Astronomy Education in

Norway

This overview is part of the project "Astronomy Education Worldwide" of the International Astronomical Union's Office of Astronomy for Education.
More information: https://astro4edu.org/worldwide

Structure of education: Children are normally in kindergarten from age 1–2 until they start formal schooling the year they turn 6 years old. Seven years in primary school are followed by three years of compulsory lower secondary school. The students then apply for different vocational directions or high school, based on their secondary school grades. All children have a right to three years of upper secondary/high school education. High school lasts for three years, where students graduating can apply for University. High school has a common first year, and for the second and third year the students choose between science and social studies, as well as taking the common courses of Norwegian, History etc. All 13 years of public education are free of charge, as well as public university studies. Less than 2% attend private primary schools, and 8% attend private high schools. The children are taught in one out of two written variants of Norwegian, and learn the other version from secondary school.

Education facilities: Norwegian schools have a typical class size of 22 children in primary school, 28 in lower secondary, 16 in vocational schools and 30 in high schools. The class sizes vary depending on the geographic location, with small class sizes in rural areas. Some small schools only have a few pupils per school year with teachers teaching groups from multiple years together. All Norwegian schools have access to running water and good internet connections, and children have the right to public transport to school if they live far away. School buildings are generally well-maintained with outside school yards. At least high schools and lower secondary schools have science laboratories of different qualities.

Governance and organisation: Public (state) schools are run by local district and city councils. High schools are run by counties. The Curriculum is set by the central government and is the responsibility of the Ministry of Education. The curriculum is under reformation, with a new curriculum between 2020 to 2022.

Teacher Training: Primary and lower secondary school teachers take a master degree in education, while high school (and some secondary school) teachers either study for a joint master degree in physics and education at a university, or study for a postgraduate education qualification after a physics degree. Teacher training for those already working is typically done with courses for teachers focusing on astronomy, though established astronomical centres like the National Center for Space-related Education (NAROM) and Solobservatoriet (formerly Oslo Solar Observatory of the University of Oslo) or through universities.

Astronomy in the curriculum: There are no specialised school courses in astronomy. Instead astronomy content can be found in natural science and later in physics.

Elementary school: Observe phenomena on the heavens, describe and contemplate on the seasons of the year. Describe the process of scientific methods and observations (often applied to astronomy). Describe planetary motions and use them to explain phases of the moon, seasons of the year and the conditions for life on earth. Extraterrestrial life. Climate, seen from an astrophysical point of view.
Upper secondary school / high school: Radiation, waves, big bang theory. Calculations with Stefan-Boltzmann and Wien displacement law. HR diagram, stellar evolution and cosmology. Single and double slit experiments, waves and properties of the light , Bohr H-atom model. Absorption and emission spectra (experiments and calculations). Characteristics of sensors and principles of semiconductor technology - usage and limitations. Gravity, simplified calculations celestial mechanics. The photoelectric effect. Scientific research methods, long term student science projects (open choice research field/tasks).

Astronomy education outside the classroom: Norway through different institutions, including science centers with planetariums, Newton rooms, Solobservatoriet and the National Center for Space-related Education (NAROM) offers additional learning possibilities to complement and enrich the school's possibilities. Many activities consist of visits to the local science centers or one of the 35 Newton rooms (newton.no) where the students have access to practical learning experiences, some of those related to astronomy. Solobservatoriet (solobservatoriet.no) and NAROM (www.narom.no) has offered diverse kinds of courses and activities to students. There are international projects involving astronomy and space sciences where Norway is involved. Some of them are done in collaboration with ESA, as for example the European Space Camp that takes place in Andøya. Other international projects where Norway participates through Nordic-ESERO are Mission X, Moon Camp, CanSat, AstroPi (www.esero.no), Rock-Star (www.rockstar-education.com) and Online Observatory (onlineobservatory.eu). Some projects involves resources international observatories at Teide Observatory in the Canary Islands and the Faulkes Telescope project / Las Cumbres Observatory.

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