Geometry for Middle School Educators™ Online

Course Description
This course provides middle school teachers with ongoing professional development that will build on and expand current knowledge and understanding of geometry. Participants will link their individual state standards to the National Council of Teachers of Mathematics (NCTM) Principles and Standards for teaching geometry to middle school students. Investigating strategies for developing mathematical literacy and fostering logical thinking will set the stage for future learning. In addition, participants will explore, discuss, and apply research-based strategies for teaching geometry and mathematics so that they can delve more intentionally into geometry content and processes.

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

Course Outcomes
Upon completion of this class, the learner will be able to:
1. Identify his or her individual learning style and reflect on how that style influences classroom teaching and learning.
2. Research NCTM standards and connect them to his or her state curriculum.
3. Analyze strategies for developing vocabulary and apply them in the classroom.
4. Promote logical thinking by offering students opportunities to “think laterally.”
5. Evaluate student performance using the van Hiele Model.
6. Use precise terminology when discussing mathematics.
7. Synthesize topics from other content areas with topics in geometry.
8. Encourage students to compare and contrast attributes of two- and three-dimensional figures.
9. Provide real-world examples for geometric topics.
10. Analyze research articles and discuss best practices.
11. Develop higher-level thinking questions to promote students’ learning of fundamental geometry concepts.
12. Use WebQuest techniques to enhance student learning and discovery of geometry topics.

**Required Text**

Students will need the use of MS PowerPoint application for this course.

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>Investigating NCTM Standards and Curriculum Focal Points</strong></td>
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<tr>
<td><strong>Reading, Writing, and Vocabulary Development in Math and Geometry</strong></td>
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<tr>
<td><strong>Logic and Reasoning</strong></td>
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<tr>
<td><strong>Two-Dimensional Figures</strong></td>
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<tr>
<td><strong>Transformational Geometry and the Coordinate Plane</strong></td>
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<tr>
<td><strong>Pythagorean Theorem and Related Concepts</strong></td>
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</table>
Three-Dimensional Solids
Exploring attributes and symmetry of polyhedra, using nets of Platonic solids to discover attributes; investigating discovery of Euler’s formula

Current Issues in Geometry
Creating and sharing ideas for geometry WebQuests that can be used with students

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 1009 points.

<table>
<thead>
<tr>
<th>Modules</th>
<th>Topics of Modules</th>
<th>Points</th>
<th>Correlations With Course Outcomes</th>
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</thead>
<tbody>
<tr>
<td>Module 1:</td>
<td>Investigating NCTM Standards and Curriculum Focal Points</td>
<td>119</td>
<td>1, 2</td>
</tr>
<tr>
<td>Module 2:</td>
<td>Reading, Writing, and Vocabulary Development in Math and Geometry</td>
<td>133</td>
<td>3, 5, 6</td>
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<tr>
<td>Module 3:</td>
<td>Logic and Reasoning</td>
<td>110</td>
<td>4, 9</td>
</tr>
<tr>
<td>Module 4:</td>
<td>Two-Dimensional Figures</td>
<td>130</td>
<td>6, 8</td>
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<tr>
<td>Module 5:</td>
<td>Transformational Geometry and the Coordinate Plane</td>
<td>111</td>
<td>6, 11</td>
</tr>
<tr>
<td>Module 6:</td>
<td>Pythagorean Theorem and Related Concepts</td>
<td>147</td>
<td>6, 7, 9, 11</td>
</tr>
<tr>
<td>Module 7:</td>
<td>Three-Dimensional Solids</td>
<td>102</td>
<td>6, 8, 9, 11</td>
</tr>
<tr>
<td>Module 8:</td>
<td>Current Issues in Geometry Education</td>
<td>157</td>
<td>9, 10, 12</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>1009</strong></td>
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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 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
1E. Designing Coherent Instruction
1F. Designing Student Assessments

**DOMAIN 2: THE CLASSROOM ENVIRONMENT**
2B. Establishing a Culture for Learning

**DOMAIN 3: INSTRUCTION**
3A. Communicating with Students
3C. Engaging Students in Learning
3D. Using Assessment in Instruction

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

**Standard 1: Learner Development**
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.

| Course Outcomes | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |

**Standard 2: Learning Differences**
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.

| Course Outcomes | 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |

**Standard 3: Learning Environments**
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.

| Course Outcomes | 1, 7, 8, 9, 11, 12 |

**Standard 4: Content Knowledge**
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.

| Course Outcomes | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |

**Standard 5: Application of Content**
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.

| Course Outcomes | 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12 |

**Standard 6: Assessment**
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.

| Course Outcomes | 1, 3, 5, 8, 9, 11, 12 |
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.

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.

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.

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.

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.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>NBCTs are dedicated to making knowledge accessible to all students. They believe all students can learn.</td>
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<tr>
<td>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.</td>
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<tr>
<td>NBCTs understand how students develop and learn.</td>
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<tr>
<td>They respect the cultural and family differences students bring to their classroom.</td>
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<tr>
<td>They are concerned with their students' self-concept, their motivation and the effects of learning on peer relationships.</td>
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<tr>
<td>NBCTs are also concerned with the development of character and civic responsibility.</td>
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### Proposition 2: Teachers Know the Subjects They Teach and How to Teach Those Subjects to Students.

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<thead>
<tr>
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<tbody>
<tr>
<td>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.</td>
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<tr>
<td>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.</td>
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<tr>
<td>They are able to use diverse instructional strategies to teach for understanding.</td>
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### Proposition 3: Teachers are Responsible for Managing and Monitoring Student Learning.

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<tbody>
<tr>
<td>NBCTs deliver effective instruction. They move fluently through a range of instructional techniques, keeping students motivated, engaged and focused.</td>
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<tr>
<td>They know how to engage students to ensure a disciplined learning environment, and how to organize instruction to meet instructional goals.</td>
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</tbody>
</table>
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


