

Math Curriculum

Aims

Mathematics and calculation are one of the very fundamental subjects that underlie so much other understanding of the world we find ourselves in, its laws, patterns, contexts and development. It is our goal to awaken the students' wonder and curiosity, to make them want to explore and think, to give them the fundamental skills and tools to be able to solve problems in everyday life and to be able to construct and develop new things for the benefit of the future. Mathematics goes hand in hand with so many other subject areas, especially the natural sciences, but also with needlework, eurythmy, folk dance, form drawing and music. These strengthen the mathematical development in us, which then comes to the benefit of the application of mathematics in physics, geography, biology and chemistry.

In the Steiner School, we go on a discovery in nature from the kindergarten class and connect numbers with the things and quantities that we find around us. Throughout the school course, these experiences and that understanding of the world are built on. Arithmetic stories develop from the completely banal to riddles, over equations and problem solutions to personal finance and surveying an area of land. Mathematics helps to amaze us and to inspire and create new things. It helps to think, in the development from the concrete to the abstract, to reason and solve problems. It creates an overview and understanding of the world.

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Objectives and Final Goals of the Subject

The student can act with professional overview and judgment in complex situations with mathematics. Skill and knowledge targets have been set for the following competence areas: Problem solving, modelling, reasoning and thinking, representation, symbol processing, communication and aids.

Numbers and Algebra (NA)

The student can use real numbers and algebraic expressions in mathematical investigations. Skill and knowledge targets have been set for the following competence areas: Numbers, calculation strategies, equations, formulas and algebraic expressions and functions.

Geometry and Measurement (GM)

The student can explain geometric relationships and calculate measurements as well as create and shape new constructions. Skill and knowledge targets have been set for the following competence areas: Geometric properties and relationships, locations and movements and measurement.

Statistics and Probability (SP) The student can evaluate statistical studies and apply probability. Skill and knowledge targets have been set for these two areas of competence: Probability calculation and statistics.

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Development of the Subject		
Content and Focus	Objectives	Final Goals
Class 1 The idea is that shared experiences and practical practice give students a personal relationship with the number symbols. The four types of calculation are introduced as a whole, so that the qualities and connection between them are made visible. In accordance with the theme WHOLE, mathematics is introduced from a holistic perspective. The students must divide into smaller parts. The numbers must be close and concrete, closely connected to things in the child's surroundings, e.g. fingers, chestnuts and rhythms. Thus, the student does not primarily learn calculation techniques, but the richness and diversity of the world of numbers. In the subject of form drawing, the students work with straight and curved lines, and here they encounter something they already know, but now in an abstract and simple form. The team "the curved and the straight" can be linked to geometry, image, eurythmy and the rhythms of music.	Numbers and Algebra and Algebra abd Measurement objectives are trained.	We work with numerical images and characteristics. In form drawing, work is based on number qualities and from whole to part. The students observe and reproduce curves, lines and patterns.



Numerical understanding is incorporated through counting, tables and observation of numbers and groupings. We work with number symbolism, first based on the intuitively understandable Roman numerals and then the Indo-Arabic numbers and the 10-number system. The individuality and character of the numbers are treated particularly thoroughly – especially the first 12 numbers. Emphasis is placed on analytical calculation – in tasks the starting point is from the whole to parts. Concrete objects are counted. MC skills are trained here. The tables are incorporated rhythmically by the stomp, the clap and the rhymes and strips, and the students jump and walk the tables forwards and backwards. Work with tables 2-12 begins in 1st grade and continues in 2nd grade. The four types of arithmetic are introduced based on practical experiences and exercises as well as stories and pictures that naturally include the symbols of the arithmetic types.		
Class 2 Dualism and polarity are the overarching themes in Class 2 and emerges in relation to such ideas as the quality of the calculators against each other; +/- and */:, and in mirroring exercises in shape drawing. The	Numbers and Algebra (NA), Geometry and Measurement (GM)	 MC Skill Objectives: The teaching gives the student the opportunity to: maintain confidence in own thinking act appropriately in situations involving numbers and calculations

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 analytical work from Class 1 continues, and counting takes place with counting and presenting numbers in connection with groupings. Here, training is carried out in relation to the competences MC Work with the small table 2-12 is continued from Class 1. It is drawn and practiced – from front to back – as rhythmic counting. The work with the four types of calculations is also continued from Class 1 in the form of immersion in oral work about connection with simple everyday situations about simple characteristics and mathematical explanations about concrete and simple symbolic representations about concrete materials and tools. 	and Statistics and Probability (SP)	 determine the number of concrete objects collect and arrange things according to shape, size and other characteristics have conversations with others about solving problems where arithmetic is used find and discover the quality of numbers in the environment MC Knowledge Objectives: The teaching gives the student the opportunity to: engage in simple strategies make connections with simple everyday situations compare simple characteristics and mathematical explanations, make concrete simple symbolic representations about concrete materials and tools
Class 3 Teaching in Class 3 can support students by letting them reflect on their place in the world and, in a tangible way, let them discover the world anew. Concretely, this happens through practical work in measuring, weighing and building and through cultivating and harvesting. The students must carry out calculations, carry out a construction of some kind and in this way concrete work with basic physical conditions such as center of gravity and stable/labile		 NA Skill Objectives: The teaching gives the student the opportunity to: develop methods for calculations with natural numbers, counting write down natural numbers from 0 to more than 1000 count backwards know Roman numerals calculate oral tasks with all four types of calculations



points. The bill is used in practical, concrete tasks such as measuring and weighing. You can work with merchant accounts thematically when establishing a class store. At the end of the period with old measuring and weighing units, the meter system is introduced to the students, which can be used immediately when their building project needs to be outlined and prepared. The road to the meter system, however, always goes via an understanding of the old measuring and weighing units which are based on the human body and physical experiences. Through talking about different units of measurement; cubit, foot, inch, coffee cup, stone's throw, the student gets a concrete, physical and personal relationship to measuring and weighing. Finally, through joint work, the class reaches our modern meter system, which is the basis for all other measuring units. Here, training is carried out in relation to the competences MC. Work is done with written arithmetic with associated algorithms for addition, subtraction, multiplication and division for whole numbers. The synthetic, common form of calculation – from parts to the whole. In addition, there is a bigger look for the position system, with tier transitions. Tables from 2 to 12 the table

continues to be practiced.

Here, NA skills are trained.

- calculate simple written addition and subtraction tasks
- calculate addition and subtraction tasks with transitions of 10 in writing
- know tables and number patterns from 2-12 forwards and backwards
- apply multiplication and preparatory division

NA Knowledge Objectives: The teaching gives the student the opportunity to:

- understand simple natural numbers and their structure
- understand how ro make calculations with natural numbers
- understand general accounting and written notes
- understand the 4 types of bills
- understand simple figure and number patterns

GM Skill objectives: The teaching gives the student the opportunity to:

- apply simple geometric concepts
- carry out and evaluate measurements of lengths, weight and time
- mirror simple figures in two axes
- work with straight lines and curved curves
- name simple geometric shapes



Mirroring is now done with several axes both vertically, horizontally and with crossings and work is being done with shape transformations. Sketches of construction with measurements etc. are included as a natural part of the construction process. Units of length and units of weight – old Danish measurements are learned, and measurements are made based on the student's own measurements of their own objects, with average units, such as the average of the class's feet and heights as well as measurement uncertainty in connection with surveying. Finally, with joint help, an understanding of units in the meter system emerges. GM skills are trained here.		 GM Knowledge Objectives: The teaching gives the student the opportunity to: understand the properties of figures understand simple geometric calculations know how to draw figures including methods gain knowledge of length, time and weight as well as units of measurement
Class 4 In arithmetic, fractional arithmetic is introduced. Dividing the whole number is both an exciting and, for many, difficult step in mathematics. It can look many ways. For some students, it is a big step to realize that the more parts the smaller units. Through cutting and folding paper, baking and sharing cookies and similar activities, teaching can be made concrete and easier to understand. The use of fractions can also be related to music. Here, in flute playing and rhythm exercises, the students can work with whole and half notes, fourths,	Numbers and Algebra (NA), Geometry and Measurement (GM) and Statistics and Probability (SP)	 MC Skill Objectives: The teaching gives the student the opportunity to: choose and use account types in different specific contexts know how numbers can be connected to practical reality describe sizes when measuring and calculating measure and calculate perimeter and area in specific situations communicate about subject matters

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eighths, etc. A whole – the unit – is broken up into	 know different cultures' methods of indicating depth
equal pieces. The spaces	in images
between the whole numbers - on the number line -	 compare measurable facts, for example from
becomes larger. Parts are drawn, colored and cut out	geography
of the whole. Tables of fractions can be produced.	
MC skills are trained here.	MC Knowledge Objectives: The teaching gives the student
Fractions are introduced and experienced practically,	the opportunity to gain knowledge of:
both graphically and through the rhythm and notes of	 mathematical problems and strategies relating to the
music. Several names for the same number exist -	outside world
which are lengthened and shortened. Fractions are	simple models
concretely illustrated, and methods for multiplication,	 simple investigations including reasoning
subtraction and addition are discovered and practiced.	 the connection between language and mathematical
Improper fractions are turned into mixed numbers with	expressions and symbols
real fractions. The work on setting up the division	 oral and written communication, including technical
continues. Skills in all types of calculations are	terms and concepts
improved.	 aids, specifically materials and tools
NA skills are trained here.	NA Skill Objectives: The teaching gives the student the
In Class 4, we work with spaciousness on paper. In	opportunity to:
connection with this year's Viking theme, work is being	 know the whole numbers, decimals and fractions
done with Nordic braid patterns and ornamentation,	 know the arrangement of numbers, the number line,
where the lines go over or below each other at points	the position system
of intersection. A theme that can also be taken up	 use the four types of calculations
again in needlework, when the students themselves	 use general calculations, rounding rules, rough
draw a pattern for an embroidery and then sew it using	calculations and written calculations
the cross-stitch technique. Time and time again, they	use variables
cross the thread diagonally, and the work grows into a	 know the concept of percentage and can use it in
whole.	practical calculations



In connection with geography, cartography is practiced, where the students begin by drawing a map of the schoolyard based on their own observation, then the road from home and finally the theme is expanded to include map drawing of the whole of Denmark. Reference is made to the teaching plan for geography. GM skills are trained here. Students also conduct experiments and look qualitatively at probabilities. Here the competences SP are trained.

Class 5

In Class 5 we work with number systems and historical mathematics. For example, students investigate the cuneiform writing of the Sumerians with the 60s system and the hieroglyphs of the Egyptians and the nul of the Indians. From geometric calculations, students find out how big an angle is, developer abstraction ability and logical thinking. It prepares the way for a greater understanding of the mathematical concepts when aids such as calipers and protractors are subsequently introduced.

MC skills are trained here:

The position system is elaborated, and decimal numbers are introduced. Commas are introduced between whole numbers and parts, so that fractions can be written as decimal numbers: some with a few decimal places and others with an infinite number. calculate with decimal numbers and use fractions linked to percentages and concrete relationships

NA Knowledge Objectives: The teaching gives the student the opportunity to:

- know simple equations
- know calculation with the 4 types of calculations, fractions, decimals, percentages, simple powers, pi
- know of the role of simple variables in formulas

GM Skill Objectives: The course provides the opportunity to:

- use geometric concepts and methods in describing concrete objects
- measure and calculate the length of open and closed figures
- measure and calculate the perimeter of closed figures
- measure and calculate surfaces, area
- produce and use a scale
- know the relationship between diameter and circumference in any circle
- draw basic geometric figures freehand
- can construct basic geometric figures with a compass and ruler

GM Knowledge Objectives: The teaching gives the student the opportunity to:

• learn about angle types and sides in polygons

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Tables of decimal numbers can be devised and written. Prime numbers exist. Composite numbers are divided into prime factors. Work is being done with rounding and estimates.

NA skills are trained here:

Freehand geometry, basic geometric concepts are introduced. This includes circles with center, chords, tangent, diagonal and radii; triangles – the isosceles, the equilateral and the right; the pointed, the obtuse-angled. Polygons – squares, rectangles, parallelograms, trapezoids, rhombuses; diagonals; symmetry; movement; shape transformations. Units of measurement are found and used with decimal points.

GM skills are trained here:

Maximum value and minimum value in statistical analysis. Some probabilities are introduced. Here the competences SP are trained

Class 6

The overall theme in Class 6 is full-scale causal thinking, not least in the natural sciences. In mathematics teaching, algebra is introduced in connection with area and percentage calculations. The use of letters as representatives of numerical values entails an exercise in abstraction. In algebra, the focus is on the ideas behind mathematics. The ability to think abstractly gives greater freedom and openness in cognition. This is an important one

- know the relationship between diameter and circumference in any circle
- gain knowledge about angle measures, lines and methods for examining figures
- gain knowledge about drawing forms for rendering, including sketch or Accurate drawings
- gain knowledge about methods for mirroring, parallel displacement and rotations
- gain knowledge about methods for determining perimeter, area and volume

SP Skill objectives: The teaching gives the student the opportunity to:

- know about experimental and investigative work methods
- find averages
- carry out investigations and describe them
- relate to probabilities
- use fractions and percentages

SP Knowledge Objectives: The teaching gives the student the opportunity to:

- gain knowledge about methods for processing and presenting data, including graphical production
- gain knowledge about methods to investigate randomness and chances, including probability through experiments

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step on the way to the liberation of thought from the		
concrete world of senses and experience. Order and		
beauty in mathematics are seen in new dimensions,		
e.g. by square rules, the number pi and the		
Pythagorean theorem. The mystery of the five in the		
rose petals and the six in the lilies can now take on		
new dimensions in the construction of pentagons and		
hexagons, which vary in many beautiful contexts. In		
the Class 5, students worked freehand, now Class 6		
students work exactly with a compass and ruler.		
MC skills are trained here		
Students also work with money turnover and		
calculation. They also work with conversion between		
fractions, decimals and percentages. Number follower		
Students further their understanding of divisibility rules.		
Algebra is introduced, with reductions, inequalities,		
parentheses, the hierarchy of arithmetic. Square		
numbers and percentages are introduced.		
NA skills are trained here:		
Students make constructions with rulers and calipers		
where they practice accuracy and precision and		
explore turnover between units of length.		
Students learn about:		
• geometric locations: midnormal, angle bisector,		
circle, parallel lines		
 circle constructions and regular polygons 		
 angles and degrees 		
 area calculations of right-angled squares 		

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 area of triangles Pi and the circumference and area of the circle scale ratio Pythagoras' theorem geometrically find the right angle practically Platonic solids are produced GM skills are trained here: Students conduct experiments involving randomness and chance. SP skills are trained here: 		
Class 7 The teaching is aimed at a holistic understanding where all aspects of the thinking that have been developed in prior years are put to use. The students will experience that the subjects concern them specifically in relation to their own lifestyle and personal choices, while at the same time providing information. Elements of an experiential visualization combined with abstract technical information, and both analogies and causality, are used in processing the curriculum. Mathematics is connected to the natural sciences: geography, biology, physics and astronomy as well as chemistry. MC skills are trained here:	Numbers and Algebra (NA), Geometry and Measurement (GM) and Statistics and Probability (SP)	 MC Skill Objectives: The teaching gives the student the opportunity to: discover and marvel at mathematical connections empathize with a problem formulation can argue for and give reasons for solutions found assess the accuracy and uncertainty of a result define and visualize practical tasks mathematically set up mathematical models of reality analyze and interpret existing models communicate with others about mathematical models describe and interpret mathematical concepts and contexts with different representations and symbols – ex graphs, functions, regulations, tables, linguistic descriptions

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Students investigate negative numbers, and the rectangular coordinate system is introduced. Variables are calculated and true or false statements are created. Algebraic expressions are transformed and made simpler. General rules exist. Terms are separated by plus and minus with parentheses calculated first. In equations, students work with a scale with two sides. Here, 'downwards' is counted instead of 'upwards'. The balance must be maintained. Formulas are discovered and used for concrete calculations. Students also investigate turnover between surface units, currency, interest calculation, tier powers - very large and small numbers, and power calculation. Students prepare equations based on practical conditions. They work with square root and Pythagoras' theorem in application. NA skills trained here are: Students work with perspective drawing, the Golden Rectangle, equality, congruence and multiplication by a point. They work with lines in triangles - meridian, altitude, midnormal, angles. GM skills trained here Width of variation. Median. Type number Mean number/average. Counting trees. SP skills are trained here. Class 8

- use the language of mathematics
- reason logically and be able to distinguish between hypotheses, definitions and sentences
- use digital and concrete aids eg use spreadsheets for statistical studies, geometry program for modeling simple geometric problems, know how to use a calculator, compasses and ruler

MC Knowledge Objectives: The teaching gives the student the opportunity to:

- gain knowledge about problem-solving processes, including structuring and delineation
- gain knowledge about models, including which tools can be used and their uncertainty and variation options
- gain knowledge about hypotheses, definitions, mathematical theorems and mathematical language as well as individual mathematical proofs
- gain knowledge of technical terms, symbols, concepts and associated sources for information search
- gain knowledge of how digital spreadsheets and geometry programs work

NA Skill objectives: The teaching gives the student the opportunity to:

• apply the four types of arithmetic to rational numbers with certainty

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The theme of the school year is freedom, equality and fraternity, revolution and liberation from authority. In line with this, the students work a lot together in groups, where they are helped, formulate questions and explain to each other how tasks and problems are to be solved. Here, the part of graph theory which is also taken up includes manipulation of graphs to get different messages across. The starting point is a number of practical examples, preferably collected by the students themselves. The students also work with completely individual period booklets to document the syllabus and their own understanding. Here we work with setting up multimodal texts. Work is based on concrete problems and contexts that can be described with the mathematical skills that are practiced. Emphasis is placed on visualization and practical application. Students work with mathematical formulas – exercises in application and coverage. Parenthetical rules and quadratic theorems in algebra are reviewed and developed through concrete area calculations. MC skills are trained here: Students work with linear algebra with 20 calculation

rules at a glance; factorization; reduction; fraction calculation; and potencies including roots. Students work with mathematical descriptions of the relationship between two quantities via function

expressions, table values and straight lines; linear

- master the basics of calculating with square and cube roots
- know about the development of the numbers in cultural history
- apply algebra
- develop familiarity with oral fluency
- choose and use the type of account in different contexts
- develop safety in the use of aids compasses, rulers, calculators, digital spreadsheets and geometry programs
- explain your own thinking orally and in writing

NA Knowledge Objectives: The teaching gives the student the opportunity to:

- gain knowledge about the four types of calculations, roots, the relationship between decimals, fractions and percentages, as well as the rational and irrational numbers
- gain knowledge about the hierarchy of arithmetic types
- gain knowledge about calculation rules for powers, roots, percentages
- gain knowledge about growth calculation, including interest calculation
- gain knowledge about methods for solving equations without and with digital tools



relationship = mathematical model, as a new	gain knowledge about graphical presentations of
mathematical discipline. Students have the opportunity	algebraic expressions
to use the coordinate system – joining points to lines,	 gain knowledge about linear and non-linear functions
slope numbers, proportionality. Support point diagram.	 gain knowledge about digital aids to be able to solve
Students have the opportunity to use the utility	equations geometrically and calculate mathematics
program Geogebra but also control/validation methods	using spreadsheets
in relation to the automatic recording. Equations with	
one unknown - graphical and algebraic solution are	GM Skill objectives: The teaching gives the student the
studied as well as two equations with two unknowns –	opportunity to:
graphical solution. Students work with turnover	 construct triangles and squares by calculating side
between room units.	lengths and angle sizes,
NA skills are trained here:	 work with geometry in plane and space,
Calculation of distances – and constructions in different	 calculate interior and exterior angle sums in all
scale ratios. Volume, density and turnovers. Surface	regular and irregular polygons,
area. Distances. Movements – mirroring, rotation,	 explain orally and in writing the procedure for
parallel translation. Enlargement and reduction. The	constructions,
circle. Inscribed and circumscribed circles.	 produce perspective drawings with one or more
GM skills are trained:	vanishing points,
Combinatorics. Faculty. Sampling with/without	 produce a cylinder or cone with an oblique section so
set-back. Ordered sample – unordered sample.	that the ellipse shape is detected,
Intervals. Bar graph - histogram. Bar chart. Pie chart	 experience geometric phenomena.
The skills are trained here: Statistics and probability	
calculus.	GM Knowledge Objectives: The teaching gives the student
	the opportunity to:
Class 9	 gain knowledge about polygons and circles,
Work continues with the previously acquired material,	Gain knowledge about right triangles including
but now in increasing difficulty.	trigonometry and Pythagoras,

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Here, the four basic types of calculations from	 Gain knowledge about methods for geometric
arithmetic are repeated, but now with the	drawing without and with digital aids,
understanding of the types of calculations as	 Gain knowledge about geometric patterns, curves,
operations with special symmetries and properties	lines and connection with equations,
such as commutativity, associativity and transitivity.	 Gain knowledge about the unit system,
MC skills are trained here:	 Gain knowledge about formulas and tools for
The calculation rules for the real numbers are rounded	determining the perimeter, area and volume of
off with an extension of the power calculation rules and	figures, both without and with digital tools.
extra focus on special cases such as the square	
theorem. The operations of elementary algebra are	SS Skill objectives: The teaching gives the student the
practiced through equations and inequalities of the 1st	opportunity to:
and 2nd degree. In relation to number systems, work is	define outcome space
done, among other things with the binary numbers. In	calculate outcome
function theory, work is done with the concept of	 divide material into boxes and produce a frequency
function, where the elements of sets are linked	table
together by formulas or graphs. Linear functions and	 draw a histogram
parabolas and hyperbolas.	 assess probabilities
NA skills are trained here:	find combinations
Teaching in trigonometry and cartography gives the	 apply and evaluate statistics
opportunity to calculate ratios between similar	
triangles, to calculate angles in polygons, and to	SS Knowledge Objectives: The teaching gives the student
calculate side lengths in a right-angled triangle based	the opportunity to:
on Pythagoras' theorem. Technical drawing. Projection	 gain knowledge of statistical tools without and with
drawing. Trimetric normal projection. Archimedean	digital aids, including statistical processing of large
solids. Cone section.	amounts of data
GM skills are trained:	 gain knowledge about methods for investigating
Students are Introduced to standards for descriptive	relationships between data
statistics and basic rules for combinatorics. They plan	



and carry out systematic collection of data, present data in histogram form, describe collected data by mean, median, type number and quartile. The understanding of the subjects is deepened through project work as well as analysis of media use and the production of statistical data. CAS is used in all relevant contexts apart from spreadsheets. SP skills are trained here: Students work with statistics and probability calculus.	 gain knowledge about the use of grouped data and samples gain knowledge about outcome spaces, probability models and calculations gain knowledge about statistical and theoretical probability
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