Geophysical Research Abstracts
Vol. 14, EGU2012-3396, 2012
EGU General Assembly 2012

Learning unit: Thin lenses „Why objects seen through lenses are sometimes upright and sometimes reversed"

L.-S. Nita
National College of Arts and Crafts "Constantin Brancusi", Craiova, Romania (laura_nro@yahoo.com),

Learning unit: Thin lenses
„Why objects seen through lenses are sometimes upright and sometimes reversed"

Nita Laura Simona
National College of Arts and Crafts "Constantin Brancusi", Craiova, Romania

1. GEOMETRIC OPTICS. 13 hours
Introduction (models, axioms, principles, conventions)

1. Thin lenses (Types of lenses. Defining elements. Path of light rays through lenses. Image formation. Required physical quantities. Lens formulas).
2. Lens systems (Non-collated lenses. Focalless systems).
3. Human eye (Functioning as an optical system. Sight defects and their corrections).
4. Optical instruments (Characteristics exemplified by a magnifying glass. Paths of light rays through a simplified photo camera. Path of light rays through a classical microscope) (Physics curriculum for the IXth grade/ 2011).

This scenario exposes a learning unit based on experimental sequences (defining specific competencies), as a succession of lessons started by noticing a problem whose solution assumes the setup of an experiment under laboratory conditions. Progressive learning of theme objectives are realised with sequential experimental steps. The central cognitive process is the induction or the generalization (development of new knowledge based on observation of examples or counterexamples of the concept to be learnt).
Pupil interest in theme objectives is triggered by problem-situations, for example: „In order to better see small objects I need a magnifying glass. But when using a magnifier, small object images are sometimes seen upright and sometimes seen reversed!" Along the way, pupils' reasoning will converge to the idea: „The image of an object through a lens depends on the relative distances among object, lens, and observer".

Associated learning model: EXPERIMENT
Specific competencies: derived from the experiment model, in agreement with the following learning unit steps

I. Evoking – Anticipation: Size of the problem, formulation of hypotheses and planning of experiment.
II. Exploration - Experimenting: Construction of experimental setup and collection of data.
III. Reflection – Arguing: Processing of data and elaboration of conclusions.
IV. Application - Transfer of knowledge: Testing the conclusions and predictions based on these conclusions and presentation of results. Impact of new knowledge (specific values and limitations) and validation of results.
Bibliography
Inquiry and the National Science Education Standards: A Guide for Teaching and Learning, Centre for Science, Mathematics, and Engineering Education, The National Academies Press, Washington 2000.
Methodological guide for teaching physics, SAR, Romanian Society of Physics and Romanian-American Foundation.
Sarivan, L., coord., Interactive teaching, M.E.C.T./ P.I.R., Bucarest 2005.
Păcurari, O. (coord.), Active teaching, Formatters guide, MEC-CNPP, 2001.
Dodoc, P. Theory and construction of optical systems, Technical Publishing, Bucharest, 1982