ABE MATHEMATICS SCOPE AND SEQUENCE

**Level One-Unit One** GLE 1 – 3.9

Teachers: Robin Dowling, Paul Flanagan, and Donna Rogers

Unit Title: Numbers and Operations: Base Ten

Amount of time for the unit: 6 hours

Purpose of Unit: The purpose of this unit is to focus on counting, cardinality, number sense, and base-ten operations. This includes reading, writing, comparing and rounding two and three-digit numbers. The other concepts that we will introduce in this unit will be the number line, and the symbols for >, < and =.

We will emphasize vocabulary with our ESOL learners establishing the difference between number names (one) and cardinality (first). It is necessary also to make the distinction between the comma to separate number groups (1,000) versus the period (1.000) used in many countries.

Unit Goals and Outcomes-Students will be able to:

* Understand the place value system to 1000
* Read and write numbers to 1000.
* Know number names and the counting sequence
* Compare two and three digit numbers based on meanings of the hundreds, tens, and ones digits using > and < signs.
* Round numbers to the nearest 10 and 100.
* Distinguish odd and even numbers
* Appropriately place numbers on a number line

Priority Standards:

Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones;

e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

a. 100 can be thought of as a bundle of ten tens — called a “hundred.”

b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones). (2.NBT.1)

Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2.NBT.3)

Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using

>, =, and < symbols to record the results of comparisons. (2.NBT.4)

Use place value understanding to round whole numbers to the nearest 10 or 100. (3.NBT.1)

Coherence: This is the basis for further exploration on number, as such it is not based on earlier standards.

Standards for Math Practice:

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

Assessment of Priority Standards and Key Content:

|  |  |
| --- | --- |
| Understand the place value system to 1000 |  |
| Read and write numbers to 1000. | Material adapted from |
| Know number names and the counting sequence |  |
| Compare two and three digit numbers based on meanings of the hundreds, tens, and ones digits using > and < signs. |  |
| Round numbers to the nearest 10 and 100. |  |
| Distinguish odd and even numbers |  |
| Appropriately place numbers on a number line |  |

Main Texts and Tools of Instruction:

|  |  |
| --- | --- |
| Achieve the core has many annotated lessons in math  <http://achievethecore.org/page/862/understanding-place-value-within-1000-mini-assessment-detail-pg> |  |

Place Value mats and worksheets

Markers or chips for place value mats

<https://www.illustrativemathematics.org/>

<http://www.math-aids.com/>

<http://www.commoncoresheets.com/Values.php>

Pages 52-17, *Changing the Way We Teach Math*, Kate Nonesuch, Malaspina University-College, 2006

ABE MATHEMATICS SCOPE AND SEQUENCE

**Level One-Unit Two** GLE 1 – 3.9

Teachers: Robin Dowling, Paul Flanagan, and Donna Rogers

Unit Title: Operations and Algebraic Thinking: Addition and Subtraction

Amount of time for the unit: 10 Hours

Purpose of Unit: The purpose of this unit is to explore the basic facts of addition and subtraction to 20 as a model for these operations before expanding to three digit numbers. We will use different models showing that addition is counting on or combining and subtraction is the inverse operation of counting back, separating or comparing.

Unit Goals and Outcomes-Students will be able to:

* Fluently add and subtract within 20
* Apply the Commutative and Associative Properties to addition.
* Add and subtract two and three digit numbers within 1000.
* Solve for the unknown value in addition and subtraction equations within 1000.
* Demonstrate an understanding of the relationship between addition and subtraction by solving word problems using drawings, balancing a check book and equations with a symbol for the unknown number to represent the problem.

Priority Standards:

Fluently add and subtract within 20 using mental strategies. Know from memory all sums of two one-digit numbers*.* (2.OA.2)

Add up to four two-digit numbers using strategies based on place value and properties of operations. (2.NBT.6)

Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. (2.NBT.7)

Explain why addition and subtraction strategies work, using place value and the properties of operations. (2.NBT.9)

Apply properties of operations as strategies to add and subtract*. 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)

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)

Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (2.OA.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)

Coherence:

Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons. (2.NBT.4)

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)

Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900*.* (2.NBT.8)

Standards for Mathematical Practice:

MP.1 Make sense of problems and persevere in solving them.

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

MP.8 Look for and express regularity in repeated reasoning.

Assessment of Priority Standards and Key Content:

|  |  |
| --- | --- |
| Fluently add and subtract within 20 |  |
| Apply the Commutative and Associative Properties to addition. |  |
| Add and subtract two and three digit numbers within 1000. |  |
| Solve for the unknown value in addition and subtraction equations within 1000. |  |
| Demonstrate an understanding of the relationship between addition and subtraction by solving word problems using drawings, balancing a check book and equations with a symbol for the unknown number to represent the problem. |  |

Main Texts and Tools of Instruction:

Place Value mats and markers

Number line worksheets

<https://www.illustrativemathematics.org/>

<http://www.math-aids.com/>

<http://www.commoncoresheets.com/Math/Addition/Solving%20Mixed%20Problems%20%28within%20100%29/English/7.pdf>

ABE MATHEMATICS SCOPE AND SEQUENCE

**Level One-Unit Three** GLE 1 – 3.9

Teachers: Robin Dowling, Paul Flanagan, and Donna Rogers

Unit Title: Operations and Algebraic Thinking: Multiplication and Division

Amount of time for the unit: 12 Hours

Purpose of Unit: The purpose of this unit is to recognize that multiplication is repeated addition and that division is repeated subtraction or the inverse of multiplication. We will introduce multiplication and division fact families to help the student understand the relationship between multiplication and division and represent and solve problems.

Unit Goals and Outcomes-Students will be able to:

* Represent multiplication as grouping and repeated addition
* Represent division as separating into groups and repeated subtraction.
* Half and double numbers within 100
* Multiply and divide within 1000
* Represent and solve problems involving multiplication and division
* Apply the Commutative, Associative, and Distributive Properties to multiplication.
* Solve for the unknown in multiplication and division problems and recognize various notations for multiplication and division.

Priority Standards:

Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5* *× 7.* (3.OA.1)

Interpret whole-number quotients of whole numbers, e.g., interpret 56 *÷* 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8*. (3.OA.2)

Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (3.OA.3)

Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 =*  *÷ 3, 6 × 6 = ?.* (3.OA.4)

Apply properties of operations as strategies to multiply and divide. 15 *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3* *× 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5)* *+ (8 × 2) = 40 + 16 = 56*. *(Distributive property.)* (3.OA.5)

Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.* (3.OA.6)

Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 *÷* 5 = 8) or properties of operations. Know from memory all products of two one-digit numbers. (3.OA.7)

15 Students need not use formal terms for these properties.

Coherence:

Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2.NBT.3)

Use place value understanding to round whole numbers to the nearest 10 or 100. (3.NBT.1)

Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. (2.NBT.7)

Apply properties of operations as strategies to add and subtract*. 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)

Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (2.OA.1)

Standards for Mathematical Practice:

MP.1 Make sense of problems and persevere in solving them.

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

MP.8 Look for and express regularity in repeated reasoning.

Assessment of Priority Standards and Key Content:

|  |  |
| --- | --- |
| Represent multiplication as grouping and repeated addition. |  |
| Represent division as separating into groups and repeated subtraction. |  |
| Half and double numbers within 100 |  |
| Multiply and divide within 1000 |  |
| Solve word problems involving multiplication and division. |  |
| Apply the Commutative, Associative, and Distributive Properties to multiplication. |  |
| Solve for the unknown in multiplication and division problems. |  |

Main Texts and Tools of Instruction:

|  |  |
| --- | --- |
| Achieve the core has many annotated lessons in math  <http://achievethecore.org/page/861/multiplication-and-division-within-100-mini-assessment-detail-pg> |  |

Number line worksheets

Pages 10, 12, 30, and 32-33 Contemporary’s NUMBER POWER REVIEW, *Whole Numbers to Algebra*, Robert Mitchell, 1993

Pages 1 - 60 *Contemporary’s Number Sense: Discovering Basic Math Concepts: Whole Number Multiplication and Division*

<https://www.illustrativemathematics.org/>

<http://www.commoncoresheets.com/>

<http://www.mathworksheets4kids.com>

ABE MATHEMATICS SCOPE AND SEQUENCE

**Level One-Unit Four** GLE 1 – 3.9

Teachers: Robin Dowling, Paul Flanagan, and Donna Rogers

Unit Title: Operations and Algebraic Thinking:

Solving Problems with Four Operations

Amount of time for the unit: 15 Hours

Purpose of Unit: The purpose of this unit is to model the application of the four operations in real life situations and word problems. Lessons will include solving problems regarding the net and gross amounts on a pay stub and developing a basic budget. We will also discuss problem solving strategies including an introduction to the four function calculator which is not programmed with the order of operations.

Unit Goals and Outcomes-Students will be able to:

* Identify the appropriate operation for a situation or word problem.
* Solve two step problems involving the four operations.
* Correctly use a four function calculator to compute a two-step problem.
* Identify and explain patterns in arithmetic
* Apply the order of operations without parentheses or exponents
* Apply problem solving strategies such as drawing a picture or diagram, making table, estimation, substituting simpler values or guessing and checking.

Priority Standards:

Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.16 (3.OA.8)

Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.* (3.OA.9)

16 This standard is limited to problems posed with whole numbers having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order. (Order of Operations)

Coherence:

Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. (2.NBT.7)

Apply properties of operations as strategies to multiply and divide. *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3* *× 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5)* *+ (8 × 2) = 40 + 16 = 56*. *(Distributive property.)* (3.OA.5)

Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 *÷* 5 = 8) or properties of operations. Know from memory all products of two one-digit numbers. (3.OA.7)

Standards for Mathematical Practice:

MP.1 Make sense of problems and persevere in solving them.

MP.2 Reason abstractly and quantitatively.

MP.3 Construct viable arguments and critique the reasoning of others.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

MP.8 Look for and express regularity in repeated reasoning.

Assessment of Priority Standards and Key Content:

|  |  |
| --- | --- |
| Identify the appropriate operation for a situation or word problem. |  |
| Solve two step problems involving the four operations. |  |
| Correctly use a four function calculator to compute a two-step problem. | Text or teacher generated examples recognizing that the four function calculator computes in the order operations are entered without regard to the conventional order of operations |
| Identify and explain patterns in arithmetic |  |
| Apply the order of operations without parentheses or exponents |  |
| Apply problem solving strategies such as drawing a picture or diagram, making table, estimation, substituting simpler values or guessing and checking. | <http://www.mathstories.com/strategies.htm> |
| Summative Review | Pages 42-43  *Whole Numbers to Algebra* |

Main Texts and Tools of Instruction:

Calculator

Number line worksheets

Number Games such as Secret Number, Krypto, and 24 cards

Figure It Out series, Curriculum Associates, 2003

Pages 2-38 Contemporary’s NUMBER POWER REVIEW, *Whole Numbers to Algebra*, Robert Mitchell, 1993

Page 7—Basic Four Function Calculator Contemporary’s Number Power: *Calculator Power*, Robert Mitchell, 2000

<https://www.illustrativemathematics.org/>

<http://www.commoncoresheets.com/>

http://www.math-aids.com/Word\_Problems/

<http://www.mathstories.com/strategies.htm>

<http://www.tv411.org/finance/earning-spending/reading-pay-stub>

<https://www.ets.org/praxis/test_day/policies/calculators/using_onscreen_calculator>

ABE MATHEMATICS SCOPE AND SEQUENCE

**Level One-Unit Five** GLE 1 – 3.9

Teachers: Robin Dowling, Paul Flanagan, and Donna Rogers

Unit Title: Understanding Fractions as Numbers

Amount of time for the unit: 8 Hours

Purpose of Unit: The purpose of this unit is to establish an understanding of a fraction as part of whole or part of a set. We will use visual fraction models, practical fraction models, and represent fractions on the number line. Computation with fractions is not introduced at this level

Unit Goals and Outcomes-Students will be able to:

* Understand the meaning of the numerator and denominator is a fraction.
* Represent a fraction on a number line
* Identify uses of common fractions such as 1/2, 1/3, 1/4, 3/4, and 1/10.
* Compare two fractions with the same numerator or same denominator.

Priority Standards:

Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by a parts of size 1*/b*. (3.NF.1)

Understand a fraction as a number on the number line; represent fractions on a number line diagram. (3.NF.2)

• Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line*.* (3.NF.2a)

• Represent a fraction *a/b* on a number line diagram by marking off a lengths 1/*b* from 0.

Recognize that the resulting interval has size *a/b* and that its endpoint locates the number

*a/b* on the number line*.* (3.NF.2b)

Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (3.NF.3)

* Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. (3.NF.3a)
* Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. (3.NF.3b)
* Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* (3.NF.3c)
* Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model*.* (3.NF.3d)

Coherence:

Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram. (2.MD.6)

Standards for Mathematical Practice:

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

Assessment of Priority Standards and Key Content:

|  |  |
| --- | --- |
| Understand the meaning of the numerator and denominator is a fraction. |  |
| Represent a fraction on a number line |  |
| Identify uses of common fractions such as 1/2, 1/3, 1/4, 3/4, and 1/10. | Class activity with measuring cups, rulers to the ¼ inch etc. |
| Represent equivalent fractions on a number line and as same sized models. |  |
| Compare two fractions with the same numerator or same denominator. | Pages 72-79a  *Changing the Way We Teach Math*  Pages 14 & 15 *The Meaning of Fractions* |
| Summative Assessment | Page 30 *The Meaning of Fractions* |

Main Texts and Tools of Instruction:

Fraction pieces or strips

Pages 72 – 88 *Changing the Way We Teach Math*, Kate Nonesuch, Malaspina University-College, 2006

Pages 10 – 30 Contemporary’s Number Sense: Discovering Basic Math Concepts: *The Meaning of Fractions*, Alan Suter, 1990

Pages 11-20 Contemporary’s NUMBER POWER: A Real World Approach to Math: *Fractions, Decimals, and Percents*, Jerry Howett, 2000

<https://www.illustrativemathematics.org/>

<http://www.commoncoresheets.com/>

[www.superteacherworksheets.com](http://www.superteacherworksheets.com) (by subscription)

<http://www.visualfractions.com/>

ABE MATHEMATICS SCOPE AND SEQUENCE

**Level One-Unit Six** GLE 1 – 3.9

Teachers: Robin Dowling, Paul Flanagan, and Donna Rogers

Unit Title: Beginning Geometry

Amount of time for the unit: 8 Hours

Purpose of Unit: The purpose of this unit is to become familiar with the names and attributes of two and three-dimensional shapes. Their similarities and differences will be analyzed to identify various shapes within the categories of triangles, quadrilaterals, other polygons and solids. We will emphasize vocabulary for HiSet and ESOL students.

Unit Goals and Outcomes-Students will be able to:

* Identify triangles, quadrilaterals, pentagons, hexagons, and octagons
* Find examples of polygons in environment.
* Recognize and draw quadrilaterals according to their attributes.
* Create a composite shape with two-dimensional

Priority Standards:

Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/ “corners”) and other attributes (e.g., having sides of equal length). (K.G.4)

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.12 (1.G.2)

Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.17 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (2.G.1)

Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. (3.G.1)

12Students do not need to learn formal names such as “right rectangular prism.”

17Sizes are compared directly or visually, not compared by measuring.

Coherence:

Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves, thirds, half of, a third of,* etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape. (2.G.3)

Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.* (3.G.2)

Standards for Mathematical Practice:

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

Assessment of Priority Standards and Key Content:

|  |  |
| --- | --- |
| Identify triangles, quadrilaterals, pentagons, hexagons, and octagons |  |
| Find examples of polygons in environment. | Ask for examples of shapes in the classroom and neighborhood. |
| Recognize and draw quadrilaterals according to their attributes. |  |
| Create a composite shape with two-dimensional |  |

Main Texts and Tools of Instruction:

Pattern blocks

Tangrams

Geometric solid models

Pages 16 -24 Contemporary’s Real Numbers: Developing Thinking Skills in Math: *Geometry Basics*, Allan Suter, 1991

<https://www.illustrativemathematics.org/>

<http://www.commoncoresheets.com/>

<https://www.superteacherworksheets.com/polygons.html> (by subscription)

<http://etc.usf.edu/clipart/galleries/678-tangram-outline-puzzles>

ABE MATHEMATICS SCOPE AND SEQUENCE

**Level One-Unit Seven** GLE 1 – 3.9

Teachers: Robin Dowling, Paul Flanagan, and Donna Rogers

Unit Title: Measurement

Amount of time for the unit: 15 hours

Purpose of Unit: In this unit we will spend time becoming familiar with both the British system (new to ESOL students) and the metric system (new to many HiSet students). Time will be spent to make measurement in various whole number unit to compare and become familiar with the systems. We will introduce perimeter, area and volume for individual and composite shapes.

Unit Goals and Outcomes-Students will be able to:

* Estimate and measure lengths in inches, feet, centimeters, and meters.
* Measure to the nearest half and quarter inch.
* Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
* Geometric measurement: understand concepts of area and relate area to multiplication and addition

Priority Standards:

Measure the length of an object twice, using length units of different lengths for the two

measurements; describe how the two measurements relate to the size of the unit chosen.(2.MD.2)

Estimate lengths using units of inches, feet, centimeters, and meters. (2.MD.3)

Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. (2.MD.4)

Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3.MD.4)

Recognize area as an attribute of plane figures and understand concepts of area measurement.

A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.

A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units. (3.MD.5)

Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). (3.MD.6)

Relate area to the operations of multiplication and addition. (3.MD.7)

1. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. (3.MD.7a)
2. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. (3.MD.7b)
3. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths *a* and *b* + *c* is the sum of *a* × *b* and *a* × *c*. Use area models to represent the distributive property in mathematical reasoning. (3.MD.7c)
4. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non- overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. (3.MD.7d)

Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters. (3.MD.8)

Coherence:

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)

Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram. (2.MD.6)

Standards for Math Practice:

MP.1 Make sense of problems and persevere in solving them.

MP.2 Reason abstractly and quantitatively.

MP.3 Construct viable arguments and critique the reasoning of others.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

Assessment of Priority Standards and Key Content:

|  |  |
| --- | --- |
| Estimate and measure lengths in inches, feet, centimeters, and meters. |  |
| Measure to the nearest half and quarter inch. |  |
| Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. |  |
| Geometric measurement: understand concepts of area and relate area to multiplication and addition |  |

Main Texts and Tools of Instruction:

Rulers

Yard Sticks

Meter Sticks

Beakers

Graph paper

Pages 1- 11 *Key to Measurement: English Units of Length,* Key Curriculum Press, 1995

*Key to Measurement: Measuring Length and Perimeter Using English Units,* Key Curriculum Press, 1995

Pages 1- 11 *Key to Measurement: English Units for Weight, Capacity, Temperature, and Time,* Key Curriculum Press, 1995

Contemporary’s Real Numbers: Developing Thinking Skills in Math: *Measurement*, Allan Suter, 1991

<https://www.illustrativemathematics.org/>

<http://www.math-aids.com/>

http://www.common coresheets.com/Values.php

<https://www.superteacherworksheets.com/measure-weight-grams.html> (by subscription)

<http://www.k-5mathteachingresources.com/3rd-grade-measurement-and-data.html>

ABE MATHEMATICS SCOPE AND SEQUENCE

**Level One-Unit Eight** GLE 1 – 3.9

Teachers: Robin Dowling, Paul Flanagan, and Donna Rogers

Unit Title: Understanding and Using Data

Amount of time for the unit: 9 hours

Purpose of Unit: Adults see tables and graphs in all forms of media. In this unit we will introduce how bar, picture, and line graphs can be used to show data points.

Students will conduct surveys and plot their results on graphs.

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Unit Goals and Outcomes-Students will be able to:

* Conduct a survey, record and categorize results on a line plot
* Read bar graphs and match graphs to data
* Read pictograph and match graphs to data

Priority Standards:

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)

Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2.MD.10)

Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.* (3.MD.3)

Coherence: Representing and interpreting data is introduced at this level and is not based on earlier standards.

Standards for Math Practice:

MP.2 Reason abstractly and quantitatively.

MP.3 Construct viable arguments and critique the reasoning of others.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

MP.6 Attend to precision.

MP.7 Look for and make use of structure.

Assessment of Priority Standards and Key Content:

|  |  |
| --- | --- |
| Conduct a survey, record and categorize results on a line plot |  |
| Read bar graphs and match graphs to data | (NOTE: This was used in another unit for computation, but has a bar graph activity, as well) |
| Read pictograph and match graphs to data |  |

Main Texts and Tools of Instruction:

*Developing Skills with Tables and Graphs*, Grades 6-8, Elaine C. Murphy, Dale Seymour Publications, 1981

Pages 12 -15; 22-32 and 35-43 Contemporary’s Real Numbers: Developing Thinking Skills in Math: *Tables, Graphs, and Data Interpretation,* Allen Suter, 1991

<https://www.illustrativemathematics.org/>

<http://www.math-aids.com/>

<http://www.commoncoresheets.com/Values.php>

<http://www.k-5mathteachingresources.com/3rd-grade-measurement-and-data.html>

<http://nces.ed.gov/nceskids/createagraph/>