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| **1st Grade Mathematics – Planning Tool** | | | | | | | | | | | | | | | | | | | | | |
| Collaborators: | | | | | | | | | | Academic Year: | | | | | | | | | | | |
| *This planning tool can be used by collaborating teachers across a given school year or term to help insure full implementation of the Iowa Core Content Standards into their classroom instructional and assessment activities.* *Full implementation is accomplished when the district or school is able to provide evidence that an ongoing process is in place to ensure that each and every student is learning the standards and the essential concepts and skills of the Iowa Core. A school that has fully implemented the Iowa Core is engaged in an ongoing process of data gathering and analysis, decision making, identifying actions, and assessing the impact around alignment and professional development focused on content, instruction, and assessment. The school is fully engaged in a continuous improvement process that specifically targets improved student learning and performance.*  ***Effective implementation of the Iowa Core is not a simple checklist. Implementation requires that educators strategically and systematically address the knowledge and skills being taught, engage in collaboration around the use of effective instructional practices and materials and develop activities to elicit evidence of student learning that match the level of rigor called for in the standards.*** | | | | | | | | | | | | | | | | | | | | | |
| **Mathematic Content Standard** | **Aug.** | | **Sept.** | | **Oct.** | | **Nov.** | | **Dec.** | | | **Jan.** | | **Feb.** | | **Mar.** | | **Apr.** | | **May** | |
| **Operations and Algebraic Thinking: Represent and solve problems involving addition and subtraction** | | | | | | | | | | | | | | | | | | | | | |
| 1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.[[1]](#footnote-1) **(1.OA.1.)(DOK 2)** | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  |
| 1. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. **(1.OA.2.) (DOK 2)** | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  |
| **Operations and Algebraic Thinking: Understand and apply properties of operations and the relationship between addition and subtraction.** | | | | | | | | | | | | | | | | | | | | | |
| 1. Apply properties of operations as strategies to add and subtract.[[2]](#footnote-2) *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)* **(1.OA.3.)(DOK 2)** | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  |

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|  | **Aug.** | **Sept** | **Oct.** | **Nov.** | **Dec.** | **Jan.** | **Feb.** | **Mar** | **Apr.** | **May** |
| 1. Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.* **(1.OA.4.) (DOK 2)** |  |  |  |  |  |  |  |  |  |  |
| **Operations and Algebraic Thinking: Add and subtract within 20.** | | | | | | | | | | |
| 1. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). **(1.OA.5.) (DOK 1,2)** |  |  |  |  |  |  |  |  |  |  |
| 1. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13). **(1.OA.6.) (DOK 1,2)** |  |  |  |  |  |  |  |  |  |  |
| **Operations and Algebraic Thinking: Work with addition and subtraction equations.** | | | | | | | | | | |
| 1. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.* **(1.OA.7.)(DOK 3)** |  |  |  |  |  |  |  |  |  |  |
| 1. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 =* ▯ *– 3, 6 + 6 =* ▯*.* **(1.OA.8.) (DOK 2)** |  |  |  |  |  |  |  |  |  |  |
| **Number and Operations in Base Ten: Extend the counting sequence.** | | | | | | | | | | |
| 1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. **(1.NBT.1.) (DOK 1,2)** |  |  |  |  |  |  |  |  |  |  |

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| **Number and Operations in Base Ten: Understand place value.** | | | | | | | | | | |
| 1. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: **(1.NBT.2.) (DOK 2)**    1. 10 can be thought of as a bundle of ten ones — called a "ten." |  |  |  |  |  |  |  |  |  |  |
| * 1. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. |  |  |  |  |  |  |  |  |  |  |
| 1. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones). |  |  |  |  |  |  |  |  |  |  |
| 1. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <. **(1.NBT.3.) (DOK 2)** |  |  |  |  |  |  |  |  |  |  |
| **Number and Operations in Base Ten: Use place value understanding and properties of operations to add and subtract.** | | | | | | | | | | |
| 1. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. **(1.NBT.4.) (DOK 1,2,3)** |  |  |  |  |  |  |  |  |  |  |
| 1. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. **(1.NBT.5.) (DOK 2,3)** |  |  |  |  |  |  |  |  |  |  |

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| 1. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. **(1.NBT.6.) (DOK 2,3)** |  |  |  |  |  |  |  |  |  |  |
| **Measurement and Data: Measure lengths indirectly and by iterating length units.** | | | | | | | | | | |
| 1. Order three objects by length; compare the lengths of two objects indirectly by using a third object. **(1.MD.1.) (DOK 2,3)** |  |  |  |  |  |  |  |  |  |  |
| 1. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.* **(1.MD.2.) (DOK 1,2)** |  |  |  |  |  |  |  |  |  |  |
| **Measurement and Data: Tell and Write time** | | | | | | | | | | |
| 1. Tell and write time in hours and half-hours using analog and digital clocks. **(1.MD.3.) (DOK 1)** |  |  |  |  |  |  |  |  |  |  |
| **Measurement and Data: Represent and interpret data** | | | | | | | | | | |
| 1. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. **(1.MD.4.) (DOK 2,3)** |  |  |  |  |  |  |  |  |  |  |
| **Geometry: Reason with shapes and their attributes.** | | | | | | | | | | |
| 1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes. **(1.G.1.) (DOK 2)** |  |  |  |  |  |  |  |  |  |  |

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| 1. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.[[3]](#footnote-3) **(1.G.2.) (DOK 2,3)** |  |  |  |  |  |  |  |  |  |  |
| 1. Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves, fourths,* and *quarters,* and use the phrases *half of, fourth of,* and *quarter of.* Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares. **(1.G.3.) (DOK 1,2)** |  |  |  |  |  |  |  |  |  |  |

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| **Mathematics Depth-Of-Knowledge Definitions - Mathematics** |

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| *Level 1 (Recall of a fact or information procedure)* includes the recall of information such as a fact, definition, term, or a simple procedure, as well as performing a simple algorithm or applying a formula. That is, in mathematics a one-step, well-defined, and straight algorithmic procedure should be included at this lowest level. Other key words that signify a Level 1 include “identify,” “recall,” “recognize,” “use,” and “measure.” Verbs such as “describe” and “explain” could be classified at different levels depending on what is to be described and explained. Examples: |

* Recall or recognize a fact, term or property
* Represent in words, pictures or symbols in a math object or relationship
* Perform routine procedure like measuring

Level 2 (Basic Reasoning: Use information or conceptual knowledge, two or more steps) includes the engagement of some mental processing beyond a habitual response. A Level 2 assessment item requires students to make some decisions as to how to approach the problem or activity, whereas Level 1 requires students to demonstrate a rote response, perform a well-known algorithm, follow a set procedure (like a recipe), or perform a clearly defined series of steps. Keywords that generally distinguish a Level 2 item include “classify,” “organize,” ”estimate,” “make observations,” “collect and display data,” and “compare data.” These actions imply more than one step. For example, to compare data requires first identifying characteristics of the objects or phenomenon and then grouping or ordering the objects.

Some action verbs, such as “explain,” “describe,” or “interpret” could be classified at different levels depending on the object of the action. For example, if an item required students to explain how light affects mass by indicating there is a relationship between light and heat, this is considered a Level 2. Other Level 2 activities include explaining the purpose and use of experimental procedures; carrying out experimental procedures; making observations and collecting data; classifying, organizing, and comparing data; and organizing and displaying data in tables, graphs, and charts.

* Specify and explain relationships between facts, terms, properties or operations
* Select procedure according to criteria and perform it
* Solve routine multiple-step problems

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| *Level 3 (Complex Reasoning: Requires reasoning, developing a plan or a sequence of steps, working with some complexity, and considering more than one possible approach and answer)* requires reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. In most instances, requiring students to explain their thinking is a Level 3. Activities that require students to make conjectures are also at this level. The cognitive demands at Level 3 are complex and abstract. The complexity does **not** result from the fact that there are multiple answers, a possibility for both Levels 1 and 2, but because the task requires more demanding reasoning. An activity, however, that has more than one possible answer and requires students to justify the response they give would most likely be a Level 3. Other Level 3 activities include drawing conclusions from observations; citing evidence and developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve problems. |

* Analyze similarities and differences between procedures
* Formulate original problem given situation
* Formulate mathematical model for complex situation

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| *Level 4 (Extended Reasoning: Requires an investigation, time to think and process multiple conditions of the problem)* requires complex reasoning, planning, developing, and thinking most likely over an extended period of time. The extended time period is **not** a distinguishing factor if the required work is only repetitive and does **not** require applying significant conceptual understanding and higher-order thinking. For example, if a student has to take the water temperature from a river each day for a month and then construct a graph, this would be classified as a Level 2. However, if the student is to conduct a river study that requires taking into consideration a number of variables, this would be a Level 4. At Level 4, the cognitive demands of the task should be high and the work should be very complex. Students should be required to make several connections—relate ideas within the content area or among content areas—and have to select one approach among many alternatives on how the situation should be solved, in order to be at this highest level. Level 4 activities include designing and conducting experiments; making connections between a finding and related concepts and phenomena; combining and synthesizing ideas into new concepts; and critiquing experimental designs. |

* Apply mathematical model to illuminate a problem, situation
* Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
* Design a mathematical model to inform and solve a practical or abstract situation

1. See Glossary, Table 1. [↑](#footnote-ref-1)
2. Students need not use formal terms for these properties. [↑](#footnote-ref-2)
3. [↑](#footnote-ref-3)