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Sky observation using the moon as a guide

A practical activity proposal for the teaching of astronomy in basic education

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Abstract. The development of practical activities of observation and recognition of the sky has been recommended in Brazilian curricular references, such as PCNs and BNCC. However, its effective implementation by teachers of Basic Education faces several difficulties, one of the main being the lack of training of these teachers in the area of Astronomy and their little or no experience with activities of observation and recognition of the sky. As a strategy to allow teachers, even without familiarity with the recognition of the sky, to promote and carry out such activities, the Astronomy Teaching Laboratory, linked to the UFES Department of Physics, developed a didactic strategy that uses the Moon as a guide for observations. This strategy has been applied, with good results, by teachers of the state education network of Espírito Santo since 2013.

Resumo. A realização de atividades práticas de observação e reconhecimento do céu tem sido recomendada nos referenciais curriculares brasileiros, como os PCNs e a BNCC. Contudo, sua efetiva realização por parte de docentes da Educação Básica enfrenta diversas dificuldades, uma das principais sendo a falta de formação destes docentes na área da Astronomia e sua pouca ou nula experiência com atividades de observação e reconhecimento do céu. Como estratégia para permitir que professores, mesmo sem familiaridade com o reconhecimento do céu, possam promover e por em prática tais atividades, o Laboratório de Ensino de Astronomia (LEA), ligado ao Departamento de Física da UFES, desenvolveu uma estratégia didática que utiliza a Lua como guia para as observações. Essa estratégia vem sendo aplicada, com bons resultados, por professores da Rede Estatual de Ensino do Espírito Santo desde 2013.

Palavras-chave. Teaching of Astronomy, Moon

1. Introduction

The use of the sky as a natural laboratory for performing practical astronomy teaching activities is strongly recommended in Brazilian curricular references, such as the National Curricular Parameters (PCNs) and the current National Curricular Common Base (BNCC), however, the effective implementation of this type of activity faces a great difficulty: the small, or null, training of teachers of Basic Education regarding contents and methodologies of Astronomy teaching and, especially, in relation to the accomplishment of practical activities of sky observation. The teacher, in general, does not know how to carry them out and what can be worked and taught through them. In this sense, the Laboratory of Astronomy Teaching (LEA), linked to the UFES Department of Physics, developed a strategy that aims to allow the accomplishment, with good didactic use, of these activities by teachers with little or no experience with sky observation, but that are interested in carrying them out.

2. Methodology

The strategy takes advantage of the fact that anyone, even having no experience with the location and recognition of stars and constellations, can easily locate the Moon in the sky. In the first step of the proposed methodology, the teacher responsible for the activity, preferably with the advice of an institution dedicated to the public outreach of Astronomy, as a planetarium or didactic observatory, should plan the most favorable nights to carry out the activity, choosing dates in which the Moon is in its crescent phase - which allows it to be observed early in the night - and when it is passing through some of the most conspicuous and easily recognizable constellations, and preferably on a date when one of the planets visible to the naked eye in this same region. A script should then be written and passed on in the classroom to the students with directions on how to observe the sky with the naked eye and drawing record of the Moon and the brightest "stars" of the nearby region to it.

In the next step, the students perform the observations and make records of what they saw in drawings (Figure 1), making notes of the brightest stars and their colors. These observations are carried out outside the school, outdoors, next to the residences in which the students live.

Then, a debate and questioning about what was recorded in the drawings are carried out in the classroom, especially questioning whether all the bright stars recorded would be stars. With the aid of software such as Stellarium, the main stars represented in the drawings are then identified. One of the highlights of the work is the realization by students that one or more of the registered stars are planets, something that most were completely unaware of. This awareness promoted a reconciliation between what is experienced and what is learned in books, between heaven and the Universe.

Ideally, as a final step, the following month, after a lunation, when the Moon has returned, roughly, to the same region of the sky, a new observation, with the naked eye and telescope, should be made at school to apply the knowledge learned in the class-

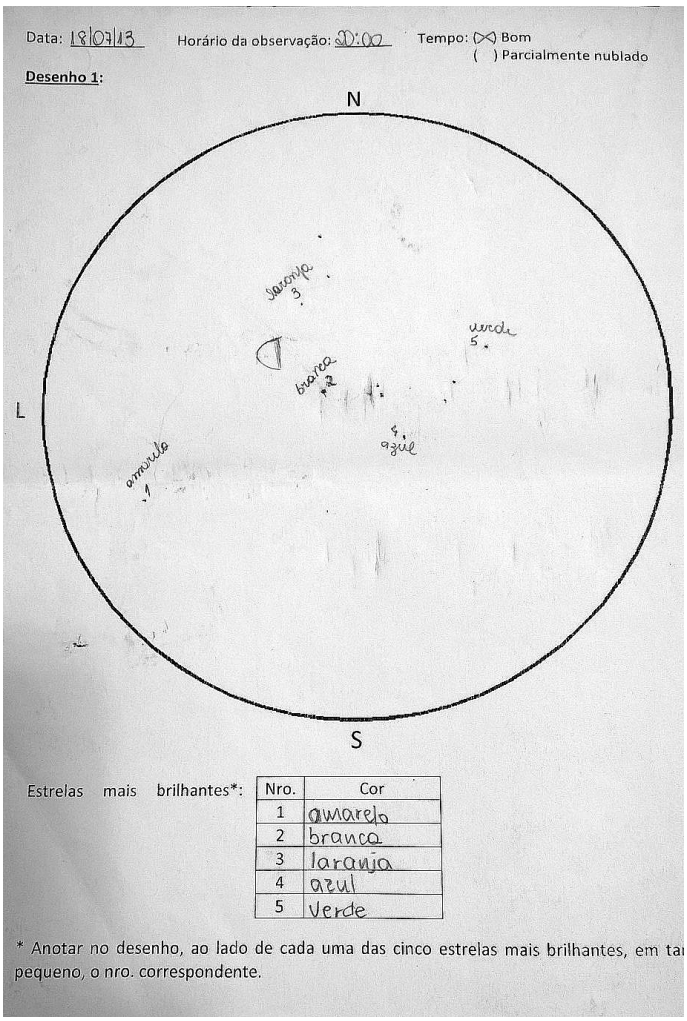

Figura 1. Student drawing, representing the Moon and the brightest stars in the sky.

room and to make the recognition of this sky region and the main constellations and celestial objects in it.

3. Results and Conclusions

The strategy has been successfully applied to High School classes of the Espírito Santo State Education Network since 2013, succeeding in challenging and motivating students to study astronomy and yielding numerous debates in the classroom. One of the most striking results is the students' learning of the existence of planets among the "stars" recorded in their drawings, that several planets are visible to the naked eye and that, in synthesis, the sky is our window to the Universe, through which we can learn about its nature and composition.

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