

MATHEMATICS

EALRS AND THEIR COMPONENTS

GRADE 2

*FROM THE WASHINGTON STATE

ESSENTIAL ACADEMIC LEARNING REQUIREMENTS

1. THE STUDENT UNDERSTANDS AND APPLIES THE CONCEPTS AND PROCEDURES OF MATHEMATICS.

1.1. Understand and apply concepts and procedures from number sense.

1.1.1. Understand place value in whole numbers. (Number and numeration)

*Group and regroup objects into 1's, 10's, and 100's and explain relationships. (CU)

*Determine the value of a digit based on its position in a number.

*Read and write numbers to at least 1,000. (CU)

1.1.2. Understand sequential relationships among whole numbers. (Number and numeration)

*Order three or more numbers to at least 1,000 from smallest to largest. (RL)

*Use comparative language (e.g., less than, more than, equal to) to compare numbers to at least 1,000. (CU)

1.1.3. ***

1.1.4. ***

1.1.5. Understand the meaning of addition and subtractions and how they relate to one another. (Computation)

*Show relationships between addition and subtraction using physical models, diagrams, and acting out problems. (CU, MC)

*Model real life situations involving addition (e.g., Peter has 7 peanut butter cookies and 4 chocolate chip. How many cookies does he have?) and subtraction (e.g., Peter has 11 cookies which is 4 more than Teresa. How many cookies does Teresa have?) using physical models and diagrams from various cultures and acting out problems. (CU)

1.1.6. Understand and apply procedures for addition and subtraction of whole numbers with fluency. (Computation)

*Use strategies for addition and subtraction combinations through at least 18.

*Recall addition and subtraction facts through at least 18.

*Solve problems involving addition and subtraction with two or three digit numbers using a calculator and explaining procedures used. [SP, CU]

*Make combinations and name total value of coins.

1.1.7. Understand and apply strategies and appropriate tools for adding and subtracting with whole numbers. (Computation)

*Use mental math strategies to compute (e.g., composing and decomposing numbers, finding combinations that are easy to add or subtract) through 100. [RL]

*Use calculator, manipulatives, or paper and pencil to solve addition or subtraction problems.

*Explain methods to mentally group numbers efficiently (e.g., when adding 52 and 59, add the 50's together to get 100, then add eleven more). [CU]

1.1.8. Understand and apply estimation strategies to predict computation results and to determine the reasonableness of answers. (Estimation)

*Use estimation strategies (e.g., front-end estimation, clustering) to predict computation results and to determine the reasonableness of answers. [RL]

*Justify reasonableness of an estimate in addition and subtraction. [CU]

*Decide whether a given estimate for a sum or difference is reasonable. [RL]

1.2. Understand and apply concepts and procedures from measurement.

- 1.2.1. Understand and apply attributes to measure objects and time. (Attributes, units, and systems)
 - *Identify attributes of an object that are measurable (e.g., time, length, distance around, or weight of objects).
 - *Compare lengths or distances where direct comparison is not possible (e.g., use a string, paper strip, arm length, or hand span to compare the height and width of a table). [RL, MC]
 - *Read a clock to tell time to the half hour.
- 1.2.2. ***
- 1.2.3. ***
- 1.2.4. Understand and apply procedures to measure with non-standard or standard units. (Procedures, precision, and estimation)
 - *Select the most appropriate unit to measure the time of a given situation (e.g., would you use minutes or hours to measure brushing your teeth, eating dinner, sleeping?). [MC]
 - *Select a tool that can measure the given attribute (e.g., analogue clock, time, string, length, balance, weight).
 - *Demonstrate measurement procedure (e.g., start at a beginning point, place units end-to-end, not overlapping, and straight line). [CU]
 - *Justify the use of one tool over another (e.g., the length of a hand is a better measurement tool for this situation than the length of a small cube). [CU, RL]
 - *Explain why, when the unit is smaller it takes more to measure an item than when the unit is larger (e.g., it takes more small paper clips than large paper clips to measure the same length). [CU]
- 1.2.5. ***
- 1.2.6. Understand how to estimate in measurement situations. (Procedures, precision, and estimation)
 - *Estimate length and weight using non-standard units. [RL]
 - *Use important benchmarks (referents) (e.g., 5 or 10) to make initial and revised estimates.
 - *Explain how a benchmark (referent) helps to make a reasonable estimate. [CU]

1.3. Understand and apply concepts and procedures from geometric sense.

- 1.3.1. ***
- 1.3.2. Understand characteristics of two-dimensional geometric figures. (Properties and relationships)
 - *Sort and describe characteristics of two-dimensional geometric figures (e.g., various polygons). [RL, CU]
 - *Draw a two-dimensional shape that matches a set of characteristics (e.g., draw a four-sided shape that has all sides the same length).
- 1.3.3. Understand the locations of numbers on a positive number line. (Locations and transformations)
 - *Indicate whether a number is above or below a benchmark number (e.g., greater than or less than 1000).
 - *Describe the location of a given number between 1 and 1000 on a number line. [CU]
 - *Identify a point up to 1000 on a positive number line.

1.4. Understand and apply concepts and procedures from probability and statistics.

- 1.4.1. ***
- 1.4.2. ***
- 1.4.3. Understand the organization of a graph. (Statistics)
 - *Identify title, horizontal and vertical axes, and key.
 - *Construct a bar graph that includes a title, key, and single unit increment. [CU]
 - *Name an appropriate title for a display of data. [CU]
- 1.4.4. ***
- 1.4.5. Understand how a display provides information about a question. (Statistics)

- *Conduct a survey for a predetermined question and collect data using tallies, charts, lists, or pictures (e.g., who has animals at home, how many, what type?). [SP, RL]
- *Identify a question that could be answered from a display.
- *Interpret results and draw conclusions from displays (e.g., pictographs, bar graphs) using comparative language (e.g., more, fewer). [CU, MC]
- *Read the labels from each axis of a graph. [CU]

1.5. Understand and apply concepts and procedures from algebraic sense.

1.5.1. Understand how patterns are generated. (Patterns, functions, and other relations)

- *Translate a pattern from one representation to another (e.g., snap-clap-stomp translates to ABC). [CU, MC]
- *Identify, extend, create, and explain patterns of addition and subtraction represented in charts and tables. [CU, RL, MC]

1.5.2. ***

1.5.3. Understand the meaning of symbols and labels used to represent situations. (Symbols and representations)

- *Use number sentences with symbols and labels to represent real-world problems involving addition and subtraction. [MC]
- *Give an example of inequality in real life (e.g., on the first turn, Juan scored 6 points, on the second turn, he scored 8 points. On the first turn, Ivana scored 9 points. On the second turn, she scored 7 points. After two turns, Juan's points are less than Ivana's points). [CU, MC]

1.5.4. ***

1.5.5. ***

1.5.6. Understand and apply strategies to solve for the unknown using addition and subtraction. (Evaluating and solving)

- *Solve equations with an "unknown" (e.g., $6 + \square = 11$; $11 = \square + 6$). [RL]
- *Justify the selection of a particular value for an unknown quantity in a real world situation (e.g., Two girls had 10 cookies. If Kwame had 6, how many did Ellie have? Explain). [RL, MC]

2. THE STUDENT USES MATHEMATICS TO DEFINE AND SOLVE PROBLEMS.

2.1. Understand problems.

2.1.1. Understand how to define a problem in a familiar situation.

Example: A classroom is planning an all-day skating party on Thursday. Each student must pay for admission (\$2); a box lunch (\$3); and skate rental (\$2). The teacher needs a total amount to reserve the rink.

- *State or record information presented in situation (e.g., the classroom is planning a skating party on Thursday. Each student must pay for admission, lunch, and skates. The teacher needs to know the total cost in order to reserve the rink).
- *Explain the problem, verbally or in writing, in own words (e.g., how much will the skating party cost?).
- *Generate questions that would need to be answered in order to solve problem (e.g., what is the cost of a ticket and skate rental for the skating rink? What is the cost of food? What is the cost for each student? What will a skating party cost?). [1.4.4]
- *Identify known and unknown information (e.g., known - the cost of admission, skates, lunch, and the number of students going; unknown - cost for each student and total cost).
- *Identify extraneous information (e.g., the party is planned for Thursday).

2.2. Apply strategies to construct solutions.

2.2.1. Understand how to create a plan to solve a problem.

*Gather and organize relevant information (e.g., create a four-column chart with student names in one column and the other three for costs related to the party - admission, skates, lunch; draw a seating chart and write in costs by each student).

2.2.2. Apply mathematical tools to solve the problem.

*Use estimation strategies (e.g., front-end estimation, clustering) to predict computation results. [1.1.8]

*Use appropriate tools from among mental math, paper and pencil, manipulative, or calculator (e.g., to determine the total cost of the skating party). [1.1.7]

*Recognize when an approach is unproductive and try a new approach.

3. THE STUDENT USES MATHEMATICAL REASONING.

3.1. Analyze information.

3.1.1. Understand how to compare information presented in familiar situations.

Example: A classroom is planning an all-day skating party on Thursday. Each student must pay for admission (\$2); a box lunch (\$3); and skate rental (\$2). The teacher needs a total amount to reserve the rink.

*Explain understanding of a situation, verbally or in writing (e.g., there are costs for admission, skates, lunch for the party; we need to know what it will cost for all of us so our teacher can reserve the rink).

*Estimate how much money will be needed for all 25 students to attend.

3.2. Make predictions, inferences, conjectures, and draw conclusions.

3.2.1. Understand how to make a reasonable prediction based on prior knowledge and information given in a familiar situation.

*Predict a numerical solution for a problem (e.g., predict how much it will cost for the class to attend the skating party).

*Use known information to make a reasonable prediction (e.g., if most students in one class like red apples, then most students in another class will like red apples).

*Make an inference based on information provided (e.g., when you skate at the rink with a big group it costs less for each person than when you go with a friend).

3.2.2. Understand how to draw conclusions based on prior knowledge and the information given in a familiar situation.

*Draw conclusions from displays using comparative language (e.g., greater than, less than).

*Provide data to justify conclusions.

*Provide examples from displays to support conclusions.

3.2.3. Analyze procedures used to solve problems in a familiar situation.

*Justify the use of a chart or table to collect and organize information used to solve a problem (e.g., the two- or four-column chart helped to keep track of the information).

*Justify the use of one mathematical tool over another (e.g., is a calculator or 100's chart a better tool in this situation?).

3.3. Verify results.

3.3.1. Understand how to justify results using evidence.

*Check for reasonableness of results by using a calculator for repeated addition (e.g., to determine the total cost of the skating party).

3.3.2. Understand how to validate thinking about numerical, measurement, geometric, or statistical ideas by using models, known facts, patterns, or relationships.

*Explain why a strategy or tool used in solving a problem (e.g., why a seating chart was helpful to help determine total cost of skating).

4. THE STUDENT COMMUNICATES KNOWLEDGE AND UNDERSTANDING IN BOTH EVERYDAY AND MATHEMATICAL LANGUAGE.

4.1. Gather information.

4.1.1. Understand how to develop and follow a simple plan for collecting information for a given purpose.

- *Determine what information is needed and how to collect it for a given purpose (e.g., to help explain something, to find out if something is needed) and who the information is for (e.g., for the classroom, for the adults at home, for the cafeteria, for the principal).
- *Develop and follow a plan to gather information about supplies needed for a project (e.g., how many pieces of paper will be needed to create a pattern design for each of the kindergarten windows?).

4.1.2. Understand how to extract information for a given purpose from one or two different sources.

- *Decide what information would be important to learn about the students in the second grade after reading an informational text (e.g., health article) in class (e.g., how many students eat a nutritious breakfast). Determine what questions to ask in a survey. Graph the results.

4.2. Organize, represent, and share information.

4.2.1. Understand how to organize information to communicate to a given audience.

- *Organize and display data on a chart to communicate a solution to a specific audience (e.g., use a chart to display individual costs and total cost for the skating party for parents and PTA).
- *Construct a bar graph with a title, key, and single unit increment to display survey results (e.g., the number of brothers and sisters of students in the class).

4.2.2. Understand how to communicate or represent ideas or information using mathematical language or notation.

- *Explain or represent ideas using mathematical language from:
 - Number sense (e.g., numbers to at least 1000) [1.1.1];
 - Measurement (e.g., identify attributes of an object that are measurable □ time, length, distance around, capacity, area or weight of objects) [1.2.1];
 - Geometric sense (e.g., describe characteristics of two-dimensional geometric figures, various polygons) [1.3.1];
 - Statistics (e.g., construct bar graph using a single increment scale) [1.4.3];
 - Algebraic sense (e.g., explain and use the symbols $<$ and $>$ to express relationships). [1.5.3]

5. THE STUDENT UNDERSTANDS HOW MATHEMATICAL IDEAS CONNECT WITHIN MATHEMATICS, OR OTHER SUBJECT AREAS, AND TO REAL-LIFE SITUATIONS.

5.1. Relate concepts and procedures within mathematics.

5.1.1. Understand how to use concepts and procedures from any two of the content components from EALR 1 in a given problem or situation.

- *Conduct a survey for a predetermined question, collect data, and use addition and subtraction procedures to compute the results of the survey. [1.4.4, 1.1.6]
- *Interpret a bar graph for comparative information (e.g., how many more than, less than) and draw conclusions about the data. [1.4.5, 3.2.2]

5.1.2. Understand how to recognize and create equivalent mathematical models and representations in familiar situations.

- *Represent addition and subtraction situations with physical models, diagrams, and acting out problems. [1.1.5]
- *Identify different representations of a pattern (e.g., snap-clap-stomp translates to ABC). [1.5.1]

5.2. Relate mathematical concepts and procedures to other disciplines.

5.2.1. Apply and analyze the use of mathematical patterns and ideas in familiar situations in other disciplines.

- *Collect and display data based on a science experiment (e.g., plant growth, magnetism).
- *Identify patterns used in the design of common objects (e.g., skateboards, clothing).
- *Describe how estimation can be used to know about how much something costs.

5.2.2. Know the contributions of individuals and cultures to the development of mathematics.

- *Recognize the contributions of women, men, and people from different cultures (e.g., examine design and patterns on tapestry from various African cultures).

5.3. Relate mathematical concepts and procedures to real-world situations.

5.3.1. Understand how mathematics is used in everyday life.

- *Generate examples of mathematics in everyday life:
 - counting (e.g., tallies to keep score during a game);
 - comparing lengths or distances where direct comparison is not possible (e.g., using a string or paper strip to compare the height and width of a desk to see if it fits in the room);
 - drawing geometric shapes (e.g., using a ruler to create shapes with equal sides);
- *Select the most appropriate unit to measure a given time (e.g., would you use minutes or hours to measure brushing your teeth, eating dinner, sleeping?);
- *Estimate the cost of two items knowing the approximate cost of one (e.g., one game costs about \$8)

