Choice of options for the mid-cycle (S4-S5)

Objectives – content - competences

This guide presents the range of options Learners have to chose from for the middle cycle (S4–S5) of the European Schools. It explains what Learners will learn, why these subjects matter, and the skills they will develop.

The middle cycle is an important stage where Learners build on previous knowledge and explore new ideas. Each subject helps Learners grow academically and personally, encouraging creativity, cultural understanding, problem-solving, and digital skills.

The goal of this document is to give families a clear overview of the learning journey, making it easier to understand what to expect and to make an informed choice.

Table of Contents

Mathematics– 4 Periods (S4–S5)

Objectives:

- Build on prior knowledge from S1–S3 with focus on **Algebra, Geometry, and Statistics & Probability**.
- Emphasize applied mathematics and modelling for real-world contexts.
- Foster problem-solving, reasoning, and digital competence through technology integration.

Content:

- **S4 Topics:**
  - **Algebra:** Basic calculations, fractions, powers, radicals, proportionality, linear models, simultaneous equations, polynomials, quadratic expressions.
  - **Geometry:** Pythagoras' theorem, trigonometric ratios (sin, cos, tan), enlargements, similar triangles, intercept theorem.
  - **Statistics & Probability:** Data collection, frequency tables, measures of central tendency (mean, median, mode), graphical representations (bar chart, histogram, boxplot), introduction to probability (sample space, events, Venn and tree diagrams).
- **S5 Topics:**
  - **Algebra:** Negative and rational powers, scientific notation, quadratic models and functions, exponential growth and decay, trigonometric functions, introduction to algorithms and simple programming.
  - **Geometry:** Units of angles (degrees, radians), unit circle, trigonometric ratios for standard angles, solid geometry (surface area, volume), Pythagoras in 3D.
  - **Statistics & Probability:** Classical and conditional probability, independent events, surveys and sampling, measures of spread (range, interquartile range, standard deviation), comparing data sets.

Competences:

- **Knowledge & Comprehension:** Understand mathematical terms, symbols, and principles.
- **Methods:** Apply calculation rules, construct graphs, use formulae and models.
- **Problem Solving:** Translate real-world problems into mathematical models; reason to solutions.
- **Interpretation:** Draw conclusions, evaluate reasonableness of results.
- **Communication:** Present reasoning and results using correct mathematical language and notation.
- **Digital Competence:** Use spreadsheets, CAS, graphing tools, and programming software for problem-solving and modelling.

Mathematics– 6 Periods (S4–S5)

Objectives:

- Provide deeper and broader mathematical understanding for students aiming at scientific or technical studies.
- Develop advanced problem-solving skills and appreciation of mathematics as a cultural and intellectual discipline.
- Strengthen modelling and analytical skills for interdisciplinary applications.

Content:

- **S4 Topics:**
  - **Algebra:** Basic calculations, prime factorization, radicals and surds, scientific notation, proportionality, linear models, simultaneous equations, polynomials, Pascal's triangle, power functions, simple quadratic equations.
  - **Geometry:** Properties of right-angled triangles, Pythagoras' theorem and its converse, trigonometric ratios, circle properties, enlargement and scale factor, congruent and similar triangles, intercept theorem, introduction to vectors and transformations.
  - **Statistics & Probability:** Data types, frequency tables, measures of central tendency and spread, graphical representations (bar chart, histogram, boxplot), probability concepts (sample space, events, Venn and tree diagrams).
- **S5 Topics:**
  - **Algebra:** Negative and rational indices, scientific notation, quadratic equations (factorization, completing the square, quadratic formula), discriminant, exponential and logarithmic functions, trigonometric functions, algorithmic thinking and programming.
  - **Geometry:** Unit circle, trigonometric identities, solving trigonometric equations, vectors in two dimensions (basis, scalar product, orthogonality), lengths and distances in 3D objects.
  - **Statistics & Probability:** Probability laws, conditional and independent events, sampling and simulation, standard deviation, comparing data sets, statistical inference.

Competences:

- **Knowledge & Comprehension:** Master advanced algebraic, geometric, and statistical concepts.
- **Methods:** Apply complex formulae, construct and interpret graphs, use advanced tools for computation and modelling.
- **Problem Solving:** Solve non-routine problems, including worded and interdisciplinary tasks.
- **Interpretation:** Evaluate solutions critically, understand implications of results.
- **Communication:** Express mathematical reasoning clearly and rigorously.
- **Digital Competence:** Use CAS, dynamic geometry software, graphing tools, and programming environments for exploration and verification.

Economics (S4–S5)

Objectives:

- Understand economic concepts and systems, focusing on European and global contexts.
- Apply economic theory to real-life situations and encourage informed decision-making.
- Develop ability to discuss and present economic ideas in a foreign language.

Content:

- **S4 Topics:**
  - **Nature and principles of economics** (basic economic problem, opportunity cost).
  - **Consumption** (family budgets, purchasing power, consumer protection).
  - **Production** (factors of production, costs, revenue, business finance).
  - **Markets** (demand/supply, elasticity, price determination).
  - **Distribution** (channels, advertising, e-commerce).
- **S5 Topics:**
  - **Payments** (money, banking, central bank roles).
  - **National economy** (GDP, growth, inflation, unemployment, policies).
  - **International trade** (advantages, barriers, trade organizations, exchange rates, Euro).

Competences:

- **Knowledge:** Comprehensive understanding of economic facts and principles.
- **Application:** Connect concepts across topics and apply them to unfamiliar contexts.
- **Analysis:** Critically interpret economic data and contexts.
- **Digital Skills**: Research and assess reliability of economic information online.
- **Communication:** Present ideas clearly using correct terminology.
- **Teamwork:** Collaborate effectively in group tasks.

ICT (Information and Communication Technology) (S4–S5)

Objectives:

- Provide fundamental ICT knowledge and skills for autonomous learning.
- Enable students to use ICT tools for research, communication, and problem-solving.
- Raise awareness of ethical, legal, and security issues in technology use.

Content:

- **Applications:** Advanced word processing, spreadsheets (functions, data visualization).
- **Programming:** Sequential instructions, loops, arrays, variables.
- **Databases:** Tables, queries, forms, reports.
- **Web Design:** HTML/CSS basics, layout, menu structure.
- **Graphics:** 2D/3D tools, image manipulation, animation.
- **ICT & Society:** Data security, copyright, social networks, emerging technologies.

Competences:

- **Application Skills:** Use advanced features of applications (word processing, spreadsheets).
- **Programming:** Understand programming concepts and apply simple algorithms.
- **Database Management**: Create and manage databases and websites.
- **Digital Media:** Develop skills in computer graphics and multimedia.
- **Information Literacy:** Critically evaluate information sources and respect copyright.

Language IV (S4–S5)

CEFR Level: A1

Objectives:

- Understand familiar words and everyday expressions.
- Read and comprehend short, simple texts.
- Interact in simple ways; ask and answer questions on familiar topics.
- Write short texts and fill in forms.
- Demonstrate basic cultural awareness.

Content:

- **Pronunciation and Grammar:** Basic pronunciation, vocabulary, morphology, and grammar.
- **Resource Use:** Use of dictionaries and ICT resources.
- **Cultural Awareness:** Introduction to cultural aspects of target language countries.

Competences:

- **Listening:** Understand familiar words and simple phrases in clear speech.
- **Reading:** Comprehend short, simple texts on everyday topics.
- **Speaking (Interaction & Production):** Engage in simple conversations; describe familiar people and objects using basic phrases.
- **Writing:** Produce short, simple texts on familiar topics.
- **Cultural Awareness:** Recognize basic cultural elements of target language communities and relate them to own culture.
- **Learning Strategies:** Apply basic tools and strategies for language learning and self-monitoring.

Latin (S4–S5)

Objectives:

- Read and understand Latin texts with common vocabulary and increasingly complex structures.
- Write simple texts (dialogues, letters, short narratives) using correct morphology and syntax.
- Deepen knowledge of Roman history, literature, and cultural heritage.
- Develop independent learning strategies and critical thinking through linguistic and cultural analysis.

Content:

- **Vocabulary and Grammar:** Extended vocabulary and grammatical structures (declensions, conjugations, syntax).
- **Resource Use:** Use of dictionaries and digital resources for translation and research.
- **Literary Studies:** Study of literary genres (e.g., myths, historical texts, speeches) and their cultural context.
- **Civilization and Culture:** Exploration of Roman civilization: daily life, institutions, art, and influence on European culture.

Competences:

- **Reading:** Comprehend and interpret Latin texts; identify grammatical structures and vocabulary in context.
- **Writing:** Produce short, structured texts in Latin demonstrating correct use of morphology and syntax.
- **Translation:** Apply linguistic knowledge to translate Latin into a modern language accurately.
- **Cultural Awareness:** Understand Roman civilization and its impact on European heritage; relate ancient culture to modern contexts.
- **Analytical Skills:** Use formal analysis to explain linguistic and stylistic features; develop critical thinking through text interpretation.
- **Learning Strategies:** Employ tools (dictionaries, ICT) and methods for autonomous learning and progress monitoring.

Art (S4–S5)

Objectives:

- Develop creative and lateral thinking through practical and theoretical work.
- Foster autonomy and responsibility in project-based learning.
- Enable students to express ideas and feelings visually and understand art as a cultural language.

Content:

- **Practical Work:** Drawing (line, texture, perspective), painting (colour theory, mixed media), sculpture (construction, modelling), and experimental techniques.
- **Themes for Projects:** Figurative vs. abstraction, observation vs. imagination, identity, landscape, architecture, art & science.
- **Art History:** Major movements contextualized within projects.
- **Reflection:** Formal analysis methods and critical commentary.

Competences:

- **Technical Skills:** Apply art elements and techniques with confidence and dexterity.
- **Creative Process:** Combine practical skills and theoretical research to create meaningful works.
- **Art History Integration:** Integrate knowledge of major art movements into personal projects.
- **Critical Reflection:** Reflect critically on own work and that of others using appropriate vocabulary.

Music (S4–S5)

Objectives:

- Develop musical knowledge, skills, and understanding through topic-based studies of genres and traditions, with emphasis on European diversity.
- Foster creativity, critical listening, and cultural awareness.

Content:

- **Five Topics + Final Project:**
  - Music for film
  - Contemporary musical styles and cultures
  - Music for dance
  - Music for special occasions
  - Musical theatre
  - (Optional topics: European folk traditions, music and voice, program music, composing in the last 100 years)
- **Final Project:** Personalized portfolio (performance, composition, multimedia).

Competences:

- **Composing & Improvising:** Extended compositions/improvisations for specific contexts; creative use of instruments, voices, and digital tools.
- **Performing:** Solo and ensemble performance with stylistic awareness, technical control, and expression.
- **Listening & Responding:** Analyze and discuss music using technical and non-technical vocabulary; open-minded approach to new styles.