From the Scientific to Educational Methodology

We formatted the scientific method of research into five simple and explicit steps: α. trigger of interest, b. hypotheses, c. experimentation, d. theory, e. continuous testing and we adjusted them for the students as steps of an educational method for the educational procedure: α. trigger of interest, b. hypotheses, c. experimentation, d. conclusions - applications, e. generalizations – explanation with microkosmos (Stragka and Kalkanis 1999, Kalkanis 2007a). We named this method as the Scientific / Educational Method by Inquiry.

The scientific method was formatted by Newton, however it is originated from the ideas of Thales of Miletus which were used form other physical philosophers / early scientists (Lloyd 1970) in ancient Greece, like Archimedes. This method is used then from the era of the ancient greek philosophy to nowadays of modern science. It is believed that the scientific method not only helps the scientific research to be efficient and fruitful but also discriminates sciences form other fields of knowledge.

				
Trigger of Interest	Hypotheses	Experimentation	Theory	Continuous Testing

The scientific / educational method formatted into the five simple steps mentioned above is used by all the greek students of the 5th and 6th grade of primary education in science, according to the official science handbook from the Ministry of Education but also from the in-service retrained and future teachers studied in the University of Athens (Apostolakis et al. 2006, Kalkanis 2007b, Imvrioti 2011, Tsakonas et al. 2011).

				
Trigger of Interest	Hypotheses	Experimentation	Conclusions – – Applications	Generalization – Explanation with micro-kosmos

Bibliography and References

Apostolakis E., Panagopoulou E., Savas S., Tsagliotis N., Makri V., Pantazis G., Petrea K., Sotiriou S., Tolias V., Tsagkogeorga A., Kalkanis G. (2006), Official Science Handbooks for the 5th and 6th grade of Primary Education "Science – I Investigate and Discover", Greek Ministry of Education – Pedagogical Institute, Athens, 2006. (Available at http://www.pi-schools.gr/books/dimotiko/ or at http://digitalschool.minedu.gov.gr/courses/DSDIM-E107/)

Imvrioti D. (2011), "microkosmos in children's world – Activities with ICT for the particular nature of matter for 5th grade of Primary Education", 7th Greek National Conference on

Science Education and New Technologies in Education Interactions between Research and Practice in Science Education, University of Thrace, Alexandroupolis, 15-18 April 2011. (Available at http://www.7sefepet.gr/images/stories/pdf/7sefepet-praktika.pdf and at http://micro-kosmos.uoa.gr → publications, english and greek version)

Kalkanis G. (2007a), "Primary Science Education (I. the Theories, II. The Phenomena), Educational Technologies and Applications (I. the Laboratory, II. The Technologies)", Athens, 2007.

Kalkanis G. et al. (2007b), Episodes for the Greek national educational television "microkosmos explains …1. heat and temperature, 2. evaporation, boiling and liquefaction, 3. melting and freezing, 4. friction, 5. renewable energy sources", http://www.edutv.ypepth.gr, Greek Ministry of Education, Athens, 2007.

Straga, S., Kalkanis, G. (1999), "The scientific method enhanced by systemic analysis - fieldwork - educational material - information technologies, as a sequence of supportive approaches in present and future Environmental Education", International Conference on Environmental Education for Sustainable Future, Indian Environmental Society, New Delhi, India.

Tsakonas P., Gikopoulou Ou., Kalkanis G. (2011), "Simulations / corelations between microscopic oscillations and macroscopic waves with the use of educational software – A preliminary version, application and evaluation", 7th Greek National Conference on Science Education and New Technologies in Education Interactions between Research and Practice in Science Education, University of Thrace, Alexandroupolis, 15-18 April 2011. (Available at http://www.7sefepet.gr/images/stories/pdf/7sefepet-praktika.pdf and at http://micro-kosmos.uoa.gr → publications, english and greek version).