



## 2022-2023 Three-Credit Hour Course: Measurement, Data, and Geometry Grades PK-5

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- ▶ **Audience:** Active West Virginia Teachers/Educators
- ▶ **Type:** Self-Paced with Rolling Enrollment
- ▶ **Enrollment:** September 1, 2022 - April 14, 2023
- ▶ **Duration:** September 1, 2022 - May 19, 2023

**Description:** The three mathematical topics covered in this course, Measurement, Data and Geometry are all important mathematical concepts that help in understanding the world around us and aid in problem solving. After completing the initial **Important Information** and the **Getting Started: Orientation**, you may choose the content topic that best matches what is being taught in your classroom at the current time, but ideally you should complete all the activities and the checkpoint assignments for that topic including the video-taped lesson implementation and reflection before starting on another topic. All three topics must be completed successfully in order to receive credit for the course. The course is self-paced but each checkpoint assignment that is submitted must be approved by the mentor (within 24 - 36 hours) before you can advance to the next checkpoint assignment. Each of the three topics requires a video-taped classroom implementation of an activity chosen from an approved list.

**Measurement:** Measurement plays an important role in many areas of our lives and is often not appreciated. Measuring is done every day. You must measure to take the correct dose of medicine, to cook, to know when to leave to get to an appointment on time, to estimate distances, and to understand weight. Measurement is used in everything from occupational skills to everyday life skills and provides a context for solving problems related to comparison of the physical attributes of objects and events. Estimation is also used when one focuses on quantities. Words such as closer, more, less, and about help build foundations for reasonable answers.

**Data:** Math is all around us. It is not confined to a classroom. Real life problem solving depends on collecting and analyzing data. Many textbooks relegate this to the last chapter and teachers often neglect it due to perceived time restraints. Children need opportunities to explore and understand their world by asking questions and making observations and measurements. They are engaged by wondering about what they observe and analyzing the data they collect to find answers to their questions. As they make sense of their observations by graphing and making other representative models of their data, they develop quantitative literacy. Data analysis also contributes to future understanding of statistics.

**Geometry:** Geometry is used daily by everyone. You make spatial calculations as you step out of bed in the morning or parallel park your car. In the world of mathematics all shapes are perfect and all measurements exact. This allows us to explore spatial sense and geometric reasoning. Exploring and talking about patterns and shapes enable us to ask questions and engage in deep inquiry. Examining geometry proofs in later studies also improves logical thinking.



**Checkpoints:** Each content topic will have various activities designed to build pedagogical understanding of how to best teach mathematical concepts. Each of the content topics in the course (Measurement, Data and Geometry) is arranged into four sections containing several activities and a “Checkpoint” assignment. Each of the Checkpoints has a specific emphasis:

- Checkpoint #1: Content and Classroom Environment
- Checkpoint #2: Mathematical Habits of Mind and Instructional Strategies
- Checkpoint #3: Application — planning, teaching and video-taping an activity
- Checkpoint #4: Reflection— with a lens on the classroom instruction captured via the video

### **Course Goals:**

- ▶ *Increase content knowledge regarding Grades PK-5 Foundations of Measurement.*
- ▶ *Determine the classroom environment that leads to increased student ownership of their learning through strategic hands-on use of tools.*
- ▶ *Deliver and video a task that demonstrates students proficiency in selecting and using appropriate tools for measurement tasks.*
- ▶ *Compose a reflection specific to classroom management routines that promote a mathematical community within the classroom with regard to measurement.*
- ▶ *Increase content knowledge regarding Grades PK-5th Foundations of Data.*
- ▶ *Determine the classroom environment that leads to increased student engagement through open-ended questioning to promote mathematical thinking and modeling of mathematical situations.*
- ▶ *Deliver and video an open-ended task specific to collecting, analyzing and representing data.*
- ▶ *Compose a reflection specific to open-ended questioning to promote thinking specific to organization & understanding of data.*
- ▶ *Increase content knowledge regarding Grades PK-5 Foundations of Geometry.*
- ▶ *Determine the classroom environment that leads to increased student engagement through student-centered thinking and mathematical discourse.*
- ▶ *Deliver and video a classroom task that provides for a student-centered environment that promotes precision, productive struggle and rich discourse specific to the foundations of geometry.*
- ▶ *Compose a reflection related to the task specific to classroom discourse, precision, and the foundations of geometry.*

### **Session Overviews**

#### **▶ Part One – Measurement**

*Measurement is the quantifying of the attributes of an object or event which can be used to compare with other objects and events. To measure is to determine how large or small a physical quantity is compared to a basic reference quantity. In other words, it’s the size or amount of something established by comparing it to a standard unit. Students of all ages should be able to understand measurable attributes of objects and the units, systems and processes of measurement and be able to estimate measurements and apply appropriate techniques and tools to measure these attributes.*



► **Part Two – Data**

*“Understanding how data is used, how it’s collected and why it’s collected helps you understand that you can be empowered by it or you can be manipulated by it” (Hollylynn Lee). Data collection and analysis use numerical and categorical data to answer questions. In order to be data literate, students need to practice skills such as: posing and refining pertinent questions, determining the types of data needed to answer specific questions, measuring and recording various types of data, graphically representing and organizing data in different ways, and analyzing data to draw appropriate conclusions.*

► **Part Three – Geometry**

*Geometry helps understanding of spatial relationships. It creates a clear perception of space and position through studying the size and shape of everything in the world. Geometry helps comprehend the measurements and relationships of lines, angles, surfaces and solids found in the everyday world. Geometry allows people to think in shapes and sizes. Knowing about different shapes and their sizes allows the mind to visualize new things by building with the learned shapes. (Reference.com)*

*Studying geometry encourages better visual ability, expands one’s imagination and 3-D thinking. Figuring out the area of a basketball court, a garden or a building lot; determining the volume of a container or a swimming pool; or making an accurate model of a house are all dependent upon geometric awareness and are real-world skills that support different vocations.*

**Course Grades**

All grades in the course gradebook must be a checkmark for successful course completion. A checkmark indicates that all work has been completed and the work meets the expectations for that assignment. Quiz scores must meet the minimum expectations as stated in the course.

