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pocket guides

a guide for researchers acting as mentors



Canadian Institutes
of Health Research

Instituts de recherche
en santé du Canada

Canada



ON MENTORING

You've agreed to mentor a high-school student.

Now what?

First of all, thank you. By agreeing to be a mentor, you are helping to develop our next generation of young researchers, encouraging their continued involvement in the world of science and providing them with a role model of a “real-life” scientist.

Second, we recognize that acting as a mentor isn't something that necessarily comes naturally. So the Canadian Institutes of Health Research has consulted with experienced mentors – and even some “mentees” – across Canada to find out what, exactly, makes a **great** mentor.

So what does a mentor do?



There are all sorts of different ways of being a mentor. For the purposes of this guide, we're assuming that you will be mentoring a high-school student, most likely assisting him or her in preparing a science fair project.* In general, students are looking for:

- assistance in developing their idea into a project;
- clarification of the scientific methods they need to use to test their hypotheses;
- training in the techniques they need to know to carry out their experiment and analyze the results; and
- access to a laboratory and the specialized equipment they need to carry out their experiments.

* And if you're asked to act as a judge at one of these science fairs, take a look at another publication in this series, "A Guide for Researchers Judging a Science Fair", available at www.synapse.cihr.gc.ca.

There are lots of different ways you can provide this mentoring. In fact, you can think of mentoring as encompassing three levels of engagement, each one requiring a greater degree of effort and involvement.

- The first level can be as little as a phone call. Often, judges at a science fair will observe that a little advice early on could have made a significant difference. Some time on the phone (or an e-mail) can get students on the right track and point them to the important literature, with a relatively modest investment of time from you.
- The second level is an extension of the first – regular phone calls or e-mails, on a weekly or monthly basis, for ongoing consultation as a project progresses.
- The third level is the most intensive, and involves the student coming to your lab and becoming an active member of your lab team, with supervision from yourself and from other members of your team, such as post-doctoral fellows, graduate students or even lab technicians.

While the third level can be most valuable, the first two levels are very effective ways of helping students who live far from a university or teaching hospital.

But I'm busy enough just running my lab
– why add mentoring to everything else I do?

Good question. At first glance, being a mentor may seem like it just adds to your workload, without much in the way of obvious benefits.

But benefits do exist. For one, universities and research institutions today often look for evidence of community involvement in making hiring or promotion decisions. Some granting agencies are now including an outreach requirement in grant applications, as well – mentoring can help to satisfy that requirement. Being a mentor can, in short, look good on your CV and further your research.



Many people with experience as mentors also cite the excitement that these young students bring to the lab as a motivating factor, helping to reawaken their own sense of excitement about their work.



“If Canada wants to produce people who can function in a highly technical society, we have to nurture them.”

PATRICK WHIPPEY,
Deputy National Judge-in-Chief,
Canada-Wide Science Fair

These short-term benefits, however, are only part of the story. Because you are doing more than simply helping with a science fair project – you may be influencing the entire future direction of a student’s life. You are taking part in the collective responsibility researchers have to lend a hand to the next generation, to give them skills and encouragement.



“Working with a mentor gives students a more accurate picture of how science works and what researchers actually do.”

RENI BARLOW,
Executive Director,
Youth Science Foundation Canada

So what do I need to do to be a good mentor?

A mentor can make all the difference between an experience that encourages students and helps take them to the next stage in their work and a bad experience that leaves them “turned off” of science.

According to experienced mentors, the overwhelmingly most important thing is to be enthusiastic. You are doing what you do because you have a love of science – this is your chance to pass it on. Let your “mentees” see how excited you are by what you do and help them to nurture their own sense of the excitement and pleasure that comes from doing research. Convey your passion!

Here are some more tips that may help you as you take on this important role:



- **First and foremost, remember whose project it is!** Your job is to provide advice, guidance and access to facilities and equipment not otherwise available to the students. Don't take over their project! And don't let others in your lab do so either. For the project to be meaningful, the research question should come from the student. While it can be tempting to simply "assign" an investigation from your own research – and some students may even expect this – it's important for the student to own the research.
- **Make sure your student is doing the actual work.** It's much more valuable for them than assisting and observing someone else, whether yourself or a lab technician. And when your student takes his or her project to a science fair, judges will be diligent about assessing what was the student's work and the role the mentor played. Too much of your involvement, despite the best intentions, can end up working against your "mentee".



- **Give the "right" help.** Assess very early the student's level of knowledge, so that your guidance is at the right level. It is incredibly frustrating to be challenged at too high a level and your students will not perform as well as they might otherwise. Make sure, as well, that you're talking to them at their level. These students are bright and motivated, but they don't have the same knowledge of the "jargon" that you do – don't confuse them! Finally, make sure that your students have the necessary safety training and adhere to all safety policies and procedures to reduce the chances of injury when they are working in your lab.
- **Set clear expectations.** Both you and your student need to be clear about what is expected of each of you. You need to be clear about how much time you are able to devote to mentoring the student and what you expect from him or her in terms of preparation and performance.
- **Be patient.** Nothing is more frustrating for a student than a mentor who moves too quickly and at too high a level.

- **Communication is key.** Listen to your “mentees” – be receptive to what they want to do and what they need to accomplish their goals. Ask a lot of questions. This is a great way to encourage your students to think a little further about what they are doing. Be available to them when they want to talk. If they feel they are being taken seriously by you, they will be more excited by their work. Temper your criticisms with praise (“constructive criticism”) and provide them with reading suggestions that will augment their knowledge.
- **Use the “buddy system”.** Sometimes, having a buddy in the lab, someone closer in age whom students can speak with more easily and work closely with, can be an important part of the mentoring experience.

Finally, it may be hard to admit, but the time may come when your “mentee’s” experiments go beyond your expertise.



Know when it’s time for students to move on and help them to find another mentor who can help them to the next stage in their work.



“Working with a young person who is eager and enthusiastic can change your perspective, remind you why you got into your field.”

PATTI LEIGH,
Executive Director,
Science Fair Foundation BC



FROM THE STUDENT'S DESK

Students who have been through a mentoring relationship have lots of advice for would-be mentors, based on their own experiences.

First, they say, students should approach you – it indicates a level of interest that bodes well for the relationship. You should see that students have an idea of what they want to accomplish. They may even write a proposal of what they want to do. In fact, some programs that match mentors with students require that the students write a proposal.

Second, they say, remember it's the student's project. Mentors provide advice and access to equipment, they teach



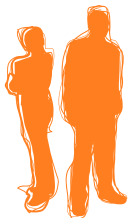
techniques – but ultimately, the student must be the one who does the work. If you end up doing too much, the students aren't learning and you may even be harming their chances when competing at science fairs.

Third, as a mentor, you should be showing students techniques – you want to produce students who know their way around a lab – but it's equally important to make sure they understand how the technique fits into their project and how to use the available techniques to take their projects to the next level.

Fourth, remember why the students are there. Yes, they need to learn techniques, but they are not just another “pair of hands” who can do the dirty work. Time spent cleaning test tubes instead of doing science may help you in your lab, but it won't be of great benefit to the student.

Most of all, remember that students are coming to you not because this is their job

or profession (yet!) but because they love and enjoy science. Make sure they leave their time with you still feeling that same passion.



"You're working with people who are the best in their fields — that's a recipe for success right there."

WILL TURK,
Student,
University of Winnipeg



"[My mentor] was always careful to listen really closely, to give me the best advice he could give and to push me."

ADRIAN VERES,
Student,
Jean-de-Brébeuf College, Montreal

A word of caution...

As a mentor for a high-school student, you are dealing, for the most part, with minors. For your protection and theirs, it is important to keep in mind some basic precepts.

Make sure the student's parents know who you are and what your involvement is with the student. Parents must give their consent in writing to their child working with you.

Remember that this is a professional relationship and treat it accordingly. Do not approach or contact students outside of the context of the work you are helping them with. Make sure that all meetings are held during business hours and in the presence of others – parents, teachers, members of your lab. If your mentorship takes an electronic form, ensure that your communications focus solely on the work at hand. Do not ask for personal information.

You are in the same position of trust as a teacher. Do not abuse that trust.

I loved it! I want to do more

That's great! Because there is any number of ways you can take your involvement with high-school students further. You can go on

to judge your local science fairs – though, of course, you have to make sure there's no conflict of interest; you should not be involved in any aspect of judging projects of students you've mentored!**

You can also consider more widespread outreach – go into high-school classrooms to work on experiments with the students or invite a class into your lab to do some hands-on work there. If having that many students working in your lab isn't really feasible, you can even bring them in for a tour. The advantage of these approaches is that you're reaching all students, not only those who have self-selected by seeking out a mentor. Who knows how many students who never saw themselves as scientists will get excited by meeting you, hearing about your work, and maybe even doing some work with you?

** And, of course, don't forget to consult another publication in this series, "A Guide for Researchers Judging a Science Fair", available at www.synapse.cihhr.gc.ca.

Of course, it's hard to get to all the classrooms out there. So some researchers are helping teachers get a better understanding of how science really works, what researchers actually do and the importance of inquiry and hands-on experimentation in their classrooms. These teachers, in turn, can pass their knowledge on to their colleagues, helping to ensure that more students get the hands-on experience that can make all the difference in the world to them.



This guide for mentors could not have been produced without the invaluable assistance of:

Youth Science Foundation Canada
www.yzf-fsj.ca
Conseil de développement du loisir scientifique
www.exposciencesbell.qc.ca

Dr. Chris Brandl, University of Western Ontario
Anne Cascadden, University of Windsor
Dr. Kathleen Hill, University of Western Ontario
Patti Leigh, Science Fair Foundation BC
Joshua Liu, Student, York University
Dr. Marek Los, University of Manitoba
Mubdi Rahman, Student, University of Toronto
William Turk, Student, University of Winnipeg
Adrian Veres, Student, Jean-de-Brébeuf College, Montreal
Dr. Patrick Whippey, Deputy National Judge-in-Chief,
Canada-Wide Science Fair

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Also available on the Web in PDF and HTML formats
© Her Majesty the Queen in Right of Canada (2008)
Cat. No. MR21-90/1-2008E-PDF
ISBN 978-0-662-47537-8

