

NY Physics 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 physics 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.



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STANDARD 4: The Physical Setting

Key Idea 4: Energy exists in many forms, and when these forms change energy is conserved.

	Performance Indicator	Product	Content
4.1a	All energy transfers are governed by the law of conservation of energy.	Yenka Motion	Online activities: - Work Done Against Gravity
4.1b	Energy may be converted among mechanical, electromagnetic, nuclear, and thermal forms.	Yenka Gears	Online demonstrations: - Playground Scenes - Projectile – Horizontal and Vertical Velocity - Mass and Gravitational Acceleration See also models: - Elastic potential energy (Energy and Motion) - Transforming energy (Electrical Energy) and online demonstrations: - Wind-Up Torch - Wind Generator
4.1c	Potential energy is the energy an object possesses by virtue of its position or condition. Types of potential energy include gravitational and elastic.	Yenka Motion	Online activities: - Work Done Against Gravity Model (Energy and Motion): - Elastic potential energy
4.1d	Kinetic energy is the energy an object possesses by virtue of its motion.	Yenka Motion	See related online activity: - Kinetic Energy Formula
4.1e	In an ideal mechanical system, the sum of the macroscopic kinetic and potential energies (mechanical energy) is constant.	Yenka Motion	Online demonstrations: - Mass and Gravitational Acceleration - Playground Scenes - Projectile – Horizontal and Vertical Velocity

4.1g	When work is done on or by a system, there is a change in the total energy of the system.	Yenka Motion	Online activity: - Work Done Against Gravity Model (Energy and Motion): - Work done
4.1k	Moving electric charges produce magnetic fields. The relative motion between a conductor and a magnetic field may produce a potential difference in the conductor.	Yenka Motion	Related online activity: - Transformers
4.1m	The factors affecting resistance in a conductor are length, cross-sectional area, temperature, and resistivity.	Yenka Motion	Online activity: - Ohm's Law
4.1o	Circuit components may be connected in series or in parallel. Schematic diagrams are used to represent circuits and circuit elements.	Yenka Motion Yenka Electronics Yenka Electricity	Online activities: - Connecting to a Power Supply in Parallel - Quiz for Current in Circuits - Measuring Current and Voltage - Circuit Symbols and Diagrams See also, the online activities: - Currents in a Parallel Circuit 1 - Currents in a Parallel Circuit 2 - Voltage Around a Circuit 1 - Voltage Around a Circuit 2 - Voltage - Series Circuits - Parallel Circuits and models (Circuits): - Parallel circuits - Series circuits (lamps)
4.1p	Electrical power and energy can be determined for electric circuits.	Yenka Electricity	Online activity: - Power, Current and Voltage Model (Electrical Energy): - Electrical Power

		Yenka Motion	See also: - Power Transmission Lines - Resistor Power Dissipation - Power Transmission
4.3a	An oscillating system produces waves. The nature of the system determines the type of wave produced.	Yenka Light and Sound	Online activity: - Longitudinal or Transverse
4.3b	Waves carry energy and information without transferring mass. This energy may be carried by pulses or periodic waves.		
4.3c	The model of a wave incorporates the characteristics of amplitude, wavelength, frequency, period, wave speed, and phase.	Yenka Light and Sound	Online activities: - Frequency and Period - Wave Speed - Transverse Waves - Longitudinal Waves See also the demonstration: - Coherence and model (Waves): - Speed of sound
4.3e	Waves are categorized by the direction in which particles in a medium vibrate about an equilibrium position relative to the direction of propagation of the wave, such as transverse and longitudinal waves.	Yenka Light and Sound	Related online activities: - Longitudinal or Transverse - Longitudinal Waves - Transverse Waves
4.3f	Resonance occurs when energy is transferred to a system at its natural frequency.	Yenka Light and Sound	Related online demonstrations: - Coherence - Microwave Reflection Interference
4.3g	Electromagnetic radiation exhibits wave characteristics. Electromagnetic waves can propagate through a vacuum.	Yenka Light and Sound	Model (Waves): - Electromagnetic spectrum See also the online activities: - X-Rays in Medicine - Wave Speed

4.3h	When a wave strikes a boundary between two media, reflection, transmission, and absorption occur. A transmitted wave may be refracted.	Yenka Light and Sound	<p>Related online activities:</p> <ul style="list-style-type: none"> - Microwave Reflection Interference - Fibre-optic Cable <p>See also the models (Waves):</p> <ul style="list-style-type: none"> - Absorption of radiation - Reflection and refraction
4.3i	When a wave moves from one medium into another, the wave may refract due to a change in speed. The angle of refraction (measured with respect to the normal) depends on the angle of incidence and the properties of the media (indices of refraction).	Yenka Light and Sound	<p>Online activities:</p> <ul style="list-style-type: none"> - Wave Refraction 1 - Wave Refraction 2 - Refraction – Turning Light - Refraction and Colour <p>Model (Waves):</p> <ul style="list-style-type: none"> - Reflection and refraction <p>See also:</p> <ul style="list-style-type: none"> - Pure Colour - Fibre-optic Cable
4.3k	All frequencies of electromagnetic radiation travel at the same speed in a vacuum.	Yenka Light and Sound	<p>Related model (Waves):</p> <ul style="list-style-type: none"> - Electromagnetic spectrum
4.3l	Diffraction occurs when waves pass by obstacles or through openings. The wavelength of the incident wave and the size of the obstacle or opening affect how the wave spreads out.	Yenka Light and Sound	<p>Model (Waves):</p> <ul style="list-style-type: none"> - Diffraction
4.3m	When waves of a similar nature meet, the resulting interference may be explained using the principle of superposition. Standing waves are a special case of interference.	Yenka Light and Sound	<p>Online activities:</p> <ul style="list-style-type: none"> - Microwave Reflection Interference - Coherence
4.3n	When a wave source and an observer are in relative motion, the observed frequency of the waves travelling between them is shifted (Doppler effect).	Yenka Light and Sound	<p>Model (Waves):</p> <ul style="list-style-type: none"> - Doppler shift

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

	Performance Indicator	Product	Content
5.1a	Measured quantities can be classified as either vector or scalar.	Yenka Motion	Related online activity: - Speed or Velocity
5.1b	A vector may be resolved into perpendicular components.	Yenka Motion	Related online demonstration: - Inclined Plane
5.1c	The resultant of two or more vectors, acting at an angle, is determined by vector addition.	Yenka Motion	Related model (Force and Acceleration): - Resultant forces
5.1e	An object in free fall accelerates due to the force of gravity. Friction and other forces cause the actual motion of a falling object to deviate from its theoretical motion.	Yenka Motion	Online activity: - Kinetic Energy and Gravity
5.1f	The path of a projectile is the result of the simultaneous effect of the horizontal and vertical components of its motion; these components act independently.	Yenka Motion	Online demonstrations: - Projectile Motion with Varying Height - Projectile with Varying Speed - Projectile with Varying Gravity - Projectile – Horizontal and Vertical Velocity See also: - Monkey and Hunter
5.1g	A projectile's time of flight is dependent upon the vertical component of its motion.		
5.1h	The horizontal displacement of a projectile is dependent upon the horizontal component of its motion and its time of flight.		
5.1i	According to Newton's First Law, the inertia of an object is directly proportional to its mass. An object remains at rest or moves with constant velocity, unless acted upon by an unbalanced force.	Yenka Motion	Model (Force and Acceleration): - Newton's first law
5.1k	According to Newton's Second Law, an unbalanced force causes a mass to accelerate.	Yenka Motion	Model (Force and Acceleration): - Newton's second law Online activities: - M and A for Fixed Force - F and A for Fixed Mass

			See also: <ul style="list-style-type: none"> - F = ma – Finding Force - F = ma – Finding Mass - F = ma – Acceleration - F = ma – The Full Set
5.1l	Weight is the gravitational force with which a planet attracts a mass. The mass of an object is independent of the gravitational field in which it is located	Yenka Motion	Online activities: <ul style="list-style-type: none"> - Weight or Mass?
5.1n	Centripetal force is the net force which produces centripetal acceleration. In uniform circular motion, the centripetal force is perpendicular to the tangential velocity.	Yenka Motion	Related online demonstration: <ul style="list-style-type: none"> - Orbit <p>and models (Force and Acceleration):</p> <ul style="list-style-type: none"> - Circular motion (changing mass) - Circular motion (changing radius)
5.1p	The impulse imparted to an object causes a change in its momentum.	Yenka Motion	Related online demonstrations: <ul style="list-style-type: none"> - Ball Dropped onto Different Surfaces - Different Balls Dropped onto a Wooden Surface
5.1q	According to Newton's Third Law, forces occur in action/reaction pairs. When one object exerts a force on a second, the second exerts a force on the first that is equal in magnitude and opposite in direction.	Yenka Motion	Model (Force and Acceleration): <ul style="list-style-type: none"> - Newton's third law <p>See also:</p> <ul style="list-style-type: none"> - Orbit
5.1r	Momentum is conserved in a closed system.	Yenka Motion	Model (Energy and Motion): <ul style="list-style-type: none"> - Conservation of momentum <p>See also:</p> <ul style="list-style-type: none"> - Newton Cradle

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