3-5 years

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Science Content:
Chemical Properties: Dissolving

Target Concepts/Skills:
Soluble and non-soluble substances

Target Age group:
3-5 years

Duration of activity:
80 minutes

Summary:
Children are asked to express their ideas for why it is not possible to identify the sugar that accidently fell in the water. Each child is given a different substance (flour, rice, bread crumbs, sugar, and coffee) and those children that have the same substance are grouped together. There is a group discussion about what would happen if their common substance would fall in water. After that, each group makes a prediction and the teacher records children's prediction on a table. A copy of the table that the teacher used for the predictions is given to each group along with all five substances and children are given time to test their predictions and complete the table with what actually happened (did the substance dissolve in water or not). Finally, the results are discussed in the class.

Objective:
By the end of the activity children should be able to:

- Distinguish between substances that dissolve, or do not dissolve, in water
- Make observations in regard to whether different substances dissolve in water

Resources:
1 plastic bag with sugar,
1 plastic bag with beans, for each group:
flour, rice, bread crumbs, coffee, water, glasses, predictions table

Where did the sugar go?

Authors: *Initial Version*
C. P. Constantinou, G. Feronymou, E. Kyriakidou and Chr. Nicolaou
Science in the Kindergarten: a resource for the pre-school educator.
2nd edition
Ministry of Education and Culture, Nicosia, Cyprus, 2004.
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Lesson plan

Activity 1 (10 minutes): Challenge: Children are asked to predict and then try and find out which substances dissolve in water.

The lesson begins with puppet show (can use figures instead of puppets): A donkey appears and holds two bags, one with beans and the other with sugar. It leaves the two bags next to a bucket with water and leaves the scene for a few seconds. During its absence, a goat passes from the scene and accidently pushes the two bags and their ingredients get to be poured in the water. When the donkey returns it realises that the bags are not where it left them and starts looking for them. It finds the beans in the water but it can't find the sugar. It asks children: "Why are my beans in the water?" "What happened to my sugar?" A discussion begins about the possible reasons why the donkey cannot detect the sugar. Time is given to children to express their ideas about what could have happened to the sugar.

Activity 2 (5-10 minutes): The children close their eyes and the teacher gives to each of them one out of the following substances: flour, rice, bread crumbs, sugar and coffee. The children are asked to observe and identify the substance that they were given. They are asked to describe it and identify similarities or differences with the substances given to other children.

Activity 3 (20 minutes): Each child is asked to identify the other children in the class that have the same substance and they then form a group. The teacher asks each group to predict what would happen if they pour their substance in water. The teacher places a table, which includes six rows, one for each substance, and three columns. The first column refers (describes) the substance whereas the other two columns indicate whether that substance dissolves (second column) or not (third column) in water. The labels for the last two columns are given in a symbolic form that could be understood by children. Each group announces their prediction and the teacher ticks the correct column based on children's prediction (dissolves on not).

1. Engage (Forming Hypotheses)

Decide which question to investigate (identify the challenge)
What do children already know? What are their ideas? (ensure that the question to be investigated is meaningful for the children): Children know that some substances dissolve in water and some others do not. Children at this point are identifying those substances that do dissolve and those that do not, through experimentation.

2. Inquiry (Designing and running experiments and observations)

Plan and conduct investigations in order to collect data

Activity 4 (25 minutes): The teacher gives all five substances and 5 glasses with the same amount of water to each group and also an empty copy of the table completed in the previous activity. Each group is encouraged to experiment by pouring the same amount of each of the five substances, one substance in each glass of water, and using the spoon to mix them (suggest ways to make sure that the same amount of each substance is poured in water e.g. use a spoon). The results are recorded on each groups table by ticking te correct column (dissolves/ doesn't dissolve)

Activity 5 (5-10 minutes): Each group presents their results and children compare their results and come to a common conclusion which is recorded by the teacher on an empty copy of the table used before. Finally, there is a comparison between the results and their initial predictions based on activity 2.

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CAPACITIES

3. Evaluation (evaluate evidence)

- Conclusion: use data to construct knowledge and generate evidence.
- Demonstrate understanding of concepts and/or ability to use inquiry skills

Activity 5 (5 minutes): The donkey returns and asks children to explain what happened to the sugar, using the results of the tests they executed and the results they entered in the table. Children are given the opportunity to talk about what they have learnt, describe their experiments, present their results and explain their conclusions.

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What happens when we add water?

Substances	Dissolves 	Doesn't Dissolve 
Flour 		
Rice 		
Bread Crumbs 		
Sugar 		
Coffee 		

Video for teacher: http://www.mhhe.com/physsci/chemistry/essentialchemistry/flash/molvie1.swf

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