



ODYSSEYWARE®

# 2010-2011 Science Lab List

Integrated Physics & Chemistry

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N/A.....	11
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**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 1 - EXPLORATIONS IN PHYSICAL SCIENCE**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
3	Experiment: Making Observations	Your goals for this assignment are to recognize a valid hypothesis, to make valid observations, to draw conclusions concerning what constitutes "good observations," and to write a scientific report.  Supply List: <ul style="list-style-type: none"> <li>• bowl of peanuts in their shells</li> <li>• various measuring tools (metric rulers, string, etc.)</li> <li>• paper and pencil</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
8	Experiment: Determining Volume	Your goals for this assignment are to use geometric formulas to determine metric volume, to use water displacement to determine the volume of an irregular solid, to properly use and read data from a graduated cylinder, and to present your findings in a scientific report.  Supply List: <ul style="list-style-type: none"> <li>• metric ruler</li> <li>• small block of wood</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
10	Experiment: Determining Density	Your goals for this assignment are to recognize the characteristics of density, to design and carry out a scientific investigation, and to present your findings in a scientific report.  Supply List: <ul style="list-style-type: none"> <li>• a penny, a nickel, and a quarter</li> <li>• metric ruler</li> <li>• metric balance</li> <li>• scissors</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
11	Experiment: Density Column	Your goals for this assignment are to recognize the characteristics of density, to design and carry out a scientific investigation, and to present your findings in a scientific report.  Supply List: <ul style="list-style-type: none"> <li>• Karo syrup or molasses</li> <li>• cooking oil</li> <li>• red solution</li> <li>• blue solution</li> <li>• piece of paraffin</li> <li>• raisin</li> <li>• peanut or cashew</li> <li>• paperclip</li> <li>• small plastic cups</li> <li>• eye droppers</li> <li>• laboratory balance</li> <li>• 50-mL graduated cylinder (or larger)</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
13	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 2 - THE STRUCTURE OF MATTER**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
2	Experiment: Atomic Structure	<p>Your goals for this assignment are to investigate a scientific hypothesis and to present your findings in a scientific report.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• large box (at least 40 to 50 cm along all sides)</li> <li>• small block of wood (around 6 to 8 cm along all sides)</li> <li>• 100 marbles or pellets (airsoft pellets work well)</li> <li>• ruler</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
8	Experiment: Identifying an Unknown	<p>Your goals for this assignment are to develop hypotheses concerning the identity of the metal under study, to follow procedures for determining density of a sample, to use data to determine the identity of a sample, to compare your conclusions to those of others and to your initial hypotheses, and to discuss any flaws in the procedure that may have affected the results.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• metric balance</li> <li>• graduated cylinder</li> <li>• ruler</li> <li>• small paper cup containing one or more metal pieces</li> </ul> <p>(aluminum foil, aluminum tabs from soda cans, aluminum or steel paper clips, copper wiring or tubing, steel wire, iron nails, aluminum nails, lead sinkers or pellets, brass connectors, zinc or copper sheet metals)</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
13	Experiment: Separating a Mixture	<p>Your goal for this assignment is to identify and use the physical properties of substances to separate the components of a mixture.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• mixture containing salt, iron filings, sand, gravel, and raisins</li> <li>• screens</li> <li>• funnel</li> <li>• filter paper (see diagram below for directions on use)</li> <li>• beakers</li> <li>• ring stand and ring</li> <li>• magnet</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
15	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 3 - MATTER AND CHANGE**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
3	Experiment: Graphing Changes of State	<p>Your goals for this assignment are to use your knowledge of changes of state to hypothesize how you will determine when the water sample is boiling, to observe and collect accurate data as the water changes state, to do a graphical analysis of data obtained during experimentation, and to interpret graphical information with respect to changes of state and latent energy.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• coarsely crushed ice (about 8 ice cubes or enough to half fill a 500-mL beaker)</li> <li>• string or wire</li> <li>• Bunsen burner or hot plate (stove on low setting may be used)</li> <li>• Pyrex beaker (use a small metal pan if a stove is used)</li> <li>• Celsius thermometer</li> <li>• ring stand with ring &amp; supports (see diagram)</li> <li>• time piece with second hand</li> <li>• digital camera (optional)</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
6	Experiment: The Cabbage Indicator	<p>Your goal for this assignment is to describe how indicators can be used to determine if a solution is an acid or a base.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• sliced red cabbage</li> <li>• stainless steel cooking container</li> <li>• food strainer</li> <li>• collection beaker</li> <li>• coffee filter</li> <li>• white vinegar</li> <li>• baking soda (or ammonia)</li> <li>• distilled water (for control)</li> <li>• two pieces of notebook paper</li> <li>• several small, clear plastic cups (3-oz [90-mL] bathroom cups work well for this purpose)</li> <li>• at least 6 household liquids for testing (suggestions: clear soda-pop, clear shampoos or liquid soap solutions, clear or light-colored fruit or vegetable juices, rain from a recent storm, water with soil fertilizer dissolved in it, etc.)</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
10	Experiment: Chemical Changes	<p>Your goals for this assignment are to identify physical and chemical changes and to identify indicators of chemical change.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• small utility candle and holder</li> <li>• matches</li> <li>• metric balance</li> <li>• 3 small sheets of paper</li> <li>• watch glass</li> <li>• 3 test tubes</li> <li>• table salt (NaCl)</li> <li>• calcium chloride (CaCl<sub>2</sub>)</li> <li>• baking soda (NaHCO<sub>3</sub>)</li> <li>• magnesium ribbon</li> <li>• 1M hydrochloric acid (muriatic acid)</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
16	Experiment: Half-Life	<p>Your goal for this assignment is to describe what is meant by the half-life of a radioactive element.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• 100 small candy pieces with printing or design on one side only (M&amp;M™, Reese's pieces™, etc.)</li> <li>• resealable plastic bag or clean plastic box with lid</li> <li>• sheet of wax paper, approximately 30 cm x 30 cm</li> <li>• plastic knife</li> <li>• plastic cup</li> <li>• graph paper</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
19	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 4 - STATES OF MATTER**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
2	Experiment: Comparing Hardness and Density of Solids	<p>Your goals for this assignment are to describe how to test the hardness of a solid, to review and practice the procedure for testing the density of solids, and to explain how to interpret a positive or negative correlation between graphed values.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• at least six of the following solid samples (some are crystals, others amorphous): aluminum, amber, calcite, chalcopryrite, dolomite, feldspar (orthoclase or anorthite), fluorite, galena, gypsum, hematite, ice, iron, magnetite, mica (muscovite or biotite), pyrite, quartz, ulexite</li> <li>• your own fingers (fingernails to be precise!)</li> <li>• copper penny (pre-1981)</li> <li>• dissection knife (from a biology dissection kit)</li> <li>• steel nail or file</li> <li>• metric balance</li> <li>• graduated cylinder</li> <li>• overflow can (optional, may be necessary for some samples)</li> <li>• graph paper</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
7	Experiment: Viscosity	<p>Your goal for this assignment is to compare and describe the viscosity of several liquids.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• egg carton</li> <li>• scissors or nail</li> <li>• several straws</li> <li>• cardboard (for ramp)</li> <li>• tape</li> <li>• stopwatch or watch with second hand</li> <li>• 1-inch block, a book, or other support ramp (see images below)</li> <li>• several test liquids (e.g., water, ketchup, honey, olive oil, molasses, syrup, heavy cream, vegetable oil)</li> <li>• microwave</li> <li>• beaker or measuring cup</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
14	Experiment: Pressure in Gases	<p>Your goals for this assignment are to collect and analyze data about the air pressure in the tires of a car and to compare experimental results with published data.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• a car and licensed driver</li> <li>• the car manual (for information)</li> <li>• air pressure gauge</li> <li>• 16 sheets of paper or thin cardboard</li> <li>• tape</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
17	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 5 - MOTION AND FORCES**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
5	Experiment: Motion Graphs	<p>Your goals for this assignment are to design an experiment to determine the velocity of a battery-powered toy car, to perform an experiment to determine the type of motion experienced by a non-powered toy car traveling down a ramp, and to make and interpret motion graphs.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• battery-powered toy car</li> <li>• non-powered toy car</li> <li>• meter stick</li> <li>• stopwatches (one for each timer) or second hand on clock</li> <li>• long board (at least 2 meters) for ramp</li> <li>• books to prop up ramp</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
11	Experiment: Propulsion	<p>Your goal for this assignment is to describe the action and reaction forces in propulsion devices.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• balloon</li> <li>• empty soda pop can</li> <li>• sharp nail</li> <li>• hammer</li> <li>• fishing line or strong thread</li> <li>• bowl of water</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
14	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 6 - SEMESTER REVIEW AND EXAM**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>
N/A	N/A	N/A

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 7 - WORK AND ENERGY**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
5	Experiment: Conservation of Energy	<p>Your goals for this assignment are to describe the relationship between the potential energy of an object and the amount of kinetic energy it can gain in a gravitational field, to describe how the kinetic energy of an object relates to the amount of mechanical energy it can transfer to another object, and to describe how the amount of work done on an object relates to how far it moves.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• cardboard tube (from gift wrap or paper towels)</li> <li>• box (cut from lightweight cardboard, such as a gift box, using the pattern below)</li> <li>• four marbles of different masses</li> <li>• meter stick</li> <li>• tape</li> <li>• scissors</li> <li>• book</li> <li>• metric balance</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
12	Experiment: Inclined Planes	<p>Your goals for this assignment are to understand the terms used to describe an inclined plane and to make measurements to calculate IMA, AMA, and efficiency.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• smooth board</li> <li>• smooth block or other object to drag up the plane (approximately 200 to 500 grams)</li> <li>• spring scale (calibrated in newtons)</li> <li>• string</li> <li>• books or blocks to support the inclined plane</li> <li>• meter stick</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
14	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 8 - HEAT FLOW**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
4	Experiment: Insulators	<p>Your goals for this assignment are to build and use a calorimeter to measure rate of heat loss and to analyze data using comparative graphs.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• large Styrofoam cup</li> <li>• small Styrofoam cup</li> <li>• flat piece of Styrofoam</li> <li>• thermometer</li> <li>• hot water</li> <li>• heat source for heating water</li> <li>• at least two insulating materials</li> </ul> <p>(shredded newspaper, sheets of newspaper, bits of cloth, small Styrofoam peanuts, bubble wrap, feathers, aluminum foil, saw dust, etc.)</p> <ul style="list-style-type: none"> <li>• clock with second hand</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
7	Experiment: Heat and Expansion	<p>Your goals for this assignment are to observe the volume effects of heat absorption on liquid water, to observe the volume effect of heat loss as water changes from the liquid to solid state, and to relate observations about thermal expansion to real world situations.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• beaker or pan for heating water</li> <li>• medium test tube</li> <li>• one-holed stopper to fit test tube</li> <li>• glass tube to fit through stopper</li> <li>• grease pencil</li> <li>• food coloring</li> <li>• hot plate for heating water</li> <li>• large round balloon</li> <li>• marker</li> <li>• tape measure</li> <li>• freezer</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
11	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 9 - ELECTRICITY AND MAGNETISM**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
3	Experiment: Electrostatic Investigations	<p>Your goals for this assignment are to explain how to determine whether two objects have the same or different charges and to demonstrate that the distance between charged objects influences the behavior of those objects.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• clear adhesive tape</li> <li>• plastic straw</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
10	Experiment: Diverting a Magnetic Field	<p>Your goal for this assignment is to collect data to determine what materials are useful in diverting magnetic fields.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• strong disk magnet</li> <li>• plastic drinking straw</li> <li>• tape</li> <li>• double-stick tape or glue</li> <li>• paperclips</li> <li>• cardboard from cereal or cake mix box</li> <li>• test materials such as pennies, aluminum foil, an iron or steel nail, cardboard, crayons, a table knife, or a popsicle stick</li> <li>• compass</li> <li>• paper</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
13	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 10 - WAVES**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
4	Experiment: Changing the Speed of a Wave	<p>Your goals for this assignment are to recognize the relationship between stiffness of the medium and the speed of a wave and to recognize the relationship between the density of the medium and the speed of a wave.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• plastic box</li> <li>• paperclips</li> <li>• 2 sturdy rubber bands, large enough to stretch around the plastic box</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
9	Experiment: Using Vibrations to Produce Sound	<p>Your goals for this assignment are to observe the transfer of vibrational energy from one object to another, to confirm that a vibrating object can create the sensation of sound, and to describe how pitch can be changed in instruments that are tapped (percussion) or blown into (woodwinds and brasses).</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• a tuning fork</li> <li>• wooden ruler</li> <li>• plastic bowl (for water)</li> <li>• 3 test tubes (or 3 identical glass bottles with narrow mouths)</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
16	Experiment: Law of Reflection	<p>Your goals for this assignment are to make observations and measurements to test the law of reflection and to analyze your results to determine accuracy.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• laser pointer</li> <li>• small rectangular or square plane mirror</li> <li>• block of wood to support mirror</li> <li>• sharp pencil</li> <li>• protractor</li> <li>• unlined paper</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
19	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 11 - CHEMISTRY AND PHYSICS IN OUR WORLD**

<b>Assignment Number</b>	<b>Assignment Title</b>	<b>Project Summary and Supply List</b>	<b>Video Demo</b>
2	Experiment: Carbon Dioxide and Water Acidity	<p>Your goal for this assignment is to relate levels of dissolved carbon dioxide to pH.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• three 12-inch balloons</li> <li>• measuring tape</li> <li>• twist tie</li> <li>• bicycle tire air pump</li> <li>• CO2 cartridge bicycle tire pump</li> <li>• one-hole stopper with glass tube inserted</li> <li>• four 100-mL beakers</li> <li>• 100-mL graduated cylinder</li> <li>• pH paper, acid range</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
4	Experiment: Water Acidity and the Environment	<p>Your goal for this assignment is to make observations to determine which types of materials are especially affected by acidic environments.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• sand paper</li> <li>• vinegar</li> <li>• fresh water</li> <li>• small jar with lid</li> <li>• several small paper or plastic cups or small beakers</li> <li>• materials to test:               <ul style="list-style-type: none"> <li>• Part A:</li> <li>• a raw egg</li> <li>• Part B (two samples of each item are required):</li> <li>• small sea shell</li> <li>• piece of coral</li> </ul> </li> <li>• a penny (use sand paper to remove any surface build-up)</li> <li>• an iron or steel nail (use sand paper to remove any surface build-up)</li> <li>• chips of marble, concrete, brick</li> <li>• various rock samples (slate, limestone, quartz)</li> <li>• piece of chalk</li> <li>• small glass bead or other piece of glass</li> <li>• small plastic bead or other piece of plastic</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
9	Experiment: Kepler's Second Law	<p>Your goal for this assignment is to carefully plot orbital data and draw conclusions based on the data.</p> <p>Supply List:</p> <ul style="list-style-type: none"> <li>• centimeter graph paper</li> <li>• scissors</li> <li>• poster board</li> <li>• triple beam balance</li> <li>• centimeter ruler</li> <li>• tape</li> </ul>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
11	Special Project	Special Project assignments are used by teachers to create their own projects if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

<b>INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 12 - SEMESTER REVIEW AND EXAM</b>		
<i><b>Assignment Number</b></i>	<i><b>Assignment Title</b></i>	<i><b>Project Summary and Supply List</b></i>
N/A	N/A	N/A

<b>INTEGRATED PHYSICS AND CHEMISTRY (2010): UNIT 13 - FINAL EXAM</b>		
<i><b>Assignment Number</b></i>	<i><b>Assignment Title</b></i>	<i><b>Project Summary and Supply List</b></i>
N/A	N/A	N/A