



SOUTHERN LEHIGH SCHOOL DISTRICT

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Scope and Sequence for **Grade 5 Mathematics**

Standards for Mathematical Practice:

MP1 Make sense of problems and persevere in solving them.
MP2 Reason abstractly and quantitatively.
MP3 Construct viable arguments and critique the reasoning of others.
MP4 Model with mathematics.

MP5 Use appropriate tools strategically.
MP6 Attend to precision.
MP7 Look for and make use of structure.
MP8 Look for and express regularity in repeated reasoning.

5.OA – Operations and Algebraic Thinking

CCSSM	PA Core Standards for Mathematics
<p>Write and interpret numerical expressions.</p> <p>5.OA.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.</p> <p>5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. <i>For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</i></p>	<p>CC.2.2.5.A.1 Interpret and evaluate numerical expressions using order of operations.</p>
<p>Pennsylvania System of School Assessment (PSSA) M05.B-O Operations & Algebraic Thinking</p>	
<p>M05.B-O.1 Use the four operations with whole numbers to solve problems.</p>	
<p>M05.B-O.1.1 Use numbers and symbols to model the concepts of expressions and equations.</p> <p><i>This section continues on the next page...</i></p>	<p>M05.B-O.1.1.1 Use multiple grouping symbols (parentheses, brackets, or braces) in numerical expressions and evaluate expressions containing these symbols.</p>

5.OA – Operations and Algebraic Thinking

CCSSM	PA Core Standards for Mathematics
<p>5.OA.1 Continued... 5.OA.2 Continued...</p>	<p>CC.2.2.5.A.1 Continued...</p>
<p style="text-align: right;">Pennsylvania System of School Assessment (PSSA) M05.B-O Operations & Algebraic Thinking</p>	
<p>M05.B-O.1 Use the four operations with whole numbers to solve problems. Continued...</p>	
<p>M05.B-O.1.1 Continued... Use numbers and symbols to model the concepts of expressions and equations.</p>	<p>M05.B-O.1.1.1 Continued...</p>
	<p>M05.B-O.1.1.2 Write simple expressions that model calculations with numbers and interpret numerical expressions without evaluating them. <i>Example 1: Express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$.</i> <i>Example 2: Recognize that $3 \times (18,932 + 921)$ is three times as large as $18,932 + 921$ without having to calculate the indicated sum or product.</i></p>
CCSSM	PA Core Standards for Mathematics
<p>Analyze patterns and relationships.</p> <p>5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. <i>For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.</i></p>	<p>CC.2.2.5.A.4 Analyze patterns and relationships using two rules.</p>
<p style="text-align: right;">Pennsylvania System of School Assessment (PSSA) M05.B-O Operations & Algebraic Thinking</p>	
<p>M05.B-O.2 Analyze patterns and relationships.</p>	
<p>M05.B-O.2.1 Create, extend, and analyze patterns.</p>	<p>M05.B-O.2.1.1 Generate two numerical patterns using two given rules. <i>Example: Given the rule “add 3” and the starting number 0 and given the rule “add 6” and the starting number 0, generate terms in the resulting sequences.</i></p>
	<p>M05.B-O.2.1.2 Identify apparent relationships between corresponding terms of two patterns with the same starting numbers that follow different rules. <i>Example: Given two patterns in which the first pattern follows the rule “add 8” and the second pattern follows the rule “add 2,” observe that the terms in the first pattern are 4 times the size of the terms in the second pattern.</i></p>

5.NBT – Number & Operations in Base Ten

CCSSM	PA Core Standards for Mathematics
<p>Understand the place value system.</p> <p>5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.</p> <p>5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.</p> <p>5.NBT.3 Read, write, and compare decimals to thousandths.</p> <p>a) Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.</p> <p>b) Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.</p> <p>5.NBT.4 Use place value understanding to round decimals to any place.</p>	<p>CC.2.1.5.B.1 Apply place-value concepts to show an understanding of operations and rounding as they pertain to whole numbers and decimals.</p>
<p>Pennsylvania System of School Assessment (PSSA) M05.B-O Operations & Algebraic Thinking</p>	
<p>M05.A-T.1 Understand the place-value system.</p>	
<p>M05.A-T.1.1 Demonstrate understanding of place-value of whole numbers and decimals, and compare quantities or magnitudes of numbers.</p>	<p>M05.A-T.1.1.1 Demonstrate an understanding that in a multi-digit number, a digit in one place represents 1/10 of what it represents in the place to its left. <i>Example:</i> Recognize that in the number 770, the 7 in the tens place is 1/10 the 7 in the hundreds place.</p> <p>M05.A-T.1.1.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. <i>Example 1:</i> $4 \times 102 = 400$ <i>Example 2:</i> $0.05 \div 103 = 0.00005$</p>

5.NBT – Number & Operations in Base Ten – *Continued...*

CCSSM	PA Core Standards for Mathematics
<p>5.NBT.1 <i>Continued...</i> 5.NBT.2 <i>Continued...</i> 5.NBT.3 <i>Continued...</i> 5.NBT.4 <i>Continued...</i></p>	<p>CC.2.1.5.B.1 <i>Continued...</i></p>
<p>Pennsylvania System of School Assessment (PSSA) M05.B-O Operations & Algebraic Thinking</p>	
<p>M05.A-T.1 Understand the place-value system. <i>Continued...</i></p>	
<p>M05.A-T.1.1 <i>Continued...</i></p>	<p>M05.A-T.1.1.1 <i>Continued...</i> M05.A-T.1.1.2 <i>Continued...</i></p>
	<p>M05.A-T.1.1.3 Read and write decimals to thousandths using base-ten numerals, word form, and expanded form. <i>Example:</i> $347.392 = 300 + 40 + 7 + 0.3 + 0.09 + 0.002 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (0.1) + 9 \times (0.01) + 2 \times (0.001)$</p>
	<p>M05.A-T.1.1.4 Compare two decimals to thousandths based on meanings of the digits in each place using $>$, $=$, and $<$ symbols.</p>
	<p>M05.A-T.1.1.5 Round decimals to any place (limit rounding to ones, tenths, hundredths, or thousandths place).</p>
CCSSM	PA Core Standards for Mathematics
<p>Perform operations with multi-digit whole numbers and with decimals to hundredths.</p> <p>5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.</p> <p>5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p> <p><i>This section continues on the next page...</i></p>	<p>CC.2.1.5.B.2 Extend an understanding of operations with whole numbers to perform operations including decimals.</p>

5.NBT – Number & Operations in Base Ten – *Continued...*

CCSSM	PA Core Standards for Mathematics
<p>5.NBT.5 <i>Continued...</i> 5.NBT.6 <i>Continued...</i></p> <p>5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, 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.</p>	<p>CC.2.1.5.B.2 <i>Continued...</i></p>
Pennsylvania System of School Assessment (PSSA)	
M05.A-T.2 Perform operations with multi-digit whole numbers and with decimals to hundredths.	
<p>M05.A-T.2.1 Use whole numbers and decimals to compute accurately (straight computation or word problems).</p>	<p>M05.A-T.2.1.1 Multiply multi-digit whole numbers (not to exceed three-digit by three-digit).</p> <p>M05.A-T.2.1.2 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.</p> <p>M05.A-T.2.1.3 Add, subtract, multiply, and divide decimals to hundredths (no divisors with decimals).</p>

5.NF – Number & Operations - Fractions

CCSSM	PA Core Standards for Mathematics
<p>Use equivalent fractions as a strategy to add and subtract fractions.</p> <p>5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions to produce an equivalent sum or difference of fractions with like denominators. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p> <p>5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate and assess the reasonableness of answers. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i></p>	<p>CC.2.1.5.C.1 Use the understanding of equivalency to add and subtract fractions.</p>
<p>Pennsylvania System of School Assessment (PSSA) M05.A.F Numbers & Operations - Fractions</p>	
<p>M05.A-F.1 Extend understanding of fraction equivalence and ordering.</p>	
<p>M05.A-F.1.1 Solve addition and subtraction problems involving fractions (straight computation or word problems).</p>	<p>M05.A-F.1.1.1 Add and subtract fractions (including mixed numbers) with unlike denominators. (May include multiple methods and representations.) <i>Example: $2/3 + 5/4 = 8/12 + 15/12 = 23/12$</i></p>
CCSSM	PA Core Standards for Mathematics
<p>5.NF.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <i>For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?</i></p> <p><i>This section continues on the next page...</i></p>	<p>CC.2.1.5.C.2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions.</p>

5.NF – Number & Operations – Fractions – *Continued...*

CCSSM

PA Core Standards for Mathematics

5.NF.3 *Continued...*

5.NF.4

Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

- a) Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. **For example**, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)
- b) Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5.NF.5

Interpret multiplication as scaling (resizing), by:

- a) Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
- b) Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.

5.NF.6

Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NF.7

Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

- a) Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. **For example**, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.

This section continues on the next page...

CC.2.1.5.C.1 *Continued...*

5.NF – Number & Operations – Fractions – Continued...

CCSSM	PA Core Standards for Mathematics
<p>5.NF.3 <i>Continued...</i> 5.NF.4 <i>Continued...</i> 5.NF.5 <i>Continued...</i> 5.NF.6 <i>Continued...</i></p> <p>5.NF.7 <i>Continued...</i> Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.</p> <p>b) Interpret division of a whole number by a unit fraction, and compute such quotients. <i>For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.</i></p> <p>c) c) Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, <i>how much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?</i></p>	<p>CC.2.1.5.C.1 <i>Continued...</i></p>
<p>Pennsylvania System of School Assessment (PSSA) M05.A.F Numbers & Operations - Fractions</p>	
<p>M05.A-F.2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions.</p>	
<p>M05.A-F.2.1 Solve multiplication and division problems involving fractions and whole numbers (straight computation or word problems).</p> <p><i>This section continues on the next page...</i></p>	<p>M05.A-F.2.1.1 Solve word problems involving division of whole numbers leading to answers in the form of fractions (including mixed numbers).</p>
	<p>M05.A-F.2.1.2 Multiply a fraction (including mixed numbers) by a fraction.</p>
	<p>M05.A-F.2.1.3 Demonstrate an understanding of multiplication as scaling (resizing). <i>Example 1: Comparing the size of a product to the size of one factor on the basis of the size of the other factor without performing the indicated multiplication.</i> <i>Example 2: Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number.</i></p>

5.NF – Number & Operations – Fractions – *Continued...*

CCSSM	PA Core Standards for Mathematics
<p>5.NF.3 <i>Continued...</i> 5.NF.4 <i>Continued...</i> 5.NF.5 <i>Continued...</i> 5.NF.6 <i>Continued...</i> 5.NF.7 <i>Continued...</i></p>	<p>CC.2.1.5.C.1 <i>Continued...</i></p>
<p>Pennsylvania System of School Assessment (PSSA) M05.A.F Numbers & Operations - Fractions</p>	
<p>M05.A-F.2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions. <i>Continued...</i></p>	
<p>M05.A-F.2.1 <i>Continued...</i></p>	<p>M05.A-F.2.1.1 <i>Continued...</i> M05.A-F.2.1.2 <i>Continued...</i> M05.A-F.2.1.3 <i>Continued...</i></p>
	<p>M05.A-F.2.1.4 Divide unit fractions by whole numbers and whole numbers by unit fractions.</p>

5.MD – Measurement & Data

CCSSM	PA Core Standards for Mathematics
<p>Convert like measurement units within a given measurement system.</p> <p>5.MD.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.</p>	<p>CC.2.4.5.A.1 Solve problems using conversions within a given measurement system.</p>
<p>Pennsylvania System of School Assessment (PSSA) M05.D.M Measurement & Data</p>	
<p>M05.D-M.1 Convert like measurement units within a given measurement system.</p>	
<p>M05.D-M.1.1 Solve problems using simple conversions (may include multistep, real-world problems).</p>	<p>M05.D-M.1.1.1 Convert between different-sized measurement units within a given measurement system. A table of equivalencies will be provided. <i>Example: Convert 5 cm to meters.</i></p>

5.MD – Measurement & Data – *Continued...*

CCSSM	PA Core Standards for Mathematics
<p>Represent and interpret data.</p> <p>5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions to solve problems involving information presented in line plots. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.</i></p>	<p>CC.2.4.5.A.2 Represent and interpret data using appropriate scale.</p> <p>CC.2.4.5.A.4 Solve problems involving computation of fractions using information provided in a line plot.</p>
M05.D.M Measurement & Data	
M05.D-M.2 Represent and interpret data.	
<p>M05.D-M.2.1 Organize, display, and answer questions based on data.</p>	<p>M05.D-M.2.1.1 Solve problems involving computation of fractions by using information presented in line plots.</p>
	<p>M05.D-M.2.1.2 Display and interpret data shown in tallies, tables, charts, pictographs, bar graphs, and line graphs, and use a title, appropriate scale, and labels. A grid will be provided to display data on bar graphs or line graphs.</p>
CCSSM	PA Core Standards for Mathematics
<p>Geometric measurement: understand concepts of volume.</p> <p>5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.</p> <p>a) A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.</p> <p>b) A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.</p> <p>5.MD.4 Measure volumes by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.</p> <p><i>This section continues on the next page...</i></p>	<p>CC.2.4.5.A.5 Apply concepts of volume to solve problems and relate volume to multiplication and to addition.</p>

5.MD – Measurement & Data – *Continued...*

CCSSM	PA Core Standards for Mathematics
<p>5.MD.3 <i>Continued...</i> 5.MD.4 <i>Continued...</i></p> <p>Convert like measurement units within a given measurement system.</p> <p>5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.</p> <ol style="list-style-type: none"> Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, or by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems. 	<p>CC.2.4.5.A.5 <i>Continued...</i></p>
<p>Pennsylvania System of School Assessment (PSSA) M05.D.M Measurement & Data</p>	
<p>M05.D-M.1 Convert like measurement units within a given measurement system.</p>	
<p>M05.D-M.3.1 Use, describe, and develop procedures to solve problems involving volume.</p>	<p>M05.D-M.3.1.1 Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems. Formulas will be provided.</p> <p>M05.D-M.3.1.2 Find volumes of solid figures composed of two non-overlapping right rectangular prisms.</p>

5.G – Geometry

CCSSM	PA Core Standards for Mathematics
<p>Graph points on the coordinate plane to solve real-world and mathematical problems.</p> <p>5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).</p> <p>5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.</p>	<p>CC.2.3.5.A.1 Graph points in the first quadrant on the coordinate plane and interpret these points when solving real world and mathematical problems.</p>
<p>Pennsylvania System of School Assessment (PSSA) M05.C.G Geometry</p>	
<p>M05.C-G.1 Graph points on the coordinate plane to solve real-world and mathematical problems.</p>	
<p>M05.C-G.1.1 Identify parts of a coordinate grid and describe or interpret points given an ordered pair.</p>	<p>M05.C-G.1.1.1 Identify parts of the coordinate plane (x-axis, y-axis, and the origin) and the ordered pair (x-coordinate and y-coordinate). Limit the coordinate plane to quadrant I.</p> <p>M05.C-G.1.1.2 Represent real-world and mathematical problems by plotting points in quadrant I of the coordinate plane and interpret coordinate values of points in the context of the situation.</p>
CCSSM	PA Core Standards for Mathematics
<p>5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.</p> <p>5.G.4 Classify two-dimensional figures in a hierarchy based on properties.</p> <p><i>This section continues on the next page...</i></p>	<p>CC.2.3.5.A.2 Classify two-dimensional figures into categories based on an understanding of their properties.</p>

5.G – Geometry – Continued...

CCSSM		PA Core Standards for Mathematics	
5.G.3 Continued... 5.G.4 Continued...		CC.2.3.5.A.2 Continued...	
Pennsylvania System of School Assessment (PSSA)		M05.C.G Geometry	
M05.C-G.2 Classify two-dimensional figures into categories based on their properties.			
M05.C-G.2.1 Use basic properties to classify two-dimensional figures.		M05.C-G.2.1.1 Classify two-dimensional figures in a hierarchy based on properties. <i>Example 1: All polygons have at least three sides, and pentagons are polygons, so all pentagons have at least three sides. Example 2: A rectangle is a parallelogram, which is a quadrilateral, which is a polygon; so, a rectangle can be classified as a parallelogram, as a quadrilateral, and as a polygon.</i>	