Curriculum for Mathematics 2P-Y – Vg3

Supplementary

This is a translation from Norwegian Nynorsk of the official Norwegian subject curriculum text.

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About the subject

Relevance and central values

Mathematics 2P-Y is an important subject for understanding and describing conditions and relationships in society through the use of mathematical modelling. Mathematics 2P-Y shall help pupils to develop a precise language for critical thinking and mathematical problem solving strategies. Mathematics 2P-Y shall prepare pupils for further study and for a society and working life in development through the practical application of mathematics.

All subjects shall help the pupils to understand the value system for learning. Critical thinking in mathematics includes critical evaluation of reasonings and arguments and can arm the pupils to make their own decisions and take a stand on important questions in their own life and in society. When the pupils are given the time to think, reflect, reason mathematically, ask questions and experience that the subject is relevant, the subject facilitates creativity and innovation. Mathematics shall help pupils to develop their ability to work independently and to collaborate with others through exploration and problem solving, and can help pupils to become more aware of their own learning. Giving the pupils the opportunity to solve problems and master challenges on their own contributes to developing perseverance and independence.

Core elements

Exploration and problem solving

Exploration in mathematics 2P-Y means that the pupils search for patterns, find relationships and discuss their way to a shared understanding. The pupils shall place more emphasis on strategies and approaches than on solutions. Problem solving in mathematics 2P-Y means that the pupils develop a method for solving a problem not previously encountered. Computational thinking is important in the process of developing strategies and approaches to solve problems, and means breaking a problem down into sub-problems that can be solved systematically. This also includes evaluating whether sub-problems can be solved best with or without digital tools. Problem solving also means analysing and reformulating known and unknown problems, solving them and evaluating whether the solutions are valid.

Modelling and application

A model in mathematics 2P-Y is a description of reality using mathematical language. The pupils shall gain insight into how mathematical models are used to describe everyday life, working life and society in general. Modelling in mathematics 2P-Y means creating such models. It also means to critically

evaluate whether the models are valid and what limitations the models have, evaluate the models in view of the original situations, and evaluate whether they can be used in other situations. Applications in mathematics 2P-Y means giving the pupils insight into how to use mathematics in different situations within and outside of the subject.

Reasoning and argumentation

Reasoning in mathematics 2P-Y means the ability to follow, evaluate and understand mathematical chains of thought. It means that the pupils shall understand that mathematical rules and results are not random, but have clear reasons. The pupils shall formulate their own reasoning in order to both understand and solve problems. Argumentation in mathematics 2P-Y means that the pupils give reasons for their approaches, reasonings and solutions, and prove that these are valid.

Representation and communication

Representations in mathematics 2P-Y are ways of expressing mathematical concepts, relationships and problems. Representations can be concrete, contextual, visual, verbal and symbolic. Communication in mathematics P means that the pupils use mathematical language in conversations, argumentation and reasoning. The pupils shall have the opportunity to use mathematical representations in different contexts through their own experiences and in mathematical conversations. The pupils shall have the opportunity to explain and give reasons for the choice of form of representation. The pupils must be able to switch between mathematical representations and everyday language and to switch between different representations.

Abstraction and generalisation

Abstraction in mathematics 2P-Y means using a formal symbol language and formal reasoning. Generalisation in mathematics P refers to the pupils discovering relationships and structures without being presented a finished solution. The pupils shall have the opportunity to explore concepts and symbols in order to express results and relationships by using algebra and suitable representations.

Mathematical area of knowledge

The fields of knowledge in mathematics 2P-Y are related to the everyday life of the pupils, the work life and the society as a whole. The fields of knowledge form the basis the pupils need in order to develop their mathematical understanding by exploring relationships within and between the mathematical fields of knowledge.

Interdisciplinary topics

Democracy and citizenship

In mathematics 2P-Y the interdisciplinary topic of democracy and citizenship refers to giving the pupils the opportunity to develop a concious approach to processing data and mathematical models which form the basis for decisions in society.

Basic skills

Oral skills

Oral skills in mathematics 2P-Y refers to creating meaning through dialogue in and about mathematics. This means communicating ideas and discussing mathematical problems, strategies and solutions with others.

Writing

Writing in mathematics 2P-Y refers to describing and explaining relationships, discoveries and ideas using suitable representations. Writing in mathematics P is a tool for developing one's own thoughts and learning. This means the ability to solve problems and present solutions that are adapted to the receiver and the situation.

Reading

Reading in mathematics 2P-Y refers to creating meaning in texts from society, working life and the field of mathematics. This means being able to sort information, analyse and evaluate its form and content, and summarise information in multimodal texts.

Numeracy

Numeracy in mathematics 2P-Y refers to using mathematical representations, concepts and approaches to do calculations and evaluate whether solutions are valid. This means recognising problems that can be solved using mathematics and formulating questions about these. Mathematics has a particular responsibility for teaching numeracy.

Digital skills

Digital skills in mathematics 2P-Y refers to the ability to use graphing tools, spreadsheets, CAS, dynamic geometry software and programming to explore and solve mathematical problems. It also means finding, analysing, processing and presenting information using digital tools.

Competence aims and assessment

Competence aims and assessment mathematics 2P-Y

Competence aims

The pupil is expected to be able to

- explore how different premises may impact how mathematical problems from society and working life are solved
- analyse and present findings in datasets from local communities and media
- use and evaluate choices of suitable measures of central tendency and measures of variability in statistical data
- read, extract and evaluate mathematics in texts about topics from social studies and the local environment, do calculations related to this, and present and argue for the results
- explore, describe and use the concepts of proportionality and inverse proportionality
- identify variable quantities in different situations and use them for exploration and generalisation
- explain and use percentages, percentage points and growth factors for modelling practical situations with digital tools
- interpret and calculate using radical expressions, powers and numbers in standard form
- plan, carry out and present independent work related to modelling and functions within topics from social studies
- use digital tools in exploration and problem solving related to the properties of functions, and discuss the solutions

Formative assessment

Formative assessment shall help promote learning and develop competence in mathematics 2P-Y. The pupils demonstrate and develop competence in the subject when they find, understand and use mathematical relationships. The pupils also demonstrate and develop competence when they work in a practical and explorative way by planning, carrying out and presenting work related to working life and society. Furthermore, the pupils demonstrate and develop competence when they explore mathematical concepts, use mathematical methods and use mathematical reasoning.

The teacher shall facilitate for pupil participation and stimulate the desire to learn by allowing the pupils to explore mathematics and solve mathematical problems by reasoning, arguing and modelling. The teacher and the pupils shall engage in dialogue about their development in programming and

strategies for solving problems. The pupils shall have the opportunity to try and fail. With the competence the pupils have demonstrated as the starting point, they shall have the opportunity to express what they believe they have achieved and reflect on their development in the subject. The teacher shall provide guidance on further learning and adapt the teaching to enable the pupils to use the guidance provided to develop their competence in discovering relationships between mathematics and practical applications.

Assessment of coursework

The grade awarded for coursework shall express the overall competence of the pupil after completing mathematics 2P-Y. The teacher shall plan and facilitate for the opportunity for pupils to demonstrate their competence in different ways, including through understanding, reflection and critical thinking, and in different contexts. The teacher shall award one grade in mathematics based on the competence the pupil has demonstrated in writing, orally and digitally, by using mathematical forms of expression, problem solving strategies and reflecting on and arguing for solutions and models.

Type of assessment

Assessment of coursework

Mathematics 2P-Y: The pupil shall recieve one grade for coursework.

Examination for pupils

Mathematics 2P-Y: The pupil can be selected for a written examination. The written examination is prepared and graded centrally. The pupil can also be selected for an oral-practical examination with a preparation part. The oral-practical examination is prepared and graded locally.

Examination for external candidates

Mathematics 2P-Y: The external candidate must sit for a written examination. The written examination is prepared and graded centrally.