Austria (Middle School) Curriculum Standards

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

Household Economics & Nutrition, grades 5-6		Environment and Modern Agriculture	Healthful Eating
Grades 5-6	Household economics and nutrition is a multidisciplinary subject, which is why interdisciplinary tasks are available to promote networking skills. ● The subject areas covered should link personal experience with everyday reference and social relevance. ● Understanding the world and culture is a priority. Pupils should be enabled to follow the (e.g. media) explanations of experts and to question them. ● Due to the content (professional competence) and methods, competences are promoted that are useful for developing or expanding professional perspectives. Based on the central importance of the household, which is to be understood in its entirety as a supply, economic and social area, schoolchildren should be motivated to take on needs-based, independent and efficient management. ● The aim is to reflect on living and eating habits in order to bring about health-promoting and environmentally conscious action in terms of prevention and sustainability.	✔	✔

	The teaching of the basics of consumer law, market and advertising strategies as well as product labeling should support the development of students into responsible consumers. The use of modern information technologies aims at communication, presentation and media competence. ● Self-competence is promoted by analyzing and reflecting on one's own living, eating and consumption habits in the classroom and thus leads to improved health and financial management. The sensitization for social and economic problems, understanding for the difficulties of feeding the world and the development of problem-solving strategies should lead students from their own experience to global thinking and increase their social skills. Contributions to the areas of education Language and communication ● Through the reflective examination of the students' own immediate areas of life as well as through clarity, practical orientation and diverse use of media, the linguistic handling of everyday experiences is made possible and thus communication skills are promoted. ● Dealing with health-related, economic and ecological topics should enable students to question, discuss and evaluate statements by experts. People & Society ● Household economics and nutrition is intended to lead students to reflected knowledge of their own lifestyle and consumption habits and to promote understanding of the different forms of social		

	coexistence in the service of equal opportunities and gender equality. ● Other topics can be attributed to this area of education: economic area of the private household in connection with economic connections; ● Existence and change of family structures and challenges in the area of gender-equitable division of labor, also in international comparison; Reflection on living together in private households as the basis of social relationships; ● Assuming responsibility as a consumer; Experience of cultural and intercultural differentiation of lifestyles and diets as well as traditions, taboos and preferences; Nature and technology ● Man's responsibility for his living environment and opportunities to actively shape it is reflected in a wide range of content: ○ recognizing connections between economy and ecology; R\ ○ reflection and evaluation of own environmentally relevant actions; ○ use of innovative household technology; ○ multimedia documentation and presentations with a special focus on information technology Health and exercise ● The health-related area is evident in household economics and nutrition as an important focus. ○ The focus is on health literacy: maintaining health and performance; ○ Nutrition for healthy people and target group-oriented nutrition; ○ Practical application of nutritional knowledge; ○ Insights into the areas of hygiene and microbiology; accident prevention and first aid;		

	○ Reflection on work processes and ergonomic design of the workplace, living area and living environment; ○ Significance of housing for health and ability to perform; ○ Critical examination of body norms and stereotypes (e.g. ideals of beauty) that affect health Creativity and design ● The creative design possibilities in household economics and nutrition promote self-realization and social responsibility and have an individually enriching and community-building effect. ● Creative areas are in particular: ○ living and working space design; ○ menu design, food preparation, food culture; ○ sensory experiments; ○ aesthetic and culinary product design and marketing concepts; ○ encouraging creative problem-solving strategies Didactic principles (5th and 6th grade): Modern, competency- and activity-oriented teaching is intended to promote the independence of the students. ● The subject, social, decision-making and action skills of the learners must be the focus of the teaching process in order to be able to orientate themselves in everyday life. ● The paradigm shift from content- and object-centered (input control) to competence-based teaching (output orientation) must be completed. The lessons should be based on scientific, cultural and social science findings and be based on the principles of salutogenetic health promotion, sustainability and the active participation of citizens in society and thus offer a basis for decision-making for a healthy, environmentally friendly and		

	socially acceptable lifestyle. ● The learning process must be organized in the areas of technical, methodological, personal and social skills. The competence-oriented formulated educational and teaching task represents binding teaching and learning goals in connection with the subject matter. ● Based on the experience of the students, the content is to be conveyed in an age-appropriate manner. ● The individuality of the learners must be taken into account when planning and designing the lessons. ● Methods that support self-reliance, personal responsibility and the ability to work in a team, such as exemplary case studies, role-playing and business games, projects, internet research, presentations and open forms of learning, are particularly suitable. ● When using the respective method, attention should be paid to clarity, practical orientation and topicality. ● Interdisciplinary teaching promotes networked thinking and transfer skills among students. The involvement of experts from outside the school and the organization of excursions and training trips open up new perspectives, create direct connections and have a motivating effect due to their reference to reality. Diverse use of media has the ability to communicate, to promote topicality and interactive debate. ● Structured, logical and networked thinking and working should be strengthened by working with nutritional and household science sources.		

	The orientation of the teaching to the current state of science requires that the teachers continue to develop their technical and methodical-didactical knowledge and skills. Competency model for household economics and nutrition ● The competency model for household economics and nutrition provides five overarching cross-semester competence areas that reflect the educational goals of the subject household economics and nutrition. In the individual semesters, these areas of competence are described in detail by sub-competencies that represent a link between action and content. Superordinate cross-semester areas of competence ● Developing awareness of one's own consumption behavior, obtaining consumption-specific information and evaluating it according to quality criteria ● Managing resources responsibly ● Recognizing and reflecting on the concept of consumer citizenship and incorporating it into decisions ● Recognizing, reflecting on and evaluating one's own eating habits and understanding the connections between eating habits, cultures, health and well-being ● Eating wholesome and sustainable food		
Grade 5	Developing awareness of one's own consumption behavior, obtaining consumption-specific information and evaluating it according to quality criteria ● Explain the economic, cultural and social significance of the household, recognize and evaluate connections between consumption habits and health, and recognize and reflect on	✔	✔

	socio-cultural influences on one's own consumption habits ● Procure consumption-related information for shopping and evaluate it according to differentiated points of view, as well as recognize and observe safety instructions ● Differentiate marketing measures from product information and describe sales channels ● Name and assess quality criteria for the sustainability and health of products and services and derive rebound effects based on selected product groups Manage resources responsibly ● Understand the private household as a reproductive and socio-economic system and establish a connection between consumption and resource consumption ● Describe the variety of resources (time, money, goods, environment, labor) for private households and recognize the mutual influences on society and the economy and understand them using examples ● Explain the importance of organizational and ergonomic as well as hygienic and health aspects of work processes and plan and organize work processes in private households ● Outline strategies for short, medium and long-term financial management in private households ● Recognize the need for active participation in the market and establish a connection between consumption and resource consumption Recognizing and reflecting on the concept of consumer citizenship and incorporating it into decisions ● Orient themselves to the market and position themselves as responsible consumers with regard to sustainability, economic		

	efficiency and ethical principles ● Know important legal regulations of consumer law, apply them to selected examples and be able to argue ● Recognize environmentally relevant factors and their regional and global effects and a sustainable ie. develop an economically, ecologically, socially and health compatible lifestyle ● Recognize and evaluate the legal, economic and social significance of housing		
Grade 6	Recognizing, reflecting on and evaluating one's own eating habits and understanding the connections between eating habits, cultures, health and well-being ● Name eating habits related to tradition, culture and religion ● Describe connections between eating habits and health and discuss responsible behavior with regard to social, psychological and physical well-being ● Calculate your own energy and nutrient requirements ● Perceive and describe socio-cultural and sensory influences on their own eating habits Eat wholesome and sustainable food ● Explain the basics of nutrition and show scientifically based connections between nutrition and health ● Describe energy-supplying ingredients in food and know and critically assess nutritional recommendations ● Name foods that provide energy and their properties and transfer their influence on preparation, preservation, storage and hygiene	✔	✔

	Developing awareness of one's own consumption behavior, obtaining consumption-specific information and evaluating it according to quality criteria ● Evaluate nutritional logs, nutritional surveys, case studies and nutritional science sources ● Explain sustainable and health-promoting criteria of products and forms of nutrition ● Creating and evaluating quality awareness Manage resources responsibly ● When selecting food and dishes, pay attention to regionality and seasonality as well as processing and quality ● Recognizing and reflecting on the concept of consumer citizenship and incorporating it into decisions ● State the legal basis for food labeling ● Know quality criteria of food and make quality-oriented nutrition and consumption decisions 4th semester – competence module 4 Recognizing, reflecting on and evaluating one's own eating habits and understanding the connections between eating habits, cultures, health and well-being ● Knowing and reflecting on nutritional trends and eating traditions of different cultures ● Design nutritional situations in different contexts of meaning and include alternative forms of nutrition ● Evaluate health-related information from different sources		

	Eat wholesome and sustainable food ● Explain low-energy ingredients in food ● Describe the production, processing and value of selected low-energy foods, name their properties and transfer their influence on preparation, preservation, storage and hygiene ● Argue for sustainable food choices ● Show scientifically based connections between nutrition and metabolism as well as nutrition and nutrition-related diseases Developing awareness of one's own consumption behavior, obtaining consumption-specific information and evaluating quality criteria ● Establish connections between consumption habits and health and, if necessary, derive a target group-oriented diet ● Explain the impact of food preparation on various aspects of food quality Manage resources responsibly ● Develop optimal purchasing planning and suitable stock management based on adequate storage and preservation methods ● Recognize the global context of world nutrition and water as a scarce commodity and reflect on their importance for their own consumption Recognizing and reflecting on the concept of consumer citizenship and incorporating it into decisions ● Comment on the connection between nutrition and health according to the WHO ● Recognize and reflect on an economically, ecologically, socially and health compatible lifestyle		

Mandatory Exercises & Career Orientation, grades 6-8		Environment and Modern Agriculture	Healthful Eating
Grades 6-8	Career orientation finds many starting points in the other subjects, but pursues independent goals that go beyond them. Instruction in vocational orientation strives for the decision-making ability of the pupils and is intended to integrate two main components: ● I strength (self-competence) and knowledge of and dealing with the world of work (technical and methodical competence). ● Social skills are becoming increasingly important in the world of work: ○ they should be both the subject of examination and practice as part of career orientation. Thus, a significant contribution to the personality development of the students should be made. ● The focus should be on developing and strengthening hope, will, decision-making ability, determination, ability, motivation, perseverance and the ability to relate. Career guidance also provides an opportunity to review traditional attitudes and prejudices about career and educational pathways and aims to expand the space of possible career and educational choices, particularly for female students.		✔

	Contributions to the educational areas: ● Language and communication: ○ Training in the precise use of language; Obtaining and critically examining information relevant to education and work. ● People & Society: ○ Get to know the working and professional world from a cultural, economic, social and ecological point of view. ● Nature and technology: ○ Impact of new technologies in the various professional and life areas. ● Creativity and design: ○ Importance of art and creativity for leisure and working life. ● Health and exercise: ○ Dimensions of health as a factor in work and occupation. Didactic principles: The instruction should take into account the fact that vocational orientation has a processual character. ● It should initiate and accompany the choice of career and education and lead to independent decisions about career and education. ● In doing so, reference should be made to career-orientated content of other subjects, including earlier school levels. The contributions of career orientation to personality development require a special type of lesson design: ● clear, direct experience and independence are prerequisites for this. The following are available for implementation in the classroom: ● class discussions, role-playing games, group work, independent individual work, personal encounters, real-world encounters.		

	• Real encounters offer a wide range of possibilities:
	  ○ school, company and job explorations, practical work days, visits to job information fairs, etc.
	  ○ They require well-founded preparation and follow-up work with the students and intensive cooperation between the schools and companies.
	  ○ When scheduling appointments, attention must be paid to the overall course of the career orientation process.
	
	It is important to remember that educational and career planning decisions are personal decisions and often take place within the family circle or in individual counseling sessions.
	• They can therefore only be prepared in class.
	• The targeted use of extracurricular counseling facilities by the pupils is to be promoted.		

Mathematics, grades 6-8		**Environment and Modern Agriculture**	**Healthful Eating**

Grades 6-8	Educational and teaching task (5th to 8th grade):
	• Mathematics lessons are intended to help pupils to better meet their responsibility for lifelong learning.
	  ○ This is done primarily by teaching students to think analytically and logically and by teaching them mathematical skills that are fundamental to the subject and relevant to many areas of life.
	  ○ In acquiring these competencies, students should recognize the diverse aspects of mathematics and the contributions of
		✔	✔

	the subject to different areas of education. ● The mathematical description of structures and processes in the world around us, the resulting deeper insight into connections and the solving of problems through mathematical procedures and techniques are central concerns of mathematics lessons. ● Adolescents should be equipped with the knowledge and skills necessary for life in society in such a way that they can recognize and use mathematics as a meaningful and useful instrument in their immediate living environment in the sense of generally educated (constructive, committed and reflective) citizens . In this sense, mathematics lessons should enable them to communicate with experts and the general public. Aspects of mathematics ● Creative aspect: ○ Mathematics trains thinking, develops strategies, stimulates the imagination and encourages creativity. ● Linguistic aspect: ○ Mathematics develops the ability to argue, criticize and judge and promotes the ability to speak clearly and precisely at the same time. ○ The mathematical principle that assertions must be justified should be a model for other subjects and areas of society. ○ The use of mathematical symbols forms a basis for precise formulation and work. ● Epistemological aspect: ○ Mathematics is a special way of capturing our world of experience. ○ It is a specific way of perceiving the phenomena of the world and understanding them through abstraction.		

	○ Mathematizing a real phenomenon can significantly deepen everyday experience. ● Pragmatic, application-oriented aspect: ○ Mathematics is a useful tool and reservoir of methods for many disciplines and a prerequisite for many studies and professional fields. ● Autonomous aspect: ○ As intellectual creations, mathematical objects and facts form a deductively ordered world of their own kind, in which statements - starting from fixed premises - can be stringently derived. ○ Mathematics enables you to trust your own thinking more than other opinion makers, and thus promotes the democratic process. ● Cultural-historical aspect: ○ The decisive role of mathematical knowledge and achievements in the development of European cultural and intellectual life - particularly closely linked to natural science - makes mathematics an indispensable part of general education. Contributions to the areas of education ● Language and communication: ○ Mathematics supplements and expands colloquial language, above all through its technical terms, symbols and representations, it makes statements more precise and condenses them. ○ In addition to the mother tongue and foreign languages, mathematics becomes another type of language. ● People and society:		

	○ The lesson should show that mathematics plays an important role in many areas of life (financial management, sociology, medicine, ...). ● Nature and technology: ○ Many natural phenomena can be adequately described and thus understood with the help of mathematics. Mathematics provides a wealth of methods with which problems can be processed. ● Creativity and design: ○ In addition to the deductive side, mathematics also has an inductive side. ○ Above all, experimentation when working on new tasks and problems makes this side visible, where creativity and ingenuity are encouraged. ● Health and exercise: ○ Some phenomena from health care and sports can be described mathematically and thus better understood. Didactic principles (5th to 8th grade): ● In mathematics lessons, the focus should be on understanding learning as an individual, active and constructive process. ○ The students should gain insights through their own activities and thus incorporate mathematical terms and methods into their knowledge system. ● In terms of the variety of methods, a range of implementation is specified for each of the following principles, within which a concrete realization - adapted to the respective teaching situation - should take place. ○ When speaking of minimum and maximum realization, this should not be understood in the sense of an evaluation.		

	● Learning in application-oriented contexts: ○ Application-oriented contexts illustrate the usefulness of mathematics in different areas of life and thus motivate to acquire new knowledge and skills. ○ Networking of the content through suitable interdisciplinary teaching should be aimed for. ○ The minimum realization consists in the thematization of mathematical applications with selected content, the maximum realization in the constant inclusion of application-oriented tasks and problems together with a reflection of the respective modeling process with regard to its advantages and limitations. ● Learning in phases: ○ Taking into account previous knowledge, terms are usually to be treated in a first phase on a concrete, descriptive, intuitive or heuristic level, to be tried out in simple applications and only to be deepened, supplemented, generalized or made precise in a later phase. ○ The minimum realization consists in the orientation towards the previous knowledge of the students and the introduction of concepts via intuitive and heuristic approaches with exemplary exactifications, the maximum realization in a far-reaching specification of mathematical concepts, sentences and methods. ● Learning in a social environment: ○ The use of suitable social forms must be tailored to the desired learning goals, the nature of the content and the respective learning group. ○ A constructive climate between teachers and learners and within these groups is helpful for any learning process.		

	○ The minimum realization consists in the situation-related change of social forms in the classroom, the maximum realization in teaching elementary techniques and rules for good team and project work as well as in cooperation with experts from outside the school. ● Learning under a variety of aspects: ○ Individual content and problems can be seen from different perspectives and examined from different directions. ○ Diverse perspectives ensure great flexibility when applying what has been learned and recognizing what has been learned in new or unfamiliar contexts and problems. ○ The minimum realization consists in the occasional clarification of different points of view when dealing with new content, the maximum realization in the creation of cross-connections and in the consistent working out of the advantages and disadvantages of different approaches. ○ This gives a complex and balanced picture of mathematics. ● Learning with instructional support: ○ Learning without instructional support is usually – especially in mathematics – not very effective and can easily lead to excessive demands. ○ Teachers must guide students and support them in a targeted manner, especially if they have problems. ○ The minimum realization consists in the provision of student-appropriate learning environments and learning opportunities, the maximum realization in differentiation measures through which individual talents, abilities, inclinations, needs and interests are promoted. ● Learning with media support: ○ The procurement, processing and evaluation of information		

	also has to be done with books (e.g. school books), magazines and with the help of electronic media. ○ The use and problems of mathematical content and learning aids on the Internet are to be discussed here. ○ The minimum realization consists in the occasional inclusion of such media, the maximum realization in the targeted acquisition of competencies ranging from the acquisition of information to the independent composition and presentation of mathematical texts. ● Learning with technological support: ○ Technological aids should be used sensibly in all areas of competence. ○ You must have at least basic functions for representing functions ,curves and other geometric objects, for symbolically transforming terms and solving equations and systems of equations, for determining derivative and antiderivative functions, for integration and for support with methods and procedures in stochastics. ○ Appropriate and sensible use of technological aids through planned procedures must be ensured. ○ The minimal realization consists of the use of appropriate tools when solving tasks and the occasional use as a didactic tool when developing new content. ○ The maximum realization is the meaningful use of such technologies as a tool for modeling, visualization and experimentation.		

	Securing the income from lessons/(written) performance assessments ● Individual, team and group work, project work and regular homework are available to ensure the learning outcome. ○ For the time frame of school work, the section "Performance assessment" of the third part applies with the proviso that in the case of school work lasting several hours, two independent task areas can be presented and dealt with separately in chronological order. ○ When working on both tasks, the use of conventional writing instruments, pencils, rulers, set squares and compasses as well as the use of formularies that have been approved for the exam by the responsible government member or other suitable formularies and electronic aids are permitted. ● Educational and teaching task, subject matter: ○ The curriculum assumes three hours per week in each year group. If the endowment is higher, a more in-depth and multifaceted treatment of the learning content should be aimed for. ○ The content in italics is only obligatory for school types with more than three hours per week. Mathematical Competencies ● Mathematical competencies have a content dimension (to which content they relate, i.e. what something is done with), an action dimension (to which type of activity they relate, i.e. what is done) and a complexity dimension (related to the type and degree of networking). ○ Mathematical competences are understood here as long-term cognitive abilities that are to be developed by learners and enable them to carry out certain activities in variable		

	situations, as well as the willingness to use these abilities and skills. ● Content dimension: ○ Mathematical competence requires knowledge and knowledge in the fields of algebra and geometry, functional dependencies, analysis and probability and statistics. ● Action dimension: ○ Mathematical competence requires skills and abilities in the following activities: ○ Descriptive-modeling work includes all activities that have to do with the translation of situations, states and processes from everyday language into the language of mathematics. The intra-mathematical change of forms of representation is also part of these activities. ○ Formal operational work includes all activities that are based on calculations or algorithms, i.e. the application of procedures, calculation methods or techniques. ○ Interpretive-documenting work includes all activities that have to do with the translation of mathematical representations, connections and facts into everyday language as well as the interpretation and documentation of results. ○ Critical-argumentative work includes all activities that have to do with arguing, questioning, exploring boundaries and justifying. Proving assertions or heuristically derived assumptions is a focus of this area of activity. ● Complexity dimension: ○ The requirements necessary to cope with mathematical tasks and problems can vary greatly and range from reproduction to networking to reflection. ○ Using basic knowledge and skills means the reproduction or		

	direct application of basic concepts, processes or representations. As a rule, only reproductive mathematical knowledge and skills or the direct application of knowledge and skills immediately recognizable from the context are required. ○ Establishing connections is required when the mathematical facts are more complex, so that terms, theorems, procedures and representations from one or different mathematical fields or different mathematical activities have to be connected in a suitable way. ○ Problem Solving and Reflection: Problem solving builds on initiative and heuristic strategies in unfamiliar situations. Reflecting means thinking about connections that do not automatically result from the mathematical facts presented. Reflective knowledge is knowledge about mathematics developed on the basis of corresponding thought processes. ● Building character – ensuring sustainability ● Since mathematics is structured in a progressive manner, attention must be paid to activating the necessary prior knowledge, repeating it and ensuring sustainability.		
Grade 6	3rd semester – competence module 3 Ensuring sustainability ● Repeat and activate necessary previous knowledge for the competence areas of this module ● Supplement and provide the basics for the competence areas of this module	✔	✔

	Securing basic skills in the long term ● powers, roots and logarithms; inequalities ● be able to define powers (with natural, integer, rational or real exponents), square roots and logarithms; know and be able to apply the appropriate calculation rules ● Working with and solving inequalities in a variable ● real functions Be able to define and represent functions of the following types; can sketch typical forms of their graphs; state characteristic properties and be able to interpret them in context ● Power functions: ● Polynomial Functions: ● Exponential functions: ● Logarithm functions ● Angular functions: Be able to examine real functions (monotony, local and global extrema, symmetry, periodicity) ● Know chains of functions; Know inverse functions ● Be able to describe the change in the graph of a function f when going from f(x) to c · f(x) , f(x) + c , f(x + c) , or f(c · x) ● Be able to describe changes in quantities using measures of change (absolute and relative change, mean rate of change, change factor) ● Be able to use the above types of real functions, especially exponential functions, in non-mathematical situations; Being able to understand functions as models, compare models and reflect on the limits of modeling ● Know real functions in several variables; recognize functions in formulas; know the general concept of function (, where A and B are arbitrary sets)		

	• Know sequences of numbers as real functions defined on or * (especially arithmetic sequences as linear functions and geometric sequences as exponential functions); represent them through explicit and recursive formation laws and apply them in non-mathematical areas • Know and be able to examine properties of sequences (monotony, boundedness, limit value) 4th semester – competence module 4 Ensuring sustainability • Repeat and activate necessary previous knowledge for the competence areas of this module • Supplement and provide the basics for the competence areas of this module Securing basic skills in the long term • Calculate sums of finite arithmetic and geometric series • Define and calculate sums of infinite series for convergent geometric series Vectors and analytic geometry in ³; vectors in n • Being able to transfer the terms and methods known from two-dimensional analytical geometry to the three-dimensional case (especially being able to describe straight lines using parametric representations) • Determine normal vectors; • Be able to describe planes using parametric representations or equations (normal vector representations). • Be able to solve systems of linear equations in three variables • Know vectors in n and their arithmetic operations, interpreting them		

	in application contexts and be able to use them sensibly Descriptive statistics; probability ● Be familiar with representations and key figures of descriptive statistics and be able to work with them ● Know the terms random trial, event and probability; Knowing methods for determining probabilities: determination of a relative proportion, determination of a relative frequency through a series of tests, indication of the subjective confidence; know that these methods only provide approximate or uncertain results ● Understand the relationship between relative frequencies and probabilities ● Be able to calculate with probabilities (tree diagrams; addition and multiplication rules) ● *Kn*ow conditional probabilities and (stochastic) independence of events ● Know and apply Bayes' theorem		
Grade 7	5th semester – competence module 5 Ensuring sustainability ● Repeat and activate necessary previous knowledge for the competence areas of this module ● Supplement and provide the basics for the competence areas of this module Securing basic skills in the long term ● Basics of differential calculus using polynomial functions ● Be able to solve simple polynomial equations of degree ≤ 4 in the domain of the real numbers (provided they are used in differential	✔	✔

	calculus) ● Be able to define the difference quotient (the average rate of change) and the derivative quotient (the local or instantaneous rate of change). ● Be able to interpret the difference and differential quotients as secant or tangent gradients as well as in non-mathematical areas ● Know the concept of the derivative function; know higher derivatives ● Know and be able to apply derivation rules for power and polynomial functions ● Be able to describe areas of monotony and curvature, extreme points, turning points and saddle points (terrace points) with the help of the derivation ● Be able to carry out investigations of polynomial functions in internal and non-mathematical areas; be able to solve simple extreme value tasks (determination of extreme points in an interval) Circles, spheres, conic lines and other curves ● Be able to describe circles, spheres and conic sections using equations ● Be able to determine the mutual position of circle and straight line and being able to calculate any existing points of intersection; find an equation of the tangent at a point of a circle ● Be able to determine the mutual position of the conic section and the straight line and be able to calculate any existing points of intersection; find an equation of the tangent at a point of a conic section ● Be able to describe plane curves (possibly also curves in space) using parametric representations		

	6th semester – competence module 6 Ensuring sustainability ● Repeat and activate necessary previous knowledge for the competence areas of this module ● Supplement and provide the basics for the competence areas of this module ● Secure basic skills in the long term Extensions and exactifications of the differential calculus ● Know the derivation rules for exponential and logarithmic functions, sine and cosine functions ● Know other derivation rules (especially the chain rule) and be able to use them for functional investigations in different areas ● Be able to carry out other applications of differential calculus, especially in economics and natural sciences ● Know and be able to explain the term continuity ● Know the concept of differentiability and the relationship between differentiability and continuity Discrete probability distributions ● Know the terms "discrete random variable" and "discrete probability distribution". ● Understand the relationship between relative frequencies and probabilities ● Know and be able to interpret the expected value, variance and standard deviation of a discrete random variable (probability distribution). ● Know the binomial coefficient and its most important properties ● Be able to work with discrete distributions (especially with the		

	binomial distribution) in application-oriented areas Complex numbers ● Recognize the usefulness of expanding the real numbers ● Know complex numbers in the form a + b ·i; calculate with them and use them to solve equations ● Know the fundamental theorem of algebra ● Know complex numbers in polar form		
Grade 8	7th semester Ensuring sustainability ● Repeat and activate necessary previous knowledge for the competence areas of this module ● Supplement and provide the basics for the competence areas of this module ● Securing basic skills in the long term Fundamentals of integral calculus ● Knowing the definite integral and being able to understand it as a number "between" all upper and lower sums and being able to understand and calculate it approximately as a sum of products: ○ Be able to express quantities through integrals, especially as generalizations of formulas with products (e.g. for areas or distances covered) ○ Know and be able to use the term antiderivative ○ Be able to calculate definite integrals with the help of antiderivatives using elementary integration rules	✔	✔

	Applications and exactifications of the integral calculus ● Be able to interpret the definite integral in different contexts and to be able to describe corresponding facts using integrals (in particular areas, volumes, distances, speeds, work and energy; other physical interpretations if necessary) ● Know the main theorems (or main theorem) of differential and integral calculus; explain the relationship between differentiation and integration ● Know the indefinite integral Continuous probability distributions; judgmental statistics ● Know the terms "continuous random variable" and "continuous distribution". ● Be able to use the normal distribution to approximate the binomial distribution ● The normal distribution can be used in application-oriented areas ● Determine and interpret confidence intervals ● Conduct simple statistical hypothesis tests and interpret their results Difference and differential equations; Basics of system dynamics ● Describe discrete changes in variables using difference equations and be able to interpret them in context ● Describe continuous changes in variables using differential equations and be able to interpret them in context ● Be able to solve simple differential equations ● Be able to describe and examine simple dynamic systems using diagrams or difference equations 8th semester		

	Ensuring sustainability ● Repetition, deepening of skills and networking of content in order to gain a comprehensive overview of the connections between different mathematical fields		