



teachers + scientists

Inspire for science



Guide to collaboration for teachers and scientists

Imprint

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Teachers + Scientists: At a glance

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schools

Einhard-Gymnasium Aachen, Andreas-Gymnasium Berlin, Robert-Havemann-Gymnasium Berlin, Georg-Büchner-Gymnasium Berlin, OSZ Gesundheit I Berlin, Ursulaschule Osnabrück, Widukind-Gymnasium Enger, Gymnasium Heepen, Gesamtschule Hüllhorst, HBLA Ursprung/Austria

6

universities/research institutions

Bielefeld University, Bielefeld University of Applied Sciences, Osnabrück University of Applied Sciences, German Cancer Research Center Heidelberg, Max Delbrück Center for Molecular Medicine Berlin, Universitätsklinikum RWTH Aachen

7

regional collaborations

1× Aachen, 1× Berlin, 3× Bielefeld, 1× Heidelberg, 1× Osnabrück

14

teachers

4

federal states

Baden-Württemberg, Berlin, Lower Saxony, North Rhine-Westphalia

5

cities

Aachen, Berlin, Bielefeld, Heidelberg, Osnabrück

12

scientists

Project content and benefit (2014-2017)

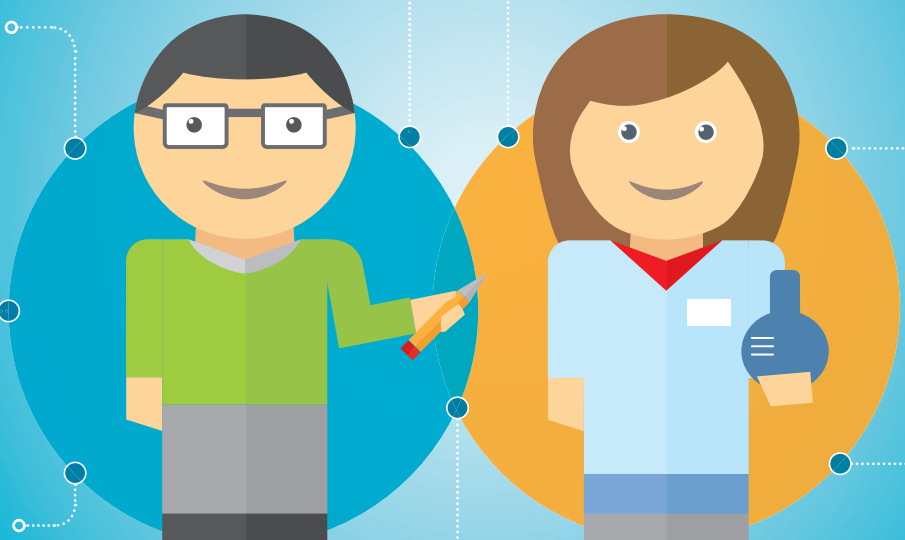
- Promotion of long-term collaborations between teachers and scientists
- Teachers get an insight into current research and can implement it in their lessons
- Aim: Improve science teaching in order to encourage more schoolchildren to consider a career in science or engineering

Dissemination

- Teacher trainings
- Presentation at conferences
- Continuation of the collaborations

Results

- Guide to collaboration between teachers and scientists
- Teaching material on various topics: human genetics, cancer research, experimental and systems ecology, elementary particle physics, epidemiology, object-oriented programming, mechanics and sensors



Project presentation and guide to collaboration

From 2014 to 2017, teachers collaborated with scientists in five German cities to bring current research into the classroom. Based on the experiences gained in the three-year collaboration between the Teachers + Scientists, we now present to you the requirements and benefits as well as characteristics and challenges of such a collaboration. At a suitable point, you will also find recommendations, designed to support you in successfully implementing partnerships between teachers and researchers!

1 | General and prerequisites for collaboration

For both teachers and researchers alike, personal commitment is the decisive factor for collaboration on such a project. Having an exciting topic and one which fits in well to everyday school life also plays a significant role. And last but not least, the “chemistry” between the partners involved should also promote a good collaboration.

Motivation and benefits for teachers

What especially motivates teachers is the opportunity to gain an insight into current and previously little-known areas of research and to get inspiration for their own lessons. And there are other advantages:

- further training through the transfer of knowledge
- clarification of their own questions on current issues within the subject
- insight into new content which goes beyond that available in the teaching materials on offer
- vocational orientation: better insight into possible applications of learning content → practice-relevant connections can be presented to the students to facilitate meaningful preparation for a university education

Motivation and benefits for researchers

The most important thing for the scientists is to publically present their research and current contents and thereby to make a contribution within the framework of outreach activities and to contribute to scientific communication. The following aspects are also beneficial:

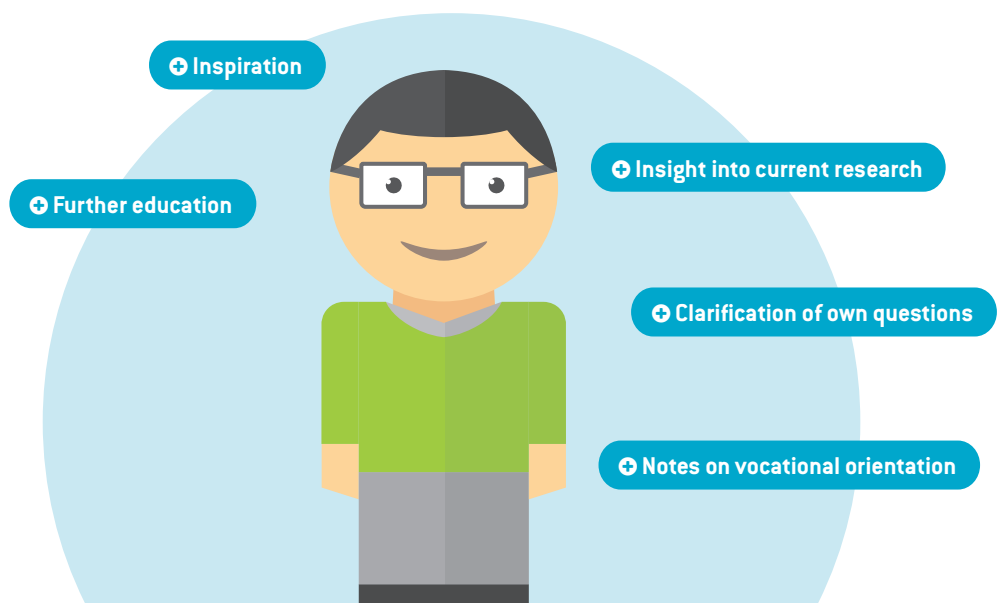
- promoting young talent and enthusiasm of students in STEM subjects
- preparation of own specialist articles from a didactic perspective
- conveying highly complex topics which are relevant to students
- insight into the day-to-day school life
- network for future research projects

2 | Finding a topic

Starting with the curricula of the subjects in question, interfaces should be sought with the current research questions of the scientists involved. Any possible interests of the students in new topics, which may be linked to existing teaching content, also play a role. Overall, it is important that the contents are related to the specialist subject, ideally supplementing it in a productive fashion and thereby addressing the entire class as far as is possible.

“The collaboration gives me the unique opportunity to engage with current research and to contribute to my own continuous professional development. I come into contact with many current developments which cause me to rethink and adapt my own lessons. The students clearly benefit as a result.”

A PARTICIPATING TEACHER



⊕ Insight into the day-to-day school life

“This collaboration promotes always explaining the subject in a way that can be understood and is different to usual. In a way, this also serves to clarify for yourself what you are actually doing.”

PARTICIPATING SCIENTIST



⊕ Scientific communication

⊕ Promoting young talent

⊕ Network for future research projects

⊕ Preparation of own specialist articles for students

3 | Development of the collaboration

In order to establish a collaboration between teachers and researchers, it is advantageous to make use of an existing network or of personal contacts. Should no direct contacts exist, it might be the case that these can be arranged via connections within the staff body or via the parents of students. Approaching potentially interested parties directly both in schools and in research institutions is also conceivable.

The acquisition of external partners—such as companies—with a view to attracting financial resources is in most cases not urgently required, but this can be taken into consideration. Consumable materials are best provided by research institutions as required. Furthermore, foundations or the school's parents' association can also be approached for support.

4 | Forms of organisation

One possibility is regional co-operation in teams of several teachers and researchers. The benefit of this form of organisation is that the level of exchange and the input of ideas is greater. To some extent, it means that a complex topic can be better dealt with. In the case of larger teams, it is an advantage to have a contact person in the area of science, who can co-ordinate everything at a local level.

Another form of the co-operation is to work in tandem, where-by one teacher works with one researcher respectively. This makes scheduling and communication more direct.

5 | Implementation of regional collaboration

A successful collaboration should involve regular personal meetings which are held individually and as required, for example on a monthly basis or every three to four months. Contact via e-mail or phone is also advantageous.

The implementation of the research topics in the lessons takes place in parallel to the collaboration with the research institution or university. With a view to other colleagues also benefiting from this, the implementation of teacher training courses on the subject also presents itself. This might, for example, take place at the participating institution.

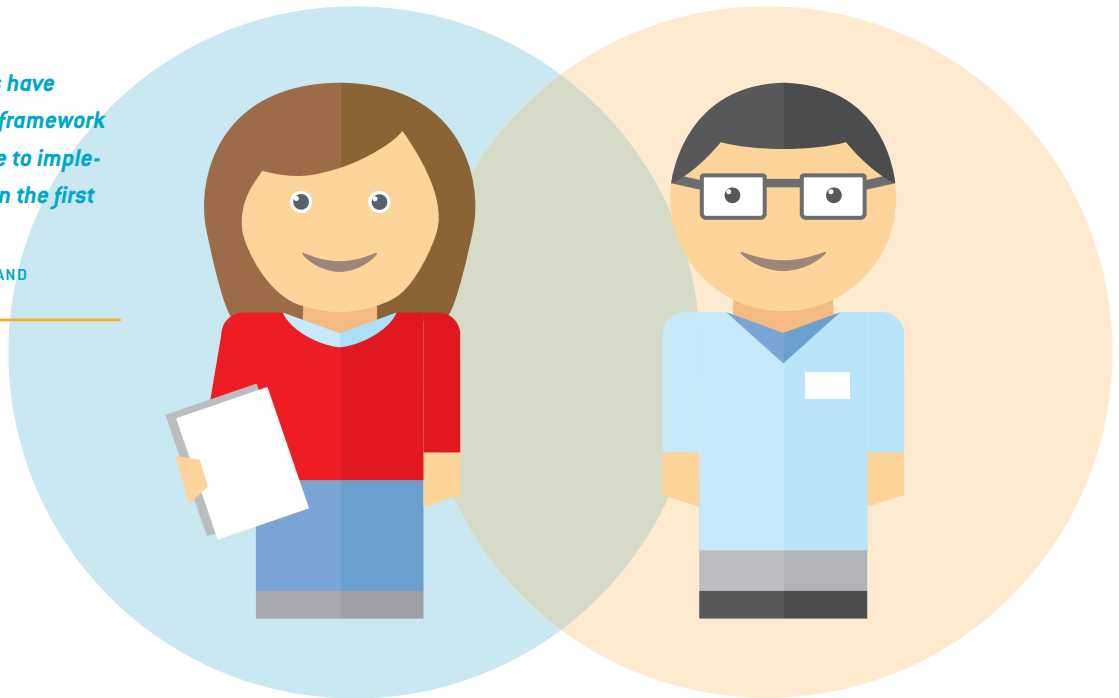
6 | Support and recognition

The participating teachers were supported by the school in terms of the provision of rooms for the project and, for example, in the establishment of project courses arising from the collaboration. Teachers were released from lessons to participate in training courses and the opportunity was given to present the project to colleagues at general conferences. In some cases, greater support for the specialist areas would have been desirable.

For the most part, the researchers at the universities were released for the project. Rooms and required materials were also provided. The breadth of support was very varied in this regard. Sometimes, there was the full support of the entire institute; in some cases, the activities of Teachers + Scientists were seen as a “special service”, which did not fit into the daily routine of the university.

“The organisers of Teachers + Scientists have managed to create a framework whereby it is possible to implement such a project in the first place.”

PARTICIPATING TEACHERS AND RESEARCHERS



Overall, the project participants rated the recognition by colleagues and superiors as very good and they regard this as a necessary pre-condition for successful implementation.

Support from Science on Stage Germany and the Stiftung Jugend forscht e. V. was primarily helpful in terms of PR and the organisation of regular national network meetings. These important organisational frameworks and the making available of financial resources for project costs were perceived to be very beneficial. The participants experienced a high level of recognition and motivation by virtue of these frameworks and through the exchange with the other partnerships.

7 | Challenges

Getting teachers on board was very much a varied process. Further participants could more easily be won in schools where there was already good co-operation between the specialist areas. It also became clear that having the support of the school management is crucial for establishing a collaboration. The time factor was also often a challenge. Where teachers were not released from teaching duties, it was only possible to engage with the project in addition to regular classroom activities.

The lack of time time was also a problem for the scientists. Employees of research institutes and universities often only have temporary contracts and are strongly bound to university projects.

During the project phase, scheduling co-ordination between the teachers and researchers primarily caused problems because the schools did not release teachers to participate in the project.

By means of common dialogue, it was possible to swiftly resolve initial difficulties in terms of finding a suitable topic. Differences

in the equipment of the schools and research institutions led to some modifications to the implementation of experiments being necessary for the schools.

8 | Press and PR work

In order to raise awareness of the project on a regional basis, several press and PR instruments were made use of. In this specific case, Science on Stage Germany offered support by providing the necessary logos, flyers, posters, text templates and press releases.

Information on the collaboration was primarily to be obtained via the participating schools' and research institutions' websites and at events such as "Open Day". Local media and social networks lend themselves to individual activities. It is also possible to publish the results of the collaboration in annual reports, press releases and articles.

Overall, it can be seen that the press and PR work is very important, particularly for schools in terms of representation of the school profile. For universities and institutes, this issue is in most cases of lesser importance. Nevertheless, the PR work plays a role in drawing the attention of potential students towards their own professional direction by means of being involved in the project or in meeting the requirements of making research comprehensible to society.

9 | Results and conclusions

All those involved found their participation in the project to be personally and professionally enriching. For the teachers, this was mainly of importance in terms of the insight into current research and the associated expansion of their understanding. The researchers benefited from the discussion and dissemina-

tion of their work to the public. For both sides, the nationwide exchange with other teachers and researchers was very profitable as was the incentive to further optimise their own teaching.

Furthermore, the materials developed with the project offered the students an insight into the current state of research in the specialist areas. They are also motivational as a result of their topicality and render them open to otherwise rather less accessible areas of research.

This leads to the fact that almost all of the regional collaborations are planning a continuation and all the teachers and researchers recommend this form of collaboration. Furthermore, the results are presented and disseminated at conferences and at teacher training sessions. To conclude, experience has given rise to the following recommendations for collaborations:

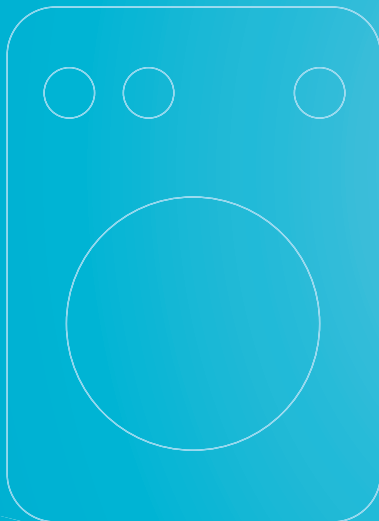
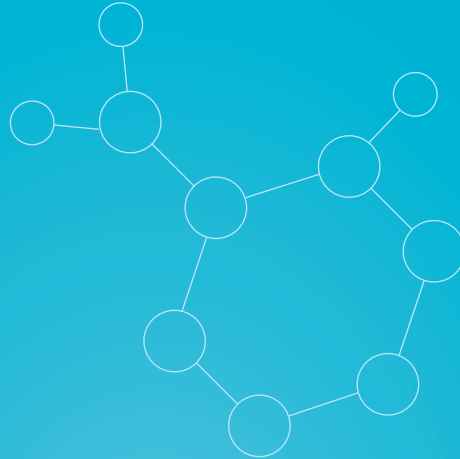
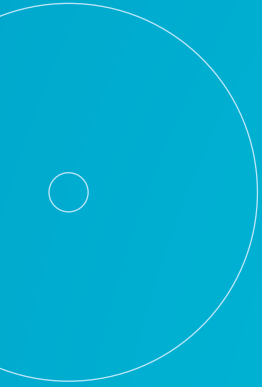
- personal motivation and interest are basic requirements
- start small and only create binding plans for a few months
- plan in time for the preparation and implementation of working with the students
- take the curriculum into account when looking for a topic, take care that other teachers will benefit

Are you interested in developing a collaboration with a teacher or scientist? Please feel free to contact us with any questions at info@science-on-stage.de!

“Such a community of interested teachers and researchers offers a special opportunity for the exchange of experience because the path from teaching to learning is important to all the professions involved.”

PARTICIPATING TEACHERS AND RESEARCHERS





www.teachers-and-scientists.de

A project organised by Science on Stage Germany

in cooperation with Stiftung Jugend forscht e. V.

