

# ORGANIZATION AND IMPORTANCE OF SCIENCE FAIRS FOR THE EDUCATIONAL SYSTEM

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## Abstract

We consider the major defining elements of the modern science fairs and aim to cite their key advantages for the high school education and the STEM field in general. We give the most common traits of the participants in these contests, as well as milestones for organisers, who wish to diversify the education in school with the inclusion of project-based learning and science fair participation.

Our aim is to encourage more educational organisations on a local level to view science fairs as a good opportunity for improving the STEM education and allowing more students to view careers in research and technology as a viable opportunity for their development.

## Anatomy of a science fair

Participants - students 8th to 12th grade (sometimes 5th to 12th or even 1st to 12th). One to three days poster session opened both to the jury and the public.

Prizes - for school and regional fairs - advancement to fairs on larger scale; sponsor awards; access to scientific equipment and facilities.

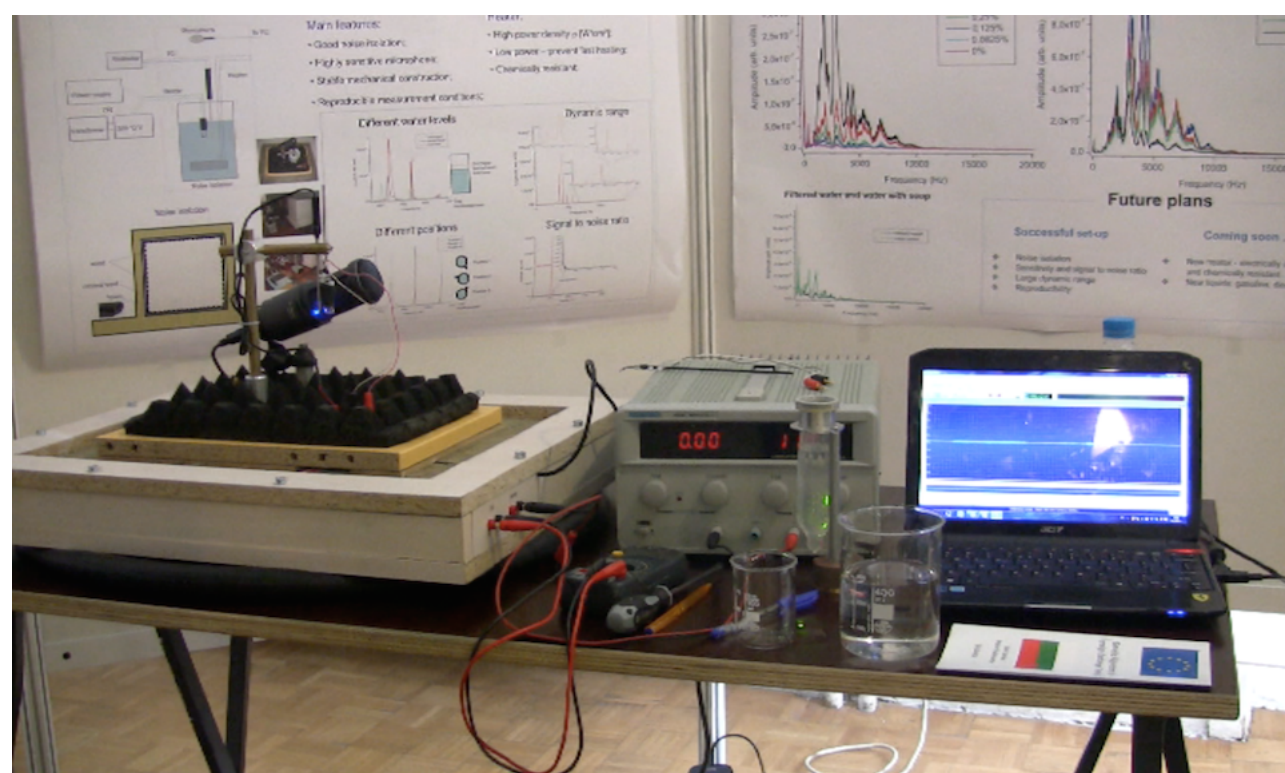
Parallel program in the form of discussions and networking events.



## Benefits of high school science fairs

While in some educational systems science fairs have been present for decades and thus have become routine event, the significance of which is taken for granted, this is not the case for numerous countries, including Bulgaria, despite that there has been a continuous tradition for a decade and a half and the first organised structures stimulating the project-based activities of high school students were started in 1967. Thus we feel there should be some emphasis on the various goals, which can be achieved with the introduction of science fairs and project-based education in the field of STEM. Some of the presented benefits are based on the statistical findings of the Science Fair Evaluation Framework, an international initiative to determine how students and teachers perceive the importance of participation in science fairs.

## Typical science fair projects



Science fairs present either a comprehensive overview on a given topic or authentic research under the guide of a mentor. Students choose to present either a scientific field they have found interesting or investigations connected with the field of expertise of their mentors. Mentors – usually STEM, from the participant's teachers or are young researchers willing to work with high school students.

In science fairs usually you see projects in different states of completion. In some countries developing a science project is part of the curriculum.

Most projects have 1 to 3 co-authors with some fairs accepting bigger collectives or aimed at high school clubs.

## Benefits for the participating students

The most frequently cited key benefits for the participants in science competitions in science fairs are:

Interaction with like-minded peers and the creation of communities of teenagers, interested in STEM, such as the ISEF alumni, the HSSI participants, many of who mentor younger students etc. This is also an important support network for students, the nature of whose extra-curricular activities is inherently stressful.

Opportunity to explore possible career paths from an early age. This not only increases the futures STEM workers, as two of every three science fair participants declare that they wish to pursue education and career in this field, but also increases future job satisfaction by allowing high-schoolers to explore different occupations, without committing too much. Networking with representatives of various universities, colleges and hi-tech industries creates more chances for internships for young people, as well as better perspectives for continuing the participants' education on a higher or professional level.

## Participants' profile

Students who do science for the sake of science

Young entrepreneurs. Especially when there are no high student business competitions. Usually students who are mature and independent for their age. This is often a requirement from their mentors to allow them to do lab and field work.

Students who have developed a professional orientation earlier.

Sometimes – fans of science.



## Benefits for schools and teachers

One of the most prominent benefits of science fairs is that they motivate both participants and observers. Students from the whole k12 range can find role models from their own generation, see science from a new perspective and interact with their peers on topics they don't normally do.

Science fairs facilitate inquiry-based learning. By definition the student research is an open inquiry (4th level inquiry based learning), but organising a school-level science event means that one can also introduce more structure to students' research topic and introduce self-study projects as part of the standard curriculum.

High achievements in the field of STEM provide a school with numerous new opportunities for funding and support. Major fairs provide direct support to the school of award-winning participants and traditions in high school research are major benefits when negotiating school-industry partnerships or applying for informal learning programs.

## Other benefits

For the supporting organisations choosing to support a science competition, over other opportunities for sponsorship provides more targeted publicity and a clearer statement of the organisation's mission. Moreover, for representatives of the industry, it can also mean an early way to secure future professionals in knowledge-intensive professions.

A well designed parallel program of a science fair offers opportunities for contacts between stakeholders, industry and academia. International science fairs can become the meeting place of partners in major international initiatives. One such example is the Intel Educator Academy, an event parallel to both EUCYS and Intel ISEF.

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