

CHEMICAL ECOLOGY: A GAME WITH INSECT COMUNICATION

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ABSTRACT

The greatest gains of a child are accomplished through toys and games that are, particularly important, to the development of child's intelligence. The objective of this paper was to test if this game was able to make understandable the meaning of "pheromone" to children from private and public schools of Taubaté (SP). To take part of the game, each child should receive a kit composed by a circle of filter paper (immersed in solution essences) attached in a popsicle straw. Before children started playing, they should keep their eyes closed and listen to the instructions carefully, what means, each child should use their olfactory sense to find other children with the same essence. The conclusion taken was all the children understood the objective of the game and they could find their partners as an insect would find. This way, many other concepts could be obtained.

KEY WORDS

Pheromone. Science education. Teaching resources.

Introduction

The greatest gains of a child are accomplished through toys and games (VYGOTSKY, 1989) that are, particularly important, to the development of child's intelligence (PIAGET, 1998). It is difficult to think about teaching science without experimentation, when children will be able to manipulate ideas, objects and try to negotiate meanings or concepts between them and with the teacher. For the other hand, most of children that are not presented to experimentation bring with them wrong or even absence of science concepts or definitions about, for example, insect communication or the hole of chemical compounds in the ecology of insects.

The communication among insects are established into a group, called species, through a mix of volatile substances "the pheromone". The hole these pheromones plays vary according to their nature: there are pheromones that act in sexual attraction, other that act in marking food pathway, or alarm defenses (VILELA e DELLA-LUCIA, 2001). Thinking about this statement, many others concepts could be reached at the same time the children could learn new possibilities to acquire knowledge and change their posture in relation to the environment.

The objective of this paper was to test if this game was able to make children understand pheromone and chemical ecology.

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Material and Methods

To perform this activity the professors or instructors provided: filter paper (12.5 cm of diameter) with no specific porosity. Another possibility was to substitute filter paper by any other with the same thickness, however, filter paper is preferable because it is not damaged during the works. Other necessity was perfumes, at least 4 different kinds or any other volatile compounds present in food essences like strawberry, lemon, cinnamon, tea essences or even flowers; try to choose essences that are well-known among children but, at the same time, different between them. For guarantee and safety, avoid cleaning products, hazardous substances or any other compound that do not smell good. It was also necessary disposable plastic cups (50mL), powdered coffee (50g), popsicle stick (12.5cm long x 0.8cm wide), gum, plastic bags and dropper. It is important to consider that the number of filter papers and popsicle stick will depend on the number of children.

About one day before the classroom, the teacher prepared the material necessary to the game, it means: using the gum, attach two filter papers with 1/3 of the popsicle stick between them. With the dropper, put some drops of one essence on the filter paper and let them dry naturally. Repeat this procedure with the other essences. When ready, this material or kit was kept, in plastic bags (taking care do not keep in the bags different essences), until the game time.

The game was carry out at Departamento de Ciências Agrárias campus (example figure 1) but could be reproduced in schools yard or gymnasium or, even into an empty classroom. Before starting, children were introduced to some topics about insects, chemical ecology and the way insects communicate among them.

Standing up in circle, each child could, randomly, receive a kit (filter paper + straw + essence) and the teacher asked them to smell and memorize the essence received, with no comments about it. Immediately after, asked children to find other colleagues that had in their hands a kit with the same essence and form a group. However, this game must be carried out in a pleasant way, trying to include them in the game and with no punishment. It was important to note if the children started showing any difficulty in finding their similar essence; in this case it was given them some cups with powdered coffee that could help children to forget the essences smelled before. The format of this game can be a little bit different, for example, instead of using the kit, children can look for the essences with the eyes closed, since the place is safety enough for it.



Figure 1. Overview of recreational project activities.
Source: Authors.

Results and discussion

After finishing the game, it was possible to verify that almost all children took part of whole activity with high interaction (example figure 2); they also understood the explanation how insect communicate, what could be proved counting the number of children that concluded the activity correctly.



Figura 2. Children participating in the game.
Source: Authors.

As cited by Labinas et al. (2010), science teachers should worried in provide students activities that could exercise their capacity to understand daily phenomenon, changing their anthropocentric point of view, in order to (Harlen, 2001) make children learn in a totally interactive way.

Ludic and experimentation activities permit children use not only their memory, but also stablish interactions and give those meanings (Labinas at al., 2010).

Conclusion

The game had the aim to socialize children, to improve the cooperation between the participants and to develop the olfactive memory, beside the biologic concepts of pheromone and chemical ecology.

RESUMO

O maior ganho de aprendizado das crianças ocorre através de jogos e brinquedos que são, particularmente, importantes no desenvolvimento da sua inteligência. O objetivo deste artigo foi verificar se um jogo poderia introduzir o conhecimento de “feromônios” às crianças dos primeiros anos do ensino fundamental de escolas públicas e particulares de Taubaté (SP). Para participar do jogo, cada criança recebia um kit constituído de um disco de papel filtro (embebido em solução de uma das 5 essências disponíveis) e preso a um palito de sorvete. Antes que cada criança recebesse seu kit, tinham seus olhos vendados e recebiam as explicações, isto é, cada criança deveria usar o olfato para sentir a essência contida no seu kit e que tentasse, também, pelo olfato, encontrar os outros colegas que tivessem a mesma essência em seus kits. A conclusão foi que todos entenderam a brincadeira e foram capazes de encontrar seus pares sem fazer uso da visão, do tato ou da linguagem e sim, do olfato que foi capaz de direcioná-los a favor da pluma de odor semelhante ao seu. Dessa forma, muitos outros conceitos poderiam ser adquiridos ao mesmo tempo em que poderiam provocar mudança de postura em relação à natureza.

PALAVRAS-CHAVE

Ensino de Ciências. Feromônio. Recursos didáticos.

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