

Preparation of a didactic sequence for elementary education 2

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Abstract. This work aims at the elaboration and analysis of a proposal to discuss topics of Astrobiology with elementary school students 2, particularly with eighth grade students from a municipal school in the city of São Paulo, João Guimarães Rosa Municipal Elementary School. We seek to understand how they construct their conceptions about the possibility of existence of extraterrestrial life from concepts of astronomy and sciences addressed in the classroom. We applied a didactic sequence, materialized in a plan of five classes, where the conceptual evolution of the students was observed through indicators of scientific literacy. Based on an exploration of students' spontaneous conceptions, using the student notebook and teacher support notebook, we observed the students' positioning in the face of situations of cognitive conflict, as well as the role of mediators in the construction of knowledge, according to the Vygotsky's socio-interactionist theory. With regard to the learning process, we try to promote scientific literacy by presenting a problem — "Is there life out there?" — and providing relevant materials that allowed the students to organize and build their mediated knowledge, thereby establishing an understanding of Astrobiology as well as its object of study, life in the Universe. The result of this work derived from the application of a didactic sequence is the student's notebook and the observation of the evolution of the students' scientific literacy in the course of the application of the activities.

Resumo. Este trabalho tem como objetivo a elaboração e análise de uma proposta para discutir tópicos de Astrobiologia com estudantes do ensino fundamental 2, particularmente com alunos da oitava série de uma escola municipal no município de São Paulo, a Escola Municipal de Ensino Fundamental João Guimarães Rosa. Buscamos compreender como eles constroem suas concepções sobre a possibilidade de existência de vida extraterrestre a partir de conceitos de astronomia e ciências abordados em sala de aula. Aplicamos uma sequência didática, materializada em um plano de cinco aulas, onde se observou a evolução conceitual dos alunos mediante indicadores de alfabetização científica. Partindo de uma exploração das concepções espontâneas dos alunos, utilizando o caderno do aluno e o caderno de apoio ao professor, observamos o posicionamento dos estudantes frente às situações de conflito cognitivo, bem como o papel dos mediadores na construção do conhecimento, de acordo com a teoria sociointeracionista de Vygotsky. Com relação ao processo de aprendizagem, tentamos promover a alfabetização científica ao apresentar um problema — "Existe vida lá fora?" — e fornecendo materiais relevantes que permitiram que os alunos organizassem e construísem seus conhecimentos mediados, estabelecendo assim um entendimento sobre Astrobiologia, bem como de seu objeto de estudo, a vida no Universo. O resultado desse trabalho derivado da aplicação de uma sequência didática é o caderno do aluno e a observação da evolução da alfabetização científica dos alunos no decorrer da aplicação das atividades.

Keywords. Astrobiology, Teaching of Astronomy

1. Introduction

This research aims to elaborate and analyze a proposal to discuss Astrobiology topics with students from the eighth grade of João Guimarães Rosa Municipal Elementary School, in São Paulo. For this purpose, the multidisciplinary character in the content and the interdisciplinary character in the action of Astrobiology should be considered (Des Marais et al. (2008)). (Figure 1)

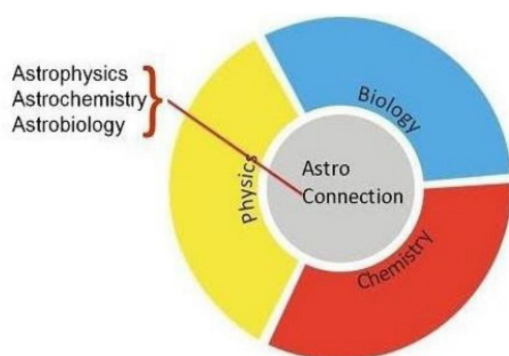


FIGURE 1. Interdisciplinarity in Astrobiology.

2. Objective

We sought to understand how students build their conceptions about the possibility of the existence of extraterrestrial life, from the concepts of Astronomy and Sciences approached in the classroom.

3. Methodology

Application of a Didactic Sequence (Dolz et al. (2004)), in five classes, observing the conceptual evolution through indicators of Scientific Literacy (Sasseron & Carvalho (2008)), through the question: "Is there life out there?" students, the organization and construction of knowledge about Astrobiology.

The exposition of the structuring axis of maintenance of the viability conditions of the existence of life — Extremophiles, Habitability (Figure 2) and Exoplanets — provided an increase in information on the subject, expanding the students' argumentative set.

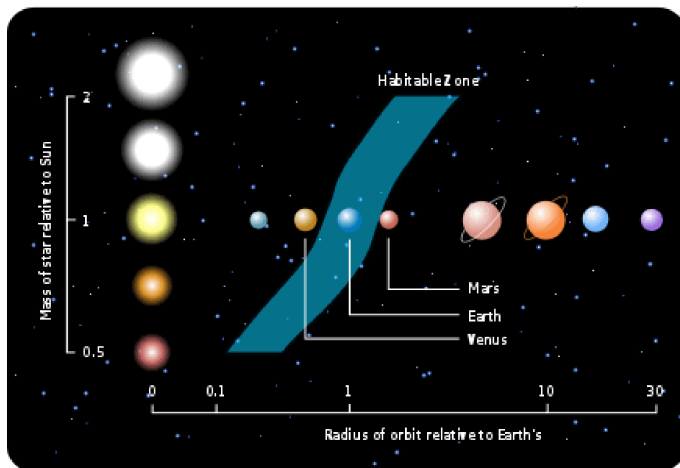


FIGURE 2. Stellar liveable zone highlighting the sun and the solar system.

4. Results and discussion

Exploring their spontaneous conceptions, using the student's notebook and the teacher's support notebook, it was observed the positioning of the students in situations of cognitive conflict, and the role of mediators in the construction of knowledge, according to theory Vygotsky's socio-interactionist (Vygotsky's (2001), Vygotsky's (2003)). The evolution of student learning during the application of activities, discussions and technological assistance, within the scope of Scientific Literacy indicator categories, occurred gradually, providing a better understanding of the content of the student's notebook. The initial hypotheses of the students, an integral element of the indicators of development of Scientific Literacy, about probable extraterrestrial inhabitants, with drawings representing anthropomorphic forms, were replaced by the understanding that microscopic life may exist in exoplanets due to the existence of water. The following is an example of a page from the student notebook filled in the classroom. (Figure 3)

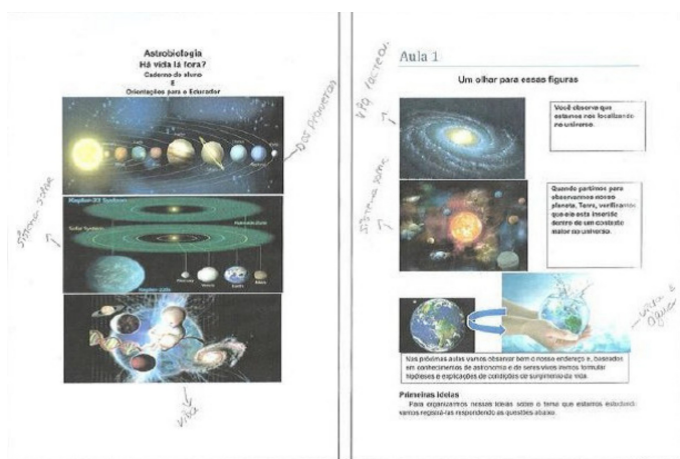


FIGURE 3. Student notebook page filled by a student.

5. Conclusion

From the Didactic Sequence, it was possible to encourage students to reflect on the proposed question and theme, producing satisfactory results and the students' apprehension of knowledge.

References

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