Equipped for the Future
Use Math to Solve Problems and Communicate Performance Continuum

PERFORMANCE LEVEL 1/2
Use Math to Solve Problems and Communicate

How adults at Level 1/2 Use Math to Solve Problems and Communicate:

- Understand, interpret, and work with pictures, numbers, and symbolic information.
- Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension.
- Define and select data to be used in solving the problem.
- Determine the degree of precision required by the situation.
- Solve problem using appropriate quantitative procedures and verify that the results are reasonable.
- Communicate results using a variety of mathematical representations, including graphs, charts, tables, and algebraic models.

Level 1/2 Performance Indicators

Use Key Knowledge, Skills, and Strategies
Adults performing at Level 1/2 can:

- Read, write, and interpret very simple types of mathematical information such as:
  Numbers Sense: Whole numbers (up to three digits), common monetary values, and benchmark fractions (1/2, 1/4) and percents (50%)
  Patterns, Functions, Relationships: Very simple patterns, commonly used denominations/groupings (5s, 10s, 25s), and very simple proportions (2:1, 1:2)
  Space/Shape/Measurement: High-frequency standard units of measurement (pounds, feet, quarts, gallons), geometric shapes, and concepts of length and width
  Data and Statistics: Very simple ways to interpret and represent data (check sheets, picture graphs, unambiguous bar graphs, line plots) emphasizing frequency of occurrence.
- Recall and use a few simple mathematical procedures such as very basic estimating; counting; sorting; ordering; grouping; adding on (using counting or a calculator); orally counting by 2s, 5s, and 10s; and measuring length and weight using tools calibrated with whole numbers (rulers, manipulatives).
- Evaluate the degree of precision needed for the solution.
- Extract discrete information from simple and concrete data and graphs, and measure with appropriate tools, describe patterns, and/or use computational procedures effectively to solve a problem and to verify that the solution is reasonable.
- Communicate the solution to the problem orally, in role plays, with pictures, or by entries on a simple chart.

Show Fluency, Independence, and Ability to Perform in a Range of Settings

- Adults performing at Level 1/2 can easily select and apply the knowledge, skills, and strategies at this level to independently accomplish simple, well-defined, and highly structured math tasks in one or more comfortable and familiar settings.
Level 1/2 Examples of Proficient Performance

Adults performing at Level 1/2 can count, order, and group to accomplish a variety of goals, such as:

- Make change using the “building” method.
- Determine the amount of flooring needed in a room by counting square units of material within the shape of the room.
- Estimate daily/weekly wages by adding on (counting) per-hour amounts.
- Fit furniture into a space by counting square units within the shape of the space or by estimating using informal measurement units.
- Interpret an unambiguous horizontal or vertical bar graph in a brochure from a local clinic in order to understand information about children’s health concerns.
- Measure ingredients for simple recipes using benchmark fractions.
- Use tallies to determine the number of usable items from the total number of items produced.
- Develop a schedule for how and when to take medication according to a doctor’s order.
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PERFORMANCE LEVEL 3

Use Math to Solve Problems and Communicate

How adults at Level 3 Use Math to Solve Problems and Communicate:
• Understand, interpret, and work with pictures, numbers, and symbolic information.
• Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension.
• Define and select data to be used in solving the problem.
• Determine the degree of precision required by the situation.
• Solve problem using appropriate quantitative procedures and verify that the results are reasonable.
• Communicate results using a variety of mathematical representations, including graphs, charts, tables, and algebraic models.

Level 3 Performance Indicators

Use Key Knowledge, Skills, and Strategies
Adults performing at Level 3 can:
• Read, write, and interpret some common types of mathematical information such as
  Number sense: whole numbers, monetary values and prices, benchmark fractions (3/4, 1/10), decimals (.25, .50, .75, 10) and percents (25%, 75%, 10%, 100%); Patterns/Functions/Relationships: simple patterns, probability and proportions (1:4, 4:1);
  Space/Shape/Measurement: commonly used standard units of measurement, common geometric shapes, and the concept of “area”; and
  Data and Statistics: simple ways to interpret and represent data (tables, bar graphs with and without gridlines, line graphs and pie graphs).
• Recall and use mathematic procedures such as addition and subtraction (with or without use of calculator), grouping, comparing 2 numbers, and basic estimating; and measure length, weight, and areas of standard and non-standard shapes using tools calibrated with whole numbers and benchmark equivalents (rulers, manipulatives).
• Evaluate the degree of precision needed for the solution.
• Define, select, and organize simple data, and measure with appropriate tools, describe patterns, and/or use computational procedures effectively to solve a problem and to verify that the solution is reasonable.
• Communicate the solution to the problem orally, in pictures, or in writing.

Show Fluency, Independence, and Ability to Perform in a Range of Settings
• Adults performing at Level 3 can easily select and apply the knowledge, skills, and strategies at this level to independently accomplish simple, well-defined, and structured math tasks in a range of comfortable and familiar, or highly structured, settings.
Level 3 Examples of Proficient Performance

Adults performing at Level 3 can select, record, and work with simple mathematical information to accomplish a variety of goals, such as:

- Stay within a set budget while shopping for work clothes.
- Determine the area of a room by grouping the square units within the shape.
- Derive an equation for determining weekly pay based on a consistent, predictable pattern, such as $5 per hour.
- Review a restaurant check for a group of five people to see if there are errors; estimate the tip based on 20%.
- Measure the approximate number of feet of baseboard that will be needed for a room.
- Survey a group on the topic of your choice and create a bar graph to display data; explain findings.
- Listen to two weather forecasters and keep track (by graphing) of the actual high and low temperatures each day for a week to see which forecaster is more accurate.
- Complete a travel expense report for work.
- Determine the yardage requirement for making a table runner from a piece of fabric.
- Keep track of monthly income and expenses.
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PERFORMANCE LEVEL 4

Use Math to Solve Problems and Communicate

How adults at Level 4 Use Math to Solve Problems and Communicate:
- Understand, interpret, and work with pictures, numbers, and symbolic information.
- Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension.
- Define and select data to be used in solving the problem.
- Determine the degree of precision required by the situation.
- Solve problem using appropriate quantitative procedures and verify that the results are reasonable.
- Communicate results using a variety of mathematical representations, including graphs, charts, tables and algebraic models.

Level 4 Performance Indicators

Use Key Knowledge, Skills, and Strategies
Adults performing at Level 4 can:
- Read, write, and interpret a variety of common mathematical information such as
  Numbers sense: monetary values, extensions of benchmark fractions (1/8, 1/3, 1/5, etc), decimals, and percents (15%, 30%, etc);
  Patterns/Functions/Relationships: patterns and simple formulas (such as $d=rt, a=lw$); Space/Shape/Measurement: standard units of measurement including fractional units and benchmark angle measurements (90 degrees, 360 degrees, etc), geometric shapes including shapes containing a combination of common shapes, concept of pi, and concept of converting between units of measurement; and
  Data and Statistics: ways to interpret and represent data (tables and graphs with scaling, basic statistical concepts such as range, mode, mean, and median).
- Recall and use a good store of mathematical procedures such as estimation, rounding, multiplication and division (with and without use of a calculator), adding and subtracting common fractional amounts, measure length, weight, area and circumference using tools calibrated to varying degrees of precision and converting units of measurement as appropriate.
- Evaluate the degree of precision needed for the solution.
- Define, select and organize a variety of common mathematical data and measure with appropriate tools, describe patterns, and/or use appropriate procedures effectively to solve a problem and verify that the solution is reasonable.
- Communicate the solution to the problem orally, with visual representations, in writing, by entries in a table or appropriate graph, or with basic statistics (range, mode, mean, median).

Show Fluency, Independence, and Ability to Perform in a Range of Settings
- Adults performing at Level 4 can easily select and apply the knowledge, skills, and strategies at this level to independently accomplish well-defined and structured math tasks in a range of comfortable and familiar settings.
Level 4 Examples of Proficient Performance

Adults performing at Level 4 can select, record, and work with mathematical information to accomplish a variety of goals, such as:

- Use a spreadsheet to keep track of monthly expenses.
- Design a survey regarding a community issue, and collect and organize the results using multiple representations such as tables, circle, bar, or line graphs.
- Develop a monthly budget.
- Decide which product to buy based on a comparison of nutritional information.
- Design a garden with at least 2 rectangular flower beds; cost out fencing and plants using a catalogue.
- Determine the amount of material needed for a round tablecloth.
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PERFORMANCE LEVEL 5

Use Math to Solve Problems and Communicate

How adults at Level 5 Use Math to Solve Problems and Communicate:

- Understand, interpret, and work with pictures, numbers, and symbolic information.
- Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension.
- Define and select data to be used in solving the problem.
- Determine the degree of precision required by the situation.
- Solve problem using appropriate quantitative procedures and verify that the results are reasonable.
- Communicate results using a variety of mathematical representations, including graphs, charts, tables and algebraic models.

Level 5 Performance Indicators

Use Key Knowledge, Skills, and Strategies

Adults performing at Level 5 can:

- Read, write, and interpret a wide variety of mathematical information such as
  - Numbers sense: money/expenses/prices, percentages, decimals and fractions;
  - Patterns/Functions/Relationships: patterns and formulas (such as $a=\pi r^2$);
  - Space/Shape/Measurement: units of measurement including fractional units, geometrical shapes including shapes containing a combination of common shapes, and concept of volume; and
  - Data and Statistics: ways to interpret, represent and draw implications from data (graphs, tables, and simple forms of statistical analysis).
- Recall and use multi-step mathematical procedures (such as keeping accounts) that involve whole numbers as well as fractions, decimals, and/or percents, and measure volume using tools with different calibrations.
- Evaluate the degree of precision needed for the solution.
- Define, select, organize, and integrate mathematical information of different types in carrying out procedures, describing patterns, and/or measuring with appropriate tools to solve the problem and to verify that the solution is reasonable.
- Create appropriate visual or graphic representations such as charts, tables, graphs, etc. and clearly communicate the solution process and results orally or in writing to a variety of audiences.

Show Fluency, Independence, and Ability to Perform in a Range of Settings

- Adults performing at level 5 can easily select and apply the knowledge, skills, and strategies at this level to independently accomplish structured math tasks in a variety of comfortable and familiar settings.
Level 5 Examples of Proficient Performance

Adults performing at Level 5 can select, analyze (by categorizing and comparing), and work with mathematical information to accomplish a variety of goals, such as:

- Design and measure shelves for a closet.
- Design a garden and determine the amount of fertilizer, fencing, and plants needed.
- Develop a yearly budget and illustrate it by creating a graph.
- Choose which car to buy based on information such as down payment required, monthly installments, and insurance costs.
- Record product measurements on a chart to monitor whether the process is in control.
- Estimate the gallons of water in an irregularly shaped garden pond in order to purchase the right amount of pond clarifier.
PERFORMANCE LEVEL 6

Use Math to Solve Problems and Communicate

How adults at Level 6 Use Math to Solve Problems and Communicate:

- Understand, interpret, and work with pictures, numbers, and symbolic information.
- Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension.
- Define and select data to be used in solving the problem.
- Determine the degree of precision required by the situation.
- Solve problem using appropriate quantitative procedures and verify that the results are reasonable.
- Communicate results using a variety of mathematical representations, including graphs, charts, tables and algebraic models.

Level 6 Performance Indicators

Use Key Knowledge, Skills, and Strategies

Adults performing at Level 6 can:

- Read, write, and interpret a wide variety of (often) complex mathematical information such as
  - **Numbers sense:** money/expenses/pricing;
  - **Patterns/Functions/Relationships:** formulas for a variety of calculations;
  - **Space/Shape/Measurement:** architectural symbols/models and scale modeling; and
  - **Data and Statistics:** ways to interpret, represent, identify trends in or draw inferences from data (complex tables and graphs; advanced forms of statistical analysis; graphing equations and generating equations from data and/or line graphs; using concept of slope).
- Research, select and apply sophisticated, multi-step mathematical concepts and procedures (such as scale modeling, cost analysis, earnings/deductions analysis)
- Evaluate the degree of precision needed for the solution.
- Independently research, select, organize and integrate mathematical information of different types in carrying out procedures, describing patterns, and/or measuring with appropriate tools, to solve the problem and to verify that the solution in reasonable.
- Create appropriate visual or graphic representations such as charts, tables, graphs, etc. and clearly communicate the solution process and results orally or in writing to a variety of audiences.

Show Fluency, Independence and Ability to Perform in a Range of Settings

- Adults performing at Level 6 can easily select and apply the knowledge, skills, and strategies at this level to independently accomplish minimally structured, complex math tasks in a variety of comfortable and familiar settings.
Equipped for the Future
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**Level 6 Examples of Proficient Performance**

Adults performing at Level 6 can select, analyze, integrate, and use mathematical information to accomplish a variety of goals, such as:

- Analyze effects of deductions on earnings and projecting annual income take home pay.
- Design a floor plan for a “dream house” to scale.
- Use an amortization table to decide whether to refinance the mortgage on a house.
- Develop a budget for a grant proposal.
- Make a decision about how to consolidate bills and credit card payments.
- Create a presentation using assorted charts and graphs to influence a committee.
- Figure estimated taxes.
- Determine the length of a side of a triangular quilting piece when the length of another side is known.