

Astronomy Education in Brazil



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: Brazil is one of the largest countries in the world with 212 million people. The official language is Portuguese and we have over 270 indigenous languages and more than 300 ethnicities, with all the formal schooling delivered in Portuguese. Even though Brazil has a strong economy, the inequalities are extreme, and this impacts the Brazilian education system, which has been historically elitist. For example, the private system (attended by a very small well-born section of the population) is much closer to that seen in developed countries, the public one (state, totally free; attended by the black and poor majority of the population) suffers with scarce investment. Teachers have low salaries and the infrastructure of the public schools is, overall, minor. Less than 20% of Physics teachers, for example, those who will teach Science/Astronomy at schools, have not graduated in Physics. We have very few teachers in different fields of knowledge. So, in general lines, the Brazilian private schools have better conditions while the public universities are the better ones. Over decades, mainly due to the hard access exams, only students from private schools accessed the public universities, while students from public schools had to go to the private universities, usually the worst ones. This situation alleviated a little bit after the implementation of affirmative actions over the last 13 years.

Formal schooling for Brazilian children commences at age 6, after 1 or 2 years attending kindergarten. There are then 9 years of primary and three years of secondary education, both compulsory. During this period, students have a broad range of subjects offered by their school (Portuguese, Mathematics, Human and Natural Sciences, Arts, Religion, Physical Activities). After that they can complete national exams to go to public/private universities. Brazil has both public (state, totally free) and private schools. The majority of the population, of course, black and poor, attends the public education system, which is challenging in so many different ways. There are different types of schools: urban and rural ones; public and privates; indigenous and *quilombolas*; confessionals (usually they are private: Roman Catholic, very minor nowadays; Protestant ones); militaries.

Education facilities: public schools, as I said before, are very challenging. They have typical class sizes of 30-40 pupils (1 teacher per class), but this can vary from region to region. Many public schools have no internet or computers access. Transport is also a very difficult to source. Water and electricity can also be a big issue depending on the region. Conditions of buildings are poor and many of the public schools lack sport facilities, laboratories and other cultural equipment and opportunities.

Governance and organisation: the public system has municipal (Primary), state (Secondary) and Federal schools which are run by city, state and federal councils, respectively. The Curriculum is set by the central government in Brasilia. The Ministry of Education, a cabinet-level federal ministry, is

tasked with coordinating national education policy and daily affairs, from early childhood to the postgraduate level. Cities and states also have their own legislation which have to be in synergy with the federal ones. The national curriculum was last reformed in 2018.

Teacher Training: Teachers are trained at universities. Primary school teachers study undergraduate degrees in education, while secondary teachers, from any specificity, study a joint degree in a specific field (physics, chemistry, etc) and education. There are different levels of postgraduate qualification after the undergraduate degree (Specialisation; Academic and Professional Master; Academic and Professional PhD, being the last one very limited yet but increasing). Universities also offer different types of continuing teachers “professional development” programmes.

Astronomy in the curriculum: At the University level, many of the Physics courses (teaching or bachelors) have no Astronomy disciplines in the curricula. We have 4 or 5 specific undergraduate courses in Astronomy/Astrophysics in Brazil. However, all are at BSc level, that is, none are focused on teaching formation. At schools even though there is no specific course of astronomy, it occupies today, especially after the 2018 curricula change, an important place in the curriculum from primary to secondary level, over each year. In primary education children are taught to recognise the Sun, Moon and planets. They learn about the solar system, the sizes of planets, their orbits and solar and lunar eclipses. Also included are, cultural astronomy, gravity, climate change and the physical processes important for life on other planets. In Secondary school, children must learn other topics of Astronomy, from stellar astrophysics to cosmology. This is relatively new, as up to a few years ago Astronomy was just studied at the high school level (basic subjects) or seen in the primary level, in Geography’s classes. In both cases, we have the challenge of guaranteeing that these subjects will be studied/covered and in an informative manner.

Astronomy education outside the classroom: Brasil has various science or astronomy outreach centres, observatories, planetariums and museums. The majority are concentrated in the South/Southeast part of the country. However, many people do not have access, especially students from public schools.

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