



# **E-I-STEAM**

## **Progetto: Infografiche per STEAM**

### **Resoconto dei principali problemi in STEAM**

Progetto numero

2019-1-PL-01-KA201-064984

IES Mediterraneo de Cartagena, Cartagena, Spain	Materia	Età 14-15	Età 16-17
	Matematica	<ul style="list-style-type: none"> <li>• <b>Funzioni</b></li> <li>• <b>Stereometria</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Trigonometria</b></li> <li>• <b>Probabilità</b></li> </ul>
	Fisica	<ul style="list-style-type: none"> <li>• <b>Struttura atomica</b></li> <li>• <b>Stoichiometria</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Forze</b></li> <li>• <b>Energia</b></li> </ul>
	Biologia	<ul style="list-style-type: none"> <li>• <b>Mitosi e meiosi</b></li> <li>• <b>Terza legge di Mendel</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Clonazione</b></li> <li>• <b>Metodi radiometrici</b></li> <li>• <b>Efficienza energetica</b></li> </ul>
	Arte	<ul style="list-style-type: none"> <li>• <b>Metrica geometrica</b></li> <li>• <b>Geometria descrittiva</b></li> <li>• <b>Analisi delle forme</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Regole di composizione visuale</b></li> <li>• <b>Teoria del colore</b></li> </ul>
	Tecnologia	<ul style="list-style-type: none"> <li>• <b>Strutture</b></li> <li>• <b>Elettricità</b></li> <li>• <b>Utilizzo dei materiali</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Elettronica</b></li> <li>• <b>Tipi di energie</b></li> </ul>

Liceul Teoretic „Tudor Arghezi” Craiova, Romania	Materia	Età 14-15	Età 15-16	Età 16-17
	Matematica	<ul style="list-style-type: none"> <li>• Interpretazione grafica delle funzioni</li> <li>• Operazioni coi vettori</li> </ul>	<ul style="list-style-type: none"> <li>• Proprietà delle funzioni logaritmiche esponenziali</li> <li>• Funzioni trigonometriche inverse</li> </ul>	<ul style="list-style-type: none"> <li>• Ruolo della seconda derivata nello studio di funzioni</li> </ul>
	Biologia	<ul style="list-style-type: none"> <li>• Legi di Mendel</li> <li>• Divisione della cellula</li> <li>• Mutazioni genetiche</li> </ul>	<ul style="list-style-type: none"> <li>• Fotosintesi</li> <li>• Sistema nervoso centrale</li> </ul>	
	Tech – Informatica	<ul style="list-style-type: none"> <li>• Combining correspondence</li> </ul>	<ul style="list-style-type: none"> <li>• Funzioni in EXCEL</li> <li>• Elenchi in ACCESS</li> </ul>	<ul style="list-style-type: none"> <li>• Linguaggi di programmazione</li> </ul>
	Chimica	<ul style="list-style-type: none"> <li>• Acido e basico</li> <li>• Gel, saponi, detergenti</li> </ul>	<ul style="list-style-type: none"> <li>• Composti organici</li> </ul>	
	Fisica	<ul style="list-style-type: none"> <li>• Legge di attrazione universale</li> <li>• Leggi della conservazione meccanica</li> </ul>	<ul style="list-style-type: none"> <li>• Macchine termiche</li> </ul>	

Subject	15 years	16 years	17 years	18 years
<b>Math</b>	<b>Algebraic expressions</b> <ul style="list-style-type: none"> <li>- Factorization</li> <li>- Algebraic fractions</li> </ul>	<b>Quadratic Function</b> <b>Quadratic function,</b> <ul style="list-style-type: none"> <li>- Properties and graph</li> <li>- Vieta's formulas</li> <li>- Square inequalities</li> </ul>	<b>Trigonometry</b> <ul style="list-style-type: none"> <li>- Graph of trigonometric functions</li> <li>- Trigonometric equations</li> <li>- Application of the sine and cosine theorem</li> </ul>	<b>Sequences and progressions</b> <ul style="list-style-type: none"> <li>- The limit of a sequence</li> </ul>
	<b>Roots</b> <ul style="list-style-type: none"> <li>- Root operations</li> <li>- Irrational expressions</li> </ul>	<b>Trigonometric functions</b> <ul style="list-style-type: none"> <li>- Sharp-angle in a rectangular triangle</li> </ul>	<b>Exponential and logarithmic function</b> <ul style="list-style-type: none"> <li>- Exponential function graph</li> <li>- Graph of the logarithmic function</li> <li>- Exponential and logarithmic equations and inequalities</li> </ul>	<b>Differential calculus</b> <ul style="list-style-type: none"> <li>- Application of derivatives</li> <li>- Examination of flow and graph of functions with derivatives</li> </ul>
		<b>Stereometry</b> <ul style="list-style-type: none"> <li>- Cross-sections of prisms and pyramids</li> <li>- Area and volume of truncated cones and pyramids</li> </ul>	<b>Combinatory</b> <ul style="list-style-type: none"> <li>- The difference between permutations, variations and combinations</li> <li>- Applying combinatory in real life problems</li> </ul>	<b>Probability</b> <ul style="list-style-type: none"> <li>- Conditional probability</li> </ul>
			<b>Analytical geometry</b> <ul style="list-style-type: none"> <li>- Mutual position of a line and a circle, an ellipse, a hyperbola and a parabola</li> </ul>	<b>Functions and limit</b> <b>Reading properties of Real Functions on Graph:</b> <ul style="list-style-type: none"> <li>- Bounded and unbounded functions</li> <li>- Periodic functions</li> <li>- Even and odd functions</li> <li>- Convex and concave functions</li> <li>- Limits of real functions</li> <li>- Asymptotes of some curves</li> </ul>

<b>SOU Gimnazija Koco Racin, Veles, North Macedonia</b>	<b>Subject</b>	<b>15 years</b>	<b>16 years</b>	<b>17 years</b>
	<b>Physics</b>	<b>Gravity</b> <ul style="list-style-type: none"> <li>- Newton's law of gravity</li> <li>- Kepler's laws</li> <li>- Movement of satellites (Deriving the formula of Newton's law of gravity)</li> <li>Movement of planets and other space objects 1<sup>st</sup> and 2<sup>nd</sup> cosmic speed)</li> </ul>	<b>Electric field</b> <ul style="list-style-type: none"> <li>- Coulomb's law</li> <li>- Electric potential</li> <li>- Electric capacity</li> </ul> (Vacuum electric permittivity, Serial and parallel capacitor, Connection Superposition principle)	<b>Modern physics</b> <ul style="list-style-type: none"> <li>- Laws of radiation</li> <li>- Bohr atomic theory</li> <li>- X rays</li> <li>- Quantum electronics</li> <li>- Radioactivity</li> </ul> (Energy levels of atoms Quantum leaps, Nuclear reactions, Absorption and emission of radiation, Radioactive decay, C 14 method, Dosimetry)
		<b>Molecular physics</b> <ul style="list-style-type: none"> <li>- Surface tension</li> <li>- Saturated and unsaturated steam</li> </ul> Air humidity (Thermodynamic equilibrium, Monomolecular layer, Absolute humidity, Relative humidity)	<b>Electric current</b> <ul style="list-style-type: none"> <li>- Electric resistance</li> <li>- Kirchoff's laws</li> <li>- Resistors</li> <li>- Semiconductors</li> </ul> (Serial and parallel resistor connection Own and mixed conductivity N type and p type semiconductors)	<b>Physics of materials</b> <ul style="list-style-type: none"> <li>- Liquid crystals</li> <li>- Crystal structure of matter</li> <li>- Polymers</li> </ul> (Phase transitions, Unit cell, Classification by symmetry, Defects and impurities, Polymerization)
		<b>Thermodynamics</b> <ul style="list-style-type: none"> <li>- First principle of thermodynamics</li> <li>- Adiabatic processes</li> </ul> (Carnot cycle, Carnot efficiency, Perpetuum mobile)	<b>Oscillations</b> <ul style="list-style-type: none"> <li>- Mathematical pendulum</li> <li>- Physical pendulum</li> <li>- Damped and driven oscillations</li> <li>- Superposition of oscillations</li> </ul> (Degree of freedom, Simple harmonic oscillator, Calculating the value of earth's acceleration)	
			<b>Waves</b> <ul style="list-style-type: none"> <li>- Wave interference</li> <li>- Dispersion of light</li> <li>- Optical lenses</li> <li>- Spherical mirrors</li> </ul> (Electromagnetic waves, Chromatic aberration Refractive index, Coherent waves Principle of superposition of waves, Mirrors and lenses constructions)	

Subject	15 years	16 years	17 years	18 years
<b>Chemistry</b>	<b>Structure of the matter</b> <b>Structure of the atom and periodic table of the elements</b> <ul style="list-style-type: none"> <li>- Explaining the structure of an atom in terms of an orbital model</li> <li>- Represent the electronic configuration of the elements</li> <li>- The meaning of quantum numbers and combinations of quantum numbers for determination of atomic orbital</li> <li>- The structure of a periodic system of elements, the periodicity of the change in the physical and chemical properties of the elements by groups and periods and the formation of chemical bonds</li> </ul>	<b>Oxidation-reduction reactions</b> <b>Equations of oxidation- reduction reactions</b> <ul style="list-style-type: none"> <li>- Change in the degree of oxidation of element in chemical reactions</li> <li>- Determine the numbers of elements in the redox reaction, the number of released and received electrons, the oxidation and reduction agent</li> <li>- Balancing oxidation- reduction reaction equations</li> </ul>	<b>Hydrocarbons</b> <b>Nomenclature and isomers of organic compounds</b> <ul style="list-style-type: none"> <li>- Nomenclature of organic compound by IUPAC</li> <li>- Branched hydrocarbon naming</li> <li>- Isomerism, formation of isomers of the saturated and unsaturated hydrocarbons</li> </ul>	<b>Basic of the biochemistry</b> <b>Nucleic acids</b> <ul style="list-style-type: none"> <li>- Construction of DNA</li> <li>- Structure of DNA</li> </ul>
	<b>Structure of the matter</b> <b>Hybridization and hybrid orbitals</b> <ul style="list-style-type: none"> <li>- Formation of chemical bonds</li> <li>- Understanding the term hybridization</li> <li>- Formation of hybrid orbitals and their spatial arrangement</li> </ul>			

<b>SOU Gimnazija Koco Racin, Veles, North Macedonia</b>	Subject	15 years	16 years	17 years
	Biology	<b>View of the wildlife</b> <b>Viruses</b> <ul style="list-style-type: none"> <li>- The lytic and lysogenic cycle of viruses</li> </ul>	<b>Molecular Biology</b> <ul style="list-style-type: none"> <li>- Transmission of genetic information</li> <li>- Transcription, translation,</li> <li>- Protein synthesis</li> </ul>	<b>Nervous system</b> <ul style="list-style-type: none"> <li>- Vegetative nervous system - synapse</li> </ul>
				<b>Endocrine system</b> <ul style="list-style-type: none"> <li>- Hormones of the pancreas - regulation of insulin and glucagon secretion</li> <li>- Adrenal glands - secretory regulation of glucocorticoids</li> <li>- Thyroid gland - regulation of thyroid hormones</li> <li>- Adenohypophysis - regulation of adenohypophysis function</li> </ul>

<b>I.T.I.S “Panella Vallauri” Reggio di Calabria Italy</b>	Subject	Age 15	Age 16	Age 17
	Math	<ul style="list-style-type: none"> <li>- Monomials polynomials</li> <li>- Ruffini theorem</li> <li>- Euclidean geometry</li> </ul>	<ul style="list-style-type: none"> <li>- Inequalities first grade</li> <li>- Equation second grade</li> <li>- Cartesian plane</li> </ul>	<ul style="list-style-type: none"> <li>- System Equations</li> <li>- Radicals</li> <li>- Trigonometry</li> </ul>
	Chemistry	<ul style="list-style-type: none"> <li>- Atom</li> <li>- Dalton's law</li> <li>- Physical states of matter</li> </ul>	<ul style="list-style-type: none"> <li>- Periodic table</li> <li>- Avogadro's law</li> <li>- Nomenclature of chemical compounds</li> </ul>	
	Physics	<ul style="list-style-type: none"> <li>- Unit of measure</li> <li>- Forces</li> <li>- Solid balance</li> </ul>	<ul style="list-style-type: none"> <li>- Uniform straight motion</li> <li>- Dynamics principles</li> <li>- Electricity</li> </ul>	
Technology				<ul style="list-style-type: none"> <li>- Production process</li> <li>- Systems and materials</li> <li>- Practical applications</li> </ul>

Subject	Age 14-15	Age 15-16	Age 16-17
<b>Math</b>	<ul style="list-style-type: none"> <li>- Expressions</li> <li>- Factorisation</li> <li>- Power</li> <li>- Equations</li> <li>- Functions</li> <li>- Probability</li> </ul>	<ul style="list-style-type: none"> <li>- Real Numbers, Power, Roots</li> <li>- Functions - Graphs</li> <li>- Probability</li> <li>- Symmetry</li> <li>- Tessellations,</li> </ul>	<ul style="list-style-type: none"> <li>- Polynomials</li> <li>- Scaling,</li> <li>- Rotation - Reflection - Translation</li> </ul>
<b>Physics</b>	<ul style="list-style-type: none"> <li>- Light - Reflection, Refraction</li> <li>- Electric Current - Energy</li> </ul>	<ul style="list-style-type: none"> <li>- Forces-Newton's laws</li> <li>- Energy Conservation</li> <li>- Electric Current, Kirchhoff, Ohm</li> </ul>	<ul style="list-style-type: none"> <li>- Electric Forces</li> <li>- Light - Velocity, Wavelength</li> <li>- Electric Current, Kirchhoff, Ohm</li> </ul>
<b>Chemistry</b>	<ul style="list-style-type: none"> <li>- Periodic Table</li> <li>- Acids, Bases, Salts</li> </ul>	<ul style="list-style-type: none"> <li>- Structure of Atom</li> <li>- Periodic Table</li> <li>- Acids, Bases, Salts</li> </ul>	<ul style="list-style-type: none"> <li>- Chemical Reactions</li> </ul>
<b>Biology</b>	<ul style="list-style-type: none"> <li>- Life Conservation</li> <li>- Biotechnology</li> <li>- Evolution of species</li> </ul>	<ul style="list-style-type: none"> <li>- Cells, Tissues, Organs</li> <li>- Circulatory</li> </ul>	<ul style="list-style-type: none"> <li>- Genetic</li> </ul>
<b>Tech - Informatics</b>	<ul style="list-style-type: none"> <li>- Programing-Coding</li> <li>- Creation-Communication Apps</li> </ul>	<ul style="list-style-type: none"> <li>- Cycle of Application Development</li> <li>- Creation-Communication Apps</li> <li>- Internet Services - Applications</li> </ul>	<ul style="list-style-type: none"> <li>- Programing-Coding</li> <li>- Networks - A.I.</li> </ul>



Zespół Szkół Kształcenia Ustawicznego Krosno, Poland	Subject	Age 16-17	Age 17-18	Age 18-19
	Math	<ul style="list-style-type: none"> <li>- Transforming the graph of the logarithmic function</li> <li>- Mutual location of two circles</li> <li>- A diagonal angle in prisms and pyramids</li> </ul>	<ul style="list-style-type: none"> <li>- Polynomial inequalities</li> <li>- Exponential inequalities</li> <li>- Cross-sections of prisms, pyramids</li> <li>- Calculation of event probabilities using the "tree" method</li> </ul>	<ul style="list-style-type: none"> <li>- Graphs of polynomials</li> <li>- Reduction formulas</li> <li>- "Stretching", "compression" along the axis of the coordinate system</li> <li>- Absolute value transformations</li> <li>- Mutual position of the straight line and the circle</li> </ul>
	Physics	<ul style="list-style-type: none"> <li>- Kepler's laws</li> <li>- Body radiation</li> </ul>	<ul style="list-style-type: none"> <li>- External photoelectric effect</li> <li>- Radioactive decay</li> <li>- Nuclear reactions</li> <li>- Hubble's law</li> </ul>	<ul style="list-style-type: none"> <li>- Measuring the distance to the moon, planets and stars</li> <li>- Nuclear radiation and its properties</li> <li>- The interaction of radiation with matter</li> </ul>
	Biology	<ul style="list-style-type: none"> <li>- DNA analysis and their use in science, judiciary and medicine</li> <li>- Biodiversity at different levels of nature organization</li> <li>- Examples of international cooperation to prevent threats to nature</li> </ul>	<ul style="list-style-type: none"> <li>- Genetic modification of microorganisms, plants and animals</li> <li>- The course of gene therapy and the possibilities of its use in the treatment of hereditary and cancer diseases</li> </ul>	<ul style="list-style-type: none"> <li>- Bioremediation methods of heavy metals by microorganisms</li> <li>- A method of mammalian cloning called cell nuclear transfer</li> <li>- Basic types of legal acts in force in the European Union</li> </ul>
	Chemistry	<ul style="list-style-type: none"> <li>- Salt formation reactions</li> <li>- Catalysts and catalytic reactions</li> <li>- Chemical properties of amino acids</li> </ul>	<ul style="list-style-type: none"> <li>- Hybridization of atomic orbitals</li> <li>- Rule of Defiance</li> <li>- Formation of a glycosidic bond</li> </ul>	<ul style="list-style-type: none"> <li>- Response rate-calculations</li> <li>- Reactions of carboxylic acids with metals, metal oxides, hydroxides and alcohols</li> <li>- Fischer and Haworth patterns</li> </ul>