



## **MELT 2019 Summer Institutes**

### **Appalachian State University, Boone NC**

**Institute Meetings.** All MELT Institutes meet **FACE-TO-FACE** in Walker Hall at Appalachian State University in Boone, NC. Additionally, SOME institutes will allow a **LIMITED** number of seats for participants who wish to take the institute in a live, synchronous, **ONLINE** manner. This means that online participants will be on their computers, interacting live with the face-to-face institute participants through each institute meeting day through the entire week. This online option is intended to help educators who, for personal or professional reasons, cannot travel to Boone in the summer.

### **Week 1: June 24-28, 2019**

#### **Math 2 (2<sup>nd</sup> High School Math) (Math CEUs)**

This Institute exemplifies the integrated and inquiry-based nature of the content in the second high school math course as defined in the North Carolina state content and pedagogy standards. It is consistent with similar curricula in other states. Institute experiences include instruction and learning through: inquiry-based methods; mathematical modeling; using technology; assessment strategies; reasoning and problem solving; standards on mathematical content, teaching, learning, and practices; and investigating teacher and student beliefs. The content of this Institute changes yearly and aims to meet the individual needs of all participants. In order to shed light on the mathematics in these courses, some of the mathematical topics and approaches in this Institute transcend high school mathematics. The CEUs provided through this Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

There will be a select number of seats available for some educators to take and interact with the Institute in a live, synchronous online manner. For online participants, the Buy-One-Get-One discount will not be available.

#### **Discrete Math (Grades 9-12) (Math CEUs)**

This Institute considers topics in high school discrete math consistent with similar high school courses in many states. Many of these topics are central to further studies in probability and statistics. Topics covered in this Institute may include: information theory, logic, set theory, combinatorics, graph theory, probability, number theory, discrete calculus, geometry, decision theory, and/or discrete analogues of continuous mathematics. Institute experiences include instruction and learning through: inquiry-based methods; mathematical modeling; using technology; reasoning and problem solving; and standards on mathematical content, teaching, learning, and practices. The content of this Institute changes yearly and aims to meet the individual needs of all participants. The CEUs provided through this Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

**Vertical Alignment: Curriculum & Learning (Grades 5-12) (Math CEUs)**

This Institute will be of value to both teachers and school/district leaders in math. Many teachers are highly knowledgeable about the curriculum in the grade(s)/course(s) they teach. However, some teachers need more information regarding these dimensions associated with grades/courses which precede and follow theirs. This Institute considers vertical alignment of content and standards from grade 5 through 12. Through this work, teachers and school/district math leaders will: be empowered to better plan instruction and assessment; recognize expected student understanding in preceding and following math courses; and better meet the needs of their students. School/district math leaders will better be able to support their teachers. The CEUs provided through this Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

There will be a select number of seats available for some educators to take and interact with the Institute in a live, synchronous online manner. For online participants, the Buy-One-Get-One discount will not be available.

**STEM for the Teacher Leader (Grades K-5) (Math/Science CEUs)**

The integration of mathematics and science content and habits of mind provides powerful tools in the classroom. What does STEM look like in the elementary grades? Participants in this Institute will: explore ways to conceptualize STEM integration; participate in inquiry-based investigations aligned to elementary curriculum; examine and critique challenging activities and investigations; and consider activities and investigations through the lenses of frameworks for STEM. This institute is most appropriate for teachers or instructional facilitators of mathematics and science in the elementary grades or others seeking to support them. Please note that this institute includes some off-site activities to allow for explorations. Additional information will be sent to registrants about two weeks prior to the session. The CEUs provided through this Institute are in combinations of Math and Science. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

**Mathematical Practices & Processes (Grades K-5) (Math CEUs)****Mathematical Practices & Processes (Grades 6-8) (Math CEUs)**

These two Institutes – one for grades K-5 and another for grades 6-8 – focus on the Mathematical Practices commonly associated with the CCSSM (problem solving and perseverance; abstract and quantitative reasoning; construct and critique arguments; model with mathematics; strategically use appropriate tools; attend to precision; find and use structure; and express regularity in repeated reasoning) and the NCTM Process Standards (problem solving, reasoning and proof, communication, connections, and representation). These practices and processes describe both how students learn mathematics and goals for mathematics education. However, for teachers to fully understand these ideas and be prepared to implement them in their classrooms, they must experience them again. These experiences can then lead teachers to implement these ideas in their classroom and, thereby, improve student learning. These Institutes consider the natural curricula of the respective grade bands. The CEUs provided through this Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

## **Week 2: July 8-12, 2019**

### **Math 3 (3<sup>rd</sup> High School Math) (Math CEUs)**

This Institute exemplifies the integrated and inquiry-based nature of the content in the third high school math course as defined in the North Carolina content and pedagogy standards and is consistent with similar curricula in other states. Institute experiences include instruction and learning through: inquiry-based methods; mathematical modeling; using technology; assessment strategies; reasoning and problem solving; standards on mathematical content, teaching, learning, and practices; and investigating teacher and student beliefs. The content of this Institute changes yearly and aims to meet the individual needs of all participants. In order to shed light on the mathematics in these courses, some of the mathematical topics and approaches in this Institute transcend high school mathematics. The CEUs provided through this Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

There will be a select number of seats available for some educators to take and interact with the Institute in a live, synchronous online manner. For online participants, the Buy-One-Get-One discount will not be available.

### **STEM Leadership (Grades 6-12) (Math/Science CEUs)**

The integration of mathematics and science content and habits of mind provides powerful tools in the classroom. But how can teacher-leaders employ similar techniques to create meaningful school or district-wide STEM initiatives? Participants in this Institute will: explore ways to conceptualize STEM integration; participate in inquiry-based investigations in selected STEM topics; design challenging activities and investigations; and examine activities and investigations through the lenses of frameworks for leadership. Additionally, participants will: consider a variety of tools for supporting STEM leadership and prepare personal plans for implementing in their own roles. This Institute is appropriate for teachers of STEM disciplines and school or district-level STEM leaders. Please note that this institute includes some off-site activities to allow for explorations. Additional information will be sent to registrants about two weeks prior to the session. The CEUs provided through this Institute are in combinations of Math and Science. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

### **Digital Learning (Grades 6-12) (Math/Digital Learning CEUs)**

While this Institute places a strong emphasis on teaching and learning through using Desmos, other technology tools are also considered. Few fields have at their disposal as many technology tools as mathematics. These tools can be differentiated by epistemological (learning) tools and pedagogical (teaching) tools, with some tools working effectively, albeit differently, as both. Through various implementations of mathematical technology, this institute will investigate mathematical concepts found in North Carolina state standards for middle grades and high school mathematics. This Institute simultaneously investigates both mathematics and appropriate technology. The CEUs provided through this Institute are in combinations of Math and Digital Learning. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

There will be a select number of seats available for some educators to take and interact with the Institute in a live, synchronous online manner. For online participants, the Buy-One-Get-One discount will not be available.

### **Numbers, Operations, & Algebraic Reasoning (Grades K-5) (Math CEUs)**

### **Numbers, Operations, & Algebraic Reasoning (Grades 6-8) (Math CEUs)**

Standards for mathematical content, teaching, learning, and practices require that teachers provide students with opportunities to think deeper and make connections among concepts. While the strands of numbers and operations are woven throughout most state standards for mathematics, notably absent in instructional practices are investigations regarding the meaning of the mathematics and why concepts and skills are valid. Thus, these two Institutes – one for grades K-5 and another for grades 6-8 – integrate the notions of number, operations, and meaning. Through inquiry-based instructional techniques that model best educational practices, these Institutes investigate topics in these strands, use problem solving and modeling, and have participants engage in and develop activities commensurate with these strands in grades K-5 and 6-8. Regardless of the state from which a participant comes, MELT will ensure that the content and style of this Institute is sufficiently individualized to meet the needs of all participants. The CEUs provided through these Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

#### **Augmenting the Classroom: Clubs, Contests, and Targeted Digressions (Grades 4 and beyond) (Math CEUs)**

An increasing number of schools and districts provide math clubs for their students, facilitate their students in participating in local and regional math competitions, and seek recreational math activities to enhance student experiences and enthusiasm in the subject. In addition, sometimes we spend so much time “doing” math that we need to take a break and spend some time thinking “about” math. What is math? What do mathematicians do? Will I really use the quadratic formula in my career? Is infinity plus 1 really bigger than infinity? How does math relate to other fields ... like poetry? When stimulating, grade-appropriate materials are found for these recreations, they provide a fun and rich environment for students. This Institute seeks to help teachers develop grade-appropriate resources and understand the important aspects associated with math clubs, competitions, recreations, and philosophical musings. The CEUs provided through these Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

## **Week 3: July 15-19, 2019**

### **Math 1 (1<sup>st</sup> High School Math) (Math CEUs)**

This Institute exemplifies the integrated and inquiry-based nature of the content in the first high school math course as defined in the North Carolina state content and pedagogy standards. Institute experiences include instruction and learning through: inquiry based methods; mathematical modeling; using technology; assessment strategies; reasoning and problem solving; standards on mathematical content, teaching, learning, and practices; and investigating teacher and student beliefs. Regardless of the state from which a participant comes, MELT will ensure that the content and style of this Institute is sufficiently individuated to meet the needs of all participants. In order to shed light on the mathematics in these courses, some of the mathematical topics and approaches in this Institute transcend high school mathematics. The CEUs provided through this Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

### **Literacy in Mathematics (Grades K-5) (Literacy/Math CEUs)**

Literacy in mathematics is fundamental to learning. In order to learn and communicate mathematical ideas, students must be able to read and write in the content of mathematics. This institute will: differentiate between what literacy looks like in ELA and in Mathematics; identify the difficulties in learning the language of mathematics; develop strategies to overcome these difficulties; and develop strategies to help students interpret problems without the teacher reading and interpreting them for the students. When appropriate, activities will be differentiated to address the needs of teachers in their respective grades. While some children's books will be connected to math activities, the primary focus are the preceding goals. The CEUs provided through this Institute are in combinations of Literacy and Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

### **Measurement & Geometry (Grades K-5) (Math CEUs)**

#### **Geometry & Proportional Reasoning (Grades 6-8) (Math CEUs)**

Geometry is central to grades K-5 and 6-8 mathematics learning. In grades K-5, measurement and geometry are often connected and, in grades 6-8, geometry and proportional reasoning are frequently connected. These two Institutes – one for grades K-5 and another for grades 6-8 – integrate the respective notions and consider inquiry-based instructional techniques that model best educational practices, use problem solving and modeling, and have participants do and develop activities commensurate with these strands in grades K-5 and 6-8. Regardless of the state from which a participant comes, MELT will ensure that the content and style of this Institute is sufficiently individuated to meet the needs of all participants. The CEUs provided through these Institute are in Math. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

### **Digital Learning (Grades K-5) (Math/Digital Learning CEUs)**

Few fields have at their disposal as many technology tools as mathematics. These tools can be differentiated by epistemological (learning) tools and pedagogical (teaching) tools, with some tools working effectively, albeit differently, as both. Through various implementations of mathematical technology, this institute will investigate mathematical concepts found in North Carolina state standards for elementary grades mathematics. Thus, this Institute simultaneously investigates both mathematics and appropriate technology. Participants in this institute will be better prepared to use technology associated with their teaching and their students' learning of

math. The CEUs provided through this Institute are in combinations of Math and Digital Learning. The tuition for this Institute qualifies for the Buy-One-Get-One discount.

There will be a select number of seats available for some educators to take and interact with the Institute in a live, synchronous online manner. For online participants, the Buy-One-Get-One discount will not be available.

## Structural Background of Summer Institutes

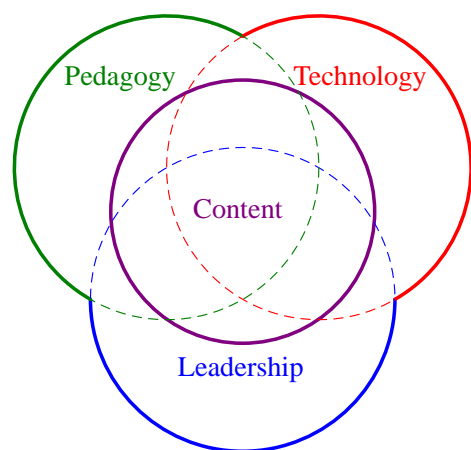
All MELT Institutes are developed to address the seemingly continual revision of state and national standards. Each Institute is modified annually in order to meet the most recent state and national standards recommendations. Furthermore, each Institute is developed in a manner that will allow for participant experiences to be commensurate with the needs of their students, school, district, and state. Regardless of the state from which a participant comes and which set of standards that state is using, MELT will ensure that the content and style of each Institute is sufficiently individuated to meet the needs of all participants. As registrations are received, MELT personnel and instructors collaborate to ensure that the class instruction and experiences are appropriate for all participants and specifically address each respective set of standards.

All MELT Institutes use a framework that integrates the domains of content, pedagogy, technology, and leadership. This framework is represented in the accompanying figure.

Each MELT Institute attempts to best mirror the nature, philosophy, structure and intent of the standards. MELT Institutes assist teachers in understanding the nature of the state-specific standards and help them to translate content and instructional techniques to their own classrooms to support student learning.

The content and delivery of each Institute is considered through a number of perspectives. Course appropriate and integrated mathematical content is experienced in every Institute offering. Although a course may be denoted as addressing only a few mathematical topics, integration of a far greater number of topics commonly occurs. Some of these topics include algebra, geometry, probability, statistics, discrete math, and mathematical modeling. The content mirrors the style and content proposed in respective state standards and significantly extends upon such both in depth and through connections. This ensures that MELT participants gain both the content knowledge and the confidence to replicate and extend the content covered in these Institutes in their own classrooms.

Within the instructional and learning experiences in each MELT Institute, integrated pedagogical and epistemological considerations and experiences are paramount and accompany the mathematical content. Among others, these experiences include instruction and learning through:



inquiry-based methods, mathematical modeling, using technology, assessment strategies, reasoning and problem solving, standards on mathematical teaching, learning, practices, and investigating teacher and student beliefs.

Each Institute is infused with consideration of the nature and practice of leadership. Participants will consider means and techniques of bringing what they have learned back to their classrooms, schools and districts. What it means to be a Mathematics Education Leader, what might that look like, and the many forms that may take in individual schools and districts is investigated.

## Information about MELT Institutes

MELT Institutes are week-long, residential professional development training opportunities. MELT instructors are university faculty and master K-12 teachers with decades of experience both in classrooms and in curriculum development.

All MELT Institutes are held in Walker Hall on the campus of Appalachian State University, 121 Bodenheimer Dr., Boone, NC 28608. Institutes run 8:30-4:30 Monday-Thursday and 8:30-noon on Friday of each week.

The MELT program negotiates discount rates with a number of Hotels in Boone. Participants who cannot commute to ASU can make use of these hotels or find other housing options. (MELT no longer uses dorm rooms as possible housing.)

MELT Institutes can be taken for either 3 CEUs (most common) or 2 graduate credits. Information regarding graduate credits are on following pages.

All MELT registrations are submitted through an online application form. The online registration system will open in January 2018. Registrations will be accepted first-come-first-served until Institutes are filled.

Tuition for an Institute is \$300 per person per week-long Institute. MELT also provides a Buy-One-Get-One free Group Discount on Institute tuitions. Any teacher, school, or district that buys any seat in any eligible MELT Summer Institute can get one seat in either that same Institute or another eligible Institute tuition free. Pairs of teachers **DO NOT** need to be in the same institute or even in the same week. This discount is even applicable to one teacher who wishes to attend two eligible Summer Institutes for the price of one. Groups of teachers can organize this group discount or a school or district can organize this through the MELT program.

After May 30<sup>th</sup>, 2018, MELT tuitions are non-refundable. Prior to this date, cancellations received in writing will receive a full refund less a \$25 processing fee. ASU and the MELT program reserve the right to cancel Institutes no less than three weeks before the first day of the Institute. If Institutes are cancelled, affected registrants will receive 100% reimbursement for their MELT Registration fees. Questions should be directed to Dr. Michael Bossé, MELT@appstate.edu; Office Phone: (828) 262-2862

For more information regarding the MELT Program and MELT Institutes, contact  
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## MELT Institutes for CEUs or Graduate Credits

For each Institute, participants will elect to earn either 30 clock hours of renewal credits (3 CEUs) or, for an additional fee, credit for a two-semester graduate course. While any MELT Institute can be taken for Continuing Education Units (CEUs) and without graduate course credit, some participants may wish to earn graduate credits to assist them in their graduate program pursuit.

### MELT Collaboration with Graduate Studies at Appalachian State University

Participants who wish to receive academic credit for graduate courses associated with the MELT institutes (2 credits per institute) may do so for the additional cost of graduate tuition and fees. In addition to attending the institute, you will be required to complete several graded assignments under the supervision of the MELT Director.

The process for receiving academic credit depends on your current status as a student at Appalachian:

**(A) If you are a current graduate student enrolled in Spring classes at Appalachian,** you will be registered for the course by the MELT program upon receipt of the institute application form and institute fee. You will be billed for tuition and fees separately by the University through your student account.

**(B) If you are not enrolled in Spring classes at Appalachian,** you will need to seek admission to the School of Graduate Studies by completing the online application at <https://www.gradadmissions1.appstate.edu/gradweb/default.asp>.

- Students who HAVE completed a graduate course at Appalachian in the last seven years must apply to be readmitted as a graduate student. There is no fee for readmission.
- Students who HAVE NOT completed a graduate course at Appalachian in the last seven years will need to apply for admission. There is a one-time application fee (currently \$65), that you will be charged during the online application process.

You will be registered for the course by the MELT program coordinator upon notification of admission from the School of Graduate Studies and receipt of the institute application



form and fee.

If you have additional questions or need assistance with the process for academic credit, please contact Dr. Holly Hirst, Mathematics Graduate Program Co-Director, [hirsthp@appstate.edu](mailto:hirsthp@appstate.edu).

For more information regarding the MELT Program and MELT Institutes, contact

Michael J. Bossé

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