

# Science Education Teacher Preparation Handbook

Western Washington University

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in collaboration with local teachers participating in the  
Science Teacher Apprenticeship

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# SECTION 1: GENERAL INFORMATION

## Section 1a: The Science Education Group

Welcome to the Western Washington University teacher preparation program. The Science Education Group is looking forward to working with you as you prepare to become a science teacher. The Science Education Group is comprised of faculty from the College of Sciences and Technology and the Woodring College of Education (WCE). The Sciences and Technology faculty hold joint appointments in one of the four science departments (Physics, Chemistry, Biology, and Geology) and the Science Education Group. They teach courses in their science disciplines as well as Science Education courses for both Elementary and Secondary pre-service teachers. The Woodring faculty hold joint appointments in one of the Woodring departments and in the Science Education Group. They teach general education courses as well as the courses particular to Science Education. The Science Education faculty all have experience working with K-12 students as well as doctoral degrees in a science discipline or Science Education. Thus, they bring expertise as scientists as well as science educators.

The Science Education faculty include:

*Dr. George Nelson*; Science, Mathematics, and Technology Education Director  
650-3637; SL250D; George.Nelson@wwu.edu

*Dr. Alejandro Acevedo*; Science Education and Biology  
650-3653; BI 309; acevedo@biol.wwu.edu

*Dr. Jacob Clark-Blickenstaff*; Science Education and Secondary Education  
650-2581; MH 305; Jacob.Blickenstaff@wwu.edu

*Dr. Emily Borda*; Science Education and Chemistry  
650-3135; CB 242; Emily.Borda@wwu.edu

*Dr. Susan DeBari*; Science Education and Geology  
650-3588; ES 105; debari@cc.wwu.edu

*Dr. Deborah Donovan*; Science Education and Biology  
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*Dr. Steve Gammon*; Science Education and Chemistry  
650-2825; CB 244; gammon@chem.wwu.edu

*Dr. Scott Linneman*; Science Education and Geology  
650-7207; ES 340; Scott.Linneman@wwu.edu

*Dr. Chris Ohana*; Science Education and Elementary Education  
650-6533; MH 251D; Chris.Ohana@wwu.edu

*Dr. Jim Stewart*; Science Education and Physics  
650-3840; BH 192; jstewart@physics.wwu.edu

## Section 1b: Getting Started

- Make an appointment with one of the Science Education faculty (see list of faculty above) in your primary endorsement area (Physics, Chemistry, Biology or Earth Science) to have your *transcripts reviewed for your endorsement*. You should keep a copy of your endorsement review until the end of your certificate program. This will be used by the Certification Officer to apply for your endorsements.

It is possible that your content coursework does not meet Washington State requirements for a primary endorsement in your area, especially if you completed the content coursework outside of Washington. In this case, your advisor will determine which courses you need, beyond your

education coursework and your science methods courses, in order to qualify for a primary endorsement.

- **Orientation Meetings**

Woodring College of Education holds an orientation meeting on the day before the beginning of fall quarter. The Science Education group will hold a short meeting immediately following WCE's meeting.

### **Section 1c: Endorsements**

- WWU offers primary endorsements in Biology, Chemistry, Physics, Earth Science, and General Science

See the Woodring web page (<http://www.wce.wvu.edu>) for information concerning these endorsements, including required content coursework for each endorsement.

### **Section 1d: Certificate and Endorsement Coursework**

- *Education courses:* The courses you must take for your teaching certificate depend on the teacher preparation program in which you are enrolled (undergraduate, post-baccalaureate, MIT). Refer to the WWU catalog for the education courses offered by Woodring College of Education that apply to your program. The Science Education Group has some specific requirements for the two practica (SEC 431a and SEC 432a). These requirements are described on pg. 4.
- *Science Content courses:* As mentioned above, you may need to take some science content courses to fulfill the Washington State requirements for an endorsement in your content area. See a Science Education advisor for a review of your transcripts.
- *Science Education courses:* There are two science education courses required for your teaching certificate and your primary science endorsement. These are SCED 481 and SCED 491. A full description of the courses can be found on pp. 5-7.

### **Section 1e: Paperwork**

You received information about important applications and deadlines in your orientation packet. Be sure to keep this information as you will need it throughout your certificate program. As well, be sure you are on the Secondary Education listserv (Patricia Roberts in Secondary Education is in charge of this). This listserv is used to remind you of deadlines and requirements.

There are a number of people on campus to help you negotiate the paperwork required for your credential:

For *Endorsement* questions:

- your Science Education advisor

For *Certificate Program* questions:

- Patricia Roberts; Dept. of Secondary Education; MH 306; 650-3327

For *Student Teaching* questions:

- Susan Bailey; Office of Field Experiences; MH 206; 650-3310
- Nancy Nelson; Office of Field Experiences; MH 206; 650-3553

For *Certificate* questions:

- Dana Edward; Certification Office; MH 216; 650-4930

## SECTION 2: EDUCATION PRACTICA

The Science Education Group has some specific expectations for the two practica courses that you take through WCE (SEC 431a and SEC 432a), which may be different than the requirements for students from other disciplines. Specifically, *we expect you to teach at least two lessons during each practicum*. We feel that having formal, observed teaching experiences early in your coursework is essential. They will give you a taste of what teaching is about, some specific experience to which you can refer during later courses, and some ideas about your strengths and weaknesses as a teacher.

There are presently two Woodring faculty responsible for setting up the practica and they are the instructors for the practica courses. We will work with them to ensure you have a placement that will allow you to meet these teaching expectations. If at all possible, they should be present during the days you teach to provide feedback about your lessons.

Listed below are specific responsibilities of both the practicum student and the mentor teacher with whom you will be working:

### Section 2a: Responsibilities of the Mentor

- Mentor should establish and clarify expectations to Practicum Placement Coordinator prior to accepting a practicum student.
- Introduce practicum student to the class.
- Communicate classroom procedures and logistics as needed.
- Allow the student to teach at least two full lessons and provide both written and verbal feedback to the student.

### Section 2b: Responsibilities of the Intern

- Make an appointment or arrangement with the mentor teacher to set up a schedule for the quarter. Show up for all scheduled observations.
- Prepare in advance. Ask what lessons will be taught on the day of observations.
- Be prepared to present yourself to the class.
- Ask the mentor teacher how you can help.
- The intern will plan and teach two lessons during their practicum experience. The following experiences should be included within these lessons: 1) planning the lesson, 2) teaching the lesson, 3) creating an assessment, and 4) reflecting on the experience. These lessons should obviously be integrated with the mentor's curriculum. The intern should use existing materials, but should personalize the materials for their own teaching style. Arrange to get feedback from your mentor and the university coordinator.

## **SECTION 3: SCIENCE EDUCATION COURSES**

As in all other disciplines, there are specific methods courses for science that you need to take to qualify for your endorsement (in addition to the WCE courses). The first is SCED 481 (Fundamentals of Teaching Science) and the second is SCED 491 (Methods in Secondary Education for Science Teachers).

### **Section 3a: SCED 481 – Fundamentals of Teaching Science**

Science Ed 481 is a two credit seminar that should be taken at the beginning of your credential program. The main purpose of this course is to introduce prospective science teachers to key ideas associated with teaching science at the secondary level. Teaching science effectively requires that teachers attend to the prior ideas that students bring with them into the classroom, that teachers provide experiences that allow students to construct their own knowledge, and that teachers pay careful attention to state and national guidelines about what needs to be taught. This course will introduce you to these fundamentals as a foundation for your professional education program including methods courses and teaching practica. You will build on these key ideas later in the Secondary Science Methods course, SCED 491.

The format of the course is a mixture of lecture/lab activity and discussion. During the first hour of the class, you will participate in an activity centered around that day's topic. The second hour of the class will be devoted to a discussion of the readings for that day.

### **Section 3b: SCED 491 - Secondary Science Methods**

Science Ed 491 is a five credit course offered during fall and spring quarters. It is generally team-taught by two Science Education faculty. It is designed to expose you to a range of theories and methods particular to teaching science. As well, we discuss topics and concerns about teaching science such as laboratory safety and controversial topics. You will be required to observe at least five local science teachers. This requirement has a couple of outcomes. First, you will be exposed to wide range of teaching styles and philosophies. Second, the teachers who have agreed to allow observations have also agreed to potentially accept student teachers for winter and spring quarters (there may be a few exceptions). Thus, *these teachers represent the pool of mentor teachers with whom most of you will be student teaching*. These observations give you a chance to meet teachers and find a mentor with whom you feel you can work. Likewise, the teachers will have a chance to meet you and decide if you are someone they can work with. With this in mind, it is extremely important to present yourself in a professional manner during these observations. However, it is also important that *you do NOT make arrangements for your internship on your own*.

## SECTION 4: STUDENT TEACHING INTERNSHIP

Your student teaching internship is the most important experience of your teacher preparation program and it is vital that we work together to maximize this experience for you. During SCED 491, we will help you identify and place you with a suitable mentor, someone who you feel you can work well with. It would be ideal to have interns matched, at least tentatively, with mentors the year before the internship. This would allow interns the option of being in the classroom when school starts in September. We are currently trying to do this by hosting meetings for soon-to-be-interns and potential mentors during the spring prior to SCED 491.

### Section 4a: Needs and Roles of the Intern, the Mentor, and the UIC

There are three people primarily involved with the student teaching internship: the intern, the mentor teacher (ATF = Affiliated Teaching Faculty), and the university coordinator (UIC = University Intern Coordinator). Each has specific needs and roles that must be fulfilled during the internship.

Intern	Mentor	UIC
<ul style="list-style-type: none"> <li>• ownership of the classes you teach</li> <li>• clear expectations of program requirements and mentor/intern relations</li> <li>• time to observe other teachers</li> <li>• early exposure to classroom experience</li> <li>• information about SMATE and available resources</li> <li>• self motivation and direction</li> <li>• life-long learning</li> <li>• join professional organizations</li> <li>• open to learning and trying new things</li> <li>• collaborative environment and independence</li> <li>• able to work with many types of people</li> <li>• time to go to job fairs and interviews</li> <li>• information about substitute certificate</li> <li>• no outside job</li> </ul>	<ul style="list-style-type: none"> <li>• articulate expectations and setup logistics</li> <li>• knowledge of WWU requirements</li> <li>• enable time for observations of other teachers</li> <li>• mediate resource finding/skills</li> <li>• provide humane and open environment for student intern</li> <li>• be willing to let go, give direction and space</li> <li>• encourage professional development</li> <li>• demonstrate a variety of instructional strategies</li> <li>• let student make mistakes</li> <li>• give constant feedback throughout internship</li> <li>• be willing to receive feedback from intern</li> <li>• be a collaborator</li> <li>• beware of legal liability issues</li> </ul>	<ul style="list-style-type: none"> <li>• clear vision of WWU program requirements and expectations</li> <li>• negotiate requirements with mentor, intern, and school administration</li> <li>• communicate best practices in higher education</li> <li>• coordinate on campus observations of exemplary profs</li> </ul>

### Section 4b: General Timeline

- Early January: Internship starts (exact date depends on the start date of your district)
- Mid-late January: ITE
- Mid March: Midterm evaluation due
- Early June: Final evaluation due

## **Section 4c: Responsibilities of the Intern, the Mentor, and the UIC**

### ***Responsibilities of the Intern***

Your proactive involvement in determining the direction and outcomes of this experience is essential.

- Choose your mentor teacher carefully.
- Come on time and be prepared every day. Provide lesson plans or sub notes whenever you must be absent.
- Maintain professional conduct and dress.
- Seek out opportunities to observe as many different teachers as possible.
- During your internship, you should seek out opportunities to take part in the following experiences:
  - Discipline reports
  - Report cards
  - Field trip planning and implementation
  - Ordering supplies
  - Staff meeting
  - IEP / 504 meetings
  - Professional development opportunities
  - Parent contacts
  - Collaboration with colleagues
  - Extra-curricular activities (to a limited extent)
- Complete ITE requirements in a timely fashion.
- Maintain contracted teacher hours (at a minimum).

### ***Responsibilities of the Mentor***

You should be aware that the intern is not in the classroom to do your job for you. The purpose of this experience is to create the opportunity for the intern to develop his or her professional skills. The intern must be allowed time to pursue professional development, attend job fairs and seek employment as needed.

- Ensure that your intern is a good fit.
- Introduce the intern to the staff and administration.
- Orient the intern to school procedures. Provide handbooks, calendars, and school rules. Discuss discipline policies and procedures. Provide workspace for the intern and access to email/internet.
- Introduce the intern to the class as a colleague (avoid creating a subordinate role for the intern).
- Collaborate with the intern to develop a plan for their internship. Review the plan periodically throughout the internship.
- Provide opportunities for the intern to experience a variety of instruction methods. Create time for observation of other teachers and other content areas and encourage diverse methods within the classroom.
- Provide support and materials needed to prepare for and complete the ITE.
- Provide the intern with a written evaluation of an observed lesson *at least once a week throughout the internship*. Conference with the intern at a regularly scheduled time once a week. Give daily verbal feedback at least for the first few weeks of teaching.
- Meet with the intern on a regular basis. Provide regular feedback for classroom activities throughout the internship.
- Promptly inform the UIC of any serious concerns regarding the intern. Document problems as they arise.
- Work with the UIC in creating a midterm and final evaluation.



### ***Responsibilities of the UIC***

- Ensure ethical practices.
- Act as an advocate for the intern and as a resource for the mentor.
- Work with intern and mentor to clarify roles and expectations.
- Observe and evaluate the intern on a regular basis. Ideally the UIC would observe a lesson and conference with the intern once a week. Twelve hours of observation and conference are the minimum acceptable. The UIC's feedback should go beyond a summary of what occurred in the lesson. Feedback on strengths, suggestions, and areas for focus would be essential. WCE provides various forms to be used during observations, although use of them varies with the UICs.
- Meet with the mentor to review the intern's progress.
- Prepare midterm and final evaluations of the intern.

### **Section 4d: Sample Timelines**

Everyone's internship is different. However, there are some general models that many intern/mentor pairs tend to follow. Below are three models that represent timelines and philosophies found in many internships. The timing indicated for each model is approximate and can be altered in different ways to fit individual internships. It should be noted that the intern is always given the opportunity to attend job fairs, to observe other teachers, and to attend interviews, although these may not be explicitly stated in these models.

#### ***Model #1: Gradual Incorporation***

In the gradual incorporation model, the student teacher works through the following sequence of responsibilities.

- Weeks 1-2 - Observation and reflection
- Week 3 – Small to large group interaction and reflection
- Weeks 4 -Preparation of classroom materials
- Weeks 5 - Planning of classroom materials and activities (mentor-generated and tested)
- Weeks 6-9 - Small-group instruction using various methods and reflection
- Weeks 10-12 - Large-group instruction using various methods and reflection
- Weeks 12-17 - Planning of classroom materials and activities (student-generated)
- Week 18 - Reviewing, revising and reflecting on the use of classroom materials and activities.

#### ***Model #2: Teach-Reflect-Teach-Reflect Model***

In this model, the intern alternates periods of teaching with periods of reflection.

- Weeks 1-2 – Intern is observing mentor. Mentor also allows time for intern to observe other teachers.
- Weeks 3-5 – Intern takes total responsibility for one class and observes mentor and other teachers in the other 5 classes. Intern receives support from the mentor teacher.
- Week 6 – Mentor takes back the class from the intern. The intern is not teaching any class at this time. The intern now has a new perspective on teaching and is able to have a more meaningful observation. The intern asks more relevant questions such as, “Why did you?” “What were you thinking of when you did this?” “Could it have been handled this way?” Etc.
- Weeks 7-10 – Intern takes on the full responsibility of 3 different classes. The mentor takes on the other classes.
- Weeks 11-15 – Intern takes on all classes.

- Weeks 16-17 – The mentor and intern collaborate in teaching. They work together, sharing the responsibility as lead teacher.
- Week 18 – Intern observes mentor and other teachers, reflects on teaching, and goes to job fairs and interviews.

***Model #3: Collaborative Integration***

This 3 phase model encourages teambuilding and classroom community. Opportunities for the intern to pursue personal goals are maximized.

- Weeks 1-3 - During the first phase the intern is given sufficient time to acclimatize to the class environment, build confidence, develop rapport, and become accepted as a member of the classroom community.
- Weeks 4-9 - When these qualities have been demonstrated, during the second phase he/she rapidly steps into the role of an instructional team member, teaching and reflecting in collaboration with the mentor.
- Weeks 10-18 - By the third phase, the intern has found his/her particular “niche,” assuming full time responsibilities and working synergistically with the mentor on collaborative and individual projects.

**Section 4e: Midterm and Final Evaluations**

Your midterm and final evaluations are written documents that are prepared by you, your mentor, and your UIC. A form with ratings for a variety of skills (see samples in the attachments at the end of this handbook) is filled out and a written narrative is prepared. Many UIC’s have different procedures for preparing these documents and you should clarify the procedure with your UIC and your mentor at the beginning of your internship. Your midterm evaluation will be part of your placement file until it is replaced by your final evaluation. Thus, these documents (especially your final evaluation) will be seen by future employers.

**Section 4f: Common Internship Problems**

*Examples of potential problems*

Intern shortcomings	Mentor shortcomings
<ul style="list-style-type: none"> <li>• Unprofessional</li> <li>• Inadequate class management</li> <li>• Ill prepared for class, poor work ethic, lack of initiative</li> <li>• Poor communication with students and/or staff</li> <li>• Relates to students with too much familiarity, not as ‘teacher’</li> <li>• Does not seek or accept constructive feedback</li> <li>• Does not implement suggested and agreed upon changes</li> </ul>	<ul style="list-style-type: none"> <li>• Unclear expectations</li> <li>• Does not provide support materials</li> <li>• Treats intern as subordinate in front of students</li> <li>• Unable to relinquish control of the classroom</li> <li>• Unable to accommodate another teaching style</li> <li>• Unable to demonstrate a variety of teaching methods</li> </ul>

### *Some suggestions to prevent problems*

- Establish a regular schedule for conferences between the intern and mentor.
- Know legal liability involved in being an intern or a mentor.
- Mentor sets clear expectations for intern: Acceptable levels of classroom management, work hours, duties, workspace, equipment, attire, etc.
- Intern generates a list of management strategies, techniques, and ideas from early observations of mentor and other teachers.
- Mentor makes resources available to intern, such as curricula, texts, teacher handbooks, and equipment.
- Introduce intern to the class as a colleague, a positive asset to class, and with authority (a “real” teacher).

### *Tips for dealing with classroom management problems*

- Send intern to observe other teachers for management ideas
- Arrange for other teachers to observe intern and give feedback
- Arrange for intern to meet with teachers who share difficult students for suggestions and assistance

### *Steps in Problem Resolution*

If a problem arises, from anyone’s perspective, it is important that communication begins immediately. Most problems can be resolved easily when addressed at an early stage, with a tactful question or suggestion. If this does not resolve the problem the following steps are suggested:

1. Mentor clearly defines the problem in writing, including examples.
2. Mentor and intern conference:
  - a. Mentor describes problem clearly and kindly.
  - b. Mentor and intern brainstorm possible solutions.
  - c. Mentor and intern agree upon a course of action and a timeline for implementation.
  - d. Set a date to re-evaluate.

If the problem is not resolved, and/or no improvement is noted:

3. Mentor meets with UIC to review problem and steps taken.
4. UIC, intern, and mentor meet and develop a plan for improvement.
5. Set a date to re-evaluate.

If the problem is not resolved, no improvement is noted:

6. UIC and mentor meet to establish course of action.

## **Section 4g: Substitute Certificates**

After you have been working in your internship for a period of time, and after your mentor, your principal, and your UIC determine you are ready, you can apply for a substitute certificate.

Intern substitute certificate

- Apply through WWU. Contact the Woodring certification officer (Dana Edward, MH 216)
  - Allows intern to teach and be paid in mentor’s classes when mentor is away.

## SECTION 5: STAMP RECOMMENDATIONS FOR THE STUDENT TEACHING EXPERIENCE

### Section 5a: Instructional Techniques

Based on current research on how people learn, the following goals have been established for the student teacher/mentor teacher relationship in the area of instructional techniques:

Goal 1: Student and mentor teachers will have a clear set of instructional guidelines and support resources for providing the optimal student teaching experience.

Goal 2: University faculty, mentor teachers, and student teachers will work together within the context of cooperation, intellectual camaraderie, and a sense of community to provide the optimal student teaching experience.

Goal 3: Student teachers will be provided with the tools to successfully implement instructional techniques as outlined by research-based, best practice.

- A. Student teachers will be provided with training and experience in implementing the four optimal components of a *Community-centered* classroom environment.
  - 1. *Learner-centered*: Schools and classrooms must be focused on the knowledge, skills, and attributes of the individual learner.
  - 2. *Knowledge-centered*: Classroom learning should emphasize understanding over memorization.
  - 3. *Assessment-centered*: Formative assessments should be used extensively to assist in identifying preconceptions, designing instruction, and monitoring student progress.
  - 4. *Community-centered*: Classroom activities should promote the development of cooperation, intellectual camaraderie, and a sense of community among students.
  
- B. The mentor teacher and student teacher will determine the best Instructional Techniques by:
  - 1. Identifying their individual areas of instructional strength and weakness.
  - 2. Analyzing how their instructional techniques compliment one another.
  - 3. Planning instructional techniques in the context of the units being taught.
  - 4. Targeting the methods that promote and encourage personal and professional growth.
  - 5. Reflecting upon success and failure.
  - 6. Utilizing all major areas of instructional techniques.

- C. Student teachers will be provided with experience with a wide range of instructional techniques that de-emphasize the traditional Lecture Based approach:

<b><u>Lecture Based</u></b>	<b>Oral</b> Delivery, content, questioning, etc. <b>Written</b> Penmanship, conventions, organization, etc. <b>Multimedia</b> Video, laser disc, etc.
<b><u>Skills Based</u></b>	<b>Isolated Drill and Practice</b> <b>Contextualized practice</b> Application of learned skills <b>Modeling</b> Ability to use/create models
<b><u>Inquiry Based</u></b>	<b>Case Studies</b> <b>Problems</b> Problem-Based Learning <b>Projects</b> Project-Based Learning Learning by Design Student design and experimentation
<b><u>Individual vs. Group</u></b>	<b>Jigsaw</b> Students complete individual components of a collaborative project <b>Cooperative Learning</b> <b>Self-study</b>
<b><u>Technology</u></b>	<b>Simulations</b> <b>Electronic tools</b> <b>Assessment opportunities</b> <b>Communication environments</b>

## Section 5b: Assessment

The following is suggested as a checklist of experiences. These potential observations are not meant as an evaluative mechanism, but rather as a means of ensuring the apprentice teacher experiences with a variety of assessment opportunities. It is highly recommended that samples of student assignments be included in a portfolio.

The levels express the measure of involvement in which an individual could participate. Level 1 is a university exposure experience and Levels 2, 3, and 4 are increasing degrees of classroom experience.

Levels	1	2	3	4	Comments
<b>Student Written formats</b>					
Multiple Choice					
Short Answer					
Open/Free Response					
Essays/journals/Lab books					
Papers/Reports					
<b>Teacher Involved Formats</b>					
Group Visuals					
Teacher Observations					
Portfolios					
Skills Checklist					
Interviews					
<b>Performance Formats</b>					
Manipulative Skills					
White Board					
Lab Performance					
Extended Investigations					
Projects					
Concept Mapping					
Venn Diagrams					
Presentations					
<b>Student Based</b>					
Self Evaluation					
Peer Evaluation					

## **Section 5c: Technology in Education**

### *Rationale*

The collection, manipulation and presentation of information stand at the heart of doing good science. Modern technologies can dramatically facilitate the handling of information. In wedding technology with science education, students are empowered to focus on the meaning of information rather than on the burden of handling that information. Additionally, in learning to apply technological solutions to scientific problems students gain a wide range of skills that can be applied in a variety of academic and professional settings. To aid both student teachers and mentor teachers in defining the role technology will play in their classroom we suggest the following guidelines:

### *Goals*

- To ensure that student teachers are given the opportunity to learn about technologies that are useful to educators prior to student teaching.
- To involve the mentor teacher in helping the intern take advantage of available technologies.

### *Experiences*

We strongly recommend that the science education program provide the following experiences:

#### **Using data acquisition technology to collect, analyze and manipulate information.**

Examples of such technologies would be:

- Vernier interfaces, probeware and supporting software
- Pasco interfaces and software
- CBL units
- Microsoft Excel to organize and manipulate data as well as to create mathematical models

#### **Internet Use**

- Locate and apply real-time data
- Access historical databases

#### **The mentor teacher should provide training for**

- Scientific probeware and software that is available on site
- Local e-mail procedures
- Grade program
- Building networking issues
- Record keeping and attendance programs

### *Guidelines*

Personal Use	<ol style="list-style-type: none"> <li>1) File management</li> <li>2) Electronic grade book</li> <li>3) E-mail</li> <li>4) Internet             <ol style="list-style-type: none"> <li>a) Accessing information</li> <li>b) Evaluating sources</li> </ol> </li> <li>5) Word processing</li> <li>6) Spreadsheets and other analysis software</li> </ol>
Computer Lab	<ol style="list-style-type: none"> <li>1) Internet Research             <ol style="list-style-type: none"> <li>a) Accessing information</li> <li>b) Creating web pages to direct student activities</li> <li>c) Evaluating resources</li> <li>d) Online real-time data acquisition</li> <li>e) Online databases</li> <li>f) General information</li> </ol> </li> <li>2) Word processing</li> <li>3) Spreadsheets and graphics</li> <li>4) Production of multimedia presentations</li> </ol>
Within the science classroom	<ol style="list-style-type: none"> <li>1) Data collection             <ol style="list-style-type: none"> <li>a) Use of sensors and probes to collect information</li> </ol> </li> <li>2) Analysis             <ol style="list-style-type: none"> <li>a) Use technology to process, and present information                 <ol style="list-style-type: none"> <li>i) Excel</li> <li>ii) Graphical Analysis</li> <li>iii) Logger Pro</li> <li>iv) CBL Units</li> <li>v) Pasco Science Workshop</li> </ol> </li> </ol> </li> <li>3) Document production             <ol style="list-style-type: none"> <li>a) Word Processing</li> </ol> </li> <li>4) Presentation software             <ol style="list-style-type: none"> <li>a) Prepare presentations using PowerPoint, html or other presentation software</li> </ol> </li> </ol>
Other learning tools of interest	<ol style="list-style-type: none"> <li>1) Modeling software             <ol style="list-style-type: none"> <li>a) Graphical analysis</li> <li>b) Excel</li> </ol> </li> <li>2) Simulation software</li> <li>3) Multimedia textbook support</li> <li>4) Image processing software</li> </ol>

### *Scoring Guide*

Mentor teachers should monitor interns on the use of technology within the science curriculum based on the following model. Student teachers will implement technology in their classroom instruction by:

Requiring the use of technological tools for collecting, analyzing, synthesizing and modeling data.	Has not used	Initial exposure, needs fine tuning	Proficient use	Innovative application
Modeling the use of technology by making deliberate use of the technologies made available to them.	Has not used	Initial exposure, needs fine tuning	Proficient use	Innovative application
Increasing their own familiarity with current technologies.	Has not used	Initial exposure, needs fine tuning	Proficient use	Innovative application
Regularly using the Internet to access information and to share information with others.	Has not used	Initial exposure, needs fine tuning	Proficient use	Innovative application
Ensuring that up-to-date tools and technologies are a part of student activities.	Has not used	Initial exposure, needs fine tuning	Proficient use	Innovative application

### **Section 5d: Professionalism**

Excellent teachers avoid presenting themselves as targets. They are seldom the subjects of student jokes or adult gossip. Rather, they inspire trust and are natural leaders. They are experts at “seizing the moment” and like the good Boy Scout, always seem to “be prepared.” Often, they view their profession as a personal path.

**“With-it ness” and “Flexitivity”** Master teachers cultivate situational awareness and are often able to “tune in” to students, peers and their environment without the need for verbal communication. Such heightened awareness enables them to diffuse classroom problems in advance and recognize unexpected opportunities. They are quick to exploit “teachable moments”. “With-it” teachers are good listeners. They are observant, empathic and sensitive. To nurture these skills, mentor teachers should regularly discuss subtle classroom nuances with their apprentices.

Being flexible and creative enables a master teacher to cope with disasters and exploit opportunities. Creativity improves the energy and impact of any classroom activity. Flexibility maximizes effective application. “Flexitivity” is a skill, which can be consciously practiced and improved. It can be applied at all levels and in any imaginable teaching endeavor. It is immensely powerful. Wherever possible, mentors and apprentices should strive to incorporate creativity and flexibility into their work.

**Organization** is what goes on behind-the-scenes. Apprentices should be introduced to planning on the daily level at first, then taught to create weekly, unit and course plans. They should record grades and attendance, write passes and referrals and deal with all forms of routine classroom paperwork. In addition, they should take responsibility for lab set-up and clean-up along with all other routine classroom tasks.

The mentor teacher should help an apprentice develop a “bag of tricks” - effective activities, presentations and demonstrations which are the “stock in trade” of science teachers and an assortment of effective, professional responses to common school situations and emergencies. The apprentice should be taught to think ahead and “always have another plan” in the event an intended activity goes awry.

**Integrity** Issues of personal and professional ethics, appropriate behavior and community standards should be regular topics of discussion between mentor and apprentice. The apprentice must be aware that teachers present a public image, which is carefully scrutinized by the community. Apprentices must fully accept responsibility for how their behavior reflects upon themselves, their colleagues, their schools and their profession. They must also be aware that conformity to social standards, no matter how subjective, has a direct bearing upon employment.

**Leadership** Most excellent teachers are natural leaders and good leadership skills are essential regardless of one’s teaching style. Committee work, advisorships and activity supervision allow the apprentice to observe and cultivate leadership. Mentors should help apprentices identify and nurture their innate leadership skills and personal style.

**Growth** Effective mentors are continuous learners. In the relationship with an apprentice it is clear that the mentor seeks better and more effective strategies for the classroom. They model a commitment to openness, learning from their colleagues including apprentices. They are active in professional organizations; attend and present workshops; seek to improve their content knowledge; read and write articles in professional journals.

**Personality** Excellent teachers tend to be enthusiastic, high energy people. Along with the many traits listed above, they are generally emotionally stable, positive, reflective and able to seek and receive guidance. Every one is an individual. Most view the profession as a path of personal development.

Mentor teachers should provide a safe environment for apprentices to explore their individuality. Apprentices should be encouraged to develop lessons and activities related to their particular skills and interests. While practicing a variety of methods, apprentices should feel free to take full advantage of their personal strengths and focus on the teaching styles which feel most comfortable. Their career will provide ample time to diversify.