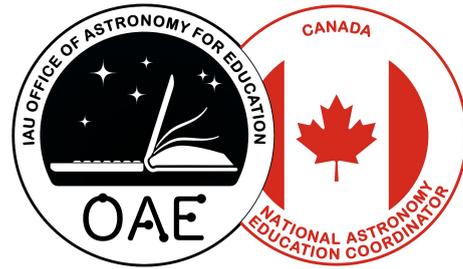


Astronomy Education in Canada



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: The education system in Canada is managed at the provincial/territorial level. With 10 provinces and 3 territories, this means Canada has 13 different educational systems. Most follow a kindergarten to grade 12 (K-12) grade system, with kids entering kindergarten at age 5 and finishing grade 12 at age 18. School is usually divided in elementary, middle, and high school, although the exact time of transition from one to the other varies by province. In the province of Québec, students graduate high school in grade 11 before going to college (Cégep), a school level unique in Canada. Education is mandatory to age 16 in most provinces and to age 18 in others. Most students attend public schools which are free of charge up to grade 12 (Cégep in Québec) but a small fraction (around 6%) attend private schools which charge fees. Education in Canada is mostly offered in the two official languages, English and French. Some schools offer education in the local Indigenous language. Education is primarily offered in French in the province of Quebec, while the other provinces mostly offer English education, with some French immersion schools and a few French schools in all provinces. There are still some religious schools, such as Catholic school districts, but religion and education are becoming more and more separate all over the country.

Education facilities: Canadian schools are divided in classes with usually fewer than 30 students. Most classes include only one grade level, but smaller schools can have multiple levels in a class. School buildings are generally well maintained and have running water. Internet access is now available in the vast majority of schools. However, remote locations such as in Northern Canada might not have access to reliable high-speed internet. Students can go to school in school buses, a service offered by school boards.

Governance and organisation: School curriculum is set by each Ministry of Education at the province/territory level, and they update (reform) their curriculum independently. There are many similarities between provinces/territories and pan-Canadian curricula have been recommended. Most provinces, especially the larger ones, have multiple school boards which manage the schools at the regional level.

Teacher Training: All teachers must obtain an education degree to teach in Canadian schools at the primary and secondary levels. Most primary school teachers are generalists, while secondary school teachers sometimes study a specific discipline (eg: physics) before becoming teachers. In-service training is highly encouraged and is mandatory in some provinces. Professional development opportunities are available in all provinces and at the national level, through different teachers' associations or science organizations. Since they receive very little pre-service training in science, many primary school teachers are not comfortable teaching science. Even at the secondary level, many science teachers have more knowledge in life sciences and will feel less comfortable teaching

the astronomy part of the curriculum. Different science organizations offer astronomy training to teachers, such as the national program Discover the Universe/ À la découverte de l'univers.

Astronomy in the curriculum: Many provinces base their curriculum on the pan-Canadian science framework written in 1997. It includes a “space” unit, part of a general science course, in grades 6 and 9. This is when most Canadian kids learn about astronomy. Other units in lower grades include concepts of daily and seasonal changes as well as light and shadows. Physics is offered at higher levels as an optional course (grades 11 and 12) and some schools will offer optional advanced courses with astronomy content, such as Earth Science.

The grade 6 space unit usually includes notions about the night sky, the Earth-Moon-Sun system, the Solar system and space exploration (with a focus on Canadian contributions). In grade 9, students usually learn more details about the Solar system and venture beyond: composition of the Milky Way, galaxies, evolution of the universe, formation of the Solar system, life cycles of stars... Similar content is seen at similar levels in the few provinces which do not follow the typical gr.6 and gr. 9 space units (Quebec, British Columbia...). In the last few years, many provinces have added Indigenous knowledge of the sky to their astronomy curriculum. As provinces update their curriculum, we can foresee this knowledge to become mandatory in all provinces and territories.

According to the curriculum, all Canadian students should have basic knowledge of astronomy and our place in the Universe. However, since these units don't have mandatory provincial exams, many teachers do not cover the whole content. For example, a study led by Chastenay in 2018 showed that only about 50% of elementary school teachers in Quebec will teach the astronomy curriculum.

Astronomy education outside the classroom: Canada is very active in both professional and amateur astronomy, as well as in astronomy communication. There are many planetariums and science centres across the country and many university departments offer public activities. The two main groups of amateur astronomers (Royal Astronomical Society of Canada, and Fédération des astronomes amateurs du Québec) have thousands of members and offer activities at their local centres in various cities. There are multiple science outreach groups which offer activities in different sciences, including astronomy, at all levels: local, regional, provincial, national, and online.

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