

## EDCI 42100: The Teaching of Biology in Secondary Schools

### I. General Information

<b>Instructor:</b>	David C. Eichinger Office: WTHR 221B Phone: 494-0711 E-mail: <a href="mailto:deich@purdue.edu">deich@purdue.edu</a>	
<b>Class Times &amp; Locations:</b>	Tu, Th 3:30-4:45	LAEB 3276
	Tu 5:00-5:50	LAEB 3276
<b>Office Hours:</b>	Tu, Th 2:30-3:20	WTHR 221B

#### Required reading:

- Series of readings to be distributed in class
- Developing Biological Literacy, 1993, BSCS
- National Science Education Standards (NSES), 1996, NRC

*NSES also available on the Web at [www.nap.edu/html/nses/](http://www.nap.edu/html/nses/)*

#### Additional Course Resources

I have created a Blackboard Vista site for this class. To access Blackboard Vista, go to <http://www.itap.purdue.edu/tit/blackboard/> and click on, "Log on to Blackboard Vista." You will need your career account login and your password to access the site for our class. You should get a list of all of your classes that have Blackboard Vista sites set up. Click on EDCI 421 (or BIOL 595 for TTT students), and you'll get access to our page and information. This site will be "Under Construction" so we will be talking about and adding to the site all semester long.

Another website of interest is the "Teacher Education" site on the College of Education's webpage <http://www.education.purdue.edu>. Check here for the latest teacher education information.

Students with disabilities must be registered with Adaptive Programs in the Office of the Dean of Students before classroom accommodations can be provided. If you are eligible for academic accommodations because you have a documented disability that will impact your work in this class, please schedule an appointment with me as soon as possible to discuss your needs.

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in *this* course: Blackboard page, my email address: [deich@purdue.edu](mailto:deich@purdue.edu), and my office phone: (765) 494-0711.

Students are required to visit <http://www.education.purdue.edu/ODFD/resources.html> and review the response procedures for emergencies in Beering Hall. It is necessary that you review these directions within the first week of your Beering classes. If you have any questions please ask.

Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, University Regulations] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972]

### II. Course Description

This course is about teaching science, specifically, about teaching biology. It is in part a practical course; you will be learning how to carry out the practical activities of science teaching: laboratory activities, developing worksheets, holding class discussions, developing and grading tests, using textbooks, and so forth. It is also in part a theoretical course; you will be learning about the nature of scientific understanding and of classroom communities, and about how to use theoretical knowledge of learners and communities to guide your teaching.

Most of your work for this course will be organized around three types of outcomes that you will want to promote for your students, individually and as a classroom community. The first of these is **conceptual understanding** of science. You will want to help all of your students gain access to communities of scientifically literate adults and to the knowledge that they possess. To achieve this goal, you will need to understand ways in which both students and members of adult communities *organize* their scientific knowledge, *use* their knowledge, and *communicate* it. You will also need to develop ways of organizing, using, and communicating knowledge that “bridge the gap” between students and scientifically literate adults.

The second major goal is that of developing a **learning community** in your classroom. You will want your students to feel that they are members of a community where you are working together on *shared problems* that are interesting and important to you and to them, where *collaboration* among students is normal and accepted, and where members of the community engage in formal and informal *symbolic exchange*, communication that benefits the community and its members. To achieve these goals you will need to learn how to maintain order, manage your classroom efficiently and promote norms of cooperation, responsibility, and mutual respect.

We will also consider strategies that you use in light of a third major goal: **educational equity**. You will want all of your students to be treated fairly, both in terms of their roles in the classroom community and of the long-term benefits that they carry away with them. You will also want your students to perceive that they are being treated fairly and give their willing support to the classroom community.

Achieving all of these goals is a complicated process. No one ever achieves them completely, and even partial success demands an extensive repertoire of knowledge, skills, and resources. In this course you will begin to build that repertoire. Your most important task during the term will be to plan an instructional unit of 5-6 lessons and teach portions of it. In the course of planning and teaching this unit, you will practice many of the activities that you will have to master as a science teacher, including analyzing the scientific content that you will teach, assessing your students' prior knowledge, planning and carrying out instruction, evaluating your students' learning, and reflecting on what you learned from teaching the unit. The course will also include a variety of demonstrations, readings, discussions, and other written assignments designed to help you develop a repertoire of knowledge, skills, and resources.

At the end of the course, this repertoire-building process will be far from complete. Hopefully, you will continue to build your repertoire for as long as you remain a science teacher. There are many ways that you can do this. You can develop ways of reflecting on your teaching experience and using your reflections to improve your practice. You can also learn from your fellow teachers and other professionals, informally or through formal mechanisms such as journals, professional meetings, and courses. All of these are means of **continuing professional development**, which is the final important goal of this course.

### III. Objectives

The areas addressed above represent the major foci for our methods course this semester. The selection of these areas is determined by several factors: my own experience learning to become a secondary biology teacher, the pedagogical and philosophical emphases of the teacher education programs here at Purdue, and state and national guidelines and standards for teacher preparation. One set of guiding principles that serves as the foundation for all of the teacher education programs here at Purdue was developed by the Interstate New Teacher Assessment and Support Consortium (INTASC). More information about these INTASC Principles can be found at:

[http://cte.jhu.edu/pds/resources/intasc\\_principles.htm](http://cte.jhu.edu/pds/resources/intasc_principles.htm) . For now, it is important to recognize the interrelationship between these principles and the specific objectives that we will be addressing during this course. For each area of focus for our course below, the corresponding INTASC Principles have been noted. (For a summary of these ten principles, see page 13 of this syllabus.)

By the time that you have completed this course, you should be able to do the following:

#### **A. Conceptual understanding (INTASC Principles 1, 4, 6 & 8)**

1. List key concepts in science units that you teach and represent the relationships among them with statements and with concept maps.
2. Develop objectives that specify how your students should be able to (a) use the main ideas of the unit in real-world contexts, (b) reflect on the main ideas, their meanings, and relationships among them, and/or (c) construct new scientific knowledge on their own initiative.
3. State a central question that specifies the most important learning from a science unit.
4. Assess your students' prior knowledge and understanding of speech genres using pretests or clinical interviews and describe the implications of your assessment for unit teaching.
5. Plan and carry out instructional strategies that help your students to learn with understanding.
6. Evaluate your students' learning.

#### **B. Learning community (INTASC Principles 2,5,6,7,8 & 10)**

7. Create an orderly classroom environment where all of your students feel personally safe.
8. Manage classroom rules, materials, and procedures efficiently.
9. Develop classroom environments where you and your students work together on shared problems.
10. Develop social norms, rules, and procedures and support and encourage student collaborative work.
11. Develop classroom environments where all students participate in and contribute to symbolic exchange.

#### **C. Educational equity (INTASC Principles 3 & 7)**

12. Develop classroom environments where all students contribute to and benefit from participation in the learning community.

#### **D. Continued professional learning (INTASC Principles 9 & 10)**

13. Reflect on your teaching experiences and the results of your evaluation to improve your teaching practice.
14. Critically evaluate textbooks and other science teaching materials.
15. Participate in professional activities of science educators.

#### **IV. Field Experience**

All students taking this course for 3 credit hours will be required to complete an instructor-approved field experience during the semester. (The field experience component is optional for students taking the class for 2 credits.) This experience is designed to give you an opportunity to apply some of the concepts, methods, and strategies that we will be discussing and practicing in this class and from your

other education courses in a hands-on teaching situation. "Teaching" is very broadly defined for this field experience - any time you are working with one or more learners on a regular basis, either in or out of a formal classroom, I consider this to be an example of teaching. Students in the past have worked in a variety of situations and contexts as they have fulfilled this requirement: working as a TA on campus, serving as a tutor for one or more people either on or off campus, volunteering in local schools or community institutes such as the Lafayette Adult Resource Academy, teaching a church or Sunday school class, coaching a team, etc. You will be asked to begin identifying an appropriate field experience during the first week of class, and to discuss and confirm your choice of field experience with your instructor. Once this is done, you will need to spend a minimum of two (2) hours per week for a minimum of six (6) weeks during the semester to fulfill this requirement.

For some of you, your field experience will be the first formal teaching experience you will encounter; for others, it will serve as a continuation of previous teaching activities. In either case, it should provide a very valuable opportunity for you to try out new teaching methods and approaches, and it should also provide a wealth of information that you can incorporate into your journal writing assignments based on our course readings and activities (see below for additional information on the journal assignment).

## **V. Course Assignments**

The following is a brief description of each of the assignments that will be completed during the course. A detailed description of each activity will be provided as it is introduced by the instructor.

**Journal & Practice Assignments:** A complete description of these activities is included on pages 9 & 10 of this syllabus.

**Microteaching Reports:** Each student will have a minimum of two microteaching, or practice teaching, experiences during the semester. Each of these sessions will be videotaped for later analysis by the student. Each session will be evaluated in three ways: by fellow students, by the instructor, and by the student him/herself. Following each session, students will view the videotape of their own teaching and prepare a brief report that incorporates peer evaluations and self evaluation.

**Unit Plan:** This will be the most significant, and most time-consuming, assignment for the semester. Each student will develop a set of instructional materials on a topic of his/her choice, following a format described and modeled by the instructor. The unit plan will be developed in pieces, with each piece designed to highlight one major component of the entire unit planning process. Lesson plans developed for the unit plan will serve as the basis of instruction during the microteaching sessions, so that students will have a chance to "field-test" their instructional materials prior to using them in an actual classroom setting during student teaching. Students may work individually or in groups on this project, but each student must ultimately turn in his/her own individual unit plan.

**Midterm and Final Exams:** Each of these exams will provide opportunities for students to analyze and synthesize issues related to biology teaching in light of the methods, materials, and strategies that have been presented in class. Exams will be given in essay format, and will either be done in class, as take-home exams, or in some combination of the two.

**VI. Grading**

Grades will be assigned on the following basis:

<i>Type of assignment</i>	<i>Total Points</i>
Microteaching reports	50
Journal and assignments	50
Midterm exam	50
Final exam	75
Unit plan	<u>125</u>
<b>TOTAL</b>	<b>350</b>

Chronic late work is a sign of unprofessional behavior, either in this class or in the science classroom. You will be allowed only one late assignment during the semester. After that, assignments will be deducted 10% of the total possible points for each weekday they are late.

Grading will be based on a straight ten-point scale as follows:

- A= 90 - 100 % OF TOTAL POSSIBLE POINTS
- B= 80 - 89 %
- C= 70 - 79 %
- D= 60 - 69 %
- F= < 60 %

The instructor reserves the right to lower the scale, with the guarantee that it will not be raised. If everyone earns an A by getting a 90% or higher, everyone will receive that grade.

**VII. Tentative Course Schedule (First half of the semester)**

<b>DATE</b>	<b>TOPICS (UP = Unit Plan)</b>	<b>ASSIGNMENT DUE (R= reading)</b>
Tu Aug. 26	Introductions, Discussion of course assignments & projects <b>Lab:</b> The BTB Demonstration	None
Th Aug. 28	Nature of science	R: <i>15 Myths of Science</i> (McComas) R: <i>NSES</i> , Overview & Chap. 1 ( NRC)
Tu Sep. 2	Scientific & biological literacy <b>Lab:</b> Video - <u>A Private Universe</u>	R: <i>Fulfilling the Promise – Chaps. 1, 2, &amp; 3</i> (NRC) R: <i>Developing Biological Literacy</i> , Chapter 3 (BSCS) Journal Entry #1
Th Sep. 4	Science as Inquiry Overview of unit planning for conceptual change	R: <i>A Conceptual Change Model of Learning Science</i> (Smith) R: <i>Inquiry and the NSES – Chap 7</i> (NRC)
Tu Sep. 9	UP Part I - Analysis of science content <b>Lab:</b> Visit Technology Resource Center Choosing a topic for unit planning (3:30-4:00 PM)	R: <i>Developing Biological Literacy</i> , Chapter 5 (BSCS) R: <i>NSES</i> , Chap. 6: Content Standards K-4: Life Science Content Standards 5-8: Life Science Content Standards 9-12: Life Science Journal Entry #2
Th Sep. 11	UP Part I cont'd - Concept mapping	R: <i>Concept Mapping for Meaningful Learning</i> (Novak & Gowin)
Tu Sep. 16	UP Part I cont'd- Objectives and central question <b>Lab:</b> Discussion of format & topic selection for first Microteaching session	R: <i>Children's Biology</i> (Mintzes, Trowbridge, Arnaudin & Wandersee) Journal Entry #3 <b>Turn in journal entries #1-3</b>
Th Sep. 18	UP Part II: Developing pre-tests & clinical interviews	R: Unit Planning packet Part II – p. 8 Appendix B – pp. 22-25
Tu Sep. 23	Guest Speaker – Bill Bayley, Chemistry Dept. Outreach Coord	Unit Plan Part I (Draft)
Th Sep. 25	Microteaching Session I	UP Part II plans – pretest or interview?
Tu Sep. 30	Microteaching Session I cont'd <b>Lab:</b> Microteaching	
Th Oct. 2	Microteaching Session I cont'd	
Tu Oct. 7	Microteaching Session I cont'd	

	<b>Lab:</b> Microteaching	
Th Oct. 9	UP Part III - Teaching strategies: List of tasks, lessons by objectives chart	Unit Plan Part I (Final)
Tu Oct. 14	<b>October break</b>	None
Th Oct. 16	<b>Midterm exam</b>	
Tu Oct. 21	Midterm Course Evaluations Collaborative learning	R: <i>Designing Groupwork</i> (Cohen) Unit Plan Part II (Draft)
Th Oct. 23	Classroom Management & Discipline	None

### Tentative Course Schedule for the Second Half of the Semester

DATE	TOPICS	ASSIGNMENT DUE (R= reading)
Tu Oct. 28	Laboratories & Lab Safety <b>Lab:</b> Lab procedure assignment	R: <i>The Science Teacher</i> , Sept. 2005, pp. 24-33, 39-45 R: <i>Rethinking Laboratories</i> (Volkman & Abell) R: NABT Position Statement - Role of Laboratory and Field Instruction in Biology Education
Th Oct. 30	Labs & Lab Safety – cont'd	Journal Entry #4
Tu Nov. 4	UP Part IV - Evaluating students' learning Discuss 2 <sup>nd</sup> microteaching	R: <i>Assessing Student Understanding of Biological Concepts</i> (Anderson) R: <i>The ABCs of Assessment</i> (Wright) Journal Entry #5
Th Nov. 6	Microteaching Session II	Unit Plan Part II (Final)
Tu Nov. 11	Microteaching Session II – cont'd <b>Lab:</b> Microteaching	
Th Nov. 13	Microteaching Session II – cont'd	Unit Plan Part III (Draft)
Tu Nov. 18	Microteaching Session II - cont'd <b>Lab:</b> Microteaching	
Th Nov. 20	Professional development Teacher-community relations	R: <i>Survival Guide for New Teachers</i> <a href="http://www.ed.gov/teachers/become/about/survivalguide/index.html">http://www.ed.gov/teachers/become/about/survivalguide/index.html</a> R: <i>The Science Teacher</i> , Sept. 2002, Interview questions
Tu Nov. 25	Student teaching: A view from the trenches	Unit Plan Part IV (Draft)
Th Nov. 27	<b>Thanksgiving break</b>	

Tu Dec. 2	Evolution vs. Creationism <b>Lab:</b> Dissection debate teams meet	R: <i>The Creation/Evolution Continuum</i> (Scott) R: <i>The Science Teacher</i> , Nov. 2003 Unit Plan Part III (Final)
Th Dec. 4	The great dissection debate	R: <i>Forum: Dissection - The Case For &amp; The Case Against</i> (The Science Teacher) Journal Entry #6 <b>Turn in Journal Entries #4-6</b>
Tu Dec. 9	Motivation & Discipline - Joe Ruhl <b>Meet at Lafayette Jefferson H.S.</b>	Lab procedure handouts due
Th Dec. 11	Advanced Placement Biology Course wrap-up/Final evaluations	Unit Plan Part IV (Final) Distribute take home final exam (Due Thursday, Dec 18 by 5:00 PM)
Th Dec. 18	<b>Final Exam</b> Due by 5:00 PM	

## JOURNAL AND PRACTICE ASSIGNMENTS

Learning to teach needs to be an active process. You cannot simply absorb the ideas and skills that you need to be a successful teacher; you must work with them, try them out, and see what sorts of difficulties you encounter. The journal and practice assignments are designed to give you a chance to do this in a context where you don't need to be concerned about failure or doing the wrong thing.

Your journal will contain several different kinds of writing, including the following:

1. **Responses to course readings.** You will write an analysis and a personal response to several reading assignments in your journal. Suggestions about productive ways to write these responses are below.
2. **Practice assignments.** There will also be short practice assignments designed to give you a chance to practice concepts and skills that you will need when you do major assignments. Practice assignments will often be used as the basis for group discussions and activities; sometimes you will exchange assignments with other students and discuss your ideas. I will sometimes collect assignments and give you feedback, but they will not be formally graded.
3. **Personal writing.** You should also feel free to use the journal for other purposes, too, such as writing about whatever is on your mind, raising questions about things that you have trouble understanding, or developing ideas for papers and test questions.

### Functions of the Journal

Although most of the journal entries will not be formally graded, we will use journals for at least three purposes, as follows:

1. **As private writing to develop thinking.** Writing often helps you organize and develop your thoughts in a way that reading, listening, and talking do not.
2. **As a basis for communication with instructors and other students.** Your journal will not be entirely private; it will be read by your instructor and possibly by other students. This process of reading and responding should help us all to understand and communicate better about course content and other issues.
3. **As a way of understanding yourself as a learner.** It is important for you to understand and think about the process through which you learn to teach for at least two reasons. First, your ultimate success as a teacher will depend on your ability to guide and control your own learning. Second, you are preparing for a career of helping others to learn. By providing a record that you can look back over and organize, the journal can provide you with an opportunity to see what happens as you learn, and to see how and why your thoughts change over time.

### Grading

You will sometimes turn in portions of your journals so that I can read and respond to them. Although responses to readings and practice assignments count as 20% of your course grade, they will not be graded in the normal sense of the word. Rather than focusing on whether you are right or wrong, I will try to respond to your concerns and thoughts. If you do a reasonably thoughtful, conscientious, and timely job of keeping up your journal, you can expect to receive full credit.

### Writing responses to course readings

Each of your course readings is, in one way or another, about science teaching. Each author, however, takes his or her own *perspective* on science teaching. This perspective generally includes a *position* about what is valuable and important and how schools contribute (or fail to contribute) to that learning, and a set of *conceptual tools* that you can use to analyze school curricula. As a student, you need to do two things: (a) understand, but not necessarily agree with, the author's position, and (b) learn to use the author's conceptual tools.

In general, you should write a journal entry for each reading assignment. There will also be other specific journal assignments during the term. In writing responses to reading assignments, you should try to develop a way of writing that really helps you make sense of and study the readings productively. It is important that you focus on and understand each reading thoroughly. This means that you must *construct an interpretation* of what you read, which can involve some or all of the following:

- 1. Summarizing:** Develop a summary, outline, or concept map of the reading.
- 2. Clarifying:** Identify aspects of the reading that seem unclear or confusing to you. Try to figure out the specific nature or source of your confusion and write about it.
- 3. Applying:** Try to think and write about how this reading can help you reflect on your own experience as a student or as a teacher, interpret the actions of your mentor or a case study teacher, or provide guidance for you in your future planning and teaching.
- 4. Integrating:** Think and write about how this reading relates to other course readings or to the main themes and ideas that we are developing in this course.
- 5. Responding:** Think and write about your personal response to the reading. Did anything about it seem to you especially significant (or trivial)? How did it compare with other readings? Did anything about it interest you, excite you, bore you, confuse you?

There is evidence from research in a variety of fields, including reading comprehension, science learning, and mathematics learning, that successful learners--learners who construct good interpretations--are characterized primarily by their tendency to engage in the activities above (often mentally as well as in writing). In particular, *clarifying* and *applying* seem to be important.

The recommendations above are not a prescription or a recipe that you must follow; you may not find all of them useful. The goal is to help you find a style of writing that is functional, but not too burdensome. Any approach you take that helps you (and us) achieve the goals outlined above is appropriate.

**EDCI 421**  
**The Teaching of Biology in Secondary Schools**

**Fall 2008**

**Materials on Reserve in WTHR 221**

**BOOKS**

*A Short Guide to Writing about Biology*, by Jan A. Pechenik

*A Sourcebook for the Biological Sciences (3rd Edition)*, by Evelyn Norholt and Paul Brandwein

*Children's Ideas in Science*, edited by Rosalind Driver, Edith Guesne, and Andree Tiberghien

*Designing Groupwork*, by Elizabeth G. Cohen

*Developing Biological Literacy: A Guide to Developing Secondary and Post-Secondary Biology Curricula*,  
by the Biological Sciences Curriculum Study (BSCS)

*Discipline Survival Kit for the Secondary Teacher*, by Julia G. Thompson

*Doing Biology*, by Joel Hagen, Douglas Allchin, and Fred Singer

*IABT Quick Hits 2000: A Compilation of Biology Teaching Ideas and Activities*, by the Indiana Association  
of Biology Teachers (IABT)

*Inquiry and the National Science Education Standards: A Guide for Teaching and Learning*, by the  
National Research Council

*Matter and Molecules: Science Book and Activity Book*, by Glenn D. Berkheimer, Charles W. Anderson,  
Theron Blakeslee, and Okhee Lee

*MicrobeWorld Activities*, by the Microbial Literacy Collaborative, Texas Instruments.

*Science and Creationism: A View from the National Academy of Sciences*, by the National Academy of  
Sciences

*Science for All Americans*, an Overview Report by the American Association for the Advancement of  
Science. Also included are separate subject area reports:

*Biological and Health Sciences*

*Mathematics*

*Physical and Information Sciences and Engineering*

*Social and Behavioral Sciences*

*Technology*

*Science for Children: Resources for Teachers*, by the National Science Resources Center, National  
Academy of Science

*Sourcebook for Biological Sciences*, by Donald Troyer, Maurice Kellogg, and Hans Andersen

*Talking Science: Language, Learning, and Values*, by Jay L. Lemke

*Teaching Genetics: Recommendations and Research Proceedings of a National Conference*, edited by  
Mike U. Smith and Patricia E. Simmons

*Teaching Secondary School Science*, by Leslie W. Trowbridge and Rodger W. Bybee.

*The Power Plant*, by Kathleen J. Roth and Charles W. Anderson

*The Responsible Use of Animals in Biology Classrooms, Including Alternatives to Dissection*, National Association of Biology Teachers

*Vivisection and Dissection in the Classroom: A Guide to Conscientious Objection*, by Gary Francione and Anna Charlton

### **JOURNALS**

*HASTI SCI-ED-O-GRAM* - HOOSIER ASSOCIATION OF SCIENCE TEACHERS, INC. (HASTI)

*INDIANA ASSOCIATION OF BIOLOGY TEACHERS NEWSLETTER* - IABT

*JOURNAL OF SCIENCE TEACHER EDUCATION* - ASSOCIATION FOR THE EDUCATION OF TEACHERS IN SCIENCE (AETS)

*JOURNAL OF RESEARCH IN SCIENCE TEACHING* - NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING (NARST)

*NSTA REPORTS!* - NSTA

*SCIENCE EDUCATION*

*SCIENCE NEWS*

*THE AMERICAN BIOLOGY TEACHER* - NATIONAL ASSOCIATION OF BIOLOGY TEACHERS (NABT)

*THE HOOSIER SCIENCE TEACHER* - HOOSIER ASSOCIATION OF SCIENCE TEACHERS, INC. (HASTI)

*THE SCIENCE TEACHER* - THE NATIONAL SCIENCE TEACHERS ASSOCIATION (NSTA)

Interstate New Teacher Assessment and Support Consortium (INTASC) Model Standards for Beginning Teachers (adopted 1992).

---

---

### **INTASC Principles**

---

1. The teacher understands the central concepts, tools of inquiry, and structures of the disciplines and can create learning experiences that make these aspects of subject matter meaningful.

---

2. The teacher understands how children learn and develop, and can provide learning opportunities that support their intellectual, social and personal development.

---

3. The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.

---

4. The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.

---

5. The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.

---

6. The teacher uses knowledge of effective verbal, nonverbal and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.

---

7. The teacher plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals.

---

8. The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social and physical development of the learner.

---

9. The teacher is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.

---

10. The teacher fosters relationships with school colleagues parents, and agencies in the larger community to support students' learning and well-being.

---