

Mathematic and Sciences – Subject Specific Assessment Info

Mathematics

Summative assessment in years 7 – 9 mathematics studies is based on tests. Students have 6 – 8 tests during the academic year. Also, work assessment is part of summative assessment.

Tests done before the Christmas vacation affect the autumn term mathematics grade.

In years 7 and 8 all tests done during the academic year affect the spring term mathematics grade.

The final grade given at the end of year 9 spring term is based on the final assessment criteria of the Finnish mathematics curriculum. All Finnish curriculum mathematics content and learning objectives are covered over years 7 – 9. Therefore, all tests done during the academic year in year 9 and the students mathematics grades in years 7 and 8 affect the final grade.

Work assessment is done throughout the whole academic year. At the end of the academic year in May students get a grade in work assessment. This grade will affect the report card grade in the same way and with the same weight as any other individual test grade.

National mathematics test is done at the end of year 9. It can affect the final grade by rounding it up or down in case that student is somewhere between two grades based on other test results in year 9 and mathematics grades in years 7 and 8.

Formative assessment is done in class by the teacher regularly. Teacher monitors students' work and gives feedback.

The learning objectives (T's) of the Finnish mathematics curriculum are listed below. Under each objective is a short description of how and at which years the objective is covered at OIS. Also, the description for level 9 (Finnish scale of 4 – 10) of the Finnish curriculum final assessment criteria is given for each objective.

T1 to strengthen the pupil's motivation, positive self-image, and confidence as a learner of mathematics.

Covered in years 7 – 9.

Final assessment criteria level 9: Does not affect mathematics number.

T2 to encourage the pupil to take responsibility for learning mathematics both independently and together with others.

Covered in years 7 – 9.

Final assessment criteria level 9: Student takes responsibility for the group's actions and strives to develop the competence of the group.

T3 to guide the pupil to perceive and understand connections between the things he or she has learned.

Covered in years 7 – 9. Mathematical knowledge is cumulative. All new things learned build on the things learned previously. Connections to previous mathematics studies are pointed out.

Final assessment criteria level 9: Student connects the things he/she has learned and describes what causes the connections.

T4 to encourage the pupil to develop accurate verbal and written mathematical expressions.

Covered in years 7 – 9. Proper mathematical language is practiced at every year level and especially in year 7 when algebra studies start.

Final assessment criteria level 9: Student can express and justify his/her mathematical thinking.

T5 to support the pupil in solving mathematical assignments that require logical and creative thinking and in developing skills needed in it.

Covered in years 7 – 9. Problems requiring the application of learned facts and skills are solved in all year levels. Students are encouraged to look for alternative solutions to a problem.

Final assessment criteria level 9: Student investigates if there are alternative solutions to a problem.

T6 to guide the pupil to evaluate and develop his or her mathematical solutions and to examine critically whether the result is reasonable.

Covered in years 7 – 9. In applications students are guided to think whether the solution they have got makes sense or not.

Final assessment criteria level 9: Student evaluates his/her solution and develops it, if needed.

T7 to encourage the pupil to apply mathematics also in other subjects and in society.

Covered in years 7 – 9. Real life mathematics problems are solved each year. The mathematical nature of physics is emphasized from year 8 onwards and problems involving formulae of physics are solved.

Final assessment criteria level 9: Student can give examples of how mathematics is applied in the society. Student can use his/her mathematical skills in various situations.

T8 to guide the pupil to develop his or her information management and analysis skills and to instruct him or her in critical examination of information.

Covered in year 9 statistics studies.

Final assessment criteria level 9: Student applies data management and analysis skills and evaluates the reliability of knowledge.

T9 to guide the pupil to apply information and communication technology in learning mathematics and problem-solving.

Covered in years 7 – 9. Several websites and programs are used. For example, Khan Academy website, Excel and Geogebra.

Final assessment criteria level 9: Student applies and combines information and communication technology in research.

T10 to guide the pupil to strengthen his or her reasoning and mental arithmetic skills and to encourage the pupil to use his or her arithmetic skills in different situations.

Covered in years 7 – 9. Students are encouraged to always try mental mathematics first and only go for the calculator when needed.

Final assessment criteria level 9: Student can calculate multiple step mathematical operations mentally and apply his/her reasoning skills in different situations.

T11 to guide the pupil to develop his or her ability to calculate basic arithmetic operations using rational numbers.

Covered in years 7 – 9. Study of fractions starts in primary school and is continued in year 7. Fractions are revised in years 8 and 9.

Final assessment criteria level 9: Student can use basic operations with rational numbers in problem solving.

T12 to support the pupil in expanding his or her understanding of the concept of numbers to real numbers.

Covered in years 7 – 9. Natural numbers, integers, rational numbers, irrational numbers and real numbers are studied in year 7 and used in years 8 and 9 after that.

Final assessment criteria level 9: Student understands what exact value and approximate value are and can write numbers in order of magnitude.

T13 to support the pupil in expanding his or her understanding of percentage calculation.

Percentages are studied in year 8 and revised in year 9.

Final assessment criteria level 9: Student can calculate change as a percentage and use percentage calculations in various situations.

T14 to guide the pupil to understand the concept of the unknown and to develop his or her skills in solving equations.

Covered in years 7 – 9. Knowing how to solve equations is maybe the most important mathematical skill to learn in middle school. It is first studied in year 7. Knowing how to solve different types of equations is necessary in many units in years 8 and 9.

Final assessment criteria level 9: Student uses an unknown fluently in writing equations and can use his/her equation solving skills in problem solving.

T15 to guide the pupil to understand the concept of the variable and to acquaint him or her with the concept of the function.

To guide the pupil to practice interpreting and producing the graph of a function.

Covered in years 7 – 9. Variables are first studied in year 7 algebra. Functions and their graphs are studied in years 8 and 9.

Final assessment criteria level 9: Student uses simultaneous equations in problem solving and understands the geometrical meaning of solving equations. Student can interpret graphs in various situations.

T16 to support the pupil to understand geometric concepts and connections between them.

Covered in years 7 – 9. 2-dimensional geometry is studied in years 7 and 8. 3-dimensional geometry is studied in year 9.

Final assessment criteria level 9: Student uses similarity and proportion in problem solving.

T17 to guide the pupil to understand and utilize properties related to the right-angled triangle and the circle.

Right-angled triangles and the mathematics related to them (Pythagoras' theorem and trigonometry) are first studied in year 8 and revised in year 9.

The geometry of circle and circle theorems are studied in year 9.

Final assessment criteria level 9: Student uses the Pythagoras' theorem and its converse and trigonometry in problem solving.

T18 to encourage the pupil to develop his or her skills in calculating area and volume.

3 – dimensional geometry is studied in year 9.

Final assessment criteria level 9: Student can calculate the area of a multiple parted 2 – dimensional shape, lateral area and volume of a solid, and utilizes his/her knowledge in problem solving.

T19 to guide the pupil in using statistical functions and calculating probabilities.

Statistics and probabilities are studied in years 8 and 9.

Final assessment criteria level 9: Student observes and compares studies using statistical functions. Student can use and calculate probabilities in problem solving.

T20 to guide the pupil to develop his or her algorithmic thinking and skills in applying mathematics and programming in problem-solving.

Covered in years 7 – 9. Programming is studied from year 7 onwards.

Final assessment criteria level 9: Student utilizes programming in problem solving. Student can edit and develop a program.

Science Subjects

Biology

General – Biology is studied for half the year in grades 7, 8, and 9. The objectives are split as shown below. Students will receive specific assessment criteria for each assigned task that correspond to the IB assessment criteria and Finnish curriculum objectives.

Yr 7 – General Biology

Focus: In 7th grade biology students learn about the general concepts of biology: What is life? What are cells? How do living things adapt to their environment? They will cover how to classify living organisms, use microscopes, conduct dissections, identify common plants, grow their own plants, and design their own research experiments on bacteria and mold. Active participation in the lessons is key! Assessments range from traditional tests to research projects, learning diaries, and dissections.

Objectives:

- T1 – Knowledge of ecosystem and ability to name different species
- T2 – Understanding of organisms' structure and the function of different organs.
- T4 – Understanding the origins of life and evolution
- T7 – Knowledge and application of basic biology concepts.

- T8 – Ability to use basic research equipment and communicate results.
- T9 – Understand an organism's life cycle and how to grow a plant.
- T10 – Can perform research at school and outside of school.
- T11 – Ability to apply biological information to their own life, use it in discussions and making decisions.

Assessment tasks:

- Summer project plant collection and identification (T1, T7).
- Activity in dissections and dissection quizzes (T2, T7, T8).
- Evolution timeline research and presentation (T4, T7)
- Traditional quizzes and tests (T2, T4, T7)
- 2 self-designed group research projects on mold and bacteria (T7, T8, T10, T11)
- Plant growth learning diary (T7, T9)

Yr 8 – Forest Ecology

Focus: In 8th grade biology students spend time outside learning about the forest ecosystems. They will dive deeper into identifying different plant types and their specific adaptations to the environment, conduct research on their local forest ecosystem, and research native Finnish animals. Assessments range from traditional tests to species collection and identification, research projects, and written reports.

Objectives:

- T1 – Knowledge of basic ecosystem structure and ability to name different species
- T3 – Understanding organism adaptation to its environment and biodiversity.
- T6 – Understanding the impact of humans on the ecosystem and the consequences of changes.
- T7 – Knowledge and application of basic biology concepts.
- T8 – Students know how to use basic research equipment and communicate results.
- T10 – Can perform research at school and outside of school.

Assessment tasks:

- Plant, mushroom, and invertebrate collection, classification and identification (T1, T7).
- Traditional exam on Finnish forest types and structure (T1, T7).
- Field test on Finnish forest types, forest layers, and different plant species (T1, T3, T7).
- Group research project - design and conducting research on forest ecosystem (T7, T8, T10).
- Short written lab reports (T7, T8)
- Written research report on specific forest animal, its adaptations to its environment, and potential endangerment (T3, T6, T7).

Yr 9 – Human Biology

Focus: In 9th grade biology students learn about the human body and how it works. They will cover the basic structure and function of the human body systems, study how humans develop from a fertilized egg, conduct organ dissections, and study their own bodies. Assessments range from traditional tests to videos and comic strips, research projects and learning diaries.

Objectives:

- T2 – Understanding of organisms' structure and the function of different organs.
- T5 – Understanding human development and basic functions of organ systems.

- T7 – Knowledge and application of basic biology concepts.
- T8 – Students know how to use basic research equipment and communicate results.
- T9 – Understand an organism's life cycle and how to grow a plant.
- T10 – Can perform research at school and outside of school.
- T11 – Ability to apply biological information to own life, use it in discussions and making decisions.

Assessment tasks:

- Learning diary analyzing own body systems functions and abilities (T7, T10, T11)
- Participation and data collection in lab activities (T7, T8)
- Participation in group discussions and data analysis (T7, T11)
- Group research project on human organ or organ system functions (T2, T7, T10, T11).
- Traditional tests and quizzes (T2, T5, T7)

Geography

General: Geography is studied for half the year in grades 7, 8, and 9. The objectives are split as shown below. Students will receive specific assessment criteria for each assigned task that correspond to the IB assessment criteria and Finnish curriculum objectives.

Yr 7 – World Geography and Earth Science

Focus: In 7th grade geography students learn the basics of map reading, scale, coordinate system, and cardinal directions. They then learn about the natural phenomena that create our natural world, from plate tectonics to the climate. Finally, they demonstrate their knowledge in a presentation about a research country of their choice.

Objectives

- T1 – Develop map literacy – ability to locate specific countries and geographical features on a map.
- T2- Understand natural landscapes phenomena and compare those of Finland with the rest of the world.
- T5 – Explain geographical phenomena and ask geographical questions.
- T6 – Use and understand cardinal directions, map keys, scale, and symbols.
- T7 – Ability to read and interpret geographical media (diagrams, maps, images).
- T8 – Ability to conduct geographical research.

Assessment tasks

- Traditional test (T2, T5-T7)
- Own country project (T1, T2, T5, T6, T7, T8, T9).
- Traditional map quizzes (T1, T2, T6, T7)
- Picture interpretation (T2, T5, T7, T10)

Yr 8 – European Geography

Focus: In 8th grade Geography students learn the European states as well as the basics of cultural geography – from population and migration to human rights and sustainable development. They demonstrate their knowledge by planning an interrail trip through several European countries and researching the natural and cultural phenomena of each country.

Objectives

- T1 – Develop map literacy – ability to locate specific countries and geographical features on a map.
- T2- Understand natural landscapes phenomena and compare those of Finland with the rest of the world.
- T3 – Understand cultural landscapes phenomena and compare those of Finland with the rest of the world.
- T4 – Reflect on human interaction with the natural world and understand the importance of sustainable use of natural resources.
- T5 – Explain geographical phenomena and ask geographical questions.
- T6 – Use and understand cardinal directions, map keys, scale, and symbols.
- T7 – Read and interpret geographical media (diagrams, maps, images).
- T8 – Conduct geographical research.
- T9 – Observe and reflect on the state of their surroundings and environment locally, in Finland, and around the world. Observe and reflect on the effect of changes to the environment.

Assessment tasks

- Traditional map quizzes (T1, T6, T7).
- Human geography test (T3, T4, T7)
- Own country project (T1, T2, T5, T6, T7, T8, T9)
- News map project (T1, T4, T7, T9)

Yr 9 – Finnish Geography & Sustainability

Focus: 9th grade Geography has both a local and global focus. In the first half of the year students learn about the natural landscapes of Finland and the Ice Age that carved them. They demonstrate this knowledge through map quizzes and by designing an Ice Age model. In the second half of the year, they turn their perspective global to learn about climate change and sustainable practices. They will discuss and propose solutions to environmental problems through student taught lessons and practice implementing sustainable actions in their daily life, recording it in a journal.

Objectives

- T1 – Develop map literacy – ability to locate specific countries and geographical features on a map.
- T2- Understand natural phenomena and compare those of Finland with the rest of the world.
- T4 – Reflect on human interaction with the natural world and understand the importance of sustainable use of natural resources.
- T5 – Explain geographical phenomena and ask geographical questions.
- T7 – Read and interpret geographical media (diagrams, maps, images).
- T8 – Conduct geographical research.
- T9 – Observe and reflect on the state of their surroundings and environment locally, in Finland, and around the world. Observe and reflect on the effect of changes to the environment.

- T10 – Develop communication and group work skills in discussing and dealing with geographical issues.

Assessment tasks

- Research and written report on ice age formations in Finland (T2, T5, T7, T8, T9, T10).
- Learning diary on sustainable daily practices/Eco action notebook (T4, T9).
- Student-designed and delivered lessons on environmental issues (T1, T4, T5, T7, T8, T9, T10).
- Traditional map tests and quizzes (T1, T7).
- Traditional test (T2, T5-T7)

Physics

Physics is studied for half of each year in grades 7, 8, and 9. The objectives are split as shown below. Students will receive specific assessment criteria for each assigned task that correspond to the IB assessment criteria and Finnish curriculum objectives (T's) which are given as follows:

- T1 to encourage and inspires students to study physics
- T2 to guide and encourage students to identify their own physics skills, set goals for their own work and work long-term
- T3 to guide students to understand the importance of physics competence in their own lives, living environments and society
- T4 to guide students to use their physics expertise to build a sustainable future and to evaluate their own choices for the sustainable use of energy resources
- T5 to encourage the student to form questions about the phenomena under review and to further develop the issues as a starting point for studies and other activities
- T6 to guide students to carry out experimental studies in cooperation with others and to work safely and consistently
- T7 to guide students to process, interpret and present the results of their own studies and to evaluate them and the entire research process
- T8 to guide students to understand the principles and importance of technological applications and inspires participation in the brainstorming, design, development and application of simple technological solutions in cooperation with others
- T9 to instruct students to use ICT to obtain, process and present information and measurement results, and to support the student's learning through illustrative simulations
- T10 to direct students to use the concepts of physics accurately and to structure their own conceptual structures towards concepts in accordance with natural science theories
- T11 to guide students to use different models to describe and explain phenomena and make predictions
- T12 to direct students to use and critically evaluate different sources of information and to express and justify different views in a physical way
- T13 to guide students to understand the nature and development of natural knowledge and scientific ways of producing information
- T14 to guide the student to achieve sufficient informed capabilities for postgraduate studies in interaction and movement and electricity

- T15 to guide students to apply their knowledge and skills in physics in multidisciplinary learning entities and offer opportunities to familiarize themselves with the application of physics in different situations such as nature, business, organizations or scientific communities

In **year 7** students study heat and its transfer in the natural world. They develop inquiry skills in an investigation they plan and carry out relating to conserving heat energy. Students develop measurement and recording skills, as well as interpreting the data they produce and evaluating their experimental procedures. Students then investigate wave phenomena, with a focus on light and natural phenomena relating to it. All work is done with discussion of safety, and within the context of technologies which seek to develop sustainability for the planet.

Assessment is carried out with an open-notebook test, and a scientific report.

In **year 8** students study forces and movement. They will use and develop mathematical skills to solve problems using formulae which express familiar concepts such as velocity in algebraic terms. They develop inquiry skills in an investigation they plan and carry out relating to forces on a falling object. Students learn about unit systems and calibration, and will process data collected graphically, learning to use information technology to aid investigation processes. All work is done with consideration of safety, and within the context of technologies which seek to develop sustainability for the planet.

Assessment is carried out with an open-notebook test, and a scientific report.

In **year 9** there are two main aspects which are studied. The first looks at the building blocks of nature, from the world of microscopic (particle physics) to macroscopic (astronomy). Students experience the challenges of scientific models for the aspects of the world which are too big, or too small, to physically see, and learn of some of the paradoxes which physics can present.

Assessment is carried out with an open notebook test, and a project on exoplanets.

The second aspect is that of electricity and related technologies, including safety, simple circuits, electromagnetism, and large-scale electricity generation. Sustainable energy generation is discussed. Students plan, carry out and evaluate an investigation relating to batteries which uses data logging and spreadsheets to facilitate collection and processing of results.

Assessment is carried out with an open-notebook test, and a scientific report.

Chemistry

Chemistry is studied for half of each year in years 7, 8, and 9. The objectives are split as shown below. Students will receive specific assessment criteria for each assigned task that correspond to the Finnish curriculum objectives (T's) which are given as follows:

- T1 to encourage and inspires students to study chemistry
- T2 to guide and encourage students to identify their own chemistry skills, set goals for their own work and work long-term
- T3 to guide students to understand the importance of chemistry competence in their own lives, living environments and society
- T4 to guide students to use their chemistry expertise to build a sustainable future and to evaluate their own choices for the sustainable use of energy resources
- T5 to encourage the student to form questions about the phenomena under review and to further develop the issues as a starting point for studies and other activities

- T6 to guide students to carry out experimental studies in cooperation with others and to work safely and consistently
- T7 to guide students to process, interpret and present the results of their own studies and to evaluate them and the entire research process
- T8 to guide students to understand the principles and importance of technological applications and inspires participation in the brainstorming, design, development and application of simple technological solutions in cooperation with others
- T9 to instruct students to use ICT to obtain, process and present information and measurement results, and to support the student's learning through illustrative simulations
- T10 to direct students to use the concepts of chemistry accurately and to structure their own conceptual structures towards concepts in accordance with natural science theories
- T11 to guide students to use different models to describe and explain phenomena and make predictions
- T12 to direct students to use and critically evaluate different sources of information and to express and justify different views in the language of chemistry
- T13 to guide students to understand the nature and development of natural knowledge and scientific ways of producing information
- T14 to guide the student to understand the basic principles of the characteristics and structure of matter and changes in substances
- T15 to guide the student to apply his knowledge and skills of chemistry in multidisciplinary learning units and offer opportunities to get to know the application of chemistry in different situations such as nature, business life, organizations or scientific communities

In **year 7** students study safety in laboratory conditions, the use of simple equipment, properties of substances, chemical reactions, pure substances, mixtures and separation techniques. The changes of state are explained with the help of particle model. Students also study solutions, solutes and solvents. They develop inquiry skills in an investigation they plan and carry out relating to paper chromatography. Assessment is carried out with a scientific report, activity during lessons (notebook, experimental work, other activity), small quizzes and a test.

In **year 8** students study the periodic table of elements, the structure of atoms including electron shell structure, patterns of reactivity relating to electronic configuration, ionic and molecular bonding/compounds with their molecular formulas. They also study ions in solution – acids and bases and how to balance reaction equations. They develop inquiry skills in an investigation they plan and carry out relating to neutralization of acid with base. Assessment is carried out with a scientific report, activity during lessons, (notebook, experimental work, other activity), small quizzes and a test.

In **year 9** students study Earth's structure, properties and production of metals, electrochemistry and corrosion. They learn also about differences between allotropes, isotopes and isomers. They study carbon and its ability to bond, hydrocarbons, alcohols, carboxylic acids, esters, fats and carbohydrates. Students investigate properties of plastics – benefits and problems, occurrence of plastics in nature and possible solutions for environmental problems. Assessment is carried out with activity during lessons (notebook, experimental work, other activity), possible presentations, small quizzes and a test.