLY.
NOT FDA APPROVED FOR CLINICAL USE.

S06625	Blood Typing Anti-Sera: Anti-A and Anti-B	**$31.00**
S06626	Blood Typing Anti-Sera Type A, B and Rh	**$60.50**
S06627	Blood Typing Anti-Sera: Anti Rh	**$29.00**

DOT: Non regulated

ABO/Rh Blood Typing Tray

These styrene trays are washable and reusable. They contain depression wells to perform ABO and Rh blood-typing. Package of 100.

DOT: Non regulated

IS 3155

contact your representative for more information

Freeze Dried ABO Blood Typing Sets

Use for blood typing of real human blood. Five milliliter vial contains enough antisera for 75 students. No refrigeration needed for freeze dried samples.

Materials from human-derived cell lines were found to be negative in tests for Hepatitis B, HIV and EBV.

S07802 Blood Typing Anti-Sera: Anti-A and Anti-B, Freeze Dried - **$33.00**
S07803 Blood Typing Anti-Sera Type A, B and Rh, Freeze Dried - **$59.00**
S07804 Blood Typing Anti-Sera: Anti Rh, Freeze Dried - **$29.00**

DOT: Non regulated

Freeze Dried Bacteria Cultures

All cultures are freeze dried into a lyophilized pellet packaged in a sterile plastic vial. The culture includes one tube of rehydrating broth and one tube agar slant, sterile swab and instructions.

S07806 Bacillus subtilis - **$15.00**
S07807 E. coli - **$15.00**
S07808 Micrococcus luteus - **$15.00**
S07809 Serratia marcescens - **$15.00**
S07810 Spirillum - **$15.00**
S07811 Staphylococcus epidermidis - **$15.00**

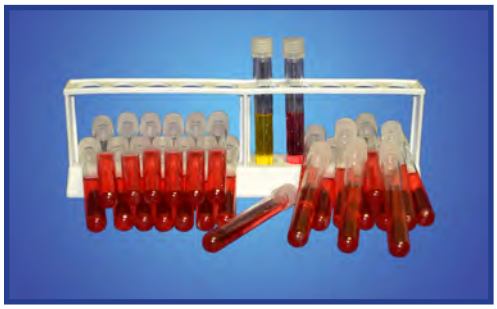
Qualitative Coliform Test Kit

Coliforms are a broad group bacteria mostly found in the intestines of warm blooded animals. While these organisms are not typically associated with serious illness themselves, they are often used as indicator organisms. The presence of coliforms may indicate a possible presence of other pathogenic or disease-causing organisms. With this easy to use and economical test kit, students simply add a small amount of collected water to a sample tube and incubate for 24-48 hours. A distinct color change indicates that coliforms are present. The kit contains instructions enough tubes to perform 25 tests.

Kit Includes: 25 Lactose Tubes

DOT: Non-regulated

S06684 **$38.00**



Master set of 12 Forensic kits
***S05884 $680.00**

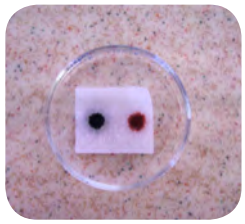
Gun Shot Residue Presumptive Test Kit

This is a two part test to determine whether a surface has been exposed to a discharged firearm. A rapid color change takes place to verify the presence of nitrates and lead. Kit contains instructions and enough materials for 30 tests.

Kit Includes:

1 x 5 ml	Diphenylamine Sulfuric Acid Solution UN1830
1 x 0.025 g	Sodium Rhodizonate
1 x 5 ml	Lead Nitrate, 0.05M Aqueous Solution
20	Alcohol Swabs

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only



S96637 $34.75

Presumptive Blood Test Kit

Test for the presence of blood on materials using phenolphthalein. The test will not distinguish between animal and human blood. Further serology tests are needed. Kit contains instructions, blood standard and reagents to complete 30 tests.

Kit Includes:

2 x 25 ml	Phenolpthalein, 2% Solution UN1814
2 x 25 ml	Ethyl Alcohol UN1170
1 x 50 ml	Hydrogen Peroxide, 3% Solution
5	Blood Standard Strips
50	Cotton Swabs

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96638

$23.50

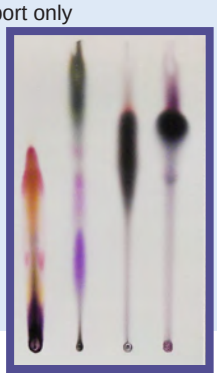
Forensic Chemistry of Document Analysis

The school library's computers have been stolen. Left behind was a ransom note demanding money. Help solve the crime using thin-layer chromatography to separate the ink on the ransom note and ink found in markers tied to possible suspects. It may be possible to provide evidence as to whether or not the ransom note could have been written with a particular marker. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

3	Felt Tip Markers
15 x 30 ml	Chromatography Solvent UN1170
15	Silica Gel Chromatography Sheets
	Capillary Tubes

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only



S96639 $94.25

Forensic Chemistry of Fuming for Fingerprints

Utilize forensics techniques of fuming for your own fingerprints. The three activities include fingerprint analysis, iodine fuming, and cyanoacrylate fuming. Students will learn how to identify different types of fingerprints and distinguishing characteristics, as well as two different methods of chemical fuming to capture fingerprints. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 tube	Super Bonding Glue
1 bottle	Iodine Crystals
1 bottle	Fingerprint Fixative
30	Fuming Trays
15 sheets	Black Plastic

DOT Info:
Non-Regulated.
NO SHIPPING
RESTRICTIONS APPLY

IS9004

contact your representative for more information

Physical Properties of Glass

Often times, during a criminal investigation, police and crime scene investigators must use all available tools and pieces of evidence to work backwards and create the most likely scenario as to what might have occurred. Different types of evidence provide different pieces to the puzzle. Learn about the different chemical and physical characteristics and properties of glass. Find how forensic scientists use these differences to help provide evidence to solve crimes. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 bottle	Borosilicate Glass Beads
1 bottle	Flint Glass Beads
1 bottle	Soda-lime Glass Beads
1 set	Refractive Index Solutions
15	Magnifiers

Optional: UV Light Source

DOT Info: Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

IS9005 - REF

Properties of Glass Refill Kit

contact your representative for more information

S96641 **$118.00**

Forensic Chemistry of Unknown Substances

Often times, when collecting evidence at a crime scene, investigators may recover substances they are unable to identify in the field. Along with evidence such as fingerprints, hair, fibers, etc., there may be traces of unknown chemicals or powders left behind by the perpetrator or perpetrators. Evidence of this nature is sent to the crime lab for identification. In this experiment, you will use your observation skills, senses, and chemical tests on a series of known substances as well as two unknown substances. You will then attempt to identify the mystery substances based on your observations and recorded data. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

30	Reaction Plates
30g	Baking Powder
30g	Baking Soda
30g	Corn Starch
30g	Talcum Powder
30g	Salt
30g	Gelatin
30g	Mystery Substance #1
30g	Mystery Substance #2
30ml	Biuret Reagent
30ml	Dilute Lugol's Iodine
30ml	Acetic Acid

DOT Info:Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S96642 **$82.00**

Forensic Chemistry of Hair Analysis

Discover how forensic scientists use hair to assist in solving crimes. You will discover the differences between human and animal hair as well as differences among different types of human hair. In the second part of the activity, you will try to determine the origin of a hair sample from a crime scene in relation to hair samples from four known suspects. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 box	Microscope Slides
1 pkg	Coverslips
	Deer Hair Sample
	Cat Hair Sample
4	Human Hair Samples
15	Forceps

DOT Info: Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S96643 **$92.50**

Forensic Chemistry of Blood Types

Blood typing is a method of classifying blood based on the presence or absence of specific proteins, called antigens, on the surface of red blood cells. Blood type, an inherited characteristic, is valuable to know in that it affects medical procedures, such as surgery and transfusions, paternity testing, as well as serving as evidence in criminal investigations. Determining blood type can help provide supporting evidence or eliminate a possible suspect's involvement in a crime. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

	Blood Typing Trays
4	Simulated Blood Samples
	Victim
	Suspect #1
	Suspect #2
	Crime Scene
1 set	ABO/Rh Blood Typing Anti-sera
1 Pkg	Mixing Sticks

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S96644R
Refill kit for Forensic Chemistry of Blood Typing
$21.00
Contains:
Simulated Blood Samples
Victim
Suspect #1
Suspect #2
Crime Scene
ABO/Rh Blood Typing
Anti-sera

S96644 **$43.00**

Note: This activity uses Innovating Science Simulated Blood and is safe for classroom use.

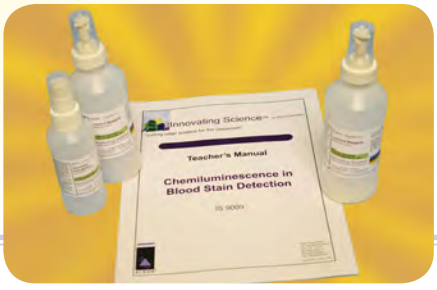
Chemiluminescence in Blood Stain Detection

Crime scene investigators are called to the scene of a possible violent crime. They examine the scene for evidence, such as fingerprints, hair, fibers, etc. After collecting the evidence, they notice there is no visible blood. Someone takes out a spray bottle and begins to spray the area with a liquid. After the area is covered with spray, they turn out the lights. A strange, faint glow appears in certain areas of the scene. Learn how luminol is used in scenes like this everyday. The special luminol formulation does not require a separate hydrogen peroxide catalyst. Simply re-hydrate and use with the simulated blood hemoglobin to show your class. This activity includes an Instruction Manual with suggested activities. Kit contains enough material for several demonstrations.

Kit Includes:

2 bottles	Luminol Reagent Powder
1 bottle	Simulated Blood Hemoglobin

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY



S96645

$27.00

Forensic Chemistry of Drug Detection

Everyone who ate the school cafeteria's chili became ill. Could someone have tainted the chili? You are a forensic toxicologist. It is you and your classmates' task to determine if any of the chili ingredients from the cafeteria could have been substituted with aspirin, which appears to have been stolen from the nurse's office. You will perform a series of chemical tests, including tests on control acetylsalicylic acid, the chemical name of aspirin, in the lab. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 bottle	Control Acetylsalicylic Acid
3 bottles	Chili Ingredients
1 bottle	Ferric Nitrate Solution 0.2M
1 bottle	Dilute Lugol's Iodine
15	Microreaction Plates
1 btl	Sodium Hydroxide 1.0N UN1824

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96646

$41.50

Crime Scene Investigation Lab

Use your forensic techniques to solve the crime of the missing frogs from the biology classroom. Four possible suspects have been identified by the authorities. Use fingerprints, hair examination, and chemical analysis of ink by thin-layer chromatography to help determine the most likely culprit. Kit contains enough material for 6 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 bottle	Fingerprinting Powder UN1361
6	Fingerprinting Brushes
6	Acetate Sheets
1	Ink Pad
6	Hand Magnifiers
6	Forceps
4	Felt Tip Markers
1 pkg	Capillary Tubes
5	Evidence Envelopes
1 bottle	Chromatography Solvent UN1170
6	Silica Gel Chromatography Sheets
1 box	Microscope Slides
1 box	Coverslips

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96647 **$150.00**

Forensic Chemistry of Dusting for Fingerprints

Learn to identify and classify different types of fingerprints. Students will learn how to identify different types of fingerprints and distinguishing characteristics, as well as dusting for fingerprints, the oldest and most commonly used method of fingerprint detection. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 bottle	Fingerprinting Powder
15	Fingerprinting Brushes
15	Hand Magnifiers
	Ink Pad
	Acetate Sheets

DOT Info:
Non-Regulated
NO SHIPPING RESTRICTIONS APPLY

S96648

$72.00

Forensic Chemistry: Chemical Detection of Fingerprints

Utilize alternative methods for detecting fingerprints. Examine some possible methods of gathering evidence when dusting for fingerprints is not effective. Learn to identify fingerprint types, a method of fuming for fingerprints, and a technique of chemically-developing fingerprints. The three activities include fingerprint analysis, ninhydrin development, and cyanoacrylate fuming. Kit contains enough material for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 tube	Super Bonding Glue
1 bottle	Ninhydrin powder
4 bottles	95% ethanol
15	Fuming Trays
15 sheets	Black Plastic

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96357
$38.50

IS9012-REF - $19.95
Refill - 25g
Fingerprint powder only

Blood Spatter

Bloodstain patterns at a crime scene can often yield a wealth of information. Part observational skills, part physics, and part mathematics, bloodstain pattern analysis may be used to help reconstruct as well as assist in supporting or refuting suspect/victim or other eyewitness accounts of the crime. Through a series of stations, students will examine the effects of several factors such as height, angle of impact, surface texture, and velocity before impact as they relate to the physical appearance of bloodstains. Kit contains enough materials for an entire class as well as Teacher's Manual and Student Study Guide copymasters.

DOT: Non regulated

IS9014
contact your representative for more information

Properties of Toothpaste

The history of teeth cleaning agents actually goes back thousands of years. Toothpaste as we know it today however is a comparatively recent development. In this activity, students will investigate several properties of toothpaste samples, provided in the kit, including presence of fluoride, pH, abrasiveness, and foaming ability. As a second activity, students will use the included materials to create their own toothpaste. Kit contains enough materials for fifteen groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 x 30 ml	Hydrochloric Acid UN1789
1 x 100 ml	Glycerin
1 x 25 g	Sodium Lauryl Sulfate UN1325
1 x 25 g	Gum, Arabic
1 x 150 g	Calcium Carbonate
3 tubes	Toothpaste
1 Pkg/50	Universal Indicator Strips
1 Pkg/50	Fluoride Test Strips
1 Pkg/15	Acetate Sheets
45	Polystyrene Test Tubes
45	Graduated Plastic Pipettes

DOT Info
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96649 **$94.00**

Properties of Soaps and Detergents

Though similar in function, soaps and detergents differ in chemistry and performance. Students will examine the similarities and differences in the properties of soap, hand dishwashing detergent, and machine dishwashing detergent, all provided in the kit. Activities include testing pH, examining the effect of soap and detergent on the surface tension of water, foaming ability, fat emulsification, and the performance of soap and detergent in hard water. Kit contains enough materials for fifteen groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 x 25 ml	Liquid Soap
1 x 25 ml	Dishwashing Detergent (Hand)
1 x 25 ml	Dishwashing Detergent (Machine)
1 x 60 ml	Vegetable Oil
1 x 60 ml	Calcium Chloride, 5% Solution
60	Disposable Medicine Cups
60	Polystyrene Test Tubes
60	Capillary Tubes
60	Graduated Plastic Pipettes
1 Pkg/50	Universal Indicator Strips

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S96650 **$69.00**

Properties of Antacids

With the global population spending over a half a billion dollars a year on commercial antacids, several companies are out there competing for a part of the business. In this activity, students will learn about some of the more common active components in over-the-counter antacids as well as investigate the rate of acid neutralization of five different antacids. Students will also compare the buffering ability of three different calcium carbonate based antacids. All antacid samples are included and the kit contains enough materials for fifteen groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

5 x 30 ml	Hydrochloric Acid, 1M Solution UN1789
2 x 30 ml	Universal Indicator UN1170
2 x 30 ml	Bromothymol Blue, 0.5% Aqueous Solution
1 x 60 ml	Antacid #5, Liquid
1 Pkg/7	Antacid #1, Tablet
1 Pkg/7	Antacid #2, Extra Strength
1 Pkg/7	Antacid #3, Tablet
2 Pkg/2	Antacid #4, Tablets
1 Pkg/15	Graduated Plastic Pipettes
2 Pkg/50	Universal Indicator Strips
90	Disposable Medicine Cups

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96651 **$57.00**

Properties of Shampoo

Different shampoos are manufactured from a variety of ingredients to perform a variety of tasks. In this investigation, students will not only learn about the role of several shampoo ingredients, but also test several properties of different shampoos which are included in the kit. Students will determine the relative viscosity, pH, flash-foam formation and retention, oil emulsification, and contaminant-dispersion abilities of different shampoos. Kit contains enough materials for fifteen groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 x 30 ml	Shampoo #1
1 x 30 ml	Shampoo #2
1 x 30 ml	Shampoo #3
1 x 30 ml	Ink, Black, 10%
1 x 30 ml	Vegetable Oil
1 Pkg/50	Universal Indicator Strips
1 Pkg/45	Graduated Plastic Pipettes
1 Pkg/25	Copper Balls
45	Disposable Medicine Cups
45	Polystyrene Test Tubes
3	Plastic Centrifuge Tube

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S96652 **$47.00**

IS9353-REF
Refill pack for Properties of Shampoo

contact your representative for more information

Properties of Aspirin

Aspirin is to this day the most widely used painkiller and largest selling non-prescription medicine in the world. Learn about the history of the development acetylsalicylic acid (aspirin) and test the performance of several different types of aspirin. Students will examine the solubility of aspirin in varying gastrointestinal environments, a comparison of active ingredients in regular and extra-strength aspirin, and the differences between regular and buffered aspirin. All aspirin samples are included and the kit contains enough materials for fifteen groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

5 x 30 ml	Hydrochloric Acid, 1M Solution UN1789
8 x 30 ml	Sodium Hydroxide, 1M Solution UN1824
1 x 30 ml	Phenolphthalein, 1% in Ethanol UN1170
1 Pkg/50	Universal Indicator Strips
1 Pkg/15	Graduated Plastic Pipettes
45	Disposable Medicine Cups
1 Pkg/75	Aspirin, Regular
1 Pkg/60	Aspirin, Buffered
1 Pkg/45	Aspirin, Enteric Coated
1 Pkg/15	Aspirin, Extra Strength

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96653 **$65.00**

Science in the Kitchen

This comprehensive kit incorporates a variety of scientific techniques all themed around common kitchen materials. Students will perform chromatography on commercial food colors, use chemical tests to identify an unknown cooking ingredient, examine the protein digesting ability of a common meat tenderizing enzyme, use titration to quantify vitamin C levels and then test an unknown juice or soda (not provided), and lastly examine some of the differences and similarities in the materials used to clean up (soap, hand dishwashing detergent, and machine dishwashing detergent). Kit contains enough materials for fifteen groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 x 0.5 ml	Food Color, Red
1 x 0.5 ml	Food Color, Blue
1 x 0.5 ml	Food Color, Green
1 x 0.5 ml	Food Color, Yellow
1 x 25 g	Baking Powder
1 x 25 g	Baking Soda
1 x 25 g	Corn Starch
1 x 25 g	"Unknown"
1 x 30 ml	Acetic Acid, 5% Solution
1 x 30 ml	Iodine Solution
1 x 5 g	Papain
1 x 15 g	Gelatin
1 capsule	Ascorbic Acid
3 x 30 ml	Iodine Potassium Iodide
1 x 30 ml	Starch Indicator Solution
1 x 100 ml	Detergent (Hand) 5%
1 x 100 ml	Detergent (Machine)
1 x 100 ml	Liquid Soap, 5%
1 x 30 ml	Calcium Chloride, 5% Solution
1 Pkg/50	Universal Indicator Strips
1 Pkg/15	Graduated Plastic Pipettes
90	Disposable Medicine Cups
75	Polystyrene Test Tubes
1 Pkg/4	Capillary Tubes
1 Pkg/15	Chromatography Sheets
15	Spot Plates
1 box	Toothpicks

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S96654 **$167.00**

Be Prepared To Handle Laboratory Spills

Solvent Spill Clean Up

Kit Includes:

1	Instruction Sheet/MSDS
2	Vinyl Exam Gloves
2	9” x 16” Polybags
2	Twist Ties
2	Blank Shipping Tags
1	Dust Pan and Brush
1 bag	Diatomaceous Earth

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S80201C

$109.00

Caustic Spill Clean Up

Kit Includes:

1	Instruction Sheet/MSDS
2	Vinyl Exam Gloves
2	9” x 16” Polybags
2	Twist Ties
2	Blank Shipping Tags
1	Dust Pan and Brush
1 Bag	Vermiculite Absorbent
1 Bag	Neutralizing Mixture (Citric Acid, Anhydrous & Litmus Powder)

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S80201B **$111.00**

Solvent, Caustic and Acid Spill Clean Up Master Kit

A handy combination of all three spill kits.

IS5000 *contact your representative for more information*

Acid Spill Clean Up

Kit Includes:

1	Instruction Sheet/MSDS
2	Vinyl Exam Gloves
2	9” x 16” Polybags
2	Twist Ties
2	Blank Shipping Tags
1	Dust Pan and Brush
1 Bag	Vermiculite Absorbent
1 Bag	Neutralizing Mixture (Calcium Hydroxide, Sodium Carbonate, Calcium Carbonate, Litmus Powder)

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S80201A **$121.00**

Vital Stain Kit

Kit Includes:

1 x 30 ml	Bismarck Brown, 1% Alcohol Solution UN1170
1 x 30 ml	Brilliant Cresyl Blue, 1% Alcohol Solution UN1170
1 x 30 ml	Cupric Acetate, 3% Aqueous Solution
1 x 30 ml	Cupric Sulfate, 1% Aqueous Solution
1 x 30 ml	Janus Green, 1% Alcohol Solution UN1170
1 x 30 ml	Methylene Blue, 1% Alcohol Solution UN1170
1 x 30 ml	Neutral Red, 1% Alcohol Solution UN1170

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S98660 **$26.00**

Spore Stain Chemicals

Kit Includes:

1 x 30 ml	Carbol Fuchsin UN1992
1 x 30 ml	Safranin O, 1% Aqueous Solution
1 x 30 ml	Ethyl Alcohol, Denatured, Reagent UN1170
1 x 30 ml	Malachite Green Oxalate, 1% Aqueous Solution
1 x 30 ml	Formalin - Nigrosin Solution

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

IS5005
contact your representative for more information

Acid Fast Stain Chemicals

Kit Includes:
1 x 30 ml Methylene Blue Chloride, 1% Alcohol Solution UN1219
1 x 30 ml Carbol Fuchsin Solution UN1992
1 x 30 ml Hydrochloric Acid, 1% Alcohol Solution UN2924

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S98662 **$8.30**

Bacteria Stain Chemicals

Kit Includes:

1 x 30 ml	Methylene Blue Loefflers Solution UN1987
1 x 30 ml	Methylene Blue Saturated, 1% in IPA/Water UN1219
1 x 30 ml	Carbol Fuchsin Solution UN1992
1 x 30 ml	Carbol Rose Bengal Solution UN1992
1 x 30 ml	Crystal Violet, 1% Alcohol UN1170

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S98664 **$14.75**

ATP Firefly Lantern

Kit Includes:

8 x 0.01 g	ATP (Adenosine Triphosphate)
8 x 0.017 g	Firefly Lantern Extract Powder

DOT Info: Non-Regulated.

S98666 **$165.00**

pH Indicator Set

Kit Includes:

1 x 30 ml	Phenolphthalein, 1% Solution UN1219
1 x 30 ml	Universal Indicator UN1170
1 x 30 ml	Bromothymol Blue, 0.04%

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S98668 **$9.25**

Microscope Slide Making Kit

This basic microscope slide-making kit will get you started mounting your own slides.

Kit Includes:

25 ml	Synthetic Balsam
1	Microscope Slide, Pack/72
1	Coverslips, Pk/100
1	Forceps

DOT Info:
Small quantity exemption 173.4
THIS PACKAGE CONFORMS TO 49 CFR 173.4
for domestic highway or rail transport only

S06972 **$30.00**

Gram's Stain

Small Kit Includes:

4 x 25 ml	Ethyl Alcohol, Denatured, 95% UN1170
1 x 30 ml	Crystal Violet Ammonium Oxalate
1 x 30 ml	Safranin O, 1% Aqueous Solution
1 x 30 ml	Iodine, Potassium Iodide Solution

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S98667 - Small $23.35

Large Kit Includes:

1 X 500ml	Dilute Lugols
1 X 500ml	Crystal Violet
1 X 500ml	Safranin O 1% Aqueous
2 L	Ethanol 95%

DOT Info:
UN1170, Ethanol, 3, PGII, Ltd Qty

IS5017 - Large
contact your representative for more information

Cereal Grass Medium

Aldon's Innovating Science cereal grass media is used for culturing protozoa (Rhizopods, Choanoflagellates, Ciliates, and Flagellates). It contains dehydrated cereal grass leaves with natural vitamins A,B,C,K. Our cereal grass media is recommended by King's lab at The University of California at Berkeley.

DOT Info:
Non-regulated

S05868 25 grams **$8.75**
IS5021 100grams
IS5022 500grams
contact your representative for more information

Microbiology Science Fair Kit

Students can grow their own bacteria with this hands-on, easy-to-use kit. They will be able to swab various surfaces around the classroom such as door handles and sinks to inoculate agar plates. Students will also investigate the levels and importance of bacteria in everyday situations.

Kit Includes:

2g	Nutrient Agar (makes 100mL 2% Agar)
6	Petri Dishes
6	Sterile Swabs

DOT: non-regulated

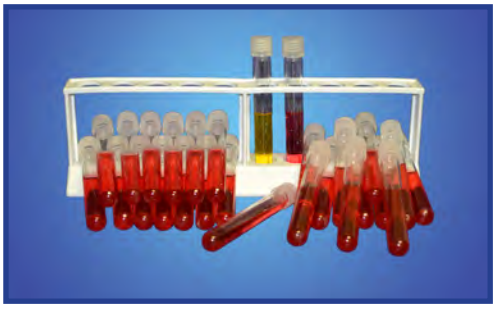
S07805 **$15.00**

Qualitative Coliform Test Kit

Coliforms are a broad group bacteria mostly found in the intestines of warm blooded animals. While these organisms are not typically associated with serious illness themselves, they are often used as indicator organisms. The presence of coliforms may indicate a possible presence of other pathogenic or disease-causing organisms. With this easy to use and economical test kit, students simply add a small amount of collected water to a sample tube and incubate for 24-48 hours. A distinct color change indicates that coliforms are present. The kit contains instructions enough tubes to perform 25 tests.

Kit Includes: 25 Lactose Tubes

DOT: Non-regulated



S06684 **$38.00**

Buffer Calibration Kit

This kit includes 500ml of each buffer solution pH 7, pH 4, and pH 10. It also includes 100ml of electrode storage solution.

Kit Includes:
500ml Buffer pH 4
500ml Buffer pH 7
500ml Buffer pH 10
100ml Potassium Chloride 1M

DOT Info:
Non-Regulated

IS5050
contact your representative for more information

Rheoscopic Fluid

Rheoscopic solution is a pearly-white, water-based solution that can be used to demonstrate concepts that are usually difficult to see such as: ocean currents, turbulence, and convection. Adding food coloring to color the solution will make it even easier and more exciting to simulate oceanic and atmospheric patterns.

DOT Info: Non-regulated

S06634 **$21.00**

Artificial Urine

Use simulated urine to identify a variety of physiological conditions with urine test strips.

IS5070 - Urine, Artificial (Control)
IS5071 - Urine, Artifical W/Vitamin C
IS5072 - Urine, Artifical W/Phosphates
IS5073 - Urine, Artifical W/ Albumin
IS5074 - Urine, Artifical W/ Ketone
IS5075 - Urine, Artifical W Glucose
IS5080 - Urine, Artifical Set Of 4
(5070, 5072, 5073, 5075)

DOT Info: Non regulated

IS5070

IS5071

Sterile Ringer's Solutions

200ml bottle.

IS5065 Ringers, Mammal
IS5066 Ringers, Frog
IS5067 Ringers, Chicken

DOT Info:
Non-Regulated
contact your representative for more information

IS5072

IS5073

IS5074

IS5075

IS5080

contact your representative for more information

Endothermic Reactions

When chemical reactions absorb heat the environment around the reaction becomes colder. Students will create an endothermic reaction and monitor the change in temperature as the reaction occurs. Students will then examine a commercial application that exploits endothermic reactions, the instant cold pack. The kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

8 pkg x 2 tabs	Sodium bicarbonate/citric acid tablets
15	Plastic cups
15	Stirring sticks
15	Bags containing:
	25 g Ammonium nitrate UN1942
	1 tbsp Vermiculite

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96893

$42.00

Exothermic Reactions

Allow students to see how chemistry can be used in a beneficial manner. Most students are probably familiar with heat packs, or hand warmers. Utilizing the release of chemical energy, these self-contained exothermic reactions are quite useful in cold environments. In this activity, students will first investigate the temperature change of an exothermic reaction and then examine how the oxidation of iron, in a process similar to rusting, can be used to create the little bags of heat used to keep hands and feet warm. The kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 x 100g	Calcium chloride
15	Plastic cups
15	Stirring sticks
15	Bags containing:
	25 g Iron powder
	1 g Sodium chloride
	5 g Calcium chloride
	1 tbsp Vermiculite

DOT Info:
Non-Regulated
NO SHIPPING RESTRICTIONS APPLY

S96894

$42.00

Chemiluminescence

Most physical and chemical reactions that involve the release of light energy also involve the release of heat energy. One unique and interesting form of light-emitting reaction is called chemiluminescence, or "cool light." Similar to the familiar glow of a firefly, students will create a chemiluminescent reaction in the classroom, and then observe the fascinating blue glow of the reaction, which lasts for over ten minutes. This is chemistry that never fails to amaze students. The kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

15 x 25 ml	Luminol solution
1 x 25 ml	6% hydrogen peroxide
15	Plastic cups, 30 ml
15	Transfer pipettes, 1 ml

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S96895 **$54.75**

Paper Chromatography

Chromatography is the oldest documented technique to separate chemical substances. In this activity, students will perform paper chromatography on three individual dyes and a mixture of dyes to determine if all three dyes are in the mixture. Students will understand not only the components of a chromatography system but also why different substances move at different rates within the system. The kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1	Chromatography dye set containing:
	1 x 0.5 ml Crystal violet
	1 x 0.5 ml Safranin O
	1 x 0.5 ml Toluidine blue
	1 x 0.5 ml Chromatography mixture
5 x 30 ml	95% Ethanol UN1170
16	Filter paper sheets
4	Capillary tubes

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96896 $42.00

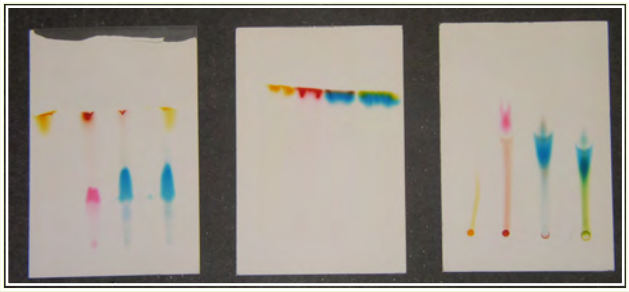
Thin Layer Chromatography

Commercial food colors may contain more than meets the eye. Students will perform thin layer chromatography, a highly effective separation procedure, on four different food colors to determine if there may be more in each color than visual appearance would lead them to believe. Each group will perform the chromatography procedure in one of three different solvents and compare their results to other student groups, allowing students to reach conclusions regarding the solubility of each food dye in different solvents. The kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1	Food coloring sample set containing:
	1 x 0.5 ml Yellow
	1 x 0.5 ml Red
	1 x 0.5 ml Blue
	1 x 0.5 ml Green
5 x 30 ml	Chromatography solvent #1 (Deionized water)
5 x 30 ml	Chromatography solvent #2 (50% Ethanol) UN1170
5 x 30 ml	Chromatography solvent #3 (95% Ethanol) UN1170
15	TLC (thin layer chromatography) sheets
4	Capillary pipettes

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only



S96897 $87.00

Properties of Polymers

Polymers affect every aspect of our daily lives. From the plastics we use to the clothes we wear, polymer chemistry is everywhere. In this kit, students will perform three fun and fascinating activities involving polymers. In the first two activities, students will perform a cross-linking procedure on polymers to create polymer "worms" and the classic "slime." In the third activity, students will investigate the properties of a super-absorbent polymer, capable of absorbing hundreds of times its own weight in water, to create instant "polymer snow." The kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1 x 4 g	Sodium alginate (Alginic acid)
1 x 30 ml	Calcium chloride concentrate
4 x 250 ml	3% polyvinyl alcohol
1 x 200 ml	4% sodium borate
1 x 35 g	Sodium polyacrylate powder (snow)
45	Clear plastic cups
15	Graduated measuring cups, 30ml
15	Plastic pipettes, 1ml

DOT Info:
Non-Regulated
NO SHIPPING RESTRICTIONS APPLY

S96898

$60.00

Acids, Bases, and the pH Scale

In this lab, you will gain an understanding of the basic differences between the properties of acids and bases, learn the role of hydrogen and hydroxide ions in acids and bases, and comprehend the nature of the pH scale with regards to acid and base strength. Students will examine the effects of acids and bases on several chemical pH indicators, determine the pH of several common household materials, and use the knowledge gained to determine the composition of four unknown clear solutions. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1	Deionized water, 25ml	1	Soap solution, 25ml
1	Dilute acid (0.1M HCl), 25ml	1	Filtered water, 25ml
1	Dilute base (0.1M NaOH), 25ml	1	Vitamin C solution, 25ml
1	0.5% litmus, 25ml	2	Wide-range pH test strips, pkg/50
1	0.02% methyl red, 25ml	1	Unknown solution #1, 25ml (Water)
1	0.5% bromothymol blue, 25ml	1	Unknown solution #2, 25ml (Dilute base) UN1824
1	1.0% phenolphthalein, 25ml	1	Unknown solution #3, 25ml (Phenolphthalein) UN1219
1	Vinegar, 25ml	1	Unknown solution #4, 25ml (Dilute Acid)
1	Household ammonia, 25ml	15	Reaction trays

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

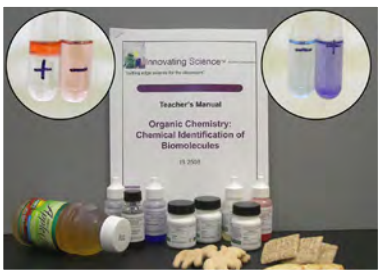
S96406 **$80.50**

Chemical Identification of Biomolecules

Understand the importance of proteins, carbohydrates, and lipids in living organisms. Students will learn to identify a positive test result for proteins using biuret reagent, examine the reaction between Benedict's reagent and a simple sugar, use iodine/potassium iodide to test for the presence of starch, and test for the presence of lipids using a fat-soluble dye. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1	Iodine/potassium iodide solution, 25ml
1	Biuret reagent, 25ml
1	Benedict's solution, 25ml
1	1.0% Sudan III stain, 25ml
1	Vegetable oil, 25ml
10g	Soluble starch
10g	Albumin
10g	Glucose



DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96407 **$53.75**

Chemical Element Observation Set

Explore the Periodic Table of Elements with the Chemical Element Observation Set. Students will study the similarities and differences between these elements. Each element is packaged in a break resistant plastic container and clearly labeled. A periodic table is included for review.

Kit Includes:

1.0 g	Aluminum Metal	1.0 g	Iron
1.0 g	Antimony Metal	1.0 g	Lead
0.5 g	Barium Metal	1.0 g	Magnesium Metal
1.0 g	Bismuth Metal	1.0 g	Manganese
1.0 g	Cadmium Metal	1.0 g	Nickel Metal
1.0 g	Calcium Metal	1.0 g	Silicon Metal
1.0 g	Carbon (Charcoal)	1.0 g	Silver
1.0 g	Chromium Metal	1.0 g	Sulfur
1.0 g	Cobalt Metal	1.0 g	Tin Metal
1.0 g	Copper Metal	1.0 g	Tungsten Metal
1.0 g	Carbon (Graphite)	1.0 g	Zinc Metal
0.1 g	Germanium		

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S98654

$106.00

Nanotechnology: Ferrofluids

Understand the definition of nanotechnology as it applies in current usage. Learn of one nanomaterial, ferrofluid, and some of its applications in modern technology. Create magnetite nanoparticles through a precipitation reaction, while employing a surfactant to create a colloidal suspension of magnetite nanoparticles (ferrofluid). In the end you will examine the response of ferrofluid upon exposure to a magnetic field. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included.

Kit Includes:

1	Ferrous Chloride 8g NA 1759
1	Ferric Chloride 22g UN1759
1	10N Hydrochloric Acid, 20ml UN1789
2	Ammonium Hydroxide, 25ml UN2672
1	Tetramethylammonium Hydroxide 20ml UN1835
15	Pipettes
15	Petri Dishes

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR173.4
for domestic highway or rail transport only

S96596

$51.50

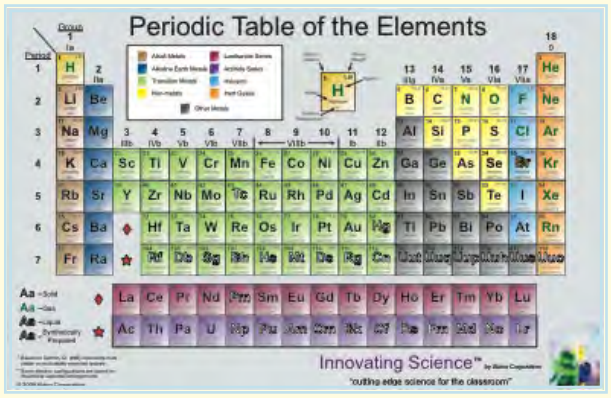
Periodic Table

Colored printing helps your students distinguish between metals, non-metals, and noble gas families as well as allowing them to differentiate types of metals, solids, liquids and gases from synthetic elements. Name, symbol, atomic number, weight, mass, electron configuration are included.

S99036A Periodic Table, Laminated **$11.75**
S99036B Periodic Table, Paper, Set/25 **$79.00**
Measures 11" by 17"

IS2940 Periodic Table Poster 21" x 34"
IS2941 Retractable Periodic Table Poster
45" x 35"
IS2942 Large Banner 4' x 8'
contact your representative for more information

DOT - Non regulated



Periodic Table Pen

Best Seller!

The most convenient reference guide available - the Periodic Table Pen. This pen holds a double sided Periodic Table. The back side is a handy miniature reference chart. A great reference right at your fingertips!

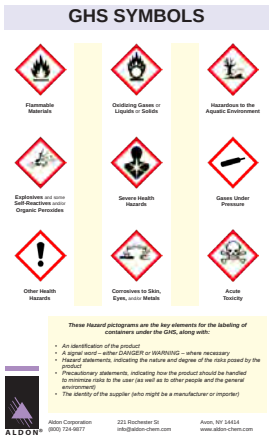
S05880 - Periodic Table Pen **$7.00**
S05880 - Periodic Table Pen Case/25 **$175.00**
DOT - Non regulated

GHS Poster

Identify new Global Harmonization Symbols quickly and easily.

IS2980 Laminated 11" x 17"

contact your representative for more information



Be on the cutting edge of science as you take your students to the future of chemistry. These labs will allow your students to learn about many aspects of chemistry while performing highly accurate experiments involving organic chemistry, electrochemistry, and titrations.

Microchemistry allows you to use fewer chemicals and save on disposal costs and preparation time. Each kit comes complete with set-ups for 15 lab groups. The organic chemistry labs (IS6111, IS 6112, IS6113, IS6114, IS6115) have chemicals for 15 groups and one 1 microchemistry organic combostill set-up. Additional organic combostill set-ups are available.

Complete Set Micro Organic Chemicals

Complete set contains 4 microchemistry lab sets:

IS6002	Formation of Esters
IS6003	Synthesis of Aspirin
IS6004	Distillation of an Alcohol Soluble Dye
IS6005	Grignard Synthesis of Benzoic Acid

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

IS6001 *contact your representative for more information*

Formation of Esters

In this experiment, you will combine alcohols with acetic and salicylic acids to form esters in a condensation reaction. The resulting esters may then be identified by their distinctive odors.

Kit Includes:

2 x 25 ml	Acetic Acid, Glacial UN2789
1 x 15 g	Salicylic Acid
2 x 25 ml	Octyl Alcohol
2 x 25 ml	Methyl Alcohol UN1230
2 x 25 ml	Sulfuric Acid, ACS Concentrate UN1830

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

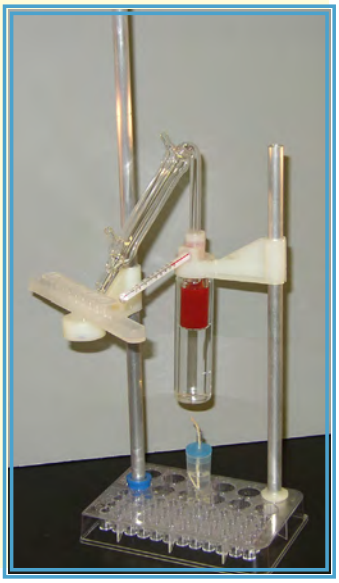
IS6002 *contact your representative for more information*

Distillation of an Alcohol Soluble Dye

Kit Includes:

6 x 25 ml	Methylene Blue Chloride, 1% Alcohol UN1987

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only



IS6004

contact your representative for more information

Synthesis of Aspirin

Kit Includes:

2 x 25 ml	Acetic Anhydride UN1715
1 x 15 g	Salicylic Acid
2 x 25 ml	Sulfuric Acid Concentrate UN1830
2 x 25 ml	Toluene UN1294

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

IS6003 *contact your representative for more information*

Grignard Synthesis of Benzoic Acid

Kit Includes:

1 x 5 g	Magnesium Metal Turnings UN1869
2 x 25 ml	Tetrahydrofuran UN2056
1 x 20 ml	Bromobenzene UN2514
1 x 25 ml	Hydrochloric Acid, 36% UN1789
1 x 10 g	Decolorizing Carbon

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

IS6005 *contact your representative for more information*

Determination of the pH of Aqueous Salt Solutions

In this experiment, you will determine the pH of several aqueous salt solutions using the indicator strip method. By analyzing the resulting pH, you will then be able to determine whether or not the ions resulting from dissociation react with water molecules, and if they do, whether it is a cationic or anionic reaction. Kit contains enough materials for 15 groups.

Kit Includes:

1 x 10 g	Sodium Chloride, Crystal
1 x 10 g	Magnesium Sulfate, Heptahydrate, Crystal
1 x 10 g	Barium Chloride, Dihydrate, Crystal UN1564
1 x 10 g	Ammonium Chloride, Granular
1 x 10 g	Lead Nitrate, Crystal UN1469
1 x 10 g	Iron (III) Chloride, Anhydrous, Crystal UN1773
1 x 10 g	Aluminum Sulfate, Crystal
1 x 10 g	Sodium Acetate, Trihydrate, Crystal
1 x 10 g	Sodium Carbonate, Anhydrous, Powder
1 x 10 g	Sodium Bicarbonate, Anhydrous, Powder
4 Pkg/50 ea	Universal Indicator Strips
2 Pkg/50 ea	pH Indicator Strips
2 Pkg/50 ea	pH Indicator Strips
2 Pkg/50 ea	pH Indicator Strips
2 Pkg/50 ea	pH Indicator Strips
15	Comboplates
15	Pipettes
15	Microspatulas

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S95317 **$285.00**

IS6009 - Refill pack forS95317

contact your representative for more information

Study of the Properties of Buffer Solutions

In this experiment, you will prepare three buffer solutions having different pH values. These solutions will then be exposed to small amounts of acids or bases and you will then demonstrate that pH should not vary significantly when the buffers are exposed to the acids and bases. By way of comparison, you will also expose water to the same acids and bases and determine the effect they have on the pH of the water. Kit contains enough materials for 15 groups.

Kit Includes:

1 x 10 g	Sodium Acetate, Trihydrate
1 x 10 g	Ammonium Chloride, Granular
1 x 10 g	Sodium Bicarbonate, Anhydrous
1 x 10 g	Sodium Chloride, Crystal
2 x 30 ml	Acetic Acid, 0.5M Solution
2 x 30 ml	Ammonium Hydroxide, 0.5M Solution
1 x 25 ml	Sodium Hydroxide, 1.0M Solution UN1824
1 x 25 ml	Hydrochloric Acid, 1.0M Solution UN1789
6 Pkg/50 ea	Universal Indicator Strips
150	Vials
15	Comboplates
15	Plastic Pipettes
15	Microspatulas

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S95319 **$206.00**

IS6010 - Refill pack for S95319

contact your representative for more information

Solubility Product of a Sparingly Soluble Electrolyte

In this experiment, the solubility and solubility product of calcium hydroxide will be determined by the titration of a saturated solution of calcium hydroxide with a standard solution of hydrochloric acid. Kit contains enough materials for 15 setups.

Kit Includes:

1 x 20 g	Calcium Chloride, Dihydrate
6 x 30 ml	Sodium Hydroxide, 1.0M (1.0N) Solution UN1824
5 x 30 ml	Hydrochloric Acid, 0.1% Solution UN1789
2 x 15 ml	Phenolphthalein, 1% Solution UN1219
15	Comboplates
15	Plastic Funnels
15	Microretort Stands
15	Small Beaker (25 ml)
15	Plastic Pipettes
15	Drop-Burettes
90	Vials
15	Microspatulas
45	Filter Papers

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4 for domestic highway or rail transport only

IS6103 ***IS6011 - Refill pack for IS6103*** *contact your representative for more information*

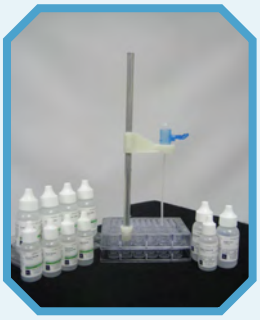
Chemical Bonds and Rates of Reaction

In this experiment, the rates of several chemical reactions will be observed in an attempt to determine the complexity and extent at which bonds may be being broken or formed. The reactions that will be considered are as follows (s = solid, l = liquid, g = gas, aq = aqueous solution). Kit contains enough materials for 15 groups.

Kit Includes:

1 x 25 ml	Hydrochloric Acid, 0.1M Solution UN1789
2 x 25 ml	Potassium Iodide, 0.1M Solution
2 x 25 ml	Iron (II) Sulfate, 0.1M Solution
1 x 25 ml	Oxalic Acid, 0.1M Solution UN1760
1 x 5 ml	Ethyl Alcohol, Denatured, Anhydrous UN1170
1 x 5 ml	Methyl Alcohol, Anhydrous UN1230
1 x 15 ml	Phenolphthalein Solution (1% Phenolphthalein in 95% Ethanol) UN1170
1 x 25 ml	Sulfuric Acid, 5M (10N) Solution UN2796
1 x 15 ml	Sodium Hydroxide, 0.25M Solution UN1824
1 x 15 ml	Silver Nitrate, 0.25M Solution
1 x 15 ml	Lead Nitrate, 0.5M Solution
1 x 15 ml	Barium Chloride, 0.25M Solution
1 x 15 ml	Potassium Permanganate, 2% Solution
15	Comboplates
15	Thin-stem Pipettes
15	Microspatulas

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only



S95323 **$256.00**

IS6016 - Refill pack for S95323

contact your representative for more information

Check out our handy refill packs!

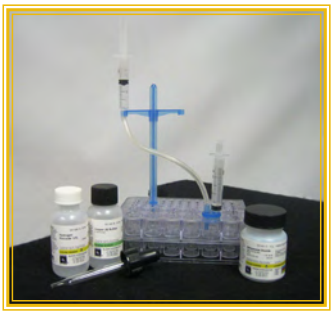
Catalysts and Rates of Reaction

In this experiment, you will be investigating the decomposition of an aqueous solution of hydrogen peroxide, both catalyzed and uncatalyzed. Kit contains enough materials for 15 groups.

Kit Includes:

2 x 25 ml	Hydrogen Peroxide, 12% UN2984
1 x 25 ml	Copper (II) Sulfate, 0.1M Solution
1 x 10 g	Manganese Dioxide, Native Powder, 85% UN1479
15	Comboplates
15	Silicone Tubing
15	Plastic Pipette Tip
15	Inlet-Outlet Plastic Lid
30	2 ml Gas Collector Plastic Syringe
15	Thin-Stem Pipettes
15	Microspatulas
15	Microretort Stand

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only



IS6105

IS6017 - Refill pack for IS6105

contact your representative for more information

Reactant Concentration & Rate of Reaction

In this experiment, you will investigate the rate of several reactions between potassium permanganate ($KMnO_4$) and oxalic acid ($H_2C_2O_4$), varying the concentration of permanganate in each reaction. Kit contains enough materials for 15 groups.

Kit Includes:

1 x 100 ml	Oxalic Acid, 0.1M Solution UN1760
2 x 25 ml	Potassium Permanganate, 0.01M Solution
2 x 25 ml	Sulfuric Acid, 5.0M (10 N) Solution UN2796
15	Comboplates
15	Thin Stem Pipettes
15	Microspatulas
15	Thin Glass Rod

DOT Info:
Corrosive liquids, n.o.s., (Oxalic acid), 8, UN1760, PG III, Ltd Qty

S95327 **$108.00**

IS6018 - Refill pack for S95327

contact your representative for more information

Determination of Concentration of Acid by Potentiometric Titration

In this experiment, you will assemble an electrochemical cell and use the potentiometric titration method to obtain data and construct potentiometric titration curves. The potentiometric titration curves will then be used to determine the end points or equivalence points for three titrations. Kit contains enough materials for 15 groups.

Kit Includes:

2 x 50 ml	Acetic Acid, 1% Solution
2 x 25 ml	Hydrochloric Acid, 1.0M Solution UN1789
1 x 3 g	Quinhydrone, 98%
2 x 50 ml	Sodium Hydroxide, 0.1M Solution UN1824
15	Comboplates
60	Vials
30	Pipettes
15	3-Hole Plastic Lids
15	Inlet-Outlet Plastic Lids
30	Silver Electrodes
15	Drop-Burettes
15	Microstands
30	Copper electrical wires with an allligator clip at one end
45	Salt-Bridge Paper

DOT Info:
UN1824, Sodium hydroxide solution, 8, PG II, Ltd Qty

IS6107

IS6019 - Refill pack for IS6107

contact your representative for more information

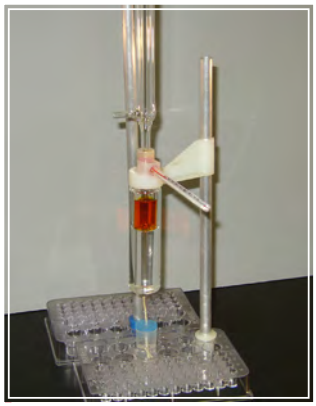
Synthesis of an Organic Acid

In this experiment, butyric acid will be synthesized by the oxidation of n-butyl alcohol (primary butyl alcohol) by potassium dichromate in the presence of a catalyst (sulfuric acid). The resultant carboxylic acid will be purified by distillation. Kit contains enough chemicals for 15 groups, also includes 1 microchemistry organic combostill setup. Additional combostill setups are available for purchase.

Kit Includes:

1 x 10 g	Potassium Dichromate Crystal UN3086
1 x 25 ml	Sulfuric Acid, Concentrate, 18M UN1830
2 x 25 ml	n-Butyl Alcohol UN1120
1	Comboplate
1	Combostill with reflux column and distillation column

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only



IS6111

IS6024 - Refill pack for IS611

contact your representative for more information

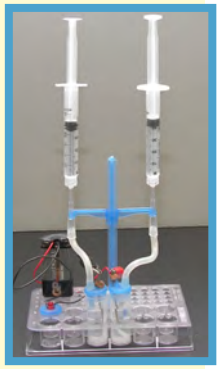
Electrolysis of Aqueous Solutions in an Electrochemical Cell

The chemical reaction in this experiment is the reduction of Ag^+ ions to Ag by hydroquinone $C_6H_4(OH)_2$. Kit contains enough materials for 15 groups.

Kit Includes:

5 X 25ml	Sulfuric acid, 1.0M solution
5 X 25ml	Sodium chloride, 0.1M solution
1 X 50g	Sodium chloride crystals
1 pkg	Sealing putty
15 ea	Comboplates
15 ea	Battery connectors w/clips and indicator light
30 ea	Plastic vials
30 ea	2-hole lids
30 ea	Copper electrodes
30 pc	Silicone tubing
30 ea	Plastic pipette tips
15 ea	Microstands
30 ea	Syringes
16 pc	Filter paper

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only



S95333 **$393.00**

IS6021 - Refill pack for S95333

contact your representative for more information

Hydrolysis of Acetamide under Basic Conditions

In this experiment, you will hydrolyze acetamide under basic conditions. The acetic acid produced, which is in a mixture, will then be distilled with hydrochloric acid to liberate the free acid. Kit contains enough chemicals for 15 groups, also includes 1 microchemistry organic combostill setup. Additional combostill setups are available for purchase.

Kit Includes:

1 x 20 g	Acetamide Crystals
1 x 25 ml	Sodium Hydroxide, 6.0M Solution UN1824
1 x 25 ml	Hydrochloric Acid, Concentrated, 32-36% UN1789
1	Comboplate
1	Combostill with reflux column and distillation column

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

IS6112

IS6025 - Refill pack for IS6112

contact your representative for more information

Dehydration of an Alcohol under Acidic Conditions

In the presence of the acid, a hydrogen and hydroxyl group are released from the ethanol, which then recombine to form water, and a double carbon bond is formed, resulting in cyclohexene. Kit contains enough materials for 15 groups, also includes 1 microchemistry organic combostill setup. Additional combostill setups are available for purchase.

Kit Includes:

1 x 30 ml	Silicone Oil
2 x 25 ml	Cyclohexanol NA1993
1 x 25 ml	Phosphoric Acid, 85% UN1805
1 x 10 ml	Potassium Permanganate, 2% Solution
1	Comboplate
1	Combostill with reflux column and distillation column

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

IS6113

IS6026 - Refill pack for IS6113

contact your representative for more information

Acetylation of Aniline using Acetic Anhydride

In this experiment, you will synthesize acetanilide from aniline using acetic anhydride. The reaction mixture will contain the desired product, acetanilide. However, the reaction will also contain the by-product acetic acid as well as unreacted acetic anhydride. These impurities will be removed using activated charcoal, filtration and recrystallation. Kit contains enough chemicals for 15 groups, also includes 1 microchemistry organic combostill setup. Additional combostill setups are available for purchase.

Kit Includes:

1 x 30ml	Silicone Oil
1 x 20 ml	Aniline UN1547
1 x 25 ml	Acetic Anhydride UN1715
1 x 5 g	Charcoal, Activated
1 x 30 g	Diatomaceous Earth
1	Comboplate
1	Combostill with reflux column and distillation column

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

IS6114

IS6027 - Refill pack for IS6114

contact your representative for more information

Synthesis of an Ester

In this experiment, you will combine alcohols with acetic and salicylic acids to form esters in a condensation reaction. The resulting esters may then be identified by their distinctive odors. Kit contains enough chemicals for 15 groups, also includes 1 microchemistry organic combostill setup. Additional combostill setups are available for purchase.

Kit Includes:

1 x 30ml	Silicone Oil
2 x 25 ml	Acetic Acid, Glacial UN2789
1 x 15 g	Salicylic Acid
2 x 25 ml	Octyl Alcohol
2 x 25 ml	Methyl Alcohol, Anhydrous UN1230
1 x 25 ml	Sulfuric Acid, Reagent ACS, 18M/36N UN1830
1	Comboplate
1	Combostill with reflux column and distillation column

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

IS6115

IS6028 - Refill pack for IS6115

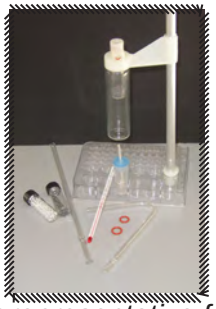
contact your representative for more information

Microchemistry Lab Hardware

Microchemistry Combostill Setup

For use with kits IS6111, IS6112, IS6113, IS6114, and IS6115.

Includes:
1 x Comboplate
1 x Combostill with reflux column and distillation column
1 x 30ml Silicone Oil

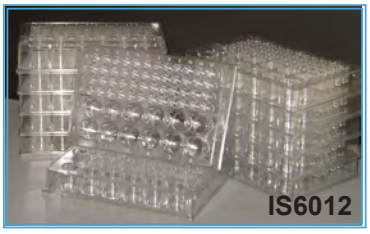


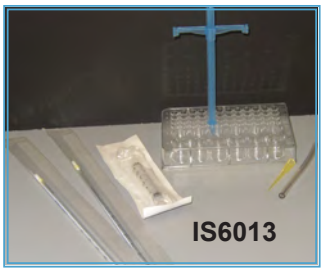
DOT Info:
Non-Regulated.

NO SHIPPING RESTRICTIONS APPLY **IS6120** *contact your representative for more information*

Item # - Price	Name
IS6006 - $85.90	**Combo-Still**
IS6007 - $31.60	**Fraction Collector for Combo-still**
IS6008 - $4.00	**Alcohol Burner**
IS6012 - $54.00	**Dual-Well Combo Plates pack of 12**
IS6013 - $15.60	**Micro-Titration Apparatus**
IS6014 - $64.00	**Student Microchemistry Equipment Set**
IS6015 - $36.30	**Electrode Set**
IS6023 - $14.95	**Drop Controller Set**
IS6029 - $76.75	**Jacketed Reflux Column**
IS6030 - $89.70	**Jacketed Distillation Column**
IS6031 - $24.20	**Support Kit for Jacketed Columns**
IS6032 - $24.20	**Microscale Thermometer 0-150°C**


IS6008


IS6012

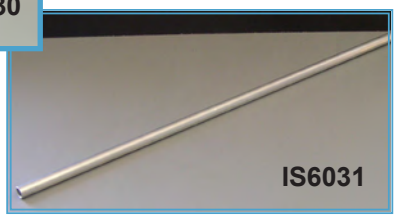

IS6013


IS6023


IS6014


IS6029

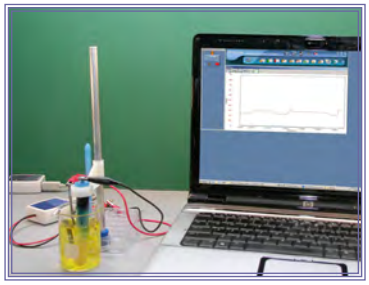

IS6030


IS6031

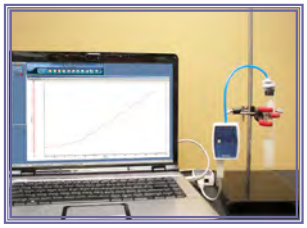
DOT Info for items on this page:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY
contact your representative for more information

STEM - *Science, Technology, Engineering, and Mathematics*
For use with Neulog sensors

Green Fuel Cell Kit - S02153 $55.00
Monitor voltage generated by a green fuel cell that is powered by yeast.



Photosynthesis and Respiration Chamber - S02141 $32.00
Monitor the cycle of photosynthesis and respiration of plants using O_2, CO_2 and light sensors.



Effectiveness of Sunscreen - S02142 $31.00
Analyze the difference in sunscreens with this kit. Find out if SPF 30 is really different than SPF 15. The kit supplies enough reagents for 15 set ups. Requires UVB sensors.

Optimized Fermentation of Yeast - S02143 $36.00
Determine the optimum food source for yeast by monitoring growth rate and respiration. Requires pressure sensor.

Titration of Sodium Thiosulfate - IS6504 *contact your representative for more information*
Determine the concentration of sodium thiosulfate in a solution by measuring the charge (current X time) that flows through a circuit of an electrochemical cell. Includes reusable microchemistry hardware.

Titration of Polyprotic Acids - S02145 $31.00
Because of successive dissociations, titration curves of polyprotic acids have multiple equivalence points. By creating a graph of the titration curve (pH vs. volume of NaOH) an unknown acid can be identified.

Determination of the Concentration of an Acid by Potentiometric Titration - S02146 $92.00
The concentration of an acid can be determined using an electrochemical cell by graphing voltage vs. volume of NaOH.

Physical Characteristics of Gases - S02147 $105.00
The gas laws (Boyle's, Charles's and Gay-Lussac's) are simple mathematical relationships between volume, temperature and pressure. By varying one factor you can measure the effect on the others. Requires temperature and pressure sensors.

Chemistry & Measurement

Density and Displacement Using an Ohaus Balance

In this exercise, you will determine the density of four metals, similar in appearance. Mass will be determined using an Ohaus Scout® Pro electronic balance and volume will be calculated using Archimedes Principle of Displacement. The data obtained will then be compared to published density values. Kit contains enough materials for 15 groups.

Kit Includes:

1 x 125 g	Aluminum Metal
1 x 125 g	Lead Metal
1 x 125 g	Nickel Metal
1 x 125 g	Zinc Metal
15	Aluminum weighing trays

DOT Info:
Non-Regulated.
NO SHIPPING RESTRICTIONS APPLY

S96701 **$61.75**

Determination of Water of Hydration Using an Ohaus Balance

In this exercise, you will perform the procedure to determine the water of hydration using a known hydrate. You will then repeat the procedure on two unknown hydrates and use your experimental data to calculate the waters of hydration for each of the unknowns.

As a final step, you will add an anhydrous salt to water and monitor the reaction for temperature change. Based on temperature data, you will arrive at a conclusion regarding the exothermic or endothermic nature of both dehydration and hydration reactions. Kit contains enough materials for 15 groups.

Kit Includes:

1 x 25 g	Copper (II) sulfate, pentahydrate ($CuSO_4 \cdot 5H_2O$)
1 x 25 g	Cobalt (II) chloride, hexahydrate ($CoCl \cdot 6H_2O$) UN3260
1 x 25 g	Magnesium sulfate, heptahydrate ($MgSO_4 \cdot 7H_2O$)
1 x 25 g	Calcium chloride, anhydrous
45	Glass vials

DOT Info:
Small quantity exemption 173.4
This package conforms to 49 CFR 173.4
for domestic highway or rail transport only

S96702 **$51.00**

EZ Prep Capsules

Item # - Price	Name/CAS#	Amount Made	DOT Info
contact your representative for more information	**Alizarin Yellow R (CAS # 1718-34-9)**	5 pack to make 5x1 liter 0.01% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
contact your representative for more information	**Ascorbic Acid (CAS # 50-81-7)**	5 pack to make 5x50 ml 5% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96660 - $30.75	**Ascorbic Acid (CAS # 50-81-7)**	1 pack to make 1 liter 5% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96661 - $14.20	**Barium Chloride (CAS # 10326-27-9)**	3 pack to make 3x50 ml 0.5M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96662 - $15.30	**Barium Nitrate (CAS # 10022-31-8)**	5 pack to make 5x50 ml 0.1M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96663 - $4.60	**Barium Nitrate (CAS # 10022-31-8)**	1 pack to make 1 liter 0.1M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96664 - $12.35	**Benedicts Reagent (Mixture)**	2 pack to make 2x50 ml Qualitative Solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96665 - $39.25	**Bromothymol Blue (CAS # 34722-90-2)**	5 pack to make 5x1 liter 0.04% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96666 - $19.80	**Calcium Chloride (CAS # 10035-04-8)**	5 pack to make 5x50 ml 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96667 - $7.25	**Calcium Chloride (CAS # 10035-04-8)**	1 pack to make 1 liter 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
contact your representative for more information	**Congo Red (CAS # 573-58-0)**	5 pack to make 5x1 liter 0.1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96669 - $19.85	**Copper (II) Sulfate (Cupric) (CAS # 7758-99-8)**	5 pack to make 5x50 ml 1.0M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96670 - $23.75	**Iron (II) Sulfate (Ferrous) (CAS # 7782-63-0)**	5 pack to make 5x50 ml 1.0M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96671 - $20.00	**Lead Nitrate (CAS # 10099-74-8)**	5 pack to make 5x50 ml 0.5M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
IS4015 -	**Magnesium Nitrate (CAS # 13446-18-9)**	5 pack to make 5x50 ml 0.1M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96673 - $7.10	**Magnesium Nitrate (CAS # 13446-18-9)**	1 pack to make 1 liter 0.1M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96674 - $16.35	**Magnesium Sulfate (CAS # 10034-99-8)**	5 pack to make 5x50 ml 1.0M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY

EZ Prep Capsules

Item #	Name/CAS#	Amount Made	DOT Info
S96675 - $24.75	**Methyl Orange (CAS # 547-58-0)**	5 pack to make 5x1 liter 0.1% solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96676 - $27.75	**Potassium Chromate (CAS # 7789-00-6)**	5 pack to make 5x50 ml 0.5M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96677 - $13.25	**Potassium Hydrogen Phthalate (CAS # 877-24-7)**	5 pack to make 5x1 liter 0.01M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96678 - $12.50	**Potassium Nitrate (CAS # 7757-79-1)**	3 pack to make 3x50 ml 1.5M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96679 - $10.75	**Sodium Bicarbonate (CAS # 144-55-8)**	5 pack to make 5x50 ml 0.5M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96680 - $4.10	**Sodium Bicarbonate (CAS # 144-55-8)**	1 pack to make 1 liter 0.5M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96681 - $12.75	**Sodium Bromide (CAS # 7647-15-6)**	5 pack to make 5x50 ml 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
contact your representative for more information	**Sodium Bromide (CAS # 7647-15-6)**	1 pack to make 1 liter 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96683 - $10.80	**Sodium Carbonate (CAS # 497-19-8)**	5 pack to make 5x50 ml 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96684 - $3.95	**Sodium Carbonate (CAS # 497-19-8)**	1 pack to make 1 liter 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96685 - $10.35	**Sodium Chloride (CAS # 7647-14-5)**	5 pack to make 5x50 ml 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96686 - $4.65	**Sodium Chloride (CAS # 7647-14-5)**	1 pack to make 1 liter 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96687 - $21.50	**Sodium Chloride (CAS # 7647-14-5)**	5 pack to make 5x50 ml saturated solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96688 - $10.75	**Sodium Hydrogen Phosphate (Dibasic) (CAS # 7558-79-4)**	5 pack to make 5x50 ml 0.001M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
contact your representative for more information	**Sodium Hydrogen Phosphate (Dibasic) (CAS # 7558-79-4)**	1 pack to make 1 liter 0.001M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96690 - $10.20	**Sodium Molybdate (CAS # 10102-40-6)**	5 pack to make 5x50 ml 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
IS4035	**Sodium Molybdate (CAS # 10102-40-6)**	1 pack to make 1 liter 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY

EZ Prep Capsules

Item #	Name/CAS#	Amount Made	DOT Info
contact your representative for more information	**Sodium Thiosulfate (CAS # 7772-98-7)**	5 pack to make 5x50 ml 0.15M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96693 - $5.10	**Sodium Thiosulfate (CAS # 7772-98-7)**	1 pack to make 1 liter 0.15M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96694 - $11.15	**Starch Soluble (CAS # 9005-84-9)**	5 pack to make 5x50 ml 1% Starch solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96695 - $5.10	**Starch Soluble (CAS # 9005-84-9)**	1 pack to make 1 liter 1% Starch solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96696 - $12.20	**Strontium Nitrate (CAS # 10042-76-9)**	5 pack to make 5x50 ml 0.1M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
S96697 - $7.65	**Strontium Nitrate (CAS # 10042-76-9)**	1 pack to make 1 liter 0.1M solution	Small quantity exemption 173.4 This package conforms to 49 CFR 173.4 for domestic highway or rail transport only
contact your representative for more information	**Thymol Blue (CAS # 62625-21-2)**	5 pack to make 5x1 liter 0.04% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96699 - $21.50	**Zinc Sulfate (CAS # 7446-20-0)**	5 pack to make 5x50 ml 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S96700 - $10.25	**Zinc Sulfate (CAS # 7446-20-0)**	1 pack to make 1 liter 0.1M solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4045A - $6.00	**Nile Blue (CAS # 3625-57-8)**	Makes 100mL 0.1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4046A - $6.00	**Safranin (CAS # 477-73-6)**	Makes 100mL 0.1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
IS4047A - $6.00	**Safranin (CAS # 477-73-6)**	Makes 100mL 0.25% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4048A - $6.00	**Neutral Red (CAS # 553-24-2)**	Makes 100mL 1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4049A - $6.00	**Methylene Blue (CAS # 61-73-4)**	Makes 100mL 1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
IS4050A - $6.00	**Methylene Blue (CAS # 61-73-4)**	Makes 100mL 0.1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4051A - $9.10	**Methyl Green (CAS # 7114-03-6)**	Makes 100mL 1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4052A - $6.00	**Malachite Green (CAS # 569-64-2)**	Makes 100mL 1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY

EZ Prep Capsules

Item #	Name/CAS#	Amount Made	DOT Info
S4054A - $6.00	Eosin Y (CAS # 17372-87-1)	Makes 100mL 1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4055A - $6.00	Crystal Violet (CAS # 548-62-9)	Makes 100mL 0.1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4056A - $6.00	Crystal Violet (CAS # 548-62-9)	Makes 100mL 1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4057A - $6.00	Bromothymol Blue (CAS # 34722-90-2)	Makes 100mL 0.1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4058A - $6.00	Bromothymol Blue (CAS # 34722-90-2)	Makes 100mL 0.04% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4059A - $6.00	Bromothymol Blue (CAS # 34722-90-2)	Makes 100mL 0.5% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4060A - $6.00	Methyl Orange (CAS # 547-58-0)	Makes 100mL 0.1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
IS4061 - $5.40	Bromocresol Yellow (CAS # Mixture)	Makes 100 mL 0.1% Solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4062A - $6.00	Bromocresol Green (CAS # 62625-32-5)	Makes 100mL 0.4% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4063A - $6.00	Bromocresol Purple (CAS # 62625-30-3)	Makes 100mL 0.4% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
S4064A - $6.00	Congo Red (CAS # 573-58-0)	Makes 100mL 0.1% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY
IS4065A - $6.00	Cresol Red (CAS # 62625-29-0)	Makes 100mL 0.2% solution	Non-Regulated. NO SHIPPING RESTRICTIONS APPLY

Biotechnology

Electrophoresis and DNA Fragment Length Determination

In this activity students will perform agarose electrophoresis on three DNA samples that have already been treated with restriction enzymes. Students will not only learn about the process of DNA electrophoresis but learn the techniques associated with the process, such as setting up an agarose gel, loading DNA samples in the agarose gel, and staining the gel in order to visualize the DNA bands. They will also learn how to determine the sizes of unknown DNA fragments after examining their results. The kit includes specially-treated DNA samples that do not require refrigeration or freezing, prepared agarose that may simply be melted in a hot water bath or microwave, TBE electrophoresis buffer, and DNA stain. There is enough DNA to run 10 gels.

Kit Contains:

200ml	0.8% Agarose
500ml	5X Tris Borate ETA Buffer,
60ml	20X DNA Stain
	LAMBDA DNA ECORI DIGEST With Loading Dye
	LAMBDA DNA HINDIII DIGEST With Loading Dye
	LAMBDA DNA ECORI/HIND III DIGEST With Loading Dye

S06973 **$95.00**

Agarose Dye Marker

Agarose dye marker set can be used with a 2% agarose gel to get students accustomed to the electrophoresis process without using expensive DNA. You can run up to 8 gels.

Kit Includes:

1 x 1 ml	Bromophenol Blue
1 x 1 ml	Xylene Cyanol
1 x 1 ml	Orange G
1 x 1 ml	Crystal Violet
1 x 1 ml	Malachite Green
1 x 1 ml	Dye Mixture

DOT Info: Non-Regulated

S96389 **$15.75**

Prepared Agarose

Simply melt the prepared agarose in a water bath or microwave. Pour into a gel casting tray, allow the molten agarose to solidify and run your gel.

IS5201
0.8% Agarose 200ml - Resolves DNA fragments 0.6-35kb long
IS5202
1.0% Agarose 200ml - Resolves DNA fragments 0.5-20kb long
IS5203
2.0% Agarose 200ml - Resolves DNA fragments 0.1- 5kb long

Powdered Agarose

Prepare your own agarose gels at any concentration with the addition of TBE running buffer. Can be stored at room temperature for years.

IS5204 - Agarose 5 gram bottle (Low EEO)
IS5205 - Agarose 25 gram bottle (Low EEO)

Agarose Gel Reagents

IS5206 - TBE Buffer 5XConcentrate 500ml. 5X running buffer concentrate makes 2.5L of 1X working concentration

IS5207 - Tris-EDTA (TE) Solution 10X concentrate 25ml. Use for diluting DNA samples

IS5208 - Loading Dye 10x 5ml. Dye that is used for tracking DNA during agarose electrophoresis.

IS5209 - DNA20x Stain 60ml bottle. Stain and Destain in 40 Minutes. This highly sensitive stain will stain a gel in about 20 minutes and destain in 20minutes. Once the gels are stained they can be stored for months without fading. Stain up to 20 gels with 60ml.

IS5250 - Agarose Gel Electrophoresis Reagent Pack. All the necessary reagents to prepare and run agarose gels in one convenient package. Contains: TBE buffer, 5x concentrate 500ml; Agarose, powdered, 5g; DNA Stain 20x concentrate, 60ml; Loading Dye, 10x concentrate, 10ml.

contact your representative for more information

Biotechnology

These new horizontal electrophoresis chambers were designed with safety and ease of use in mind. The chambers are made from thick, durable acrylic, with secure lids to prevent leaks all around. The feet are adjustable for easy leveling, wires are recessed, and a safety stop prevents the gel from running when the cover is not secure. Casting trays are easily removed from the base and include rubber end caps and embossed gel rulers.

IS 5255

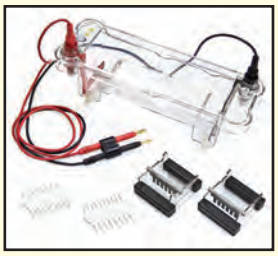
Runs up to 16 samples per gel. Requires 500 ml buffer and power supply.

Unit Includes:
1 Injection molded UV Transparent base
1 Transparent cover
1 Casting Tray (7x14cm) with Embossed Gel Ruler & Rubber End Caps
1 8/10 Comb Combo
2 6 Tooth Comb

IS 5256

Runs up to 16 samples per gel. Requires 500 ml buffer and power supply. Allows two 7x7cm electrophoresis gel trays to run simultaneously on one apparatus.

Unit Includes:
1 Injection molded UV Transparent base
1 Transparent cover
2 Casting Tray (7x7cm) with Embossed Gel Ruler & Rubber End Caps
2 8/10 Comb Combo
2 6 Tooth Comb



IS 5257

Requires 1000 ml buffer and power supply. Allows six 7x7cm electrophoresis gel trays to run simultaneously on one apparatus.

Unit Includes:
1 Injection molded UV Transparent base
1 Transparent cover
6 Casting Tray (7x7cm) with Embossed Gel Ruler & Rubber End Caps
6 Glass Slides
6 6 Tooth Comb

contact your representative for more information

Power Sources

Compatible with all electrophoresis units above, our power source can be used with 75V or 150V. Maximum current is 250 milliamps. Can be used with one or two cells simultaneously. Run time for gels at 75V is approximately 40-50 minutes and approximately 20-30 minutes at 150V.

IS5258

Electrophoresis Accessories

IS5259	Replacement 6 tooth gel comb
IS5260	Double Comb 8/10
IS5261	7x14cm casting tray with embossed gel ruler. Each tray comes with 2 rubber end caps.
IS5262	7x7cm casting tray with embossed gel ruler. Each tray comes with 2 rubber end caps.

IS5259

IS5260

IS5261

IS5262

Histology Reagents

Item #	Description	Grade	Use
IS 5301	Water, Deionized	Histology Grade	For preparing Histology reagents
IS 5302	Balsam, Canada Natural, 100ml, Paper Filtered	Histology Grade	For use in mounting specimens
IS 5303	Balsam, Canada Natural, 25ml, Paper Filtered	Histology Grade	For use in mounting specimens
IS 5304	Paraffin Refined White Wax, Granules, Melt rapidly at 56-67º C. 500g bottle	Histology Grade	Used in embedding tissue
IS 5305	Synthetic Mounting Medium Refractive index - 1.53 500ml	Histology Grade	For use in mounting specimens

contact your representative for more information

Item #	Description	Grade
IS5314	Acetocarmine 2% stain (Aqueous),100ml	Histology Grade
IS5315	Carbol Fuchsin Solution, 100ml	Histology Grade
IS5316	Crystal Violet Solution 0.1% Aqueous, 500ml	Histology Grade
IS5317	Eosin Y Solution 0.2% Aqueous, 500ml	Histology Grade
IS5318	Giemsa stain Aqueous, 100ml	Histology Grade
IS5319	Gram's Iodine Solution Aqueous, 500ml	Histology Grade
IS5320	Hematoxylin (Delafields) Solution, Aqueous , 500ml	Histology Grade
IS5321	Janus Green Solution Aqueous, 500ml	Histology Grade
IS5322	Methylene Blue 1% Aqueous, 500ml	Histology Grade
IS5323	Neutral Red 1% Aqueous, 500ml	Histology Grade
IS5324	Safranin O Solution 1% Aqueous, 500ml	Histology Grade
IS5325	Schiff Reagent, Histology Grade, 500ml	Histology Grade
IS5326	Sudan III Saturated Solution Aqueous, 100ml	Histology Grade
IS5327	Sudan IV, Solution, Saturated 100ml, 100ml	Histology Grade
IS5328	Toluidine Blue O, Solution 1% Aqueous, 500ml	Histology Grade
IS5329	Wrights Blood Stain, Solution, 500ml	Histology Grade
IS5330	Wrights, Stain Buffer Aqueous, 500ml	Histology Grade
IS5040	Xylene, 500ml	Histology Grade
IS5041	Isopropanol 99%, 3.8L	Histology Grade
IS5042	Isopropanol 99%, 1L	Histology Grade
IS5043	Ethanol, Denatured, 3.8L	Histology Grade
IS5044	Ethanol, Denatured, 1L	Histology Grade
IS5045	Ethanol, Denatured, 95%, 3.8L	Histology Grade
IS5046	Ethanol, Denatured, 95%, 1L	Histology Grade
IS5047	Methanol, Denatured, Absolute, 1.0L	Histology Grade

Periodic Table of the Elements

Period	Group 1 Ia	2 IIa	3 IIIb	4 IVb	5 Vb	6 VIb	7 VIIb	8	9 VIIIb	10	11 Ib	12 IIb	13 IIIa	14 IVa	15 Va	16 VIa	17 VIIa	18 0
1	1 H 1.01 Hydrogen $1s^1$																	2 He 4.00 Helium $1s^2$
2	3 Li 6.94 Lithium $1s^2 2s^1$	4 Be 9.01 Beryllium $1s^2 2s^2$											5 B 10.81 Boron $1s^2 2s^2 p^1$	6 C 12.01 Carbon $1s^2 2s^2 p^2$	7 N 14.01 Nitrogen $1s^2 2s^2 p^3$	8 O 16.00 Oxygen $1s^2 2s^2 p^4$	9 F 19.00 Fluorine $1s^2 2s^2 p^5$	10 Ne 20.18 Neon $1s^2 2s^2 p^6$
3	11 Na 22.99 Sodium $[Ne]3s^1$	12 Mg 24.31 Magnesium $[Ne]3s^2$											13 Al 26.98 Aluminum $[Ne]3s^2 p^1$	14 Si 28.09 Silicon $[Ne]3s^2 p^2$	15 P 30.97 Phosphorus $[Ne]3s^2 p^3$	16 S 32.07 Sulfur $[Ne]3s^2 p^4$	17 Cl 35.45 Chlorine $[Ne]3s^2 p^5$	18 Ar 39.95 Argon $[Ne]3s^2 p^6$
4	19 K 39.10 Potassium $[Ar]4s^1$	20 Ca 40.08 Calcium $[Ar]4s^2$	21 Sc 44.96 Scandium $[Ar]3d^1 4s^2$	22 Ti 47.87 Titanium $[Ar]3d^2 4s^2$	23 V 50.94 Vanadium $[Ar]3d^3 4s^2$	24 Cr 52.00 Chromium $[Ar]3d^5 4s^1$	25 Mn 54.94 Manganese $[Ar]3d^5 4s^2$	26 Fe 55.85 Iron $[Ar]3d^6 4s^2$	27 Co 58.93 Cobalt $[Ar]3d^7 4s^2$	28 Ni 58.69 Nickel $[Ar]3d^8 4s^2$	29 Cu 63.55 Copper $[Ar]3d^{10} 4s^1$	30 Zn 65.39 Zinc $[Ar]3d^{10} 4s^2$	31 Ga 69.72 Gallium $[Ar]3d^{10} 4s^2 p^1$	32 Ge 72.61 Germanium $[Ar]3d^{10} 4s^2 p^2$	33 As 74.92 Arsenic $[Ar]3d^{10} 4s^2 p^3$	34 Se 78.96 Selenium $[Ar]3d^{10} 4s^2 p^4$	35 Br 79.90 Bromine $[Ar]3d^{10} 4s^2 p^5$	36 Kr 83.80 Krypton $[Ar]3d^{10} 4s^2 p^6$
5	37 Rb 85.47 Rubidium $[Kr]5s^1$	38 Sr 87.62 Strontium $[Kr]5s^2$	39 Y 88.91 Yttrium $[Kr]4d^1 5s^2$	40 Zr 91.22 Zirconium $[Kr]4d^2 5s^2$	41 Nb 92.91 Niobium $[Kr]4d^4 5s^1$	42 Mo 95.94 Molybdenum $[Kr]4d^5 5s^1$	43 Tc (98) Technetium $[Kr]4d^5 5s^2$	44 Ru 101.07 Ruthenium $[Kr]4d^7 5s^1$	45 Rh 102.91 Rhodium $[Kr]4d^8 5s^1$	46 Pd 106.42 Palladium $[Kr]4d^{10}$	47 Ag 107.87 Silver $[Kr]4d^{10} 5s^1$	48 Cd 112.41 Cadmium $[Kr]4d^{10} 5s^2$	49 In 114.82 Indium $[Kr]4d^{10} 5s^2 p^1$	50 Sn 118.71 Tin $[Kr]4d^{10} 5s^2 p^2$	51 Sb 121.76 Antimony $[Kr]4d^{10} 5s^2 p^3$	52 Te 127.60 Tellurium $[Kr]4d^{10} 5s^2 p^4$	53 I 126.90 Iodine $[Kr]4d^{10} 5s^2 p^5$	54 Xe 131.29 Xenon $[Kr]4d^{10} 5s^2 p^6$
6	55 Cs 132.91 Cesium $[Xe]6s^1$	56 Ba 137.33 Barium $[Xe]6s^2$	♦	72 Hf 178.49 Hafnium $[Xe]4f^{14} 5d^2 6s^2$	73 Ta 180.95 Tantalum $[Xe]4f^{14} 5d^3 6s^2$	74 W 183.84 Tungsten $[Xe]4f^{14} 5d^4 6s^2$	75 Re 186.21 Rhenium $[Xe]4f^{14} 5d^5 6s^2$	76 Os 190.23 Osmium $[Xe]4f^{14} 5d^6 6s^2$	77 Ir 192.22 Iridium $[Xe]4f^{14} 5d^7 6s^2$	78 Pt 195.08 Platinum $[Xe]4f^{14} 5d^9 6s^1$	79 Au 196.97 Gold $[Xe]4f^{14} 5d^{10} 6s^1$	80 Hg 200.59 Mercury $[Xe]4f^{14} 5d^{10} 6s^2$	81 Tl 204.38 Thallium $[Xe]4f^{14} 5d^{10} 6s^2 p^1$	82 Pb 207.20 Lead $[Xe]4f^{14} 5d^{10} 6s^2 p^2$	83 Bi 208.98 Bismuth $[Xe]4f^{14} 5d^{10} 6s^2 p^3$	84 Po (209) Polonium $[Xe]4f^{14} 5d^{10} 6s^2 p^4$	85 At (210) Astatine $[Xe]4f^{14} 5d^{10} 6s^2 p^5$	86 Rn (222) Radon $[Xe]4f^{14} 5d^{10} 6s^2 p^6$
7	87 Fr (223) Francium $[Rn]7s^1$	88 Ra (226) Radium $[Rn]7s^2$	★	104 Rf (265) Rutherfordium $[Rn]5f^{14} 6d^2 7s^2$	105 Db (268) Dubnium $[Rn]5f^{14} 6d^3 7s^2$	106 Sg (271) Seaborgium $[Rn]5f^{14} 6d^4 7s^2$	107 Bh (270) Bohrium $[Rn]5f^{14} 6d^5 7s^2$	108 Hs (277) Hassium $[Rn]5f^{14} 6d^6 7s^2$	109 Mt (276) Meitnerium $[Rn]5f^{14} 6d^7 7s^2$	110 Ds (281) Darmstadtium $[Rn]5f^{14} 6d^8 7s^1$	111 Rg (280) Roentgenium $[Rn]5f^{14} 6d^9 7s^2$	112 Cn (285) Copernicium $[Rn]5f^{14} 6d^{10} 7s^2$	113 Uut (284) Ununtrium $[Rn]5f^{14} 6d^{10} 7s^2 7p^1$	114 Fl (289) Flerovium $[Rn]5f^{14} 6d^{10} 7s^2 7p^2$	115 Uup (288) Ununpentium $[Rn]5f^{14} 6d^{10} 7s^2 7p^3$	116 Lv (293) Livermorium $[Rn]5f^{14} 6d^{10} 7s^2 7p^4$	117 Uus (294) Ununseptium $[Rn]5f^{14} 6d^{10} 7s^2 7p^5$	118 Uuo (294) Ununoctium $[Rn]5f^{14} 6d^{10} 7s^2 7p^6$

Alkali Metals
Alkaline Earth Metals
Transition Metals
Non-metals
Other Metals
Lanthanide Series
Actinide Series
Halogens
Inert Gases

Atomic Number
Atomic Weight*
Symbol
Name
Electron Configuration**

Example: 1 H 1.01 Hydrogen $1s^1$

57 La 138.91 Lanthanum $[Xe]5d^1 6s^2$	58 Ce 140.12 Cerium $[Xe]4f^1 5d^1 6s^2$	59 Pr 140.91 Praseodymium $[Xe]4f^3 6s^2$
60 Nd 144.24 Neodymium $[Xe]4f^4 6s^2$	61 Pm (145) Promethium $[Xe]4f^5 6s^2$	62 Sm 150.36 Samarium $[Xe]4f^6 6s^2$
63 Eu 151.96 Europium $[Xe]4f^7 6s^2$	64 Gd 157.25 Gadolinium $[Xe]4f^7 5d^1 6s^2$	65 Tb 158.93 Terbium $[Xe]4f^9 6s^2$
66 Dy 162.50 Dysprosium $[Xe]4f^{10} 6s^2$	67 Ho 164.93 Holmium $[Xe]4f^{11} 6s^2$	68 Er 167.26 Erbium $[Xe]4f^{12} 6s^2$
69 Tm 168.93 Thulium $[Xe]4f^{13} 6s^2$	70 Yb 173.04 Ytterbium $[Xe]4f^{14} 6s^2$	71 Lu 174.97 Lutetium $[Xe]4f^{14} 5d^1 6s^2$
89 Ac (227) Actinium $[Rn]6d^1 7s^2$	90 Th 232.04 Thorium $[Rn]6d^2 7s^2$	91 Pa 231.04 Protactinium $[Rn]5f^2 6d^1 7s^2$
92 U 238.03 Uranium $[Rn]5f^3 6d^1 7s^2$	93 Np (237) Neptunium $[Rn]5f^4 6d^1 7s^2$	94 Pu (244) Plutonium $[Rn]5f^6 7s^2$
95 Am (243) Americium $[Rn]5f^7 7s^2$	96 Cm (247) Curium $[Rn]5f^7 6d^1 7s^2$	97 Bk (247) Berkelium $[Rn]5f^9 7s^2$
98 Cf (251) Californium $[Rn]5f^{10} 7s^2$	99 Es (252) Einsteinium $[Rn]5f^{11} 7s^2$	100 Fm (257) Fermium $[Rn]5f^{12} 7s^2$
101 Md (258) Mendelevium $[Rn]5f^{13} 7s^2$	102 No (259) Nobelium $[Rn]5f^{14} 7s^2$	103 Lr (262) Lawrencium $[Rn]5f^{14} 7s^2 7p^1$

Aa - Solid ♦
Aa - Gas
Aa - Liquid
Aa - Synthetically Prepared ★

* Based on Carbon-12. (###) represents most stable or most stable expected isotope.

** Some electron configurations are based on theoretical expected arrangements.

Innovating Science™ by Aldon Corporation

"cutting edge science for the classroom"