

# Crystals and Polymers

## Course Syllabus

WHEN		WHAT	HOW	
Week 1	Monday	Morning	Introduction	<ul style="list-style-type: none"> <li>- Student introductions</li> <li>- Overview of syllabus</li> <li>- Classroom rules and procedures</li> <li>- <u>Lab safety</u></li> </ul>
			What is a crystal?	<ul style="list-style-type: none"> <li>- Define characteristics of crystals</li> <li>- Examine some crystals</li> </ul>
		Afternoon	The Elements	<ul style="list-style-type: none"> <li>- Look at periodic table</li> <li>- Chemical properties</li> <li>- Lab: Building models of atoms</li> <li>- Present and discuss models</li> </ul>
	Tuesday	Morning	Properties of crystals	<ul style="list-style-type: none"> <li>- Review terms from previous day</li> <li>- Lab: Build models showing different bonding types</li> <li>- Discuss crystal properties</li> <li>- Activity: Examine mineral sets and identify properties</li> </ul>
		Afternoon	Lab: Growing Crystals	<ul style="list-style-type: none"> <li>- Begin crystal growing lab</li> <li>- Record observations from lab</li> <li>- Discuss observations</li> </ul>
	Wednesday	Morning	Solutions	<ul style="list-style-type: none"> <li>- Unsaturated, saturated, and supersaturated solutions</li> <li>- Demo of different types of solutions</li> <li>- <u>Does temperature affect the solutions?</u></li> </ul>
		Afternoon	Solutions and Crystallization	<ul style="list-style-type: none"> <li>- Review terms from the morning</li> <li>- Discuss seed crystals</li> <li>- Lab: Make rock candy</li> <li>- Continue crystal growing lab from 6/28</li> </ul>
	Thursday	Morning	Do crystals have certain shapes?	<ul style="list-style-type: none"> <li>- Introduce seven crystal systems</li> <li>- Activity: Paper folding exercise</li> <li>- Lab: Continue crystal growing lab from 6/29</li> </ul>
		Afternoon	Lab: Ghost Crystals	<ul style="list-style-type: none"> <li>- Introduce lab</li> <li>- Examine and record observations</li> <li>- Discuss observations using terms learned <u>during the morning</u></li> </ul>
			Real-life applications of crystals	<ul style="list-style-type: none"> <li>- Discuss ways crystals are used in everyday life</li> </ul>
	Friday	Morning	Gemstones	<ul style="list-style-type: none"> <li>- Look at slides/photos of gemstones</li> <li>- Discuss economic/historical importance of gemstones</li> </ul>
		Afternoon	Gemstones	<ul style="list-style-type: none"> <li>- Start internet/library research on gemstones</li> </ul>

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Week 2	Monday	Morning	4th of July!	<ul style="list-style-type: none"> <li>- Review homework and terms from last week</li> <li>- Lab: Re-doing rock candy lab</li> <li>- Activity: Building crystals with solid-state kits</li> </ul>
		Afternoon	NO CLASS	
	Tuesday	Morning	What is a polymer?	<ul style="list-style-type: none"> <li>- Discuss and define polymer vs. non-polymer</li> <li>- Give examples of polymers</li> <li>- Discuss difference between monomers and polymers</li> <li>- Acting demonstration of monomers and polymers</li> <li>- <u>Build polymer chains with paperclips</u></li> </ul>
		Afternoon	Types of polymers	<ul style="list-style-type: none"> <li>- Discuss 6 main types of polymers</li> <li>- Exploring polymers and rubbers</li> <li>- Skewer through a balloon activity</li> <li>- Lab: Making rubber bands</li> <li>- Homework: Bring in 3-4 plastic items</li> </ul>
	Wednesday	Morning	What polymers form plastic?	<ul style="list-style-type: none"> <li>- Discuss rubber band lab from previous day</li> <li>- Collect and organize plastics</li> <li>- Activity: Identifying Unknown Plastics</li> <li>- Discuss polymers in plastics</li> </ul>
		Afternoon	Properties of polymers	<ul style="list-style-type: none"> <li>- Review properties of plastics</li> <li>- Discuss amorphous, crystal, crosslinking, thermoset, thermoplastic, and hydrophobic/hydrophilic</li> </ul>
	Thursday	Morning	Polymers as amorphous or crystals	<ul style="list-style-type: none"> <li>- Lab: Make peanut brittle</li> <li>- Discuss connection to amorphous crystals</li> </ul>
			Afternoon	Crosslinking
			Thermoset vs. thermoplastic	<ul style="list-style-type: none"> <li>- Discuss lab from morning</li> <li>- Lab: Shrinkable Plastics</li> <li>- Lab: Epoxy Putty</li> </ul>
	Friday	Morning	Hydrophobic/hydrophilic	<ul style="list-style-type: none"> <li>- Discuss results from labs on 7/7</li> <li>- Lab: Superabsorbant polymer</li> </ul>
		Afternoon	Forming Polymers: Addition and Condensation	<ul style="list-style-type: none"> <li>- Acting demonstration of addition and condensation polymerization</li> <li>- Lab: Making nylon rope</li> </ul>

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WHEN		WHAT	HOW	
Week 3	Monday	Morning	How are polymers used?	<ul style="list-style-type: none"> <li>- Review types and properties of polymers</li> <li>- Discuss real-life examples of polymers</li> <li>- Demo: Comparing densities of different plastics</li> </ul>
		Afternoon	Synthetic polymers	<ul style="list-style-type: none"> <li>- Discuss lab results</li> <li>- Lab: Making a superball</li> </ul>
			Writing Seminar	<ul style="list-style-type: none"> <li>- Discuss structure of essays</li> <li>- Plagarism</li> <li>- Importance of good writing in science</li> </ul>
	Tuesday	Morning	What are natural polymers?	<ul style="list-style-type: none"> <li>- Discuss results of superball lab</li> <li>- Explain the polymer properties of a superball</li> <li>- Synthetic vs. natural polymers</li> <li>- Discuss link between polymers and biomolecules</li> <li>- Monosaccharides and sugars</li> <li>- Lab: Identifying sugar content in food</li> </ul>
		Afternoon	What are polysaccharides?	<ul style="list-style-type: none"> <li>- Discuss relationship between monosaccharide and polysaccharide</li> <li>- Discuss carbohydrates and starches</li> <li>- Lab: Iodine test for starches in food</li> </ul>
	Wednesday	Morning	Carbohydrates as condensation polymers	<ul style="list-style-type: none"> <li>- Discuss iodine lab results</li> <li>- Explain how carbohydrates are formed</li> </ul>
			What are fats?	<ul style="list-style-type: none"> <li>- Discuss saturated vs. unsaturated fats</li> <li>- Brainstorm what common items contain fat</li> <li>- Lab: Making soap</li> </ul>
		Afternoon	Health and biomolecules	<ul style="list-style-type: none"> <li>- Finish soap lab from the morning</li> <li>- Create a health brochure informing people about two or more of the following: proteins, carbohydrates, fats, polysaccharides, etc.</li> </ul>
	Thursday	Morning	What are proteins?	<ul style="list-style-type: none"> <li>- Create a comparison/contrast diagram for polysaccharides and polymers</li> <li>- Amino acids and protein synthesis</li> <li>- Lab: Testing for proteins</li> <li>- Lab: Protein denaturation</li> </ul>
		Afternoon	DNA and biomolecules	<ul style="list-style-type: none"> <li>- What is DNA?</li> <li>- Discuss connection between proteins and DNA</li> <li>- Activity: DNA dance</li> <li>- Lab: Build a DNA strand</li> </ul>
	Friday	Morning	Presentations	<ul style="list-style-type: none"> <li>- Prepare for presentations</li> </ul>
		Afternoon	Closing Ceremonies/Conferences	