

Crystals and Polymers Course Syllabus

Day	Time	WHAT (skills goals/knowledge goals/concepts/readings)	HOW (Activities)
Day 1 Monday	Morning - A	Introduction: <ul style="list-style-type: none"> - Student introductions - Classroom Procedures - Overview of topics Topic: What are crystals? <ul style="list-style-type: none"> - Define characteristics of crystals and non-crystals using candy - Examine some crystals 	<ul style="list-style-type: none"> - K,W, L chart on crystals - Characteristics of crystals and non-crystals using candy
	Morning – B	<ul style="list-style-type: none"> - Continue discussion from Morning - A 	<ul style="list-style-type: none"> - Read pages 6-8 from textbook - Definition of crystals
	Afternoon – A	<ul style="list-style-type: none"> -Discuss “Growing Crystals” lab 	<ul style="list-style-type: none"> - Crystal Pictures Lab - Discuss lab. -Grow crystals: 3 groups each to grow 2 samples of a particular crystal.
	Afternoon – B	<ul style="list-style-type: none"> - Complete “Growing Crystals” Lab -Review topics discussed. -Discuss homework 	<ul style="list-style-type: none"> - Finish lab and clean-up. - Review terms from morning. -HW: Send list of ingredients home for making rock candy.
Day 2 Tuesday	Morning - A	Topic: How do we identify crystals? <ul style="list-style-type: none"> - “Growing Crystals” Lab - Crystal properties to test 	<ul style="list-style-type: none"> - Review terms from previous day. - Examine results from previous day’s lab and record observations. - Discuss physical property, physical change, and types of test.
	Morning – B	<ul style="list-style-type: none"> - Introduce afternoon lab 	<ul style="list-style-type: none"> - Discussion on “Identifying an Unknown Crystal” Lab.

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	Afternoon – A	- “Identifying an Unknown Crystal” Lab - “Inquiry Crystal Growth Lab”	- Perform lab. - Plan procedure for lab
	Afternoon – B	- Review properties to identify crystals - Review homework.	HW: Make rock candy and bring to class on Friday.
Day 3 Wednesday	Morning - A	Topic: Do crystals have certain shapes? - “Growing Crystals” Lab - “Identifying Unknown Crystals Lab”	- Examine & record observations. - Complete recrystallization questions. Discuss lab results.
	Morning – B	Discuss plans for “Inquiry Crystal Growth Lab”	- Perform Lab
	Afternoon – A	- Gemstone research	- Research a gemstone (on internet and at library). Write a short report (1-3 pgs.).
	Afternoon – B	- Gemstones research continued.	- Continue gemstone research and writing. - HW: Work on gemstone report.
Day 4 Thursday	Morning - A	Topic: What do the crystal structures really look like? - “Growing Crystals” Lab - Review seven crystal systems/shapes. - Characteristics of crystal models	- Examine & record observations. - Crystallography handout - Discuss types of angles, number of faces in each type of system, crystalline and amorphous solid
	Morning – B	- Crystal system models and take measurements	- Build models of different crystals.
	Afternoon – A	- Crystal system models	- Continue building models.
	Afternoon – B	- Borax and Alum crystals - Review crystal systems and properties. - Review homework	- Make Borax and Alum crystals. - HW: Complete gemstone report and presentation.

Day	Time	WHAT (skills goals/knowledge goals/concepts/readings)	HOW (Activities)
Day 5 Friday	Morning - A	Topic: What do we know about crystals? - Growing Crystals” Lab. - Review from previous day “Teach Us About Your Gemstone”	- Record final observations. - Discuss lab results. - Review crystal structures. - Gemstone presentations
	Morning – B	- Nitinol/Memory Metal	- Read “Memory Metal” article. Discuss article - Make shapes with memory metal.
	Afternoon – A	Review crystal topics from week.	- Play “Crystal Jeopardy!”
	Afternoon – B	- Knowledge about crystals	Complete “L” column of K,W, L chart. - HW: Read “Breakfast of Crystals” Article
Day 6 Monday	Morning - A	Topic: What is a polymer? - Homework Check - Personal polymer survey - Polymer vs. non-polymer	- Five minute reflection on “Breakfast of Crystals” Article - K,W, L chart on polymers - Ask students to give examples of polymers. - Discuss and define polymer vs. non-polymer.
	Morning – B	- Monomer and polymer	- Begin “Ghost Crystals” lab - Acting demonstration of monomers and polymers. - Make models of monomers and polymers. -List characteristics of polymers.
	Afternoon – A	- Polymer chains - Main - Block - Random	- Build polymer chains with paperclips. - Complete Ghost Crystals Lab
	Afternoon – B	-Review -Review homework	- Review polymers, monomers, formation of polymers. -HW: Bring in 3-4 items made of plastic.

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Day 7 Tuesday	Morning - A	Topic: What polymers form plastic? - Collect homework. - Identifying plastics	- Collect and organize plastics. - “Identifying Unknown Plastics” lab.
	Morning – B	- Lab conclusion - Polymers in plastics	- Discuss lab results - Introduce the “Big 6” – 6 main types of polymers.
	Afternoon – A	Exploring Polymers and Rubbers.	- Needle through a balloon activity - “Making Rubber Bands” lab
	Afternoon – B	- Review homework	- Complete rubber band lab. -HW: - Keep a “My use of plastics chart” for the week. - Peanut Brittle Ingredients
Day 8 Wednesday	Morning - A	Topic: Do polymers have certain properties? - Review properties of plastics/polymers. - Introduce polymer properties.	- Follow-up discussion on rubber-band lab - Discuss: amorphorous, crystal, crosslinking
	Morning – B	- Crosslinking - Non-Newtonian fluid	- Crosslinking acting demonstration. LAB: Gluep, Gooblek, and Cornstarch Putty
	Afternoon – A	- Thermoset vs. thermoplastic	- Shrinkable Plastics (shrinky dink) lab
	Afternoon – B	- Review topics from day. - Review homework	- Make peanut brittle. - Bake shrinky dink.
Day 9 Thursday	Morning - A	Topic: How are polymers made from monomers? - Homework Check-in - Polymers as amorphous or crystals	- Shrinky Dink results - Read “Peanut Brittle” Article - Taste test peanut brittle. - Discuss connection to amorphorous crystals
	Morning – B	- Review thermoset and thermoplastic	- Epoxy Putty Lab
	Afternoon – A	- Hydrophobic/hydrophilic	- Superabsorbant Polymer lab - Read “Tyvek” article and show properties of tyvek.

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	Afternoon – B	- Review topics from day -Review homework	HW: Complete “My use of plastics” chart. - Research Addition and Condensation Polymerization
Day 10 Friday	Morning - A	Topic: How are polymers used? - Homework check - Addition and Condensation Polymerization - Properties of polymers - Polymer uses	- Review “My use of plastics chart.” - Making Nylon demonstration - Review properties. - Discuss polymer uses.
	Morning – B	-Polymer properties of superballs	- “Making a Superball” lab - Explain the polymer properties of a superball.
	Afternoon – A	- Polymer uses (continued)	- “Making Erasers” lab - Discuss testing for “Eraser Challenge” – which eraser works the best
	Afternoon – B	- Knowledge of polymers	- Complete “L” column of K,W, L chart. HW: Read “PET” Article
Day 11 Monday	Morning - A	Topic: What are natural polymers? - Homework Check-in - Synthetic and natural polymers.	- Complete “Eraser Challenge” - Discuss “PET” Article - K,W,L chart on biomolecules
	Morning – B	- Monosaccharides & Sugars	- Discuss link between polymers and biomolecules.
	Afternoon – A	- Types of sugars	- Identifying Sugar Content in Food lab
	Afternoon – B	- Lab conclusion. - Discuss results Review homework	- Discuss results of lab. - HW: Look at nutrition labels on food and record the sugar amounts, sugar types, and any sugar alternatives.

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Day 12 Tuesday	Morning - A	Topic: What are polysaccharides? - Review topics from previous day. - Artificial Sweeteners - Monosaccharides and polysaccharides	- Review: synthetic and natural polymers, carbohydrates, monosaccharides, and polysaccharides. - “Sinking Soda Surprise” demo - Discuss relationship between monosaccharide and polysaccharide.
	Morning – B	Lactose Intolerance	“Milk Makes Me Sick” lab
	Afternoon – A	- Carbohydrates - Starches	- Soda cracker taste test. - Iodine test for starches in food.
	Afternoon – B	- Review topics from day. - Review homework	- HW: Create a comparison/contrast diagram for polysaccharides and polymers.
Day 13 Wednesday	Morning - A	Topic: What are proteins? - Homework check-in - Other important polysaccharides: Cellulose and Chitin - Amino acids - Proteins and Amino acids	- Share comparison/contrast diagrams. - Review starches and discuss cellulose and chitin.
	Morning – B	- Proteins	- Protein denaturation of egg whites (by whisking)
	Afternoon – A	- Proteins (continued)	- Protein denaturation by acid - Coagulation of Proteins – Effect of Heat on Proteins
	Afternoon – B	- Review topics from day.	- “Protein Test in Food” lab - Review: proteins, amino acids, denaturation, and coagulation. HW: Read “Polysaccharides” Article

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Day 14 Thursday	Morning - A	Topic: DNA and Biomolecules – What’s the connection? - Homework check-in - DNA inventory -Proteins and DNA -Nucleotides and their 3 main parts	- Discuss “Polysaccharides” Article - Ask students to list words that come to mind when they hear “DNA” - Discuss connection between proteins and DNA - Make-up of DNA
	Morning – B	- DNA	- Isolation of DNA lab - Discuss lab results.
	Afternoon – A	Topic: What’s the fuss about fats? - What are fats? - Carbohydrates and fats - Saturated and Unsaturated fats	- Discuss fats, carbohydrates and fats, and saturated and unsaturated fats. - “Fats in Potato Chips” lab
	Afternoon – B	- Lab conclusion - Review homework.	- Discuss lab results. - HW: Prepare for open house lab station.
Day 15 Friday	Morning - A	Topic: Let’s analyze our lunch for biomolecules! -Review tests done to detect sugars, starches, fats, etc.	- Analyze a McDonald’s Happy Meal by conducting tests for sugars, starches, and fats
	Morning – B	- Lab conclusion	- Write a letter to the McDonald’s Corp. and explain your findings. Indicate whether or not they should improve Happy Meals
	Afternoon - A	- Biomolecule wrap-up - Knowledge of biomolecules	- “Jammin’ Jelly” experiments - Complete “L” column of K, W, L chart.