

Odysseyware®

# SUPPLY LIST

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## Chemistry



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## UNIT 1: MEASUREMENT AND ANALYSIS

Assignment	Summary	Video Demo	Supplies
*Report: Metric System	Prepare a 300 word detailed report on the history of the metric system in America.	No	<ul style="list-style-type: none"> <li>research resources</li> </ul>
Project: Practice in Measuring Metric Volumes	Practice in the skill of measurement and estimation is useful in chemistry.	No	<ul style="list-style-type: none"> <li>15 containers - 5 large (size of a soda can), 5 medium, and 5 small</li> <li>one 100 mL graduated cylinder</li> <li>colored water</li> </ul>
Project: Measuring Length with Precision	Measure at least 10 objects around the room that are less than one meter in length.	No	<ul style="list-style-type: none"> <li>metric ruler</li> </ul>
*Experiment: Masses	Determine the mass of 10 more objects of your choice.	Yes	<ul style="list-style-type: none"> <li>centigram balance</li> <li>various small objects</li> </ul>
*Project: Tutorial for Making a Scatter Plot Using an Electronic Spreadsheet Program	In this project, you will be designing a scatter plot (a type of line graph) based on information given to you in a data table.	No	<ul style="list-style-type: none"> <li>Microsoft Excel®</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

## UNIT 2: STARTING THE INVESTIGATION: HOW TO IDENTIFY ELEMENTS, COMPOUNDS, AND MIXTURES

Assignment	Summary	Video Demo	Supplies
Project: Researching Branches of Chemistry	Define each of the listed branches of chemistry in the assignment. Pick one branch to research further and answer the questions in the assignment.	No	<ul style="list-style-type: none"> <li>research resources</li> </ul>
Experiment: Observation of a Phase Change	<p>One way to study energy is to study the melting and cooling characteristics of a pure substance. In looking at these phase changes, we can see the result of adding energy and its effect on the temperature of the substance changing phases. We will be studying this phenomenon using PDCB or paraffin wax.</p> <p>paradichlorobenzene (PDCB) (moth crystals)</p> <p>Not suggested if you do not have access to a fume hood or good ventilation system to perform. Paraffin wax may then be used in place of PDCB.)</p>	No	<ul style="list-style-type: none"> <li>test tube with 12-15 grams paradichlorobenzene (PDCB) (moth crystals)</li> <li>test tube with 12 - 15 grams of paraffin wax. (substitute for PDCB)</li> <li>three Pyrex beakers the same size, 150 mL to 500 mL range</li> <li>two 250 mL Pyrex beakers</li> <li>two thermometers</li> <li>beaker stand</li> <li>water</li> <li>heat source</li> <li>three dye tablets or egg-coloring tablets</li> </ul>

*Experiment: Salt and Sand	In this activity you will make a mixture of salt and sand and then devise a way to separate them into the original sample of pure salt and pure sand.	No	<ul style="list-style-type: none"> <li>• pure white sand</li> <li>• ½ sand and ½ salt mixture</li> <li>• pure salt</li> </ul>	<ul style="list-style-type: none"> <li>• filter funnel</li> <li>• filter paper or heavy paper hand towel</li> </ul>
*Report: Density	Determine the density of three pure solids on g/cm <sup>3</sup> .	No	Choose objects of which you are sure of their identity, such as aluminum foil (crumpled or in a ball), copper wire or iron nails.	
Experiment: Using the Tyndall Effect to Identify Colloids	In this experiment you will identify colloids using the Tyndall effect.	No	<ul style="list-style-type: none"> <li>• 3 clear glasses with smooth sides</li> <li>• laser pointer or flashlight</li> <li>• red Jell-O®</li> </ul>	<ul style="list-style-type: none"> <li>• red food coloring</li> <li>• sugar</li> <li>• water</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A	

### UNIT 3: EXPLORING LAWS FOR GASES AND CONSERVATION OF MASS

Assignment	Summary	Video Demo	Supplies	
*Project: Graphing Kinetic Energy	Print out graph paper and sketch a curve that represents the distribution of molecules at a temperature below the one shown	No	<ul style="list-style-type: none"> <li>• graph paper</li> <li>• pencil</li> </ul>	
Experiment: Finding Absolute Zero Experimentally	<p>Here are your goals for this lesson:</p> <p>Predict how the volume of a gas will change with the temperature is raised or lowered</p> <p>Calculate what the change in volume of a gas should be when the temperature is changed</p> <p>Visualize the relationship between the temperature and volume of a gas</p> <p>Make and use graphs to predict the volume of gas at different temperatures.</p> <p>Communicate findings</p>	Yes	<ul style="list-style-type: none"> <li>• 250 mL Erlenmeyer flask</li> <li>• wire gauze</li> <li>• short piece of plastic tube</li> <li>• rubber stop, 1-hole to fit flask</li> <li>• water</li> <li>• beaker to fit flask</li> <li>• ice</li> </ul>	<ul style="list-style-type: none"> <li>• burner or hot plate</li> <li>• ring stand</li> <li>• ring</li> <li>• thermometer</li> </ul> <p>If a gas jet burner is used:</p> <ul style="list-style-type: none"> <li>• ring</li> <li>• wire gauze</li> </ul>
*Project: Charles's Law	Explain in detail including a descriptive analysis of what happened in the experiment and in terms of Charles's law.	No	<ul style="list-style-type: none"> <li>• a gallon metal can with a lid</li> <li>• a Bunsen burner</li> </ul>	<ul style="list-style-type: none"> <li>• cold water</li> </ul>

*Project: Absolute Zero - Real or Theoretical?	Compose a report on whether or not real gas and ideal gas will ever reach absolute zero.	No	<ul style="list-style-type: none"> <li>research resources</li> </ul>
*Essay: Biography	Write a biography, using 500 words, of one or more of the following scientists: Robert Boyle, Lord Kelvin (William Thomson), or James Maxwell.	No	<ul style="list-style-type: none"> <li>research resources</li> </ul>
*Examining the Use of Certain Gases as Propellants	Do some research on photo-reactive process and then write a 500 word essay on the pros and cons of the controversy of using chlorofluorocarbons as aerosol propellants.	No	<ul style="list-style-type: none"> <li>research resources</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

#### UNIT 4: THE DISCOVERY OF ATOMS: NATURE'S BUILDING BLOCKS

Assignment	Summary	Video Demo	Supplies
*Experiment: Physical Properties of Elements	In this experiment, you will be exploring some of the physical properties of some common elements.	Yes	You may select pure materials that are convenient for you to find to use in this experiment. Some suggestions are: iron nails, aluminum foil, copper wire, magnesium ribbon, or lead fishing sinkers.
*Experiment: Chemical Properties of Some Metals	The ability to burn in air (combine with oxygen with the release of heat and light) is a chemical property of some materials. In this experiment you will test certain metals for their ability to burn.	No	<ul style="list-style-type: none"> <li>tin can lid with 4 indentations</li> <li>support stand and ring</li> <li>Bunsen burner or propane burner</li> <li>samples of iron, copper, magnesium, and lead</li> </ul>
*Report: Fission Reactors	Prepare a 500 word report on fission reactors in use today.	No	<ul style="list-style-type: none"> <li>research resources</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

#### UNIT 5: MOLECULAR STRUCTURE

Assignment	Summary	Video Demo	Supplies
Project: Bonding of Water	Plan and conduct an investigation to compare the properties of water and to see what makes water unique.	No	<ul style="list-style-type: none"> <li>research resources</li> <li>a slideshow program such as PowerPoint®</li> </ul>

Experiment: Demonstrating Polar Properties	This experiment is designed to help reveal the properties of polar and nonpolar substances	No	<ul style="list-style-type: none"> <li>acetate (overhead transparency material) strip</li> <li>tissue paper</li> <li>vinyl strip</li> </ul>	<ul style="list-style-type: none"> <li>woolen cloth</li> <li>slow, steady stream of water from a faucet</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A		N/A

## UNIT 7: CHEMICAL REACTIONS, RATES, AND EQUILIBRIUM

Assignment	Summary	Video Demo	Supplies
Experiment: Observing Chemical Changes	In this experiment you will observe chemical change.	Yes	<ul style="list-style-type: none"> <li>0.01 M NaCl solution - To make the salt solution, pour 0.58 g of table salt in 1 liter of distilled water and stir to dissolve.</li> <li>0.01 M <math>K_2CrO_4</math> solution - To make the potassium chromate solution pour 1.94 g of <math>K_2CrO_4</math> into 1 liter of distilled water and stir to dissolve. Potassium chromate solid can be purchased at drug, hobby, or photo supply store</li> <li>0.01 M <math>AgNO_3</math> solution - To make the silver nitrate solution pour 1.7 g of /L of <math>AgNO_3</math> into 1 liter of distilled water and stir to dissolve. The solution can also be purchased at a local drug or photo supply store</li> <li>several small test tubes</li> <li>several eye droppers, one for each solution</li> </ul>
*Experiment: Chemical Reactions	In this experiment you will observe chemical reactions.	Yes	<ul style="list-style-type: none"> <li>M acidified iron (II) sulfate, <math>FeSO_4</math> - 1.52 g/liter of solution and 1 mL concentrated HCl; solid <math>FeSO_4</math> can be purchased at drug or hobby store. <b>WEAR GOGGLES WHEN HANDLING CONCENTRATED HCl AND WORK IN A WELL VENTILATED AREA.</b></li> <li>M potassium permanganate, <math>KMnO_4</math> - 1.58 g/liter of solution; solid <math>KMnO_4</math> can be purchased at drug, hobby, or chemical supply store</li> <li>M NaCl solution - 0.58g/liter of solution; table salt</li> <li>M ammonium nitrate, <math>NH_4NO_3</math> - 0.80 g/liter of solution; solid ammonium nitrate can be purchased at drug or fertilizer store</li> <li>several test tubes or baby-food jars</li> <li>several medicine (eye) droppers</li> <li>graduated cylinders or marked disposable pipettes</li> </ul>

*Experiment: Ammonium Nitrate	In this experiment you will observe ammonium nitrate reactions.		<ul style="list-style-type: none"> <li>solid sodium hydroxide, NaOH - lye, can be purchased in grocery store</li> <li>solid ammonium nitrate, NH<sub>4</sub>NO<sub>3</sub>, can be purchased from a drug or fertilizer store</li> <li>concentrated hydrochloric acid, HCl</li> <li>phenolphthalein solution (or other indicator) - can be purchased from a hobby shop</li> <li>thermometer to fit test tubes</li> <li>forceps (tweezers)</li> <li>water</li> <li>test tubes with stoppers</li> <li>graduated cylinders or marked disposable pipettes</li> </ul>
Experiment: Effect of Solution Concentration on Reaction Rate	Use the following investigation to check a general rule for the rate of reaction.	No	<ul style="list-style-type: none"> <li>chalk crumbs or dust</li> <li>Other sources of calcium carbonate may be used including crushed antacids tablets, reptile calcium powder, calcium supplement, and eggshell.               <ul style="list-style-type: none"> <li>○ M HCl - see previous experiment</li> </ul> </li> <li>clean test tubes (5)</li> <li>metric balance</li> <li>weighing paper</li> </ul>
Activity: Exploring Factors that Affect Equilibrium (	Evaluate experimental results showing equilibria shifts due to temperature change.	No	N/A
Project: Research a Chemist	Pick one of the following chemists and perform a bit of research on him/her.  Alice Hamilton  Rosalind Franklin  Marie Curie  Gertrude B. Elion  Ada Yonath  Henry Cavendish  Robert Boyle  Antoine Lavoisier  Mario J. Molina  Svante Arrhenius	No	<ul style="list-style-type: none"> <li>research resources</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

## UNIT 8: EQUILIBRIUM SYSTEMS

Assignment	Summary	Video Demo	Supplies
Experiment: Solubility Trends	Review the four factors of dissolving you will investigate in this experiment. Given the correct solvent for a solute, explain what could you do to hasten the solution process?	Yes	<ul style="list-style-type: none"> <li>• rock salt (water softener crystals)</li> <li>• glycerin</li> <li>• water</li> <li>• 2 baby-food jars with lids</li> <li>• rubbing alcohol (isopropyl alcohol)</li> <li>• stirring rod</li> <li>• test tubes</li> </ul>
* Experiment: Acid Strength	In this project you will be observing acid strength.	Yes	<ul style="list-style-type: none"> <li>• distilled water               <ul style="list-style-type: none"> <li>○ M HCl (8.3 mL concentrated HCl per 1 L of solution)</li> </ul> </li> </ul> <p>CAUTION: WEAR GOGGLES! HANDLE CONCENTRATED ACIDS UNDER ADULT SUPERVISION IN AN AREA WITH ADEQUATE VENTILATION. ALWAYS ADD ACID TO THE PRE-MEASURED WATER.</p> <ul style="list-style-type: none"> <li>○ M HCl (1 mL 0.1 M HCl per 100 mL of solution)</li> <li>○ M HCl (1 mL 0.001 M HCl per 100 mL of solution)</li> <li>• marble, limestone, or chalk chips</li> <li>• pipette (glass with suction bulb or disposable)</li> <li>• 4 test tubes</li> <li>• goggles</li> </ul>
Activity: Solution Concentration vs. Conductivity	Plot the meter reading on the graph provided. Be sure to properly label the axes.	No	<ul style="list-style-type: none"> <li>• printer or graph paper</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A



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**UNIT 9: CARBON CHEMISTRY: HYDROCARBONS**


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Assignment	Summary	Video Demo	Supplies
Experiment: Volatility	In this investigation, we will study the volatility of a number of organic compounds.	No	<ul style="list-style-type: none"> <li>acetone - available in the paint department of stores</li> <li>isopropyl alcohol - 90% rubbing alcohol available at drug stores</li> <li>mineral oil</li> </ul> <ul style="list-style-type: none"> <li>water</li> <li>4 test tubes or other equal size glass containers</li> <li>grease marker or masking tape</li> <li>ruler</li> <li>goggles</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

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**UNIT 10: CARBON CHEMISTRY: FUNCTIONAL GROUPS**


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Assignment	Summary	Video Demo	Supplies
Project: Carbon Allotropes	<p>Research carbon allotropes and create physical 3D models of at least 3 different allotropes.</p> <p>Perform a bit more in-depth research on your three chosen carbon allotropes and answer some questions.</p> <p>Choose one of your three allotropes. Perform additional research and answer the prompts in the assignment.</p>	No	<ul style="list-style-type: none"> <li>research resources</li> </ul> <p>The 3D models can be made from any materials. One common method is to use toothpicks and gummy candies.</p>
Experiment: Preparation of a Polymer	The purpose of this lab is to prepare and explore some of the properties of a unique polymer, commonly known as slime.		<ul style="list-style-type: none"> <li>3 small beakers</li> <li>stirring rod</li> <li>polyvinyl alcohol</li> </ul> <ul style="list-style-type: none"> <li>borax</li> <li>food coloring (optional)</li> </ul>
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

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**UNIT 11: CHEMISTRY REVIEW**


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Assignment	Summary	Video Demo	Supplies
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

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\* indicates an alternative assignment

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