Austria (Middle School) Curriculum Standards

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

Ethics, grades 6-8		Environment and Modern Agriculture	Healthful Eating
Grade 6-8	Competency model, competency areas, competency descriptions The competency model is divided into five competency areas that apply to all school levels. The skills described are to be developed at all school levels. Their level of expression should become more complex and differentiated as the school level progresses. Perceive and take perspectives The students can ● Perceive, describe and interpret situations and problems in the individual, social and ecological environment ● Deal with the way of thinking, values and living environments of others and assess their own position. Analyze and reflect The students can ● Develop and write ethically relevant texts with the help of	✔	✔

	subject-specific terminology and methods and ● Relate knowledge and experiences from different fields and areas of life and reflect them in the light of ethical positions. Arguing and judging The students can ● Present basic moral and ethical concepts, understand their historical, socio-economic and cultural contexts and ● Critically examine arguments and make independent and well-founded ethical judgements. Interact and communicate The students can ● Present their own thoughts and those of others appropriately and linguistically sensitively and ● Conduct disputes on an argumentative basis with consensus and dissent and deal with differences of opinion and conflicts non-violently. Develop options for action The students can ● Take a responsible and ethically reflective position on moral problems through action plans and; ● Relate the skills acquired to their own life plans.		

Geography & Economy, grades 6-8		Environment and Modern Agriculture	Healthful Eating
Grades 6-8	• The socially, economically and ecologically limited world Reflect structuring principles of the earth according to different points of view • Analyzing possible ways of structuring the earth according to natural, cultural, political and economic features • Compare interest-based structures • Making and reflecting on geographies through zoning/structuring/demarcation • Analyzing Earth's geo-ecosystems • Convert climate data into diagrams • Compare and question climate classifications of the earth • Analyze interactions between climate, relief, soil, water and vegetation • Explain geo-ecosystems and their anthropogenic transformation Discuss population and society • Depict the current and possible future distribution of the world population • Analyzing world population dynamics • Discuss causes and effects of spatial and social mobility in different societies Assess people's economic needs • Explain the importance of the market and market failure • Depict economic inequalities on earth	✔	✔

	• Assess the causes of economic inequalities (political action, resources, global economic structures) Assess the production of needs in terms of concepts of sustainability • Reflect on conflicts of use using regional examples • Explain regional conflicts over the availability of scarce resources (land, water, mineral resources, etc.) and the political interests behind them Assess different consequences of natural events based on the social and economic structure • Reflect on the viability of the one world in a future-oriented manner		
Grade 6	3rd semester – competence module 3 Diversity and unity - The new Europe • Discuss the concept of space and the structuring of Europe • Compare the structure of Europe according to natural, social and economic characteristics • Investigate heterogeneous spatial and economic effects of the integration process of the European Union • Critically reflecting on European concepts • Discuss convergences and divergences of European societies • Explain social and political developments in the European context and question their importance for your own life • Discuss migrations in and to Europe • Recognize the opportunities of the European education and job markets for your own life and career planning • Assess the valorization of production areas • Investigate the dependency of agricultural use on the natural area	✔	✔

	potential • Compare structures and changes in agricultural and industrial production conditions in Europe • Assess the suitability of spaces for tourism development and the consequences of development 4th semester – competence module 4 Diversity and unity - The new Europe • Evaluate competition policy and regional policy • Discuss measures and effects of the European internal market • Theoretically justify spatial disparities and illustrate them using selected examples • Recognize and critically evaluate the carriers, instruments, functioning and goals of competition and regional policy • Compare regional development paths • Discuss the changes in space, economy and society through accession and membership in the European Union using selected examples • Understand the importance of cross-border cooperation for spatial development • Reflect on (national) statehood and the formation of new European regions with regard to their future viability		
Grade 7	5th semester – competence module 5 Austria - space - society - economy • Explain changes in the geopolitical situation in Austria • Explain the various effects of the qualities of Austrian borders since the 20th century	✔	✔

	Possibilities of cross-border regional development under the influence of European integration ● Explain overall economic performance and problems as well as economic and social policy ● Understand the development of economic data and assess their validity ● Present special features of Austrian economic and social policy ● Explain moments of macroeconomic crisis in connection with divergent economic theories ● Discuss economic and social policy and their conflicting goals as related to interests and argue different positions ● Assess Austria as a business location ● Work out the advantages and disadvantages of Austria as a business location from different perspectives and compare them with other countries ● Analyze the emergence of regional disparities ● Explain the impact of regional disparities on everyday life and the economy ● Discuss Austria's foreign trade in connection with European and global developments ● Discuss quality of life in Austria ● WIKU: Describe industry and services as the essential basis for value creation and assess their current and future networked problem areas 6th semester – competence module 6 Austria - space - society - economy ● Discuss natural opportunities and risks ● Explain geo-ecological factors and processes ● Recognize natural conditions as an opportunity for regional		

	development • Discuss natural and social conditions and processes as causes of ecological problems • Develop your own strategies for ecologically sustainable action • Assess demographic development and socio-political implications • Show the development of the Austrian population • Assess possible social and economic consequences of population development • Discuss challenges of multicultural and aging populations • Evaluate the effects of social inclusion and exclusion processes on the living conditions of selected population groups • Analyze companies and professional fields • Create product and business ideas for your own company • Describe steps to start a business • Work out the basics of bookkeeping (income and expenditure accounting). • Reflect on your own options for choosing educational paths and careers • WIKU: Interpret operational key figures • WIKU: Capture the basics of operational management		
Grade 8	7th semester Local - regional - global: networks - perceptions - conflicts Discuss the opportunities and dangers of globalization • Analyze your own location or the local impact in globalization processes in relation to personal opportunities and risks • Discuss global change and its economic, social and ecological causes and effects - also with regard to one's own life situation	✔	✔

	• Discuss the effects of economic globalization • Develop strategies for individual, operational and socially sustainable action • WIKU: Analyze the positioning possibilities of companies and regions in the globalized economy • Compare political and economic systems • Assess the causes and effects of social and economic disparities on a global level • Discuss forms, opportunities and risks of development cooperation • Compare different economic and regulatory models • Analyze power relations in political and economic systems • Examine the political design of spaces • Explain goals, scope for design and effects of spatial planning • Examine constructions of spaces and space-related identities • Develop a willingness to participate in a creative way, at least at the local political level 8th semester Local - regional - global: networks - perceptions - conflicts • Examine cities as habitats and economic centers • Compare diversity of subjective realities in cities • Analyze social differences in urban spaces • Describe processes of urbanity and urbanization • Assess the importance of metropolises as control centers of the economy • Develop perspectives and examples for sustainable urbanity • WIKU: Analyze money and currency • Analyze developments in international capital flows and financial markets		

	• Evaluate forms of investment according to risk and opportunity		

Geometry, grades 7-8		**Environment and Modern Agriculture**	**Healthful Eating**
Grades 7-8	The students should be able to successfully work on or solve familiar and new tasks in different situations independently. In particular, the students should achieve the following goals and skills: • The further development of the concept of space and the promotion of spatial thinking • The structuring of constructive spatial thinking • The ability to work on and solve spatial tasks with adequate geometric methods and to create suitable documentation using the geometric terminology • Reading and making cracks of spatial objects • The development and deepening of algorithmic thinking skills by dealing with spatial geometric problems • The ability to independently work on and solve new geometric tasks in different situations • The ability to make sensible use of hand sketches, classic design methods and 3D CAD software • The application of basic geometric knowledge to scientific and technical problems • Recognizing cross-connections to mathematics, computer science, natural sciences, technology and fine arts		✔

	Contributions to the areas of education Language and communication ● Grasping and understanding of geometric formulations and arguments; ● verbal description of geometric objects and spatial processes; ● conclusive justification of geometric procedures and documentation of geometric considerations using precise language; ● Use of geometric knowledge as a means of intercultural understanding; ● Using geometric mappings as a language-independent means of communication People & Society ● Preparation for the professional world and further education; ● Promotion of teamwork; ● Adequate use of contemporary media; ● Presentation of own work Nature and technology ● Spatial perception and intelligence training; ● Acquisition, analysis and modeling of environmental and technical objects; ● Solving spatial geometric problems from the natural sciences and technology; ● Orientation in virtual 3D worlds Health and exercise ● Promotion of spatial orientation ability;		

	• Exercises on kinetic space conception; • Promotion of fine motor skills; • Activation of different brain areas Creativity and design • Creative and individual design of objects from technology, architecture, design, art and their presentation with different media; • Development of creative solution strategies for spatial geometric tasks Didactic principles (7th and 8th grade): For the planning and implementation of competence-oriented lessons in descriptive geometry, it is advisable to observe the following principles, among others: • Based on known spatial objects from the imagination of the students, basic geometric concepts are developed. ○ This enables the step from direct object observation to independent spatial imagination. • Three-dimensional objects are analyzed with regard to their shapes, structures and geometric laws and are described using the parameters necessary for their definition. ○ This forms the basis for the constructive acquisition and 3D modeling of spatial objects. • Spatial imagination is trained above all when solution strategies are developed on the basis of the spatial conditions - if possible on the original object or on a model. ○ Algorithmic thinking and problem-solving skills are promoted by dealing with spatial geometry tasks. ○ Axonometric drawings and hand sketches are used to support		

	the spatial perception. ● Freehand drawings accompany the entire lesson. ○ Attention is paid to adhering to the proportions and the geometric mapping rules. ○ The computer-aided modeling of room objects is supported by the creation of geometrically correct hand sketches. ● The tasks must be selected in such a way that their processing requires a balanced division between classic constructive and computer-aided methods. ○ Structured documentation of the essential work steps supports traceability with both methods. ● The acquired geometric skills and abilities are to be structured and consolidated in the following semesters. ○ Newly acquired skills must always be placed in the context of previously acquired skills. ● Terms familiar from the natural sciences and mathematics are also used in teaching descriptive geometry. ○ With the help of problems from technology, architecture, design and art, which correspond to the experiences of the students, geometric knowledge and skills are developed and consolidated. Competence model for descriptive geometry ● Dealing with descriptive geometry promotes both technical and general skills (e.g. social skills). ○ The technical skills in descriptive geometry relate to geometric actions, geometric content and the complexity of the required cognitive processes. ○ They are described in the competency model for descriptive geometry.		

	○ A geometric competence has three dimensions, namely an action, a content and a complexity dimension. ● The action dimension shows the different activities that are developed and promoted in geometry lessons. ● The content dimension reflects the essential content of descriptive geometry in a structured way. ● The complexity dimension describes the requirements necessary to solve geometric tasks and problems with regard to the networking of basic and reflective knowledge. The three dimensions of geometric competencies are specified below. ● Areas of action dimension ● Analyzing, modeling and planning (H1): ● Analyzing means recognizing the overall spatial situation and the geometric relationships, as well as breaking down spatial objects into sub-objects, capturing relations and transformations. ● Modeling means transferring the knowledge gained from the analysis into an idealized, simplified, abstract form of representation. ● Planning means finding and selecting strategies that lead to the concrete creation of a model or the solution of a geometric task. Operate (H2): ● Operating means - after analysis, modeling and planning - the correct, sensible and efficient implementation of construction processes with suitable media and forms of visualization (e.g. hand sketches, construction drawings, real and virtual models, CAD construction). Operating involves the judicious and appropriate use of 3D CAD software.		

	Interpret (H3): ● Interpreting means capturing and mentally creating three-dimensional models from different forms of representation. Arguing and justifying (H4): ● Arguing means citing geometric considerations that speak for or against a certain point of view/decision. Arguing requires a correct and adequate use of geometric terminology. ● Justification means the specification of a plausible argument or chain of arguments that leads to certain conclusions or decisions. Areas of the content dimension Geometric objects and their properties (I1): ● Coordinate systems, linear basic elements, curves, surfaces, volume models, differential geometric properties Relations between objects (I2): ● Cuts, Boolean operations, dimension relations Transformations (I3): ● Translation, rotation, mirroring, scaling Illustrations and cracks (I4): ● Projection and crack, parallel cracks, shadows in parallel cracks, central cracks		

	Areas of complexity dimension Using basic knowledge and skills (K1): ● Using basic knowledge and skills means the reproduction or direct application of basic geometric concepts, objects and processes. ● As a rule, reproductive geometric knowledge and skills or the direct application of knowledge or skills that is immediately recognizable from the context are required. Establishing Connections (K2): ● Establishing connections is necessary when the geometric facts are more complex, so that a combination of several content and action areas is necessary for processing. Reflecting, using reflective knowledge (K3): ● Reflecting means thinking about geometric relationships that cannot be read directly from the facts presented. ● Reflective knowledge is knowledge developed through appropriate reflection processes and the resulting conclusions. A subject-specific competence is described in this model by a triple consisting of an area of action, an area of content and an area of complexity (e.g. H1, I3, K2). Securing the income from lessons/school work ● Individual, team and group work, project work and regular homework are available to ensure the learning outcome. ● The time frame for schoolwork can be found in the assessment of performance section of the third part.		

	Educational and teaching task, subject matter: ● In the following, the subject matter is given for each semester based on the areas of the content dimension of the competency model. ○ The geometric content is differentiated and linked to areas of action and areas of complexity to form competencies. ○ For reasons of readability, the complexity dimension is not consistently shown. ○ In the sub-items, the order is initially based on the content areas. ○ In these, analysis, modeling and planning, operating, interpreting, as well as arguing and justifying are further refined according to the sequence of action areas. The following central ideas are relevant for the development of the teaching material in all semesters: ● Using the concept of space when working on spatial geometric tasks ● Developing, deepening and structuring of constructive spatial thinking by dealing with geometric issues ● Reading and making cracks of spatial objects ● Creation of geometrically correct freehand sketches ● Selection of the appropriate tools (classic-constructive or computer-aided) and suitable forms of representation (freehand sketches, parallel lines and central lines) ● Translating real situations into geometric models ● Determining the spatial relationships from different representations ● Developing algorithmic thinking skills by dealing with spatial geometric problems ● Planning of solution strategies and sequencing of the chosen solution path ● Communicating about geometric issues using appropriate technical		

	language		
Grade 7	5th semester – competence module 5 Geometric objects and their properties ● Working with linear primitives (point, line, plane, polygon) and coordinate systems (e.g. Cartesian world and user coordinate systems): ● Knowing and recognizing the above geometric objects and their properties ● Working with coordinate systems (e.g. coordinate paths, switching between coordinate systems) ● Arguing and justifying the choice of suitable positioning of coordinate systems and geometric objects in relation to one another ● Working with volume models of basic bodies (e.g. prisms, pyramids, spheres, cones, cylinders, extrusion bodies, rotating bodies) and special polyhedra (e.g. platonic polyhedra): ● Knowing and recognizing basic bodies and special polyhedra as well as their properties ● Differentiating between surface and volume models ● Creating geometric primitives and polyhedrons as volume models with 3D CAD software ● Analyzing objects in the real world, recognizing primitives and polyhedra, and capturing their geometric properties ● Capturing and generating a mental three-dimensional model of an object composed of basic bodies from different forms of representation ● Making arguments for or against the use of appropriate geometric primitives and polyhedra		✔

	Relations between objects Working on simple position tasks in descriptive parallel drawings and their application (e.g. sections of linear basic elements, cube sections, simple penetrations of flat objects): ● Capture and analyze the relationships between geometric objects ● Making cuts ● Arguing and justifying the choice of suitable cuts Working with Boolean operations (union, intersection and difference): ● Know the Boolean operations and their properties ● Perform Boolean operations Model objects from primitives using Boolean operations with 3D CAD software: ● Capturing and generating mental three-dimensional models of the above objects from different forms of representation with regard to relations ● Modeling for planning strategies for concrete creation of the above objects ● Perform Boolean operations when modeling with 3D CAD software ● Argue and justify the choice of suitable Boolean operations Transformations ● Working with congruence transformations (translation, rotation, reflection) and scaling: ● Knowing and analyzing the above transformations and their properties ● Performing the above transformations		

	Modeling objects from primitives by congruence transformations and scaling with 3D CAD software: ● Capturing and generating mental three-dimensional models from different forms of representation with regard to the above transformations ● Modeling for planning strategies for the concrete implementation of the above transformations ● Applying spatial transformations to create the above objects ● Arguing and justifying the choice of suitable transformations when modeling geometric objects from primitives Illustrations and tears ● Understanding of projections (parallel and central projection) as images and the results of projections: ○ Knowing and recognizing projections and cracks and their basic properties ● Capturing the geometric meaning of contour and outline ● Working with assigned main plans (plan, elevation, cross plan) and axonometric plans: ○ Knowing and recognizing the above cracks and their basic properties ○ Producing geometrically correct freehand sketches, associated main plans and axonometric plans of linear primitives and (composite) primitives, taking visibility into account ● Capturing and generating mental three-dimensional models of composite primitives from associated master plans and axonometric plans ● Arguing and justifying the choice of suitable cracks		

	6th semester – competence module 6 Geometric objects and their properties ● Working with elementary curves (e.g. circles, ellipses, helixes) and free-form curves (e.g. Bézier curves) as well as with their parametric representations and tangents: ○ Knowing and recognizing the above curves and their properties ○ Knowing and determining parametric representations and tangents of the above curves ○ Creation of curves with suitable media (e.g. hand sketch, construction drawing, CAD construction) ○ Capturing and generating a mental three-dimensional model of curves from different forms of representation ● Making arguments for or against the use of specific curves ● Working with solid models created by rotation and extrusion (e.g. solids of revolution, general pyramids, prisms, cylinders and cones): ○ Knowing and recognizing the above geometric objects and their properties ○ Analyzing objects in the real environment with regard to possible creations through rotation and extrusion ○ Creating the above volume models with 3D CAD software ○ Acquisition and generation of mental three-dimensional models of the above solids from different forms of representation ○ Making arguments for or against using rotation and extrusion to create specific volume models		

	Relations between objects and transformations ● Processing of complex positional tasks in descriptive parallel cracks and their application (e.g. penetrations of planar limited objects): ○ Analyzing geometric objects in terms of their relative positions ○ Planning of strategies for the processing of situational tasks ○ Carrying out position tasks (e.g. sections) in descriptive parallel drawings ○ Acquiring position relations between geometric objects from different forms of representation ○ Arguing and justifying geometric procedures when working on position tasks in clear parallel drawings Processing of simple position tasks and measurement tasks (determination of line lengths and angular dimensions) in assigned normal plans: ● Analyzing geometric objects with regard to their position and dimension relations ● Planning strategies for processing location and measurement tasks ● Carrying out simple position tasks in assigned normal cracks ● Acquiring position and dimension relations from different forms of representation ● Arguing and justifying geometric procedures when working on position and measurement tasks Generating solid models of revolved and extruded objects (e.g. solids of revolution, general pyramids, prisms, cylinders and cones) and applying relations and transformations to create more complex solid models: ● Analyzing relations and transformations that can be used to create volume models of the above geometric objects ● Model building to plan strategies for the concrete creation of volume models of the above geometric objects through suitable relations and		

	transformations ● Perform appropriate relations and transformations to create volume models of complex geometric objects ● Capture relations and transformations to generate mental complex geometric models ● Argue and justify the use of suitable relations and transformations when creating volume models of complex geometric objects Illustrations and tears Applying basic design principles to represent shadows in parallel lighting in descriptive parallel cracks: ● Know the basic concepts and properties of parallel lighting with regard to shadow constructions ● Perform shadow constructions ● Create geometrically correct freehand sketches and parallel drawings in connection with shadow constructions ● Capture the spatial situation from parallel cracks of objects and their shadows ● Argue and justify the choice of suitable construction principles for implementing shadow constructions ● Provide arguments for or against particular interpretations of shadow rendering ● Structure and consolidate the geometric skills and abilities already acquired that are necessary for the areas of competence of this semester		

Grade 8	7th semester Geometric objects and their properties Working with surfaces of revolution and extrusion (e.g. rotating surfaces, general pyramid, prism, cylinder and cone surfaces), sliding and ruled surfaces (using selected examples) and free-form surfaces: ● Knowing and recognizing the surfaces listed above and their properties ● Analyzing objects in the real environment, recognizing the above surfaces and recording their geometric properties ● Creating surface models with 3D CAD software ● Capturing and generating mental three-dimensional models of surfaces from different forms of representation ● Providing arguments for or against the use of surface and volume models Recording of the differential geometric terms tangential plane, surface normal and outline of surfaces: ● Know the above terms and their meaning ● Find tangent planes and surface normals of revolved surfaces ● Recognize outlines of surfaces in different forms of representation Relations between objects and transformations Determination of planar spherical sections as well as point-by-point and tangent-by-point determination of the intersection curves of surfaces: ● Analyzing the relations between faces ● Modeling for planning strategies for determining the intersection curves of surfaces		✔

	• Performing plane spherical cuts • Determining intersection curves of surfaces (point-by-point and tangent-by-point) • Capturing relations and transformations required in creating mental models of spheres and patches • Arguing and justifying geometric procedures when working on the above cutting tasks Working with surface and volume models using examples from technology, architecture, design, art, etc. with 3D CAD software: • Analyzing the relations between more complex geometric objects • Planning strategies for the concrete creation of the above geometric objects through appropriate relations and transformation • Performing intersection and union tasks and appropriate transformations to create the above objects • Capturing relations and transformations needed to create mental three-dimensional models of the above objects • Arguing and justifying geometric procedures in the creation and processing of the above objects with regard to relations and transformations Illustrations and tears Production of normal cracks of circles: • Knowing the basic properties of the normal cracks of circles • Constructing the normal cracks of circles Production of central cracks using the average method: • Knowing the characteristic terms and properties of central cracks • Constructing central drawings of simple geometric objects using the		

	average method ● Capturing the spatial situation from central cracks (e.g. from photographs) ● Arguing and justifying the choice of suitable views (e.g. position of eye and main point) Structuring and consolidation of the geometric skills and abilities already acquired that are necessary for the areas of competence of this semester 8th semester Geometric objects and their properties, relations between objects, transformations, maps and cracks Working on spatial geometry problems related to technology, architecture, design, art, etc.: ● Analyzing spatial geometry problems with regard to geometric objects, relations and transformations ● Planning of strategies for processing spatial geometric problems ● Selecting the appropriate form of representation and positioning of the geometric objects when working on spatial geometric problems ● Creating of the solution to spatial geometric problems with the help of suitable geometric objects, relations and transformations ● Acquiring of spatial geometric problems from different forms of representation ● Arguing and justifying the use of suitable geometric objects, relations and transformations as well as the choice of suitable forms of representation when working on spatial geometric problems ● Structuring and deepening of already acquired geometric skills and abilities in order to guarantee a sustainable safeguarding of geometric		

	competencies		