France Eduational Curriculum Alignment

The presentations offered by The Educated Choices Program provide support for teaching and learning of the following standards:

Chemical Physics, High School		Environment and Modern Agriculture	Healthful Eating
Constitution and transformations of matter 1. Monitoring the evolution of a system, the seat of a transformation	Concepts covered in second ● Amount of substance (mol) ○ definition of mole ○ solution ○ solute ○ mass concentration ● Dosage by calibration ● Modeling of a transformation by a chemical reaction ● Reaction equation ● Concept of limiting reactant Concepts and content ● Required capacities ● Experimental activities supporting training A) Determine the composition of the initial system using physical quantities ● Relationship between molar mass of a species ● Mass of entities and Avogadro's constant ● Molar atomic mass of an element ● Molar volume of a gas.		✔

France Educational Curriculum Standards, last updated (June 15th, 2022)

	○ Determine the molar mass of a species from the atomic molar masses of the elements which compose. ○ Determine the amount of matter in a sample of pure substance from its mass and the periodic table. ○ Use the molar volume of a gas to determine a quantity of matter. ● Determine the amount of matter of each species in a mixture (liquid or solid) from its composition. ○ Concentration in quantity of matter. ● Determine the amount of substance in a solute from its concentration by ○ mass ○ or quantity of matter ○ and the volume of solution. ● Determine absorbance, Spectrum of absorption, color of a species in solution, law of Beer Lambert. ● Explain or predict the color of a species in a solution from its UV-visible spectrum. ○ Determine the concentration of a solute from experimental data relating to the absorbance of solutions of known concentrations. ○ Propose and implement a protocol to carry out a standard range and determine the concentration of a colored species in solution by measurements of absorbance. ○ Test protocol usage limits. B) Monitoring and modeling the evolution of a chemical system transformation modeled by an oxidation-reduction reaction: ● oxidant ● Reducer		

- couple
- oxidizer-reductor
- half equation
- electronic

From experimental data, identify the transfer of electrons between two reactants and model it by electronic half-equations and by an oxidation-reduction reaction.

- Establish an equation of the reaction between an oxidant and a reducer, the oxidant-reducer couples being given.
- Implement transformations modeled by redox reactions.
- Determine the evolution of the quantities of material during processing.
  - initial state
  - concept of progress (mol)
  - progress table
  - final status

- Qualitatively describe the evolution of the quantities of material of the chemical species during a transformation.
  - Establish the progress table of chemical transformation from the equation of the reaction and the initial amounts of matter of the chemical species.
  - final advancement
  - advancement maximum
  - total transformations and not total

	Stoichiometric mixtures ● Determine the composition of the system in the final state depending on its initial composition for a transformation considered total. ● Determine the final progress of a reaction from the description of the final state and compare to progress maximum. ● Determine the composition of the final state of a system and the final progress of a reaction. Numerical Ability Determine the composition of the final state of a system undergoing total chemistry transformation using a programming language. Math Ability Use first degree linear equations. C) Determine a quantity of matter from a Titration chemical transformation with color tracking. ● Redox reaction titration support ● Change of limiting reagent during the titration ● Define and identify equivalence ● Qualitatively link the evolution of the quantities of matter of reactants and products in the final state to the volume of titrant added. ● Relate equivalence to the change of limiting reagent and to the introduction of the reagents in stoichiometric proportions ● Establish the relationship between the quantities of reactant matter introduced to achieve equivalence. ● Explain or predict the color change observed at the titration equivalence involving a colorful species ● Carry out a direct titration with colorimetric identification of equivalence to determine the quantity of substance of a species in a		

	sample. ● Prepare a solution by dissolution or by dilution by choosing the appropriate equipment. ● Realize the UV-visible absorption spectrum of a chemical species. ● Carry out absorbance measurements with the help of a manual. ● Implement a recognition test to identify a chemical species. ● Implement the experimental protocol of a direct titration with tracking colorimetric equivalence. ● Use simulation software and molecular models to visualize the geometry of chemical entities. ● Propose and implement a liquid-liquid extraction protocol of a chemical species from solubility and miscibility data. ● Implement reflux heating and fractional distillation devices. ● Perform filtration, washing to isolate and purify a chemical species. ● Perform thin layer chromatography. ● Implement a device to estimate a change of state temperature ● Respect the recommended safety rules when using chemicals products and glassware. ● Respect the mode of elimination of a chemical species or a mixture in order to minimize the impact on the environment.		
2. From the structure of entities to the physical properties of matter	Required skills, concepts and content Experimental activities supporting training A) From the structure to the polarity of an entity ● Lewis diagram of a molecule, of a mono ion or polyatomic. ● Electronic gap. ● Feature geometry.		✔

	● Draw the Lewis diagram of mono molecules and ions or polyatomics, from the periodic table: ○ OH , 2 2N, HO, CO, NH, CH, HCl, H, HO, Na, NH, Cl, OH, 2 2 2 3 4 3 4 2-O. Interpret the geometry of a feature from its Lewis diagram. ● Use molecular models or modeling software molecular representation to visualize geometry of an entity. ● Electronegativity of atoms, evolution in the periodic table. ● Polarization of a covalent link, polarity of a molecular entity. ● Determine the polar character of a bond from the given electronegativity of atoms. ● Determine the polar or apolar character of a molecule entity from its geometry and the polarity of its connections. B) From the structure of entities to the cohesion and solubility/miscibility of chemical species ● Cohesion in a solid. ● Modeling by interactions between ○ Ions ○ polar entities ○ apolar entities and/or ○ hydrogen bridge. ● Explain cohesion within solid ionic and molecular compounds through the analysis of interactions between entities. ● Dissolution of ionic solids in water ● Reaction equation of dissolution ● Explain the ability of water to dissociate a species ionic and to solvate ions. ● Model, at the macroscopic level, the dissolution of an ionic compound in water by a reaction equation, using the notations (s)		

	and (aq). ● Calculate the concentration of ions in the solution obtained. ● Solvent extraction. ● Solubility in a solvent. ● Miscibility of two liquids. ● Explain or predict the solubility of a chemical species in a solvent by analyzing the interactions between the entities. ● Compare the solubility of a solid species in different solvents (pure or mixed). ● Interpret a liquid-liquid extraction protocol from solubility values of the chemical species in the two solvents. ● Choose a solvent and implement a protocol liquid-liquid extraction of a molecular solute ● Hydrophilic/lipophilic/amphiphilic of a chemical species organic. ● Explain amphiphilic character and washing agents properties of a soap from the semi-developed formula of its entities. ● List common applications of surfactants. ● Illustrate the properties of soaps.		
3. Physico-chemical properties, synthesis and combustion of chemical species organic	Required capacities, concepts and content Experimental activities supporting training A) Structure of organic entities ● Crude and semi-developed formulas ● Saturated carbon skeletons ● Characteristic groups and functional families. ● Identify, from a semi-developed formula, the characteristic groups associated with the families of compounds: ○ alcohol		✔

	◦ aldehyde ◦ ketone and ◦ carboxylic acid • Link between name and semi-developed formula. • Justify the name associated with the condensed structural formula of simple molecules with only one group characteristic and vice versa. • Identify groups' characteristics by infrared spectroscopy. • Exploit, from reference values, an infrared spectrum absorption. • Use molecular models or software to visualize the geometry of organic molecules. B) Syntheses of organic chemical species protocol steps • Identify, in a protocol, the transformation steps reagents, isolation, purification and analysis (identification, purity) of the synthesized product. • Justify, based on the physico-chemical properties of the reagents and products, the choice of isolation methods, purification or analysis. • Yield of a synthesis. • Determine, based on a protocol and data experimental results, the yield of a synthesis. • Schematize experimental devices of the synthesis steps and caption them. • Implement a reflux assembly to synthesize an organic chemical species. • Isolate, purify and analyze a product formed. C) Conversion of stored energy in organic matter to usual organic fuels Cite examples of common fuels. • Combustion modeling by an oxidation-reduction reaction. • Write the complete combustion reaction equation of an alkane and an alcohol.		

	◦ molar energy of reaction ◦ specific calorific value ◦ energy released during a combustion. • Microscopic interpretation in gaseous phase: ◦ modification of molecular structures ◦ energy link • Estimate the molar energy of reaction for a transformation into gaseous phase from the bond energies data • Implement an experiment to estimate the heat power of a fuel. Combustions and issues of society. • List common applications that implement combustion and the associated risks. • List current areas of study for applications from a perspective of sustainable development.		
Movement and interactions	Concepts and content Required skills Experimental activities supporting training 1. Fundamental interactions and introduction to the notion of field electric charge, interaction, electrostatic, influence, electrostatic. • Interpret experiments involving electrostatic interaction • Use Coulomb's law ◦ cite the analogies between Coulomb's law and the law of gravitational interaction. • Gravitational force and field of gravitation. • Electrostatic force and field electrostatic force. ◦ Use vector expressions: ▪ the gravitational force and the gravitational field		✔

- electrostatic force and electrostatic field.
- Characterize a locally electrostatic field line or gravitational field.
- Illustrate the electrostatic interaction.
- Map an electrostatic field.

2. Description of a fluid at rest
- Description scales.
- Macroscopic quantities of description of a fluid at rest:
  - density
  - pressure
  - temperature
- Qualitatively explain the link between the quantities macroscopic description of a fluid and the microscopic behavior of the entities they constitute.

- Model of behavior of a gas:
  - use Mariotte's law.
  - test Mariotte's law, for example by using a device comprising a microcontroller.
- Actions exerted by a fluid on a surface:
  - forces pressing
- Exploit the relationship F = P.S to determine the pressure force exerted by a fluid on a flat surface, S, subjected to the pressure, P.
- Fundamental law of statics fluids.
  - In the case of an incompressible fluid at rest, use the relationship provided expressing the fundamental law of fluid statics P2-P1 = g(z1-z2).
- Test the fundamental law of fluid statics.

3. Movement of a system speed variation vector.
- Link between vector variation velocity of a modeled system by a

	material point between two neighboring instants and the sum of forces applied to it. Role of the mass. ● Use the approximate relationship between the system speed variation vector, modeled by a material point between two neighboring instants and the sum of the forces applied ○ to deduce an estimate of the variation of speed between two neighboring instants, the forces applied to the system being known ○ to deduce an estimate of the forces applied to the system, the kinematic behavior being known ● Produce and/or use a video or a chronophotography of a system modeled by a point moving material to build speed variation vectors. ● Test the approximate relationship between the variation of the velocity vector between two neighboring instants and the sum of the forces applied to the system. Numerical Ability: ● Use a programming language to study the approximate relationship between the variation of the system velocity vector modeled by a material point between two neighboring instants and the sum of the forces applied to it. Math Ability: Summing and subtracting vectors. ● Implement a device to illustrate electrostatic interaction. ● Use a device to locate the direction of the electric field. ● Measure pressure in a gas and in a liquid. ● Implement an experimental device to collect data on a movement (video, chronophotography, etc.).		

Energy: conversions and transfers	1. Energetic aspects of electrical phenomena Concepts and content Required skills Experimental activities supporting training ● Electric charge carrier. ● Link between intensity of a continuous current and load flow. ● Linking the intensity of a direct current and the flow rate of charges. ● Model of a real source of DC voltage as an association series of an ideal source DC voltage and of a resistance. ● Explain some practical consequences of a resistor presence in the model of a source actual DC voltage. ● Determine the characteristic of a real source of tension and use it to propose a modeling of an ideal source associated with a resistance. Power and energy ● Power balance in a circuit Joule effect ● Case of dipoles ohmic Efficiency of a converter. ● Quote a few orders of magnitude of power supplied or consumed by common devices. ● Define the efficiency of a converter. ● Evaluate the performance of a device 2. Energetic aspects of mechanical phenomena Concepts and content Required skills Experimental activities supporting training ● Kinetic energy of a system modeled by a material point.		✔

	- Work of a force. - Expression of work in the case with a constant force. - Kinetic energy theorem. - Use the expression for the kinetic energy of a system modeled by a material point. - Use the job expression WAB(F) F.AB in the case of constant forces. - State and use the kinetic energy theorem. Conservative forces - Energy potential - Case of the field of earth's gravity. - Establish and use the expression for the potential energy of gravity for a system near the surface of Earth. Non-conservative forces - Example of friction - Calculate the work of a frictional force of constant intensity in the case of a rectilinear trajectory. - Mechanical energy - Preservation and non-preservation mechanical energy. - Gain or dissipation of energy. - Identify conservation and non-conservation situations conservation of mechanical energy. - Use the variation of mechanical energy to determine the work of the non-conservative forces. - Exploit the conservation of mechanical energy in simple cases: - free fall in the absence of friction - oscillations of a pendulum in the absence of friction, etc. - Use the variation of mechanical energy to determine the work of the non-conservative forces.		

	○ Use a device (smartphone, processing software images, etc.) to study the evolution of energies kinetics, potential and mechanics of a system in different situations: ■ fall of a body ■ rebound on a support ■ oscillations of a pendulum, etc. Numerical Ability ● Use a language of programming to carry out the energy balance of a moving system. Mathematical ability ● Use the scalar product of two vectors. ● Use a multimeter, adjust the gauge if necessary. ● Carry out an electrical assembly in accordance with a standardized electrical diagram. ● Measure and process a signal using a measurement interface or a microcontroller. ● Control the production of a signal using a microcontroller. ● Implement a protocol to estimate transferred energy electrically or mechanically. ● Respect the recommended safety rules when using electrical appliances.		
Waves and signals	Concepts and content Required capacities ● Experimental activities supporting progressive training mechanical waves. Associated physical quantities ● Describe, in the case of a progressive mechanical wave, the propagation of a mechanical disturbance of a medium in space and		✔

	over time: ○ swell ○ seismic waves ○ sound waves, etc. ● Explain, using a qualitative model, the propagation of a mechanical disturbance in a material medium. ● Produce a disturbance and visualize its propagation in various situations, for example: ○ sound wave ○ wave along a string or a spring ○ wave at the surface of the water. Speed of a wave ● Delay ● Exploit the relationship between the propagation time, the distance traveled by a disturbance and the speed, in particular to locate a wave source. ● Determine, for example using a microcontroller or a smartphone, a distance or the speed of a wave. ● Illustrate the influence of the medium on the speed of a wave. Periodic mechanical waves ● Sine waves ● Period ● Wave length ● Relationship between period, length wave and celerity. ● Distinguish spatial periodicity and temporal periodicity. ● Justify and exploit the relationship between period, length wave and celerity. ● Determine the characteristics of a mechanical periodic wave from spatial or temporal representations. ● Determine period, wavelength and celerity of a traveling sine wave		

	using a string of measurement. Numerical Abilities ● Representing a periodic Signal and illustrate the influence of its characteristics (period, amplitude) on its representation. ● Simulate, using a programming language, propagation of a periodic wave. Mathematical ability ● Use graphs representing sine and cosine functions. 2. Light: ● images and colors, wave and particle models Concepts and content Required capacities ● Experimental activities supporting training ○ A) Images and colors conjugation relation of a converging thin lens. ● Magnification ○ real image ○ virtual image ○ upright image ○ reverse image ● Exploit the conjugation relations and magnification provided to determine the position and size of the image of a real plane object. ● Determine the characteristics of the image of an object ○ real plane formed by a thin converging lens. ● Estimate the focal length of a thin lens convergent. ● Testing the conjugation relationship of a thin lens convergent. ● Achieve focus by changing either the focal length distance of the converging lens, i.e. the geometry of the optical assembly.		

	Math skills ● Use the theorem of Thales. ● Use algebraic quantities. Color ● White color ● Colors complementary ● Color of objects Synthesis ● Additive ● Subtractive synthesis ● Absorption ● Diffusion ● Transmission Color vision and tri-chromy ● Choose the additive synthesis model or the subtractive synthesis according to the situation to be interpreted. ● Interpret the perceived color of an object from incident light as well as phenomena ○ absorption ○ scattering ○ transmission. Predict the result of the light overlay colors and the effect of one or more color filters on an incident light. ● Illustrate the notions of additive synthesis, subtractive synthesis and colored objects. B) Wave and particle models of electromagnetic lightwave domains. ● Relationship between wavelength, speed of light and frequency. ● Use a scale of frequencies or wavelengths to identify a spectral		

	domain. ● Quote the order of magnitude of frequencies or lengths of electromagnetic waves used in various areas of application (medical imaging, visible optics, wifi signals, microwaves, etc.). The photon ● Energy of a photon ● Qualitative description of the light-matter interaction: ○ absorption ○ emission. ● Quantization of energy levels of atoms. ● Use the expression giving the energy of a photon. ● Exploit an energy level diagram using the relations $\lambda = c /$ and $\Delta E = h$. ● Obtain the spectrum of a spectral source and interpret it from the diagram of energy levels of the entities which constitute it. ● Implement an experimental device to illustrate the propagation of a mechanical disturbance. ● Implement an experimental device to collect data on the propagation of a mechanical disturbance (video, chronophotography, etc.). ● Implement a device to measure the period, the wavelength, the speed of a periodic wave. ● Implement an experimental approach to estimate the focal length of a converging thin lens. ● Make an optical assembly with a thin lens to view the image of a real plane object. ● Implement a device to illustrate additive synthesis or subtractive synthesis. ● Implement a device to illustrate that the apparent color of an object depends on the light source. ● Implement an experimental protocol to obtain a spectrum resignation.		

	• Comply with the safety rules recommended when using bright sources.		

Cinema-Audiovisual - First Class, High School		Environment and Modern Agriculture	Healthful Eating
Preamble specific to the teaching of audiovisual cinema specialties	Knowledge and skills worked • During this specialized teaching, the student acquires skills which promote the affirmation of one's judgment and creative practice, individual or collective. ○ knowledge ■ aesthetic ■ cultural ■ historical ■ technical ○ develops skills ■ reflective ■ analytical and methodological ■ artistic ■ critical • These knowledge and skills can be organized according to the following four sets: ○ Understand the meaning of a cinematographic and audiovisual work in connection with its context and audience ○ Appreciate the specificity of an artistic gesture in the	✔	✔

	cinematographic field and audiovisual ○ Determine the constituent choices of a creative project and implement them ○ Analyze film productions and audiovisual, accurately and well-argued ● Choose the relevant analysis tools and methods according to the media and specific writing contexts ● Mobilize your analytical skills in the service of your own writing practice, film and audiovisual. ● Understand the main landmarks in the history of cinema and audiovisual related with those of the other arts ● Understanding the relationship between technical innovation and cinematographic and audiovisual creation at different times ● Mobilize their knowledge to nourish their experience as a spectator and their artistic practice. ● Experience through discovery and exchange one's own aesthetic choices ● Affirm the values specific to its responsibility as spectator and creator ● Present and defend your artistic project and the choices on which they are based. Learning situations and student experiences In cinema-audiovisual, students experience a variety of learning situations, including: ● The encounter with works ● The exchange with professionals ● The artistic practice in the form of exercises or projects ● The theoretical and historical contributions in the conduct of the teacher		

	- The analytical procedures In the experiences of the student, these different pedagogical methods are associated with strong relationships between the theoretical and practical dimensions of teaching. In the first year of special education, the emphasis is on creative affirmation biases. In this perspective, a prominent place is given to following learning situations: - Detailed study of works and in particular the construction of the point of view - Exchanges and work with professionals - Carrying out exercises and projects that can range from writing script until final assembly - Development of a creative notebook accompanying a project of the year and the reflections they arouse - Personal arguments to expose and justify a point of an artistic view - Confrontation with other gazes - Critical apprehension of various audiovisual writings to identify and understand their specifics - Implementation of various analysis methods and tools - cultural - technical - formal - historical - economics, etc. - Introduction to theoretical reflection based on historical and aesthetic references. By the end of the first year,		

	the student is expected to be able to: ● Appreciate the specificity of an artistic gesture in the cinematographic field and audiovisual in connection with one of the questions of the year ● Analyze and put into perspective the major choices that preside over the creation of a cinematographic work in relation to its production context and the realities of his time ○ technical ○ cultural ○ economics, etc. ● Identify some major relationships between technical innovation and artistic choice ● Develop a personal writing approach (from the script to the editing) by affirming his point of view and justifying it ● Analyze in detail an extract or a work from one of the questions of the year by choosing the appropriate tools. Evaluation ● Promote a variety of situations involving alternatively or jointly ○ written or oral ○ theoretical or practical ○ individual or collective skills ● Evaluate of the practical dimension, favor the path of reflection, the student's creative process and ability to justify them ● Encourage situations where the student identifies and justifies his artistic choices, through a variety of media ● Associate as soon as possible the theoretical dimension and the practical dimension of learning, and measure the student's capacity for reinvestment ● Promote the intersection of assessments, teachers and stakeholders		

	professionals.
	● Present a reasoned reflection on works, in writing or orally
	● Analyze excerpts or works using various methods and tools, in writing or orally
	● Rewrite a script or film fragments based on instructions, the analysis and confrontation of various supports and documents to build a personal reflection
	● Carry out exercises or a creative project and their critical presentation
	● Highlight personal or collective traces and documents attesting to the progression and affirmation of a point of view throughout the creative project
	    ○ meetings
	    ○ interviews
	    ○ project status
	    ○ research
	    ○ references		