



Papa Smurf's Potion Lab and Jokey's Gift Game



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The Potion Lab activity is based on a puzzle earliest mentioned by W. W. Rouse Ball in the third, 1896, edition of his book *Mathematical Recreations And Problems Of Past And Present Times*.

The problem is also said to have been a favorite problem of Lewis Carroll who wrote it this way: “*You are given two glasses. One contains 50 tablespoons of milk, the other 50 tablespoons of water. Take one tablespoon of milk and mix it with the water. Now take one tablespoon of the water/milk mixture and mix it with the pure milk to obtain a milk/water mixture. Is there more water in the milk/water mixture or more milk in the water/milk mixture?*”

In making the potions visitors work through the mechanics of this problem in several versions. The activity also provides an opportunity to manipulate fractions and consider whether the outcome is unique to specific initial conditions or more universal.

Jokey's Gift Game challenges visitors to predict the contents of their gift by interpreting the data recorded by visitors preceding them.

In the Smurf cartoons most of Jokey's gift boxes contain ash dust bombs, but sometimes they contain cakes or flowers. This activity is set up for 4 undisclosed gifts each of which contains exactly one item: a dust bomb, cake or flowers. So the contents are the same in two of the four boxes. As the data accumulates, visitors will have information to evaluate to help them figure out which gift is the most likely.

The item repeated in two of the four boxes has a 1 in 2 or 50% likelihood of being selected if chosen randomly where the other two each have a 1 in 4 or 25% likelihood. These are the only percentages that should influence a prediction. Visitors may be tempted to believe that an outcome is due, or “overdue” because it has not appeared as often as others but this is not the case in this scenario.

Thank you for stopping by! Contact us at MathHappens.org if you have any questions or comments.