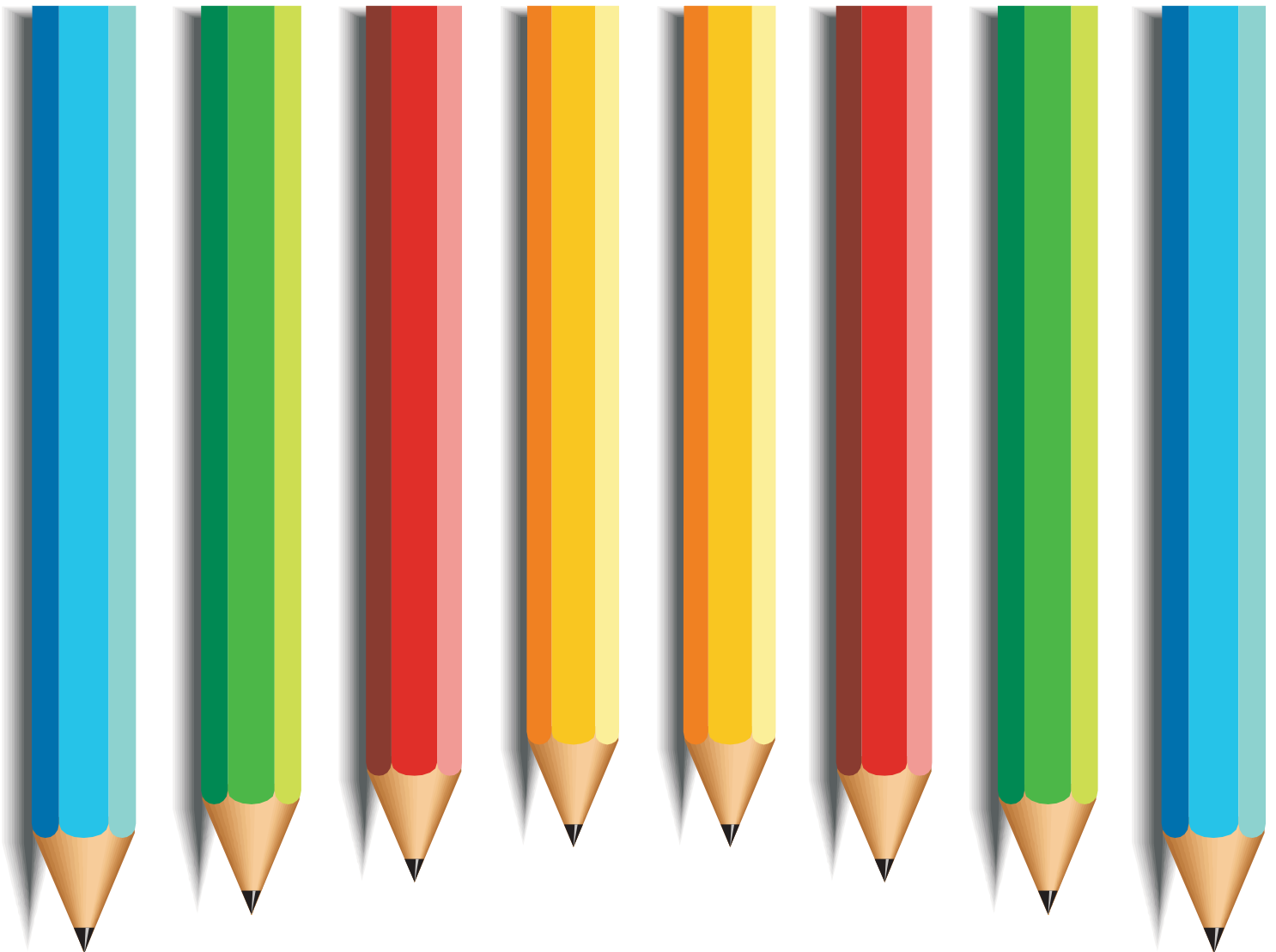


HSCI2011

Proceedings of the
8th International Conference on
Hands-on Science
Focus on multimedia

(Jointly co-organised with MPTL'16 - Workshop on
Multimedia in Physics Teaching and Learning)

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The Hands-on Science Network

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EXPERIMENTING FROM A DISTANCE IN CASE OF (OPTICAL) FOURIER- TRANSFORMATION

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Abstract. One of the aims to use multimedia in physics teaching and learning is to visualize mathematical relations or complex phenomena, e. g. Fourier-Transformation (FT). It is well known that if light is diffracted by objects the intensity distribution in Point P on a screen is the Fourier transformed of the diaphragm described by a suited function. Therefore it is obvious to use an optical set up to teach and model the FT experimentally.

We built a Remotely Controlled Laboratory (RCL) to study optical FT. The set up is standard, but the objects are produced by electron beam lithography for high quality diffraction patterns. The remote user has to switch on the laser, has to choose a diffracting object, has to analyse the respective intensity pattern and has to develop his own research program depending on the richness of diffracting objects or matter of interest.

We will perform the RCL with diffracting objects like circular, quadratic or triangular diaphragms (single forms), like different arrangements of single forms and "infinite" or finite quadratic grids. One aim is to visualize the basic laws of FT (scaling, linearity, separation, convolution, symmetries) and to support their learning. The other aim is to understand the structure of two-dimensional diffraction pattern.kM11

NANOMATERIALS SCIENCE LEARNING RESOURCE FOR SECONDARY SCHOOLS

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Abstract. The aim of this work is development of electronic learning resource on Nanomaterials Science Basis for pupils of secondary school. This resource is a component of electronic educational complex "Physics of nanomaterials" ("PhNM"), which was developed for support of the course "PhNM" for students of Karelian State Pedagogical Academy.

Using this resource pupils get first knowledge on nanomaterials science. All themes are divided in four

sections: "What is nano?", "What is nanomaterials?", "What is nanotechnology?" and "Applications of nanotechnologies". Materials are presented as brief illustrated texts and video materials, as well as games, crosswords, puzzles and different practices. Tests collection with multiple choices is intended for the knowledge control. Also there are such important sections as "Dictionary", "Library" and "Materials for Teacher" in developed resource.

For the development of learning resource language HTML, Sothink SWF Quicker, Macromedia Flash and Adobe Premiere were used. Programming language Java Script was used for tests processing.

The testing of developed learning resource on Nanomaterials Science Basis among school students will begin in September 2011.

THE IMPACT OF LEARNING MARINE BIODIVERSITY "BY DOING", IN 8TH SCHOOL YEAR STUDENTS

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Abstract. For Students from the 8th school year of the Portuguese educational system, Natural Sciences and Project Area units are mandatory. With the objective of learning marine biodiversity "by doing", an activity involving both units was implemented during 6 months. Firstly students were given a conference by external experts. Secondly students worked in the field (intertidal platform - protect Biophysics of Avenças) collecting animals and registering the biodiversity. Thirdly, in the lab, they tried to identify the species collected. Finally, at the classroom, students prepared different types of works: models, posters, films, PowerPoint's, etc. The best works were submitted to the national contest KIT MAR. To evaluate the impact on students, surveys were implemented before and after. Results demonstrated that students appreciated the methodology and knowledge has improved.