ABSTRACT TEMPLATE

MATHEMATICAL EXPERIMENTS - AN IDEAL FIRST STEP INTO MATHEMATICS

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Mathematical experiments are – in contrast to experiments in science – not a substitute for a proof, but a means to stimulate mathematical thinking. There are quite a few variants of mathematical experiments. Mathematikum in Giessen, Germany, is one of the world's first mathematical science centers and has influenced many similar institutions. It is a house with more than 180 experiments, which has attracted more than 1.8 million visitors since its opening in 2002. The experiments include puzzles, mirror experiments, experiments with soap bubbles, experiments dealing with randomness and so on.

The development and the choice of experiments are based on two main principles.

1. *Take mathematics seriously*. Each experiment must have clearly definable mathematical background. Also, the experiments in total should give a broad view of mathematics. In fact, while many experiments have a close connection to mathematics in school, many others include mathematics which is never taught in school. So, Mathematikum provides a more representative picture of mathematics than school.

2. *Take visitors seriously*. In Mathematikum every visitor is welcome and each visitor may do what he or she wants to do. Visitors may start wherever they want to (there is no recommended tour), they may choose the experiments they want to (there is no hidden curriculum).Visitors may spend their individual amount of time on the exhibits. Mathematikum avoids "motivation" by light, smoke and strange colors, and so on, since we are convinced that mathematics itself is a main attraction. Also the exhibits look technically simple, and are not contextualized, since we want to bring the visitor as quickly as possible to the mathematical phenomenon.

The effects of a Mathematikum visit are remarkable. Inside you hear the visitors talking (sometimes screaming) to each other – they talk about the exhibits. Also one sees clearly the Aha-effect, when they understand a phenomenon. Actually, the visitors leave Mathematikum happier than they entered it.

Experiments are an ideal first step in mathematics. They provide in fact a step into mathematics, since solving the problem, the brain and logical thinking is involved. It is only one step, since, for instance, the mathematical language is missing. So, many more steps could follow.