

Astronomy in basic level schools in Brasil

M.F.O. Saraiva & S.O. Kepler

Instituto de Física, Universidade Federal do Rio Grande do Sul
Av. Bento Gonçalves 9500, CP 15051, 91501-970 Porto Alegre, RS, Brazil
email: fatima@if.ufrgs.br

Abstract. We present the structure of the basic school curriculum in Brazil, that for a few years has included astronomy, and comment on the strategies that universities are adopting for preparing the teachers for the new curriculum.

Keywords. astronomy education, Brazil

1. Introduction

Astronomy has been neglected for decades in the basic school curriculum in Brazil, generally being taught only in the 5th grade by untrained Geography teachers. The problem of astronomy teaching is part of the larger problem of sciences teaching that, on the other hand, is part of the general problem of education in Brazil. According to a study published by the Brazilian Academy of Sciences (ABC 2007) the knowledge level of Brazilian students of fundamental and middle level is extremely low, compromising the development of the country. Aware of the urgent need of improvement in the basic educational system, in the second half of the 1990s, the Brazilian government started an educational reform, with the promulgation of the third Law of Directives and Bases of National Education (LDB, Brasil MEC 1996) and the elaboration of the National Curriculum Parameters for Fundamental School (Brasil MEC 1998) and for Secondary School (Brasil MEC 1999), containing guidelines for schools and teachers to implement the educational reform. These documents reserve to astronomy an important place among the curricular contents recommended for fundamental and for secondary levels, recognising the importance of basic knowledge of astronomy for the scientific literacy of future citizens.

2. National curriculum parameters and astronomy education

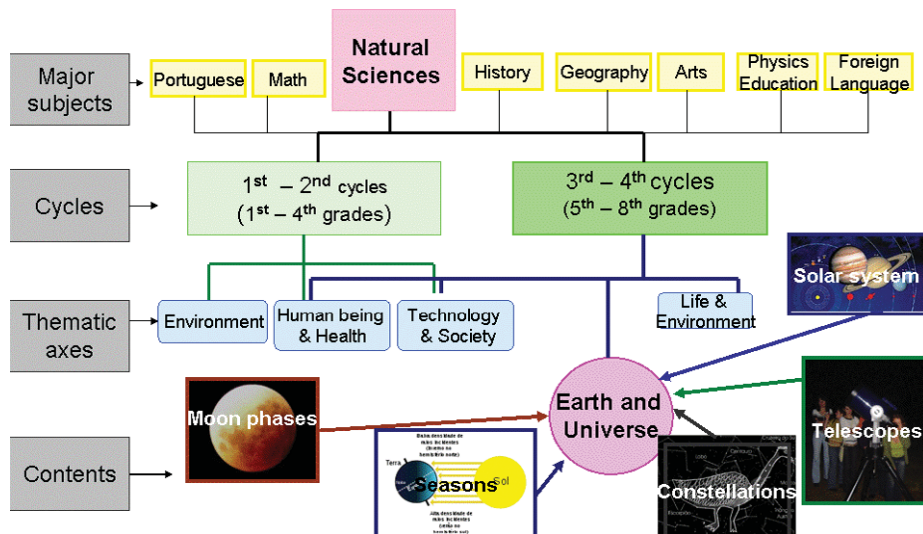
The general structure of basic education in Brazil is shown in Table 1. Fundamental school is compulsory for children with ages between 7 and 14 years, and extends over 8 grades. Secondary school (grades 9 to 11) is not mandatory yet. The national curriculum for the fundamental grades is developed in 8 major areas of knowledge, one of them being Natural Sciences. The contents of each area are organised according a few thematic axes that take into account the regional differences. Astronomy is inserted in the Natural Sciences area within the thematic axis “*Earth and Universe*”, recommended for grades 5 to 8 (Fig. 1).

The National Curriculum Parameters for Secondary School suggests several structural themes for the major knowledge fields. One structural theme for the physics curriculum is called “*Universe, Earth and Life*”, and its thematic units include topics of Astronomy, Cosmology and Astrobiology (Fig. 2).

Table 1. Organisational structure of basic education

	Duration	Age
Infant education	2 year	4 – 5
Fundamental education	9 year	6 – 14
Secondary education	3 year	15 – 17

National Curriculum Parameters for Fundamental Education

**Figure 1.** The National Curriculum Parameters for Fundamental Education in Brazil.

3. Teachers education and astronomy teaching

Despite the recommendations of the PCNs, most schools in Brazil fail to adopt astronomy in their curriculum, and the main reason for that is the lack of knowledge of astronomy on the part of teachers, which makes them feel uncomfortable with the subject. A study by Leite & Housome (2007) shows that most science teachers have very little familiarity with the scientific approach to astronomical concepts, and their conception of the universe and astronomical objects are at the same level as their students'. This reflects the failure of teacher education and BA/BSc courses in providing a thorough science education to future teachers. In fact, only few science teacher education courses have astronomy as a mandatory or as an optional discipline in their curriculum. One exception is the Physics Education course at the Physics Institute of Universidade Federal do Rio Grande do Sul (UFRGS), that have two mandatory astronomy disciplines. In this scenario, the continuing education courses assume a highly important rôle in minimising the conceptual deficiencies of teachers. The professional master degree courses constitute another strategy of the government to improve in-service teachers education. The Professional Master in Physics Teaching at the Physics Institute of UFRGS, started in 2002, has the objective of improving the professional qualification of in-service Physics and Science teachers, and has "Teaching of Astronomy" as one of its work fields. From the 42 fundamental school teachers that concluded their dissertation until 2009, 7 of

National Curriculum Parameters for Secondary Education

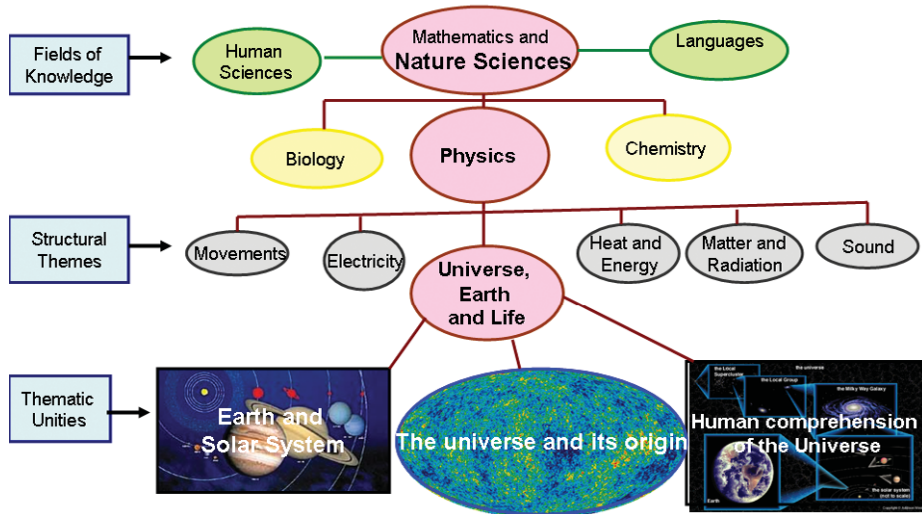


Figure 2. The National Curriculum Parameters for Secondary Education in Brazil.

them worked in the development of educational materials for the use of astronomy as a motivation tool for the study of physics.

References

- Academia Brasileira de Ciências 2007, *O ensino de ciências e a educação básica: propostas para superar a crise* (Rio de Janeiro: ABC)
- Brasil MEC 1996, *Ministério da Educação e do Desporto. Lei de diretrizes e bases da educação nacional*, Lei n. 9394-96 (Brasília: MEC)
- Brasil MEC 1997, *Parâmetros Curriculares Nacionais: Ciências Naturais/Secretaria da Educação Fundamental* (Brasília: MEC/SEF)
- Brasil MEC 1999, *Parâmetros Curriculares Nacionais para o Ensino Médio: Ciências da Natureza, Matemática e suas tecnologias*, Secretaria de Educação Média e Tecnológica (Brasília: MEC)
- Leite, C., & Hosoume, Y. 2007, *Revista Latino-Americana de Educação em Astronomia*, 4, 47