Wrappings, carpenters and symmetries in everyday life – making flexible use of knowledge and supporting independent learning

Rüdiger Vernay, Bremen, Germany

You can generally fit open problems and topics into any school curriculum. In dealing with them the students extend their abilities step by step towards a more flexible use of their knowledge and towards independant learning. In the workshop I´m going to present three examples showing that in theory and in practice.

1. Symmetries in everyday life (class 5 - 11 years)

In traditional geometry instruction in Germany the teaching of symmetry is usually limited to finding symmetry
axes in geometrical figures and drawing symmetrical figures at(?) given axes (when the axis is given). But symmetry includes much more. Symmetry is everywhere if we look around. I´ll present material for "FREIARBEIT" - that means students are free to choose a topic / a problem out of a given pool and to work on them with their own means in their own working tempo with a certain leisure in a given time - and I´ll give a report on my classroom experiences.

2. About carpenters and architects (class 9 - 15 years)

Realistic calculations out of the work of carpenters and architects are in the centre of attention here. Various open problems will be presented to you, all designed to show that you have to connect different mathematical tools (mainly
Pythagoras, intercept theorem and algebra) in order to reach a solution.

3. Wrappings (class 10 - 16 years)

"Design and build a remarkable wrapping for 1 kg of rice." That is the task for a homework. Aditionally students have to show by calculations that their box can really hold 1 kg of rice, that the condition "More than 15% unfilled space is not allowed" is fulfilled and they have to determine how much paper is needed to build the box.
In dealing with this job students can develop some creativity, at the same time they have to be careful to select shapes of wrappings which they can calculate with their own mathematical knowledge. Thus they show which level they´ve reached by now. I´ll demonstrate how this task fits into a common geometry curriculum and I´ll present some students works.