Mentoring Tips for Mentors of Undergraduate Researchers

"…a good mentor seeks to help a student optimize an educational experience…"[1]

****Elements of a Good Summer Undergraduate Research Project for Your Mentee***

- reasonable breadth
  - not just focused on doing one technique or one synthesis
- feasible
  - interesting results are attainable within the time period of the research experience
- generates data that the student can present
  - i.e. during the Summer Undergraduate Research Symposium on Thursday July 29
- stays away from cookbook experiments
  - project should be more than a set of written instructions
  - project should require the student to think creatively, research, and problem solve
- has built-in difficulties that will be faced later in the project when student is more confident and independent
- has several aspects
- takes the student from research dependence to research ***independence*** within the time frame of the research experience

****Establishing a Good Mentor:Mentee Relationship***

- foster open ***communication***
  - make direct eye contact and address your mentee by name
  - be enthusiastic and welcoming
  - introduce your mentee to all personnel in your research lab
  - show your mentee around the lab, its facilities, and the building
  - discuss laboratory and safety policies
  - obtain contact information from your mentee (cell phone number and emergency contact information)
  - provide your mentee with your/graduate student contact information
  - if possible/needed, have your mentee work under the jurisdiction of a graduate student/postdoc supervisor
  - review with your mentee the chain of command in your laboratory
  - give your mentee a lab notebook and indicate your expectations for its use
  - talk about the overall picture of your research, in general, and the mentee's project, in particular
  - discuss your mentee's:
    - background (major, classes taken, previous research experience)
    - talents (build on these)
    - future plans (career goals, encourage the mentee to consider graduate school)
- establish a set schedule of mentee ***expectations*** for the research project and for work
  - days/times, e.g. Monday through Friday 8:30 AM to 5:00 PM, you expect mentee to be in the research lab
  - equivalent to full-time job—minimum of 40 hours per week expected

*adapted from 1) Handelsman, J., Pfund, C., Lauffer, S. M. & Pribbenow, C. M. (2005). Entering Mentoring, Madison, Wisconsin: Board of Regents of the University of Wisconsin System and 2) Wisconsin Center for Education Research at the School of Education. (2008). Research Mentor Training at http://www.researchmentortraining.org (accessed May 11, 2010).

    - project tasks that are expected to be completed by the end of the research program
- provide opportunities to assess mentee ***understanding***
    - meet with your mentee on a regular basis
        - perhaps once per week, e.g. each Monday at 4 PM
        - review mentee progress from the previous week
        - set attainable mentee goals for the following week (if you get x and y to work, then should be able to do z next week)
        - ask your mentee what is and is not working/going well on the research project
        - evaluate mentee's understanding of the project (e.g. perhaps through biweekly presentation)
        - give mentee project ownership and promote mentee accountability
        - be accepting of mentee mistakes and use these as growth/learning opportunities
        - use questioning to promote learning
- model appropriate ***ethical behavior*** for scientific research
- be aware of diverse learning styles and be ready to address ***diversity*** issues

Prepare Guide Sheets (sets of instructions) on:

1. safety rules and regulations within your research lab
2. chemical waste disposal and chemical handling (when a fume hood is needed and when it is not)
3. chemical hygiene (not returning excess chemical to reagent bottle, chemical labeling)
4. operating procedures for common equipment
5. techniques commonly used in your laboratory (e.g. preparation of standard solutions, sterilization techniques, data manipulation and graphing, etc.)
6. laboratory contact and "in case of emergency" contact information

NOTE: Have an experienced researcher (graduate or undergraduate student) prepare these guide sheets. These guide sheets can be refined/updated and given to all new members of your research laboratory.

In essence, effective mentoring can be distilled down to six key elements….

- **Expectations**
- **Communication**
- **Understanding**
- **Independence**
- **Ethics**
- **Diversity**

Reference

1. National Academy of Sciences. (1997). Adviser, Teacher, Role Model, Friend: On Being a Mentor to Students in Science and Engineering. National Academies Press: Washington, D.C.

WVNano REU and SURE Participant Requirements

REU Participant Requirements

1. Participant will research for ten weeks during the summer.
2. Participant will work an average of 40 hours per week.
3. Participant will not have another job or participate in another summer course.
4. Participant will attend the 3-4 day training held May 23-May 26, 2011.
5. Participant will abide by all REU and all West Virginia University rules and regulations.
6. Participant will be paid a stipend of $5,000 for his/her summer research.
7. Participant will attend and present his/her research findings at the undergraduate symposium on July 28.
8. Participant will complete all technical aspects of the REU program.
9. Participant will take part in all team-building activities (typically held on alternate Saturdays). However, legitimate conflict with one of these activities does not negate program participation. Bring potential conflicts to the attention of the project director.

SURE Participant Requirements

1. Student will research for eight weeks during the summer.
2. Student will work an average of 40 hours per week.
3. Student will not have another job or participate in another summer course.
4. Student will attend the orientation on Tuesday May 31, 2011.
5. Student will participate and complete all components of the one-credit hour research course (including all online assignments).
6. Student is responsible for paying all fees (but not tuition) associated with the one-credit hour research course according to WVU policy.
7. Student researcher will abide by all SURE and all West Virginia University rules and regulations.
8. Student researcher will be paid a stipend of $3,600 for his/her summer research.
9. Student will attend and present his/her research findings at the SURE symposium on July 28.