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“Inquiry Based Learning Approach in Teaching Phase Transitions” for Experimental Skills Formation in 16 Years Old Students

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Inquiry-based learning is an important pedagogical approach through which teachers can introduce students to the world of science and scientific research. Learning through inquiry is an active learning that requires students to take responsibility, make decisions, cooperate and self-assess. The role of the teacher is crucial when using the research approach in physics lessons, so it is important that he knows the experience of other colleagues, their ideas and good practices. The teacher is the one who guides the students in conducting research, supplying equipment and processing experimental data. We are convinced that the best way for students to understand the essence of science is by doing their own scientific research.

The report offers an idea for the formation of experimental skills by conducting inquiry on several specific problems related to thermal phenomena. Teams of students are formed, who choose to work on one of several proposed experimental tasks related to phase transitions. These tasks are borrowed from the International Young Physicists Tournament (IYPT) and are adapted to the conditions of the Bulgarian school and the respective curriculum. In solving them, students follow the steps of a scientific research - discuss the specific situation and formulate a scientific question, perform a physical experiment, collect and analyze results, draw conclusions that are confirmed experimentally. The proposed tasks are related to the following topics:

- Melting and solidification of crystalline and amorphous bodies (two tasks)
- Conditions on which the evaporation process depends (one task)
- The specifics of the boiling process (one task).

The formation of experimental skills occupies an important place in the physics curriculum for 8th grade Bulgarian schools. In recent years, there has been a tendency in the teaching of physics to develop more and more active practical and experimental skills. Teachers are looking for ways to do this both during classes and extracurricular activities, using modern interactive methods and approaches. The report describes the methods by which the learning process is organized and offers a proven technology of training on these physics topics.

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