

WHEELHOUSE 1: MIND & BRAIN EDUCATION

Memory Systems: Working memory

- What are the three memory systems operating in the classroom?
- What every teacher needs to know about working memory & cognitive load
- Three critical limits of working memory & recognizing working memory issues
- Strategies to support students with working memory limitations

Memory Systems: Long-term memory

- How are learning experiences, encoded, consolidated and retrieved?
- What are the three memory systems operating in the classroom?
- Types of rehearsal and memory
- Strategies to make learning "sticky"

The Adolescent Brain: Using superhero strengths and vulnerabilities to promote mental health & well-being

- Introduction to the teen brain
- Everything you need to know about the social teen brain
- Managing teens and risk
- Differences in teaching the teen brain

Attention in the Classroom

- What are the three systems of attention?
- Recognizing and diagnosing different attention issues
- Strategies: Different types, different interventions
- The anatomy and evolution of attention.

Emotion Regulation & Trauma Informed Teaching

- Introduction to the brain & emotion
- What is emotion and where does it come from?
- Zones of Tolerance: Empowering kids to recognize and regulate
- Teaching Emotion Regulation: Prevention, de-escalation and coregulation
- Recognizing and supporting trauma and chronic stress

Motivation Option 1: The Science of Motivation

- Geary's Theory: An evolutionary view of motivation
- Myths about intrinsic and extrinsic motivation
- Intro to Self Determination Theory
- Putting autonomy, relatedness and competency into practice

Motivation Option 2: The Science of Agency

- Vygotsky and Csikszentmihalyi: Getting students in the zone
- The importance of productive stress
- Dweck's Mindset Theory
 - Priming the pump to motivate initial engagement
 - Persistence during challenging tasks
 - Keeping students charging after success or setback

Motivation Option 3: The Science of Belonging

- Culturally Responsive Teaching

- Understanding Stereotype Threat to support all students
- The origins of bias and how to address it

How the EML Brain Learns: Using the science of language acquisition to support all learners

- How the brain learns language and field-tested strategies for teaching
- How to detect and diagnose language acquisition issues
- The linguistic reorganization needed to acquire another language
- How STEM can provide great opportunities for equal access to learning

Building Cognitive Schema Through Instructional Sequences

- How the brain naturally builds and deepens its conceptual understanding
- Using instructional to support how the brain makes sense of the world
- Using student prior experience as the foundation and springboard for all new learning
- Teaching and learning strategies that move students from surface to deep to transfer
- Where do misconceptions come from? Why are they so persistent & pernicious?

WHEELHOUSE 2: SCIENCE INSTRUCTION

Introduction to the New State Standards

- The Three Dimensions and Performance Expectations
- The Science & Engineering Practices
- What are the Cross-Cutting Concepts?
- Why teach engineering & technology?
- Sequencing science instruction to expose misconceptions and develop deep conceptual understanding
- The role of literacy and math

Science & Engineering Practices

1- to 3-day workshops about implementing each of the following SEPs:

Practice 1: Asking questions and defining problems

- Using phenomena to inspire questions to drive learning
- Launch routines to illicit investigative questions
- Strengthen students' questions using the QFT Protocol
- Using literacy strategies to define engineering problems
- Differentiating between the types of scientific questions to design investigations

Practice 2: Developing and using models

- When do we use models?
- Using models like scientists use them
- Iteration: Critiquing and improving models
- Mathematical and computational models
- Modeling progressions K-12
- Modeling in different science disciplines

Practice 3: Planning and carrying out investigations

- Different types of investigation require different planning models
- Scaffolding tools & approaches to build understanding of investigation design
- Designing investigations
- Determining the type of evidence needed to explain a phenomenon or design a solution
- Grade level progressions

Practice 4: Analyzing and interpreting data

- The Data Cycle: Planning, collecting, representing, analyzing and interpreting
- Different stories, different graphs
- Certainty and uncertainty in data
- Scaffolding strategies K-12 to move from visual to statistical models
- Data progressions K-12

Practice 5 Option 1: Using mathematics to make sense of a phenomenon

- Integrating math and science
- Mathematical modeling
- Calculating certainty and uncertainty in data
- Arguing from mathematical evidence
- Math progressions K-12

Practice 5 Option 2: Computational thinking in the science classroom

- What is computational thinking and how to get students doing it?
- Thinking like a computer to unpack phenomena and solve problems
- A practical framework for teaching computational thinking
 - Reflective use, design and evaluation
 - Data collection, processing, modeling and problem solving
- Computational thinking progressions K-12

Practice 6: Constructing explanations (for science) and designing solutions (for engineering)

- CER(J) Explanations
- Strengthening each component of the argument
- Scaffolding the development of written explanations
- Moving from drawn explanations and models to written explanations
- Explanation progressions K-12

Practice 7: Engaging in argument from evidence

- Difference between the argument and argumentation
- The centrality of argumentation to all stages of science and engineering
- Scaffolding strategies and progressions
- Fitting the tool to the task
- Strengthening evidence and reasoning

Practice 8: Obtaining, evaluating, and communicating information incorporating literacy in science

- Building a culture of talk for safety and belonging
- Student talk protocols
- Evidence from text and active reading strategies
- Using graphs to represent evidence
- Integrating reading and writing into investigations
- Guiding instruction versus directing instruction to elicit and deepen student thinking

The Cross-Cutting Concepts

- Cross-Cutting Concepts as lenses for sense-making
- Evidence based scaffolding strategies to introduce, integrate and deepen thinking during investigations
- Deepening thinking across grade-levels using the cross-cutting concepts
- Thinking across disciplines and using the CCCs as tools for transfer and discovery

Topic 1: The 5E Model of Instruction to build 3-dimensional lessons

Topic 2: Incorporating science and engineering into literacy

- Active reading strategies
- Scaffolding explanation writing
- Student talk and discourse strategies

Problem-Based & Phenomenon-Driven Learning

- Choosing the right problem or phenomena
- Explore before Explain
- Designing problem-based lessons
- Maintaining high content rigor while providing student choice
- Teaching across content and curricular lines
- Facilitating student collaboration

Fostering STEM Identity

- Explore the intersection of identity and science, technology, engineering and math
- Reflect on your own educational experiences and biases
- Investigate the impact of your STEM identity on your students
- Learn strategies to cultivate strong STEM identities in your students as well as yourself

WHEELHOUSE 3: NATURE AND ENVIRONMENTAL LITERACY

Summer Immersion Field Course

Every summer we offer a 3-day field experience for K-12 educators and their adult family or friends.

This 3-day experience has a dual focus:

- To provide K-12 educators with an ecological and natural history experience that introduces them to local Colorado examples for science and social studies concepts they will be teaching in the classroom (e.g., ecology, botany, astronomy, history etc.).
- To introduce teachers to an environmental issue that is place-based and engage with that issue (e.g., invasive species, water management, etc.).

Teachers requesting re-licensure credit must follow-up by implementing a related activity with their students in the fall. The course also aims to lean heavily on “recreation” in the deepest sense of the word *re-creation*. More than ever, teachers need opportunities to be playful, be inspired and interact with peers on a heart level. Nature provides ample opportunities for this kind of healing and rejuvenation to occur.