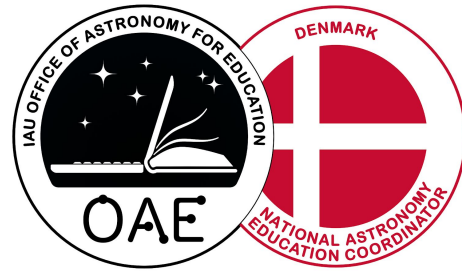


Astronomy Education in Denmark



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: A majority of children get their education through the Danish municipal primary and lower secondary school, which in Danish is referred to as "Folkeskole". It is a comprehensive, integrated municipal school covering primary and lower secondary education (ISCED 1 and 2) without streaming. Education is compulsory for ten years starting from the year the child turns six. Whether the education is received in a publicly provided school, in a private school or at home is a matter of individual choice, as long as accepted standards are met. It is education itself that is compulsory, not school. Schools must provide pupils with subject-specific qualifications and prepare them for further education. Moreover, schools should prepare pupils for their role as citizens in a democratic society. The Folkeskole builds on the principle of differentiated teaching. Teaching is organized so it strengthens and develops interests and qualifications while catering for the needs of the individual pupil. It also aims at developing pupils' cooperative skills, by challenging all pupils to reach their full potential and lower the significance of social background on academic results. Pupils are continuously evaluated. Teachers develop individual learning plans for pupils, which are updated regularly. National computer-based tests have been introduced in a number of subjects in grades 2 to 8. Progression to the next grade is usually automatic. School-leaving examinations are taken in grade 9. Parents may choose a private school for their children. Private schools are self-governing institutions required to measure up to the standards of public schools. There are many different types of private schools and some are based on a specific philosophy, a special pedagogical approach or a religious belief. Private schools receive a substantial state subsidy based on the number of pupils in these schools. Continuation schools -Efterskoler -are private residential schools for pupils in grades 8 to 10. In addition to normal subjects, emphasis in these schools is typically on social learning and fields such as sports, music, nature or ecology. In the 2014/2015 school year, 78% of all pupils in primary and lower secondary schools attended the Folkeskole, 16% attended private schools, 4% attended private residential schools known as "Efterskoler", and 2% attended special schools. Apart from the compulsory grades 0 to 9, the Folkeskole also has an optional grade 10. In the 2014/2015 schoolyear, 51% of pupils having attended grade 9 also attended grade 10. In Denmark, upper secondary education programs, also referred to as youth education programs, can be divided into: (1) Generalupper secondary education programs (high-school), which primarily prepare students for higher education and typically take 3 years. (2) Vocational upper secondary education and training programs, which primarily prepare students for a career in a specific trade or industry and typically takes 4 years.

Education facilities: The average number of pupils per class in the Folkeskole is 21.4, while the figure for private schools is 18.1 (2014/2015). All schools have access to running water, good internet connections, laboratory facilities for science, as well as sports facilities. School buildings are generally well-maintained and there is focus on the health and safety of the children while they are in school.

Governance and organisation: The State or the municipalities finance the education system. Most institutions are self-governing, while the State or the municipalities own some. The Ministry of Education defines common rules and guidelines (curricula) specifying the aims, contents and duration of programs and individual subjects. The ministry also defines the testing and examination system, with the use of national boards of external examiners.

Teacher Training: Teachers for the primary and lower secondary education (Folkeskolen) are taught at teachers colleges. It is a four-year bachelor degree, which can be acquired, based on a three-year high-school degree. As part of the four year training is half a year of practice in a school. During the teacher training the student will get a general background to teach all subjects for year 1-10 in Folkeskolen, but will specialize in depth in two subjects, i.e. math, physics, Danish, biology, history, etc. So all physics teachers in lower secondary education have specialized in physics during their teachers' college training. To teach in the upper secondary school (high-school) a university master degree, consisting of a 3 year bachelor (180 ECTS) and a 2 year masters (120 ECTS) is required. So all high-school physics teachers have a university master degree in physics. There are possibilities for teachers to get additional training when they already work in school, i.e. a teacher without a physics specialization can get this at a later stage in their career.

Astronomy in the curriculum: In year 1-6 science is taught as a single subject, as part of the curriculum is the knowledge of the celestial bodies and how they move on the sky. Early in primary education children are taught to recognize the Sun, Moon and planets. In year 7-9 the school children learn about the solar system including the sizes of planets, their orbits and solar and lunar eclipses. They also get acquainted with gravity, climate change and the physical processes important for life on other planets. During upper secondary education (high-school) it is possible at some schools to have astronomy as an individual course for one year. The level of physics can vary from 1 year to 3 years. To prepare for studying astrophysics at university at least three years of physics is required. Within the one-year of obligatory physics for all, they will be taught cosmological models, energy and light.

Astronomy education outside the classroom: There are several science or astronomy outreach centers, around the country. Denmark has a very long tradition of astronomy going back to Tycho Brahe and Ole Rømer. There are many very active local astronomy clubs that host meetings and offer public stargazing with telescopes on a regular basis. A voluntary youth organization founded by H.C. Ørsted, and run by university students nationally, offer astronomy camps and astronomy education events for children and youth. Two areas of Denmark have obtained the designation of "Dark Sky". There is also a good share of "walk a Solar System" paths spread around the country.

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For specific information about astronomy education in Denmark or on this document please contact the Office of Astronomy for Education (oea@astro4edu.org).