

**Construct viable**

**arguments**

**and critique the reasoning of others.**

\*Construct arguments using concrete referents, such as objects, pictures, and drawings.

\*Explain their thinking and make connections between models and equations.

\*Refine their mathematical communication skills as they participate in mathematical discussions involving questions like, “How did you get that?” and “Why is that true?”

\*Explain their thinking to others and respond to others’ thinking.

 **Look for and**

 **express regularity in**

 **repeated reasoning**.

\*Notice repetitive actions in computation to make generalizations.

\*Use models to explain calculations and understand how algorithms work.

\*Use models to examine patterns and generate their own algorithms. For example, students use visual fraction models to write equivalent fractions.

**Make sense of problems**

**and persevere in solving them.**

\*Know that doing mathematics involves solving problems and discussing how they solved them.

\*Explain to themselves the meaning of a problem and look for ways to solve it.

\*Use concrete objects or pictures to help them conceptualize and solve problems.

\*Check their thinking by asking themselves, “Does this make sense?”

\*Listen to the strategies of others and will try

 different approaches.

 \*Use another method to check

 their answers.

**Reason abstractly and quantitatively.**

\*Recognize that a number represents a specific quantity.

\*Connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities.

\*Extend this understanding from whole numbers to their work with fractions and decimals.

\*Write simple expressions, record calculations with numbers, and represent or round numbers

using place value concepts.

**Grade 4**

**Grade Level Emphasis**

**PA Core Standards**

**Standards for Mathematical Practice**

***Tool Developed by***

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 **Attend to precision.**

\*Develop their mathematical communication skills.

\*Use clear and precise language in their discussions with others and in their own reasoning.

\*Specify units of measure and state the meaning of the symbols they choose. For instance, they use appropriate labels when creating a line plot.

**Model with Mathematics.**

\*Experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, creating equations, etc.

\*Need opportunities to connect the different representations and explain the connections.

\*Use all of these representations as needed.

\*Evaluate their results in the context of the situation and reflect on whether

the results make sense.

**Use appropriate tools**

**strategically.**

\*Consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful.

\*Use graph paper or a number line to represent and compare decimals and protractors to measure angles.

\*Use other measurement tools to understand the relative size of units within a system.

\*Express measurements given in larger units in terms of smaller units.

**Look for and make use of structure.**

\*Look closely to discover a pattern or structure.

\*Use properties of operations to explain calculations (partial products model).

\*Relate representations of counting problems such as tree diagrams and arrays to the multiplication principal of counting.

\*Generate number or shape patterns that follow a given rule.

**MP 2**

**MP 8**

**MP 3**

**MP 1**

**MP 7**

**MP 5**

**MP 6**

**MP 4**