

A probability riddle about finding the fève in the galette des rois

FIRST SCENARIO: *Your family has four people: two parents, you, and your brother. Your parents buy a small galette des rois and cut it into four equal slices. Because you are the youngest, you get to choose your slice first. Then your parents take two slices for themselves and give the last slice to your brother.*

Nobody knows where the fève is. But your parents inspect their slices and it is now clear that neither of them has gotten the fève.

SECOND SCENARIO: *Your family has four people: two parents, you, and your brother. Your parents bake a small galette des rois and cut it into four equal slices. Because you are the youngest, you get to choose your slice first. Then your parents take two slices for themselves and give the last slice to your brother.*

You do not know where the fève is. But your parents know, and they make sure that neither of them gets the slice containing the fève.

QUESTION (FOR EACH SCENARIO): *You may now keep your slice or ask to swap slices with your brother. Does either option give you a better chance of finding the fève?*

EXPLANATION: The probability riddle that we have presented is equivalent to the famous *Monty Hall problem*, with the advantage of presenting it in a context that is familiar to students. Additionally, the students have to compare two similar texts and then see whether their differences affect the mathematical modelling of the problem (they do).

This probability riddle is also suitable for children: to convince them (without formally mentioning probabilities) it is possible to illustrate the four possible cases, with the fève being in any of the initial four slices.

In the second scenario, in three out of four cases the fève is in the brother's slice. So, most likely, the swap is beneficial and therefore it is the best option.

In the first scenario, two cases must be excluded because they cannot occur (the ones where the fève is in the parents' slices). Then in one case out of two the fève is in the brother's slice so swapping or not swapping makes no difference for the likelihood of winning the fève.