



**Your  
Education  
Ally.**

By Teachers,  
*For Teachers.*

# Course Syllabus

Name:

Date:

## Today is a Great Day to Learn Something New!

Professional learning to meet your needs.

Engaging and applicable, ELEVATE courses are the core of Teaching Channel. We offer a variety of courses that meet the continuing education needs of teachers from across the country. Teaching Channel courses work perfectly for license renewal needs, working to move up through salary schedules, or for professional learning to support improved student outcomes.

Teaching Channel provides continuing education graduate credit courses that have been approved and endorsed by regionally accredited colleges and universities from across the United States.



**Current University Partners** (See a current list of academic partners on our website)

Continuing Education courses are approved by our regionally accredited (HLC, NECHE, WSCUC, NWCCU) partners by review of syllabi, content, and coursework expectations.

(Indicate anticipated university/college partner below, if applicable.)

### Course Creation and Evaluation:

Courses are created and evaluated by educators with a master's degree or higher in an education-related field and five or more years of classroom experience in PreK-12th grade education. Course evaluators provide personalized, specific feedback for assignments and rubric-based grading aligned with best practices in professional education.

#### Spring Term

Registrations Accepted  
July 16-March 15  
Coursework Due\*  
April 15

#### Summer Term

Registrations Accepted  
December 16-July 15  
Coursework Due\*  
August 15

#### Fall Term

Registrations Accepted  
March 16-October 22  
Coursework Due\*  
November 15

\*Or first business day after the 15th if due date falls on a weekend.

## Coursework Details

The Rigor of Teaching Channel Graduate-Level Continuing Education Courses.

### Professional Learning Model

Our research-based Professional Learning Model is used to design ELEVATE continuing education courses. The model includes five elements used to guide professional learning and to positively impact student outcomes:



### Course Content

**ELEVATE Courses** are self-paced, and per standard practice in the field, each credit carries the equivalent of fifteen hours of content and coursework. Participants explore resources that include a solid balance of research and applicability. All courses feature video clips, research-based articles, and interactive elements to enhance and support learning. To receive credit, participants must complete the following requirements according to expectations outlined in our course rubric:

**Response Questions:** Connect new learning from course resources to current pedagogy.

**Resource Review:** Find resources related to the course topic to extend learning and solve problems of practice.

**Applications:** Complete a variety of assignments encouraging participants to implement new learning in their classrooms or schools.

**Reflection:** Write a reflection paper that activates critical thinking and inspires the transformation of future professional practice.

<b>Course Name</b>	Promoting Problem Solving Strategies in Math
<b>Course Number</b>	OL 5572
<b>Course Credits</b>	3 or Flex Credit

*NOTE: This syllabus is an outline of the course requirements and is subject to change; the coursework will be completed and submitted in the online environment where you will have full access to a variety of media, links, and other online tools required to satisfactorily complete this course.*

### **Course Description:**

Problem solving is an essential skill in school and in life, and this course focuses on best practices to infuse problem solving into your math instruction. Empower students as they develop their Mathematical Habits of Mind, and explore a range of strategies to foster problem-solving skills, both before, during, and after teaching math. Compare and contrast planning practices that effectively incorporate problem solving into math lessons, and learn to emphasize equity and accessibility to promote an inclusive learning experience for all students learning math. Get ready to gain the tools and knowledge to empower students in becoming confident and capable problem solvers in mathematics.

### **Course Objectives:**

1. Use prompts about teaching secondary math to describe assumptions and insights of practitioners, researchers and self, including how the information relates to professional education practice and growth.
2. Connect ideas about problem solving in math with your current instructional model.
3. Identify strategies to support Mathematical Habits of Mind.
4. Explain how to foster problem solving skills before, during, and after math instruction.
5. Compare and contrast planning practices that include problem solving in math instruction.
6. Articulate ways to promote equity and accessibility instruction for all students learning math.

### **Required Reading:**

All articles and other resources are linked in the online environment, within their respective assignments.

All coursework is to be completed in the Teaching Channel online environment.

## Knowledge Base:

Knowledge base, in part, is affirmed in the writing and research of these references:

Boaler, J. (2022). *Mathematical Mindsets: Unleashing Students' Potential Through Creative Mathematics, Inspiring Messages and Innovative Teaching*. Wiley.

Kaplan, J. (2023). *Try It! More Math Problems for All*. Taylor & Francis.

Lang, N. D., & Marzano, R. J. (2019). *The New Art and Science of Teaching Mathematics*. Solution Tree Press.

National Council of Teachers of Mathematics: Index. Retrieved June 29, 2023, from <http://www.nctm.org>

Schuhl, S., Kanold, T. D., Barnes, B., Toncheff, M., Deinhart, J., Kanold-McIntyre, J., & Larson, M. R. (2023). *Mathematics Instruction and Tasks in a Plc at Work(r), Second Edition: (Develop a Standards-Based Curriculum for Teaching Student-Centered Mathematics)*. SOLUTION TREE.

Zakowich, T. (2023). *50 Math Tricks That Will Change Your Life: Mentally Solve the Impossible in Seconds*. Page Street Publishing.

Zhang, S. (2023). *The Pedagogy of Secondary-School Mathematics* (Y. Yao & H. Pan, Trans.). Springer Nature Singapore.

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## Teaching Channel Course Rubric

All course submissions must meet general graduate level standards through the use of correct grammar, spelling, and mechanics. Each paragraph should be clearly organized and include 5 sentences or more. If work does not meet the above criteria, it will be returned to the student for resubmission.

Rubric	A Grade = Outstanding Performance	B Grade = Target Performance	Below Target Performance
<b>Statement of Intention and Awareness</b>	The evaluator will only review the Statement of Intention and Awareness for a response to each prompt. If a student does not respond to each prompt, the Statement will be returned to the student for resubmission. The student's Statement of Intention and Awareness will be evaluated as part of the Reflection.		
<b>Investigation: Read and Respond</b>	Coursework thoroughly and accurately addresses all question components by summarizing key concepts from readings. In at least half of the responses, the participant also makes inferences related to professional practice or supports answers with professional experiences.	Coursework thoroughly and accurately addresses all question components by summarizing key concepts from readings.	Coursework will be returned to student for resubmission with evaluator instructions if it does not meet target performance.

All coursework is to be completed in the Teaching Channel online environment.

Investigation: Resource Review Rubric	A Grade = Outstanding Performance	B Grade = Target Performance	Below Target Performance
Summary of Resource	Coursework summarizes the main ideas presented in the resource and includes at least one instance of critical analysis (i.e. asks questions, looks for gaps in information, disputes contradictions, etc.)	Coursework summarizes the main ideas presented in the resource.	Coursework will be returned to student for resubmission with evaluator instructions if it does not meet target performance.
Relation to Personal Assumptions or Course Content	Coursework provides more than one detailed example of how the resource supports or challenges personal assumptions and/or course content.	Coursework provides one example of how the resource supports or challenges personal assumptions and/or course content.	Coursework will be returned to student for resubmission with evaluator instructions if it does not meet target performance.
Impact on Professional Practice	Coursework provides more than one clear explanation of how the information in the resource could impact professional practice.	Coursework provides one explanation of how the information in the resource could impact professional practice.	

All coursework is to be completed in the Teaching Channel online environment.

Application Rubric	A Grade = Outstanding Performance	B Grade = Target Performance	Below Target Performance
<b>Planning, Development and Execution</b>	Coursework shows complete planning, development and/or execution of application, clear articulation of details and inclusion of polished required artifacts.	Coursework shows complete planning, development and/or execution of application and inclusion of required artifacts.	Coursework will be returned to student for resubmission with evaluator instructions if it does not meet target performance.
	Coursework includes creative or innovative application of new knowledge and skills from course content to professional practice.	Coursework includes application of new knowledge and skills from course content to professional practice.	
<b>Written Requirements</b>	Coursework provides clear, logical, and organized responses to any writing prompts in the application. It also includes at least one detailed connection to course objectives, student learning goals or transformation of professional practice.	Coursework provides clear, logical, and organized responses to any writing prompts in the application.	

All coursework is to be completed in the Teaching Channel online environment.



Reflection Rubric	A Grade = Outstanding Performance	B Grade = Target Performance	Below Target Performance
<p><b>Connection to Statement of Intention and Awareness</b></p>	<p>Coursework includes an evaluation of both learning goals articulated in the participant's Statement of Intention and Awareness from Module 1. Participant includes one future learning goal related to course content.</p>	<p>Coursework includes an evaluation of one of the learning goals articulated in the participant's Statement of Intention and Awareness from Module 1.</p>	<p>Coursework will be returned to student for resubmission with evaluator instructions if it does not meet target performance.</p>
<p><b>Summary of Learning</b></p>	<p>Coursework includes three or more detailed connections to specific assignments completed or course content viewed (assigned readings or videos).</p>	<p>Coursework includes two general connections to course content.</p>	
<p><b>Description of Positive Influence or Transformation</b></p>	<p>Coursework includes two or more specific ideas for changes in one's professional practice with timelines. OR Coursework includes two or more detailed action steps with timelines for positively impacting other stakeholders.</p>	<p>Coursework includes one general idea for changes in one's professional practice. OR Coursework includes one action step for positively impacting other stakeholders.</p>	

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## Module 1

### 1. Tell us about yourself!

Before we begin with course content, write 1 sentence about yourself. You will be asked to include this background in each of the modules submitted for the course. This provides context for your responses and enables the course evaluator to respond with feedback tailored to your specific role in education. Here are three examples to guide you:

- I'm a 4th grade teacher and teach all subjects.
- I'm a middle school counselor.
- I'm out of the classroom on leave this year, but next year I'll be back teaching 9th grade science.

### 2. Statement of Intention and Awareness

At Teaching Channel, we want your learning to be purposeful and applicable to your professional practice. To do that, research says learners need to first identify their motivations and goals. Next, learners assess prior knowledge and previous experiences so they can create deeper connections to the course material.

Using the guidelines below, please address the following in your Statement of Intention and Awareness, in a total of two paragraphs, or more:

1. Share your motivation for learning about strategies for developing engaging and effective secondary math instruction.
2. Summarize your previous knowledge or experience with developing and planning secondary math instruction.
3. List your own two learning goals for the course.

In Module 1, your evaluator will review your Statement of Intention and Awareness to ensure it is complete. It will be graded within your Reflection Requirement in Module 3, where you'll revisit your Statement of Intention and Awareness to identify your growth and learning from the beginning of the course to the end.

### 3. Application: Math through Problem-Solving

Math is more than just memorizing facts and formulas! It is important for students to develop a deep understanding of complex math concepts. One way we can develop deep understanding is through problem solving. Read the following resources to learn about problem solving in math instruction and why it is important for our students, then complete the reflection questions that follow.

- "Mathematics as a Complex Problem-Solving Activity" by Jacob Klerlein and Sheena Hervey - Generation Ready
- "Why It's So Important to Learn a Problem-Solving Approach to Mathematics," by Richard Ruscak
- "Benefits of Problem-Solving in the K-12 Classroom," by Miranda Marshall

After reading the above resources, share your insights, shifts in thinking, and ideas that challenge you regarding teaching problem solving in secondary mathematics.

All coursework is to be completed in the Teaching Channel online environment.

Next, identify 2 quotes or sections that stood out to you in the resources, and write your thoughts (insights, connections, questions, etc.) in one paragraph or more per quote or section.

Please submit your 2 paragraphs with your Module submission, including a brief citation of the resources where you found the quote or section. If sharing a link, be sure the share settings are set to, "anyone with the link can view."

#### 4. Application: Mathematical Habits of Mind

The mathematical "Habits of Mind" involve an effective and engaging approach to math instruction. To learn more, review the "8 Mathematical Habits of Mind," (each habit has its own PDF) from Math4Life through the West Virginia Department of Education.

These habits are mindsets or cognitive approaches that help students truly learn mathematics and not just memorize facts and figures.

After reviewing each mindset, please recreate the graphic organizer below to share, in one sentence or more, what each habit means to you.

Then, select 3 of the Habits, and list 1 or more strategies you would use to instill each habit of mind in your students.

Habit of Mind	Definition	Strategy
Make sense of problems and persevere in solving them		
Reason abstractly and quantitatively		
Construct viable arguments and critique the reasoning of others		
Model with mathematics		
Use appropriate tools strategically		
Attend to precision		
Look for and make use of structure		
Look for and express regularity in repeated reasoning		

Please submit your completed graphic organizer with your Module coursework.

## Module 2

### 1. Tell us about yourself!

Provide a one sentence or longer explanation of your role in the field of education.

### 2. Application: The Teacher as Facilitator

These readings provide a set of best practices for how teachers can effectively build students' mathematical understanding before, during, and after an instructional unit or activity.

- Review the NCTM's Effective Math Teaching Practices
- Review the What Works Clearinghouse Instructional Tip Guide for Improving Mathematical Problem Solving in Grades 4 Through 8
- Review the Supporting Mathematical Problem Solving at Home from Institute of Educational Sciences. While this resource is for caregivers, the ideas can be implemented in the classroom.

After you have reviewed the resources, create and complete a table like the one below, describing 2 or more best practices you could include in your instruction.

Teacher's Role in Fostering Problem Solving Skills		
Before Instruction	During Instruction	After Instruction

*\*View the entire What Works Clearinghouse Educator's Practice Guide for Improving Mathematical Problem Solving in Grades 4 Through 8!*

### 3. Application: Planning Instruction

Many schools or districts have a program that you may be expected to use. Schools have different policies about the programs, some being more flexible and some requiring following the program guide closely. No matter what program and approach your school has, you can include problem solving into your classroom! Review the resources below to learn about ways to include problem solving in your instruction and then reflect using the prompts below. You will have an opportunity to use these planning methods again in module 3.

- "Phasing Problem-Based Teaching into a Traditional Education Environment" by Larry Copes and Kay Shager. While the article is "dated", it provides a model called SPOSA to include problem solving into any math classroom.

Another way to include problem solving in math instruction is to use Backwards Design. Read about three easy steps for planning using Backwards Design. While reading the article, think about how it could be used to include problem solving activities in the classroom.

- "Backwards Design in Three Steps" by Academic Outreach and Innovation - Washington State University
- "The 4-Part Math Lesson" by Making Math Moments that Matter

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Reflect on the planning methods discussed above by responding to 2 of the prompts below, in one paragraph or more per prompt.

1. What do you notice is similar about each of the methods?
2. What do you notice is different about each of the methods?
3. Which method do you think would work best in your classroom? How might you use the method to include problem solving in an upcoming math unit?
4. How do the eight Habits of Mind connect to the methods?






Please submit your responses with your Module submission.

#### 4. Application: Equity in Mathematics

Have you ever heard a student say, "I hate math!" or "I'm not good at math!"? It is essential that we ensure our math instruction is inclusive and accessible to all of our students. Through the following resources, you will explore ways in which we can promote equity and accessibility to math instruction for all students. Please review the resources and complete the application below.

- "DEI - Diversity, Inclusion, and Equity in the Math Classroom" by Allie Johnston - Sadlier School
- "Making Math Accessible for All Students" by Ashley Marlow and Katie Novak - Edutopia
- (Podcast) "Leading Equity - Changing the Mindset that Math Isn't for Everyone," from the Leading Equity Center

After reviewing the resources, please respond to 3 of the 5 prompts below, and share your responses in a total of two paragraphs, or more.

- |   |                             |
|---|-----------------------------|
|  | 1. An idea that was sparked |
|  | 2. A question you had       |
|  | 3. A quote that resonated   |
|  | 4. Something to think about |
|  | 5. A connection you made    |

Please submit your responses with your Module submission.

#### 5. Investigation: Resource Review

To complete the Resource Review, identify two resources related to (but not directly from) the course content to enhance your professional practice, and deepen your understanding of the course content.

Resources may include blog posts, podcasts, websites, videos, documentaries, films, articles, books, or journals, published within the last five years. To find a resource, we suggest a web search (Google) using terms or ideas from the course you'd like to learn more about, or that relate to your specific professional learning needs.

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Please provide the resource title, author, copyright or publishing date, and URL (if applicable). Then, in two paragraphs or more per resource, respond to one or more of the following:

- Share information about how the resource information could impact your professional practice
- Explain how each resource supports or challenges your professional assumptions
- Summarize any questions that remain, i.e.: gaps in information or contradictions

To meet "A" criteria as outlined in the course rubric, for each resource, include two or more different examples of how the resource supports or challenges assumptions, *and* explain two ways this resource will impact your professional practice.

## Module 3

1. Tell us about yourself!

Provide a one sentence or longer explanation of your role in the field of education.

2. Synthesis

Professional learning is essential for teachers to continue growing and improving their practice. Now, it's time to put your learning into action with a culminating project. This project is an opportunity for you to utilize the knowledge and skills you've acquired throughout the course to create something practical for your classroom or school. Teaching Channel wants you to culminate this course through an assignment that's relevant, applicable, and useful. Please select and complete one of the following options:

Option A: Plan an Initiative

Develop a plan to incorporate a paradigm shift, a specific educational model or a growth initiative into your classroom, on your team, or in your building. You may use Google Slides, Google Docs (for a narrative)—whatever works best for you. Please include each of the following in your 2 page or more plan:

1. Goals – what will the end results be?
2. Allies and Resources – who and what could help you reach your goals?
3. Communication – how will you engage with all stakeholders
4. Roadblocks and possible solutions
5. Timeline for implementation

Please submit your plan with your coursework submission.

Examples:

- Including problem solving in all math classes
- Using one of the planning and teaching methods in math classes
- Developing the mathematical Habits of Mind across the school
- Ensuring equity in math instruction across the school/district

### Option B: Design a Presentation

Create a 30 min or more presentation for an audience of your choice, based on your learning in this course. Please include the following in your presentation:

1. One slide identifying your audience and how the presentation will benefit the group
2. Three or more concepts or ideas to be addressed in the presentation
3. Speaker notes embedded in the slides (or in a separate document)
4. One or more interactive activity (e.g. discussion prompt, jigsaw, gallery walk)
5. An explanation of next steps, such as additional trainings, resources, and/or collaborations

Please submit your presentation with your coursework submission.

### Examples of Topics:

- The 8 mathematical Habits of Mind
- Equity in math
- The teacher's role in math instruction
- One of the methods of planning and implementing problem solving

### Option C: Develop a Unit of Study

This option presents you with the opportunity to significantly enhance an existing unit of study or create a brand new one, comprised of 5 or more lessons. For this option:

1. Describe the student goals/objectives of the unit
2. Using our template, please include enough detail to ensure full understanding of the program or unit of study. Could a colleague teach this from your explanation, without preparation from you?
3. Embed links to lesson resources (e.g. websites, videos, readings) within the template
4. If you are revising an existing unit, please describe the areas you've enhanced or extended the original lesson(s)

Please submit your template with your coursework submission.

### Examples:

- Incorporate new strategies into an existing unit plan used with your students
- Create a new unit using the mathematical Habits of Mind and/or the planning and implementation methods
- Create a new unit or modify an existing unit that includes problem solving with equity and access as the emphasis

### 3. Reflection

In 2 or more double-spaced pages (12pt font), synthesize your learning by summarizing how your learning in this course has evolved your professional practice. To meet "A" criteria as outlined in the course rubric, your reflection should include:

- A comparison of your learning goals from your Statement of Intention and Awareness in Module 1 with your new learning, to assess how you've grown.
- One key takeaway from your learning.

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- One future learning goal related to course content.
- Three or more detailed connections to specific course applications, information from readings, and other completed course activities.

And your choice of *one* of the following:

- Two or more specific ideas for changes to your professional practice with timelines for implementing changes.
- Two or more detailed action steps you'll take to positively influence others (students, parents, colleagues, administrators, community members, etc.), including implementation timelines.

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