Strategies for Middle School Science Teachers™ Online

Course Description
Strategies for Middle School Science Teachers™ Online examines the methods, strategies, and curriculum of the successful middle school science classroom. Participants will investigate the unique characteristics of middle school learners and become familiar with a variety of techniques to involve those students in a meaningful educational experience in science. Topics will include effective planning, integrating technology in science, managing and organizing the classroom, utilizing appropriate assessments, questioning and communication strategies, meeting the needs of diverse learners, and connecting the science classroom to the real world.

Course Alignments
This PLS 3rd Learning course is aligned to Charlotte Danielson’s Framework for Teaching:
- Domain 1 – 1A, 1B, 1C, 1D, 1E, and 1F
- Domain 2 – 2A, 2B, 2C, and 2D
- Domain 3 – 3A, 3B, 3C, 3D, and 3E
- Domain 4 – 4A, 4B, 4E, and 4F

Course Outcomes
Upon completion of this class, the learner will be able to:
1. Design and organize a plan for a successful middle school science program.
2. Incorporate current scientific theory and instructional methods into the science program.
3. Adapt specific lessons to a variety of learning styles.
4. Prepare meaningful homework and laboratory exercises for the middle school student.
5. Integrate appropriate technologies into the science classroom for data collection, analysis, communication, and evaluation of student progress.
6. Utilize successful, research-based questioning techniques to enhance learning.
7. Connect the middle school science program to the real world.
8. Differentiate instruction to meet the needs of diverse learners.
9. Establish realistic goals connected to national science standards.
10. Formulate a variety of effective formal and informal assessments to monitor student progress.
11. Analyze student data and modify instruction as necessary to ensure that all students are given the opportunity to succeed.
13. Develop motivating, inquiry-based activities to stimulate student interest.
14. Communicate and foster relationships with colleagues, families, and the community.
15. Integrate required and appropriate science subjects into the middle school classroom.
16. Evaluate methods to prepare students for standardized tests as required by district, state, or national regulations.
17. Develop several strategies that will prepare the middle school science student for a successful high school science experience.
18. Describe physical and emotional characteristics of middle school learners.
19. Develop cross-curricular lessons to connect science with other subject areas.
20. Evaluate various methods of incorporating meaningful group activities into the classroom.

Required Text

Required Software
Microsoft Excel or OpenOffice Calc AND Microsoft PowerPoint. OpenOffice Calc can be downloaded for free from the OpenOffice site: http://www.openoffice.org/

Instructors and learners will also use instructor-generated materials, learner-generated materials, and Web-based resources to facilitate learning.

Topical Outline

<table>
<thead>
<tr>
<th>List of Concepts</th>
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<tbody>
<tr>
<td><strong>Characteristics of Middle School Learners</strong></td>
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<tr>
<td>Physical and physiological development; intellectual development; emotional and social development; gender differences; the effects of peer, parental, and academic pressure in middle school</td>
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<tr>
<td><strong>Planning for Success</strong></td>
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<tr>
<td>Moving from long-term to short-term planning; aligning lesson plans to district, state, and national standards; creating a daily lesson plan; pacing and sequencing; monitoring and adjusting plans</td>
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<tr>
<td>Topic</td>
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<tr>
<td><strong>Learning Styles and Diversity</strong></td>
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<tr>
<td><strong>Classroom Management and Communication</strong></td>
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<tr>
<td><strong>Integrating Technology</strong></td>
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<tr>
<td><strong>Assessing Progress and Using Data</strong></td>
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<tr>
<td><strong>Conquering Curriculum</strong></td>
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<tr>
<td><strong>Connecting the Dots</strong></td>
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### Course Assessments and Links to Institutional Outcomes and Course Outcomes

Throughout the course, the learner will be assessed and evaluated on the completion of the following assessments. Learning activities include whole-group and small-group discussions and assessments for a total of 915 points.

<table>
<thead>
<tr>
<th>Modules</th>
<th>Topics of Modules</th>
<th>Points</th>
<th>Correlations With Course Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1:</td>
<td>Characteristics of Middle School Learners</td>
<td>121</td>
<td>2, 3, 8, 12, 18</td>
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<tr>
<td>Module 2:</td>
<td>Planning for Success</td>
<td>123</td>
<td>1, 2, 4, 7, 9, 12, 13, 15, 19, 20</td>
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<tr>
<td>Module 3:</td>
<td>Learning Styles and Diversity</td>
<td>121</td>
<td>2, 3, 4, 6, 8, 9, 11, 12, 13, 20</td>
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<tr>
<td>Module 4:</td>
<td>Classroom Management and Communication</td>
<td>105</td>
<td>1, 2, 4, 5, 6, 7, 12, 13, 14, 19, 20</td>
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<tr>
<td>Module 5:</td>
<td>Integrating Technology</td>
<td>87</td>
<td>2, 4, 5, 7, 12, 13, 15, 19, 20</td>
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<tr>
<td>Module 6:</td>
<td>Assessing Progress and Using Data</td>
<td>116</td>
<td>2, 5, 7, 8, 10, 11, 16, 17</td>
</tr>
<tr>
<td>Module 7:</td>
<td>Conquering Curriculum</td>
<td>141</td>
<td>4, 6, 7, 9, 12, 13, 14, 15, 19, 20</td>
</tr>
<tr>
<td>Module 8:</td>
<td>Connecting the Dots</td>
<td>101</td>
<td>1, 2, 7, 9, 14, 17, 20</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>915</strong></td>
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</table>

Criteria specific to each assessment will be explained in conjunction with the instructional activities.

### Instructional Methodology

The instructional methodology of this course focuses on developing, enhancing, and improving the instructional expertise and pedagogical knowledge base of practicing educators. Strategies include presentation of new content through online readings, active construction of knowledge through practice and problem solving, collaborative group work, personal reflection, structured small-group or whole-class discussion, analysis of assigned reading, and the application of course content and skills to participant’s individual grade level, subject area(s), and classroom.

### Grading Scale

The course facilitator will post the college-specific grading scale.

### PLS 3rd Learning’s Late Policy

There will be a 10% deduction of points per day for all posts and submitted assignments that are late. Replies posted after the due date will earn no points. In rare cases, partially or poorly completed assignments may be resubmitted for partial credit at the discretion of the instructor. The following exceptions apply:

- If a participant is sick/hospitalized or has a death in the family, the timing of makeup work may be arranged with the course facilitator. No points will be deducted if the work is completed according to the agreement.
If a participant is on vacation/traveling/etc., the participant must contact the course facilitator ahead of time to avoid a penalty. This type of absence may occur only once during a course. All posts should be submitted for the missed module before leaving.

If a participant has difficulty completing everything in a week, an extension can be granted if the participant contacts the facilitator during the week (not at the last minute).

**PLS 3rd Learning’s Participant Drop Policy**
- Participants are eligible to receive a refund if they attend class for one week or less. This means participants must withdraw by the end of Module 1 to receive a refund.
- Refunds of the balance of tuition paid will be given, minus the $50 deposit.

**PLS 3rd Learning’s Academic Integrity Policy**
PLS 3rd Learning expects absolute academic honesty and integrity from every course participant. The specific Academic Integrity and Honor Code Policies of our partner colleges and universities are embraced and enforced by PLS 3rd Learning instructors. The following are considered to be serious violations:

- Plagiarism: the use of another’s ideas, data, or words without proper acknowledgement.
- Fabrication: the use of invented information or the falsification of research or other findings with the intent to deceive.
- Collusion: improper collaboration with another in preparing assignments or projects.
- Cheating: an act of deception by which a student misrepresents that he or she has mastered information on an academic exercise that he or she has not mastered.
- Academic Misconduct: tampering with grades, or taking part in obtaining or distributing any part of student work that is not his or her own.

Violation or suspected violation will be investigated and pursued according to specific college/university procedures.

**Identity Authentication**
The college/university, PLS 3rd Learning, and students share a joint responsibility to ensure that each student’s contribution in an online course activity comes from that student alone. For the student, this responsibility has two parts:

1. Students are responsible for positively ensuring that every contribution to an online course created with the student’s computer account is made by the student alone. Contributions covered under this policy include: written assignments; quiz and exam submissions; discussion forum postings; live participation in text-based chat sessions, phone conferences, and videoconferences. If a student allows another person to write or make any kind of submission to an online activity in the student’s name, then this constitutes cheating and will be treated as a violation of academic honesty.
2. Students are responsible for ensuring the integrity of their computer account security by following the actions required of them by the PLS 3rd Learning
Acceptable Use Policy. These actions include keeping passcodes private, updating passcodes when required by PLS 3rd Learning, and reporting breaches of the security policy to the IT Helpdesk.

Course Evaluation
The evaluation of learner work will be based on the defined criteria for learner assessments. The criteria for learner assessments will be outlined for students prior to instructional activities and engagement with student learning targets (outcomes). Grading is based solely on the evaluation of student learning targets and defined criteria for learner assessments.

Formative assessment of learning outcomes is conducted throughout the course, using a variety of means that include the following: completion of assessments; constructive contributions to class discussions (whole-class as well as small-group); sharing of valuable, pertinent, and/or applicable ideas and experiences; and active participation in online interactions. It is expected that each participant will contribute to the academic quality of the course.

Summative assessment includes the completion of weekly learning activities and assignments for which the participant will need to synthesize class content, apply it to his or her own practice, and complete a plan for implementing the major components of content and skill acquired during the course.
Alignments to Charlotte Danielson’s *Framework for Teaching*

Each PLS 3rd Learning course is aligned to the components in Charlotte Danielson’s *Framework for Teaching*. The alignments for this course are listed below.

**DOMAIN 1: PLANNING AND PREPARATION**
1A. Demonstrating Knowledge of Content and Pedagogy  
1B. Demonstrating Knowledge of Students  
1C. Setting Instructional Outcomes  
1D. Demonstrating Knowledge of Resources  
1E. Designing Coherent Instruction  
1F. Designing Student Assessments

**DOMAIN 2: THE CLASSROOM ENVIRONMENT**
2A. Creating an Environment of Respect and Rapport  
2B. Establishing a Culture for Learning  
2C. Managing Classroom Procedures  
2D. Managing Student Behavior

**DOMAIN 3: INSTRUCTION**
3A. Communicating with Students  
3B. Using Questioning and Discussion Techniques  
3C. Engaging Students in Learning  
3D. Using Assessment in Instruction  
3E. Demonstrating Flexibility and Responsiveness

**DOMAIN 4: PROFESSIONAL RESPONSIBILITIES**
4A. Reflecting on Teaching  
4B. Maintaining Accurate Records  
4E. Growing and Developing Professionally  
4F. Showing Professionalism
**Course Outcome Correlations With INTASC Standards for Teachers**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Course Outcomes</th>
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<tbody>
<tr>
<td><strong>Standard 1: Learner Development</strong></td>
<td>The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.</td>
<td>2, 3, 6, 8, 10, 11, 12, 13, 18</td>
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<td><strong>Standard 2: Learning Differences</strong></td>
<td>The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.</td>
<td>3, 4, 8, 11, 13, 14</td>
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<tr>
<td><strong>Standard 3: Learning Environments</strong></td>
<td>The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation.</td>
<td>1, 2, 4, 9, 11, 12, 13</td>
</tr>
<tr>
<td><strong>Standard 4: Content Knowledge</strong></td>
<td>The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.</td>
<td>1, 2, 6, 9, 10, 11, 12, 13, 15, 19</td>
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<tr>
<td><strong>Standard 5: Application of Content</strong></td>
<td>The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.</td>
<td>2, 4, 6, 10, 12, 13, 19, 20</td>
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<tr>
<td><strong>Standard 6: Assessment</strong></td>
<td>The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher’s and learner’s decision making.</td>
<td>2, 6, 10, 11, 16</td>
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Standard 7: Planning for Instruction
The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.

1, 2, 4, 7, 9, 13, 14, 15, 17, 19

Standard 8: Instructional Strategies
The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 19

Standard 9: Professional Learning and Ethical Practice
The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.

2, 3, 5, 9, 10, 11, 14, 20

Standard 10: Leadership and Collaboration
The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.

1, 2, 7, 13, 14, 17, 19

The Interstate New Teacher Assessment and the Support for Consortium (InTASC) standards were developed by the Council of the Chief State School Officers and member states. Copies may be downloaded from the Council’s website at http://www.ccsso.org/intasc.


**Course Outcome Correlations With National Board of Professional Teaching (NBPTS) Five Core Propositions**

**Proposition 1: Teachers are Committed to Students and Their Learning.**

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<th>Course Outcomes</th>
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<td>3, 8, 11</td>
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NBCTs are dedicated to making knowledge accessible to all students. They believe all students can learn.

They treat students equitably. They recognize the individual differences that distinguish their students from one another and they take account for these differences in their practice.

NBCTs understand how students develop and learn.

They respect the cultural and family differences students bring to their classroom.

They are concerned with their students’ self-concept, their motivation and the effects of learning on peer relationships.

NBCTs are also concerned with the development of character and civic responsibility.

**Proposition 2: Teachers Know the Subjects They Teach and How to Teach Those Subjects to Students.**

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<tr>
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<td>1, 2, 5, 6, 7, 9, 13, 15, 16, 17, 19</td>
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NBCTs have mastery over the subject(s) they teach. They have a deep understanding of the history, structure and real-world applications of the subject.

They have skill and experience in teaching it, and they are very familiar with the skills gaps and preconceptions students may bring to the subject.

They are able to use diverse instructional strategies to teach for understanding.

**Proposition 3: Teachers are Responsible for Managing and Monitoring Student Learning.**

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NBCTs deliver effective instruction. They move fluently through a range of instructional techniques, keeping students motivated, engaged and focused.

They know how to engage students to ensure a disciplined learning environment, and how to organize instruction to meet instructional goals.
NBCTs know how to assess the progress of individual students as well as the class as a whole.  

They use multiple methods for measuring student growth and understanding, and they can clearly explain student performance to parents.  

**Proposition 4: Teachers Think Systematically about Their Practice and Learn from Experience.**

NBCTs model what it means to be an educated person – they read, they question, they create and they are willing to try new things.  

They are familiar with learning theories and instructional strategies and stay abreast of current issues in American education.  

They critically examine their practice on a regular basis to deepen knowledge, expand their repertoire of skills, and incorporate new findings into their practice.  

**Proposition 5: Teachers are Members of Learning Communities.**

NBCTs collaborate with others to improve student learning.  

They are leaders and actively know how to seek and build partnerships with community groups and businesses.  

They work with other professionals on instructional policy, curriculum development and staff development.  

They can evaluate school progress and the allocation of resources in order to meet state and local education objectives.  

They know how to work collaboratively with parents to engage them productively in the work of the school.  

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Bibliography


