

## **THE MENTAL TELESCOPE: THE NON-EUCLIDEAN GEOMETRY CASE STUDY**

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The story of the birth of non-Euclidean geometries is a very interesting chapter in the history of mathematics, for a number of reasons. First of all, the current systematization was reached only with a troubled path that lasted many centuries, which suggests that perhaps there was an epistemological obstacle hiding, which the historical perspective highlights. Moreover, the history of the development of these new geometries is fascinating because it provides an example of how, although starting from very remote roots, mathematics is a subject in constant evolution, alive and susceptible to change, against the stereotype that sees it instead as a “dead” topic. Finally, analysing the development of this branch of geometry serves to combat the stereotype that mathematics is the creation of isolated geniuses, presenting a clear example of how it is instead a wonderful collective cultural creation.

Our intent is to show that non-Euclidean geometries can be a tool to promote the understanding of the modern axiomatic method in mathematics, to stimulate students’ aptitudes to logical thinking and to allow students to consolidate the knowledge of Euclidean geometry by developing it in a critical way.

Planned structure of the Workshop:

- Introduction to spherical geometry (laboratorial session).
- Formalization: what is non-Euclidean geometry (with historical glance), axiomatization of geometries.
- The mental telescope: how non-Euclidean mathematical ideas have provided tools for physics and fertilised art, showing how the interdisciplinary approach is successful not only in teaching, but also in the development of culture as a whole.

Polystyrene balls, rubber bands, drawing pins, small wooden trains, felt-tip pens, inflatable balls (all provided by the speaker).

