

PAINEL 32

**HOW IS ASTRONOMY PRESENTED IN TWO BRAZILIAN
GEOGRAPHY TEXTBOOKS?**

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The Brazilian Ministry of the Education (MEC) has a governmental program for the assessment of the textbooks called Textbook National Program (PNLD). The textbooks from the first to the eighth grade of the Brazilian formal education are analyzed by university professors, researchers, and graduate students in five areas: History, Geography, Sciences, Portuguese Language and Mathematics. Since 1998, four classification categories are assigned to the revised textbooks: (i) excluded, (ii) recommended with warnings, (iii) recommended and (iv) recommended with distinction. In this work, the content of Astronomy is analyzed in two Geography textbooks (one is assigned as recommended by MEC). I point out that there are no astronomers in the Geography revision committee yet. On the other hand, MEC has invited astronomers as referees for the revision of Science textbooks after sometimes making a previous consultation to the Teaching Commission of the Brazilian Astronomical Society (CESAB). The same evaluation methodology adopted by MEC in PNLD for the Geography textbooks was applied. The Astronomy content in the Geography textbooks includes: geographic orientation, topocentric perspective of the sky, days and nights, yearly seasons and weather, fundamental Earth motions, and Moon phases. In both analyzed books, big conceptual mistakes were found in several astronomical concepts so that those natural phenomena can be poorly understood by the classroom teacher. Therefore, the transmission of the scientific knowledge to the students has been seriously affected. An important conclusion of this work is the imperious necessity to include astronomers in the Geography textbook revision committee of MEC.

PAINEL 33

**THE FIRST GRADUATE COURSE ON ASTRONOMY
TEACHING IN BRAZIL**

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We present the history of the creation of the first master course on astronomy teaching in the country and its particularities. The works aiming the creation of a graduate course on physics, chemistry and mathematics teaching at the Universidade Federal do Rio Grande do Norte (UFRN) began more than two years ago, involving lecturers from those three Departments. The discussions

evolved till the creation of the Programa de Pós-Graduação em Ensino de Ciências Naturais e Matemática (PPGECNM), a Graduate Programme on Natural Science and Mathematics Teaching linked to the Centro de Ciências Exatas e da Terra of the UFRN. The lecturers involved opted for a professional master degree modality, which requires that the Programme students have to keep their teaching activities at schools during the course. Such a situation constitutes an ideal context to the effective implementation of the didactic and methodological innovations envisaged. It shall be emphasized that up to now the PPGECNM is the only graduate course with that professional master degree modality in the Northeast region of Brazil and the only one in the country which includes astronomy teaching. The present work can be useful to stimulate and help other Brazilian Universities to implement similar initiatives. We further discuss the recent creation of an International Research Group on Physics and Astronomy Teaching, the Base de Pesquisa em Ensino de Física e de Astronomia, coordinated by one of us (LCJ). We finally analyse our strategies aiming an effective development and quality improvement to the formation of graduate teachers specialized in astronomy contents. (PRONEX/FINEP; NUPA/USP; Temáticos/FAPESP)

PAINEL 34

**DEVICES FOR OBSERVING THE SUN AND SOME SOUTHERN-
HEMISPHERE STARS DAILY PATHS**

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One of the greatest difficulties in teaching introductory astronomy is making a student to get used with motions in the celestial sphere. The fact that an observer may watch a clockwise apparent path for a star, a counterclockwise one for another, and a mix of both paths for another star becomes a puzzling problem for a beginner astronomy student. This student may get confused with the idea that if a southern-hemisphere observer follows a star daily path with a particular southeast rising, he will notice that this star will have both apparent motion, clockwise, in rising and setting, and counterclockwise, when it moves over a vertical circle containing east and west cardinal points and the observer zenith. This especial case, not usually reported in books, is very difficult to explain without a specific device showing its occurrence for a particular latitude. Aiming to act as a teachers help to explain those little differences of daily apparent motion of stars, a simple device was built showing daily path of some stars for a southern-hemisphere observer placed at Cuiabá, MT (latitude $\sim 15.5^\circ$ S). As the student get familiar with the device his knowledge may be used for building a similar one for any other latitude. Still taking in account the concept of the celestial sphere, another device was built with the purpose of showing the Sun