

NY Chemistry Core Curriculum Correlation (Grade 9-12)

Reference: [Standards \(pdf\)](#)

Introduction

This document correlates Yenka Science software to the content performance indicators of the New York state chemistry core curriculum. It highlights specific areas of the curriculum that are covered by Yenka Science and points to resources that will be useful when teaching the material.

The terminology we have used in this document is as follows:

- **Product:** this is the relevant Yenka Science product, covering Physics and Chemistry. These products can be used independently of each other, and more information can be found on the [Yenka website](#).
- **Online activity:** these are lesson plans for classroom activities for use with the Yenka software. Students work through these independently by interacting with a Yenka simulation, following notes and answering questions to learn about an aspect of the curriculum material. Some of these lesson kits are suitable for use as a whiteboard presentation, and are referred to as *online demonstrations*.
- **Model:** a short pre-made Yenka model with instructions, which will give pupils the opportunity to apply their knowledge of a subject. These models are found under the *Content* tab when Yenka is opened.

Since all the Yenka Science titles are simulators, they will help you to cover other areas of the curriculum too. This is just a list of the activities and models that are currently available; there are plenty of other experiments you can simulate. You may wish to look at the tutorials under *Getting Started* in Yenka, and the [training videos](#) provided on the website, to explore more of the potential uses of the software, and show you how to create your own models.



STANDARD 4: The Physical Setting

Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

	Performance Indicator	Product	Content
3.1q	Matter is classified as a pure substance or as a mixture of substances.	Yenka Inorganic Chemistry	Online activity: - Substances and Mixtures - Particles in Elements, Compounds and Mixtures See also: - The Vocabulary of Mixtures - Elements, Compounds, Mixtures and Changing State
3.1r	A pure substance (element or compound) has a constant composition and constant properties throughout a given sample, and from sample to sample.		
3.1s	Mixtures are composed of two or more different substances that can be separated by physical means. When different substances are mixed together, a homogeneous or heterogeneous mixture is formed.		
3.1t	The proportions of components in a mixture can be varied. Each component in a mixture retains its original properties.		
3.1u	Elements are substances that are composed of atoms that have the same atomic number. Elements cannot be broken down by chemical change.	Yenka Inorganic Chemistry	Related online activities*: - Periodic Table (1) - Periodic Table (2) - Periodicity in Group 1 - Periodicity in Group 7 - Properties of Metals and Metal Compounds - Some Physical and Chemical Changes
3.1v	Elements can be classified by their properties and located on the Periodic Table as metals, nonmetals, metalloids (B, Si, Ge, As, Sb, Te), and noble gases.		
3.1w	Elements can be differentiated by physical properties. Physical properties of substances, such as density, conductivity, malleability, solubility, and hardness, differ among elements.		See also models: Classifying Materials: - Elements and Compounds Periodic Table: - Alkali metals (melting points) - Alkali metals (reactivity) - Halogens - Transition metals
3.1x	Elements can also be differentiated by chemical properties. Chemical properties describe how an element behaves during a chemical reaction.		
3.1y	The placement or location of an element on the Periodic		

	Table gives an indication of the physical and chemical properties of that element. The elements on the Periodic Table are arranged in order of increasing atomic number.		
3.1z	For Groups 1, 2, and 13-18 on the Periodic Table, elements within the same group have the same number of valence electrons (helium is an exception) and therefore similar chemical properties.	Yenka Inorganic Chemistry	Online activities*: <ul style="list-style-type: none"> - Periodicity of Group 7 – Reactions - Electron Arrangements and the Formulae of Compounds
3.1cc	A compound is a substance composed of two or more different elements that are chemically combined in a fixed proportion. A chemical compound can be broken down by chemical means. A chemical compound can be represented by a specific chemical formula and assigned a name based on the IUPAC system.	Yenka Inorganic Chemistry	Online activities: <ul style="list-style-type: none"> - Particles in Elements, Compounds and Mixtures - Electron Arrangements and the Formulae of Compounds <p>See also the models:</p> <ul style="list-style-type: none"> - Elements and compounds (Classifying materials) - Compounds and chemical reactions (Equations and Amounts)
3.1dd	Compounds can be differentiated by their physical and chemical properties.	Yenka Inorganic Chemistry	Related online activities: <ul style="list-style-type: none"> - Properties of Metals and Metal Compounds - Physical Properties of Liquids - Properties of Covalent Materials
3.1ee	Types of chemical formulas include empirical, molecular, and structural.	Yenka Inorganic Chemistry	Related online activities: <ul style="list-style-type: none"> - Empirical Formula - Percentage Composition and Empirical Formulae - Chemical Formulae and Equations <p>and model (Equations and Amounts):</p> <ul style="list-style-type: none"> - Empirical formula of a metal oxide
3.1jj	The structure and arrangement of particles and their interactions determine the physical state of a substance at a given temperature and pressure.	Yenka Inorganic Chemistry	Online activity: <ul style="list-style-type: none"> - States of Matter - Comparing Gases, Liquids and Solids - The Behaviour of Solids, Liquids and Gases

3.1kk	The three phases of matter (solids, liquids, and gases) have different properties.		Models (Classifying Materials): - Solids, liquids and gases
3.1nn	Differences in properties such as density, particle size, molecular polarity, boiling and freezing points, and solubility permit physical separation of the components of the mixture.	Yenka Inorganic Chemistry	<p>Online activities:</p> <ul style="list-style-type: none"> - Separation Techniques - Separation by Distillation - Fractional Distillation - The Vocabulary of Mixtures <p>Models (Water and Solutions):</p> <ul style="list-style-type: none"> - Fractional distillation - Extracting salt <p>See also, the online activities:</p> <ul style="list-style-type: none"> - Salt Preparation Methods 1 - Solving Problems Using Methods of Separation - Solving Problems Using Methods of Separation (2) - Making Sulfur Chlorides (2) <p>and demonstrations:</p> <ul style="list-style-type: none"> - Separation of a soluble solid from a mixture with an insoluble solid - Separation of solids from liquids - Separation of a solid from solution
3.1oo	A solution is a homogeneous mixture of a solute dissolved in a solvent. The solubility of a solute in a given amount of solvent is dependent on the temperature, the pressure, and the chemical natures of the solute and solvent.	Yenka Inorganic Chemistry	<p>Online activities:</p> <ul style="list-style-type: none"> - The Vocabulary of Mixtures - Solubility - Solubility Curves <p>Online demonstration:</p> <ul style="list-style-type: none"> - Solubility II <p>Models (Water and Solutions):</p> <ul style="list-style-type: none"> - Solubility definition - Solubility and temperature - Fizzy drinks

3.1pp	The concentration of a solution may be expressed in molarity (M), percent by volume, percent by mass, or parts per million (ppm).	Yenka Inorganic Chemistry	Related activities: - Moles Dissolved - Standard Solutions - Calculating Concentration as a Molarity 1 - Calculating Concentration as a Molarity 2 and model (Water and Solutions): - Molar concentration
3.1rr	An electrolyte is a substance which, when dissolved in water, forms a solution capable of conducting an electric current. The ability of a solution to conduct an electric current depends on the concentration of ions.	Yenka Inorganic Chemistry Yenka Electrochemistry	Model: - Ions in Solution (Water and Solutions) - Electrolysis (concentration) (Electrochemistry) See also: - Making Cells in Chemistry - Cells II - Electrolysis of Lead Bromide - Electrolysis of Sulfuric Acid - Making a Simple Cell
3.1ss	The acidity or alkalinity of an aqueous solution can be measured by its pH value. The relative level of acidity or alkalinity of these solutions can be shown by using indicators.	Yenka Inorganic Chemistry	Online activities: - Different Indicators - Universal Indicator Model (Acids, Bases and Salts): - pH and indicators See also: - Indicators - Mixing Acids and Alkalis - pH - pH and pOH
3.1tt	On the pH scale, each decrease of one unit of pH represents a tenfold increase in hydronium ion concentration.	Yenka Inorganic Chemistry	Online activity: - Dilution of Acids and Alkalis - pH

3.1yy	There are alternate acid-base theories. One theory states that an acid is an H ⁺ donor and a base is an H ⁺ acceptor.	Yenka Inorganic Chemistry	Model (Acids, Bases and Salts): - Acids and bases
3.1zz	Titration is a laboratory process in which a volume of a solution of known concentration is used to determine the concentration of another solution.	Yenka Inorganic Chemistry	Model (Acids, Bases and Salts): - Titration Online activities: - Neutralisation by Titration Online demonstration: - Neutralisation See also the model (Acids, Bases and Salts): - Titration curves and online activities: - Indicators - Back Titration - Treatment for Indigestion and online demonstrations: - Strong Acid and Strong Base Titration - Buffer Solutions
3.2a	A physical change results in the rearrangement of existing particles in a substance. A chemical change results in the formation of different substances with changed properties.	Yenka Inorganic Chemistry	Related online activity: - Some Physical and Chemical Changes
3.2b	Types of chemical reactions include synthesis, decomposition, single replacement and double replacement.	Yenka Inorganic Chemistry	Online demonstrations: - Decomposition - Displacement - Thermal Decomposition and Reduction of Lead Sulfide See also: - Displacement Reactions - Displacement Reactions and Redox - Solid Displacement Reactions - Thermal Decomposition and Redox

			<p>and online activity:</p> <ul style="list-style-type: none"> - Electrolysis of Sulfuric Acid <p>and online demonstration:</p> <ul style="list-style-type: none"> - Electrolysis of water
3.3a	In all chemical reactions there is a conservation of mass, energy, and charge.	Yenka Inorganic Chemistry	<p>Online activities:</p> <ul style="list-style-type: none"> - Mass Changes in Chemical Reactions <p>See also:</p> <ul style="list-style-type: none"> - Mass Changes During Chemical Reactions
3.3b	In a redox reaction the number of electrons lost is equal to the number of electrons gained.	Yenka Inorganic Chemistry	<p>Online activities:</p> <ul style="list-style-type: none"> - Redox
3.3c	A balanced chemical equation represents conservation of atoms. The coefficients in a balanced chemical equation can be used to determine the mole ratios in the reaction.	Yenka Inorganic Chemistry	<p>Online activities:</p> <ul style="list-style-type: none"> - Chemical Formulae and Equations <p>See also the model (Equations and Amounts):</p> <ul style="list-style-type: none"> - Balanced reactions <p>and online activities:</p> <ul style="list-style-type: none"> - Writing Chemical Equations 1 - Writing Chemical Equations 2 - Writing Chemical Equations 3 - Writing Chemical Equations 4 - Group 1 Chlorides - Copper Oxide and Ammonia
3.3d	The empirical formula of a compound is the simplest whole-number ratio of atoms of the elements in a compound. It may be different from the molecular formula, which is the actual ratio of atoms in a molecule of that compound.	Yenka Inorganic Chemistry	<p>Online activities:</p> <ul style="list-style-type: none"> - Empirical Formula - Chemical Formulae and Equations <p>See also the model (Equations and Amounts):</p> <ul style="list-style-type: none"> - Empirical formula of metal oxide

			and online activities: - Percentage Composition and Empirical Formulae - Working out the Formula of Magnesium Oxide by Experiment
3.3e	The formula mass of a substance is the sum of the atomic masses of its atoms. The molar mass (gram-formula mass) of a substance equals one mole of that substance.	Yenka Inorganic Chemistry	Online activities: - Calculating the Formula Mass of a Compound - The Mole See also: - Water of Crystallisation
3.3f	The percent composition by mass of each element in a compound can be calculated mathematically.	Yenka Inorganic Chemistry	Online activity: - Percentage Composition by Mass
3.4b	Kinetic molecular theory (KMT) for an ideal gas states that all gas particles: <ul style="list-style-type: none"> • are in random, constant, straight-line motion • are separated by great distances relative to their size; the volume of the gas particles is considered negligible. • have no attractive force between them. • have collisions that may result in a transfer of energy between gas particles, but the total energy of the system remains constant. • 	Yenka Inorganic Chemistry	Related online activities: - Comparing Gases, Liquids and Solids - The Behaviour of Solids, Liquids and Gases
3.4e	Equal volumes of gases at the same temperature and pressure contain an equal number of particles.	Yenka Inorganic Chemistry	Online activity: - Molar Volume of Gases See also: - Molar Volume of Oxygen - Molar Volume of Hydrogen
3.4f	The rate of chemical reaction depends on several factors: temperature, concentration, nature of the reactants, surface area, and the presence of a catalyst.	Yenka Inorganic Chemistry	Online activities: - Effect on Rate of Reaction of Varying Surface Area (1) - Effect of Surface Area on Reaction Rate (2) - Effect of Concentration on Reaction Rate (1)

			<ul style="list-style-type: none"> - Effect of Concentration of Reaction Rate (2) - Effect of Particle Size on Reaction Rate - Catalyst - Catalysts <p>Models (Reaction Rates):</p> <ul style="list-style-type: none"> - Catalysts and rate - Concentration and rate - Surface area and rate - Temperature and rate <p>See also online activities:</p> <ul style="list-style-type: none"> - Reaction Rates – Calcium Carbonate and Acid - Calcium Carbonate Reaction Rate Change - Concentration and Rate of Reaction - Reaction Rates - Rate Apparatus - Monitoring Rate of Reaction <p>and models (Reaction Rates):</p> <ul style="list-style-type: none"> - Definition of reaction rate - Measuring reaction rate
3.4g	A catalyst provides an alternate reaction pathway, which has a lower activation energy than an uncatalyzed reaction.	Yenka Inorganic Chemistry	<p>Related online activities:</p> <ul style="list-style-type: none"> - Catalyst - Catalysts - Making and Testing Oxygen <p>and model (Reaction Rates):</p> <ul style="list-style-type: none"> - Catalysts and rate
3.4h	Some chemical and physical changes can reach equilibrium.	Yenka Inorganic Chemistry	<p>Related models (Equations and Amounts):</p> <ul style="list-style-type: none"> - Equilibrium (ammonium chloride) - Equilibrium and temperature
3.4i	At equilibrium the rate of the forward reaction equals the rate of the reverse reaction. The measurable quantities of reactants and products remain constant at equilibrium.		

Key Idea 5: Energy and matter interact through forces that result in changes in motion.

	Performance Indicator	Product	Content
5.2a	Chemical bonds are formed when valence electrons are: <ul style="list-style-type: none"> transferred from one atom to another (ionic) shared between atoms (covalent) mobile within a metal (metallic) 	Yenka Inorganic Chemistry	Online activities: - Properties of Ionic Materials - Properties of Covalent Materials - Electron Arrangements and the Formulae of Compounds See also: - Periodic Table (2)
5.2d	Electron-dot diagrams (Lewis structures) can represent the valence electron arrangement in elements, compounds, and ions.	Yenka Inorganic Chemistry	Related online activities: - Properties of Ionic Materials - Properties of Covalent Materials
5.2g	Two major categories of compounds are ionic and molecular (covalent) compounds.	Yenka Inorganic Chemistry	Related online activities: - Properties of Ionic Materials - Properties of Covalent Materials
5.2i	When a bond is broken, energy is absorbed. When a bond is formed, energy is released.	Yenka Inorganic Chemistry	Related online activity: - Energy Changes in Reactions (1)
5.2n	Physical properties of substances can be explained in terms of chemical bonds and intermolecular forces. These properties include conductivity, malleability, solubility, hardness, melting point, and boiling point.	Yenka Inorganic Chemistry	Online activities: - Properties of Ionic Materials - Properties of Covalent Materials See also models (Classifying Materials): - Ionic, covalent and metallic (conductivity) - Ionic, covalent and metallic (melting points) - Ionic, covalent and metallic (solubility)

* **Note:** Yenka Chemistry ignores the transition elements when labeling groups in the Periodic Table. Therefore where the NY curriculum refers to groups 13 to 18, Yenka activities talk of groups 3 to 7, with the noble gases in group 0. The transition metals come between groups 2 and 3. Please refer to the Periodic Table in Yenka for clarification.

If you have any questions about Yenka or this document, please contact [Esther Droop](#) or visit www.yenka.com